UNIVERSIDAD DE COSTA RICA
SISTEMA DE ESTUDIOS DE POSGRADO

EVALUATING THE EFFECTIVENESS OF A COURSE TAUGHT TO MICROBIOLOGY STUDENTS: USEFULNESS OF VOCABULARY, SPEAKING ACTIVITIES, AND MATERIALS

Trabajo final de investigación aplicada sometido a la consideración de la Comisión del Programa de Estudios de Posgrado en la Enseñanza del Inglés como Lengua Extranjera para optar al grado y título de Maestría Profesional en Enseñanza del Inglés como Lengua Extranjera

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Dedication

I would like to dedicate this project to my family who have been a great support throughout this process.

Mauli

I would like to dedicate this project to my dad who is watching me from above. All he wanted was the best for me and I know he is celebrating this triumph wherever he is. I love you very much, dad!

Diego

This project is not only mine but from all the amazing people who have been next to me throughout this journey. This is to my mom, who taught me the importance of valuing my education. To my dad, who taught me to love English. To my brother and sisters, who taught me to continue no matter what. This is also to my best friend, Duff, because you kept me going. You motivated me when I no longer could. You told me stories, and with this one, we can close another chapter.

Jessica

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Jessica

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RESUMEN

Este trabajo de investigación analiza en qué medida la enseñanza de vocabulario y habilidades orales puede ser eficaz para mejorar las habilidades lingüísticas de un grupo estudiantes de Microbiología de la Universidad de Costa Rica. Por lo tanto, se utilizaron los métodos cuantitativos como cualitativos para examinar datos y el nivel de competencia lingüística que los estudiantes requerían para dominar el idioma. Los participantes se inscribieron en un curso de IFE que cubría tareas de la vida real y para desarrollar habilidades de lectura y expresión oral. Además, después de administrar la prueba previa y la prueba posterior, los resultados revelaron que el curso de inglés para microbiólogos tuvo un impacto en la competencia lingüística de los participantes. Los investigadores discutieron los resultados sobresalientes que se incluyeron en este documento para demostrar la efectividad de la integración de tareas que fueron significativas para lograr los resultados esperados. En conclusión, enseñar vocabulario y habilidades para hablar a microbiólogos puede mejorar el dominio del idioma inglés de los estudiantes. Los estudiantes deben mejorar estas habilidades ya que su campo académico y profesional exige un alto nivel de comprensión y capacidad para interactuar con una gran cantidad de artículos científicos en inglés.

Palabras clave: IFE (Inglés con Fines Específicos), microbiología, prueba previa y prueba posterior, habilidades del habla, adquisición de vocabulario.

ABSTRACT

This research paper analyzes the extent to which teaching vocabulary and speaking skills to a group of students of Microbiology from the University of Costa Rica can be effective at improving language skills. Therefore, both quantitative and qualitative method approaches were used to examine the data and the level of language competency the students required in order to become proficient in the language. The participants enrolled in an ESP course that covered real-life pre-tasks and main tasks to develop reading and speaking abilities. Additionally, after administering the pretest and post-test, results revealed that teaching the English for Microbiologists course had an impact on the participants' language competency. The researchers discussed the outstanding results that were included in the findings of this paper to suggest the effectiveness of integrating tasks that were significant to accomplish the expected results. In conclusion, teaching vocabulary and speaking skills to microbiologists can improve the students' proficiency in the English language. Learners need to enhance these skills as their academic and professional field demands a high level of comprehension and ability to interact with the plethora of English scientific articles.

Keywords: ESP, microbiology, pretest, and post-test, speaking skills, vocabulary acquisition.

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EMS: English for Microbiology Students

ESP: English for Specific Purposes

FL: Foreign Language

MA in TEFL: Master's Program in Teaching English

L2: Second Language

TBLT: Task-based Language Teaching

UCR: University of Costa Rica

Caja Costarricense del Seguro Social CCSS

English for Microbiology Students EMS

English for Specific Purposes ESP

Food and Drug Administration FDA

Needs Analysis NA

Task-based Language Assessment TBLA

Task-based Language Teaching TBLT

University of Costa Rica UCR

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As a graduation requirement from the Master's in Teaching English as a Foreign Language Program, an English for Specific Purposes (ESP) course has been designed in order to teach a given population. The purpose of this final graduation project is to put into practice the knowledge acquired during the program. This project is divided into two parts: Course Design and the Practicum. This report will deal with the data collected for the first part which is Course Design.

The design of an ESP course involves the commitment of the student teachers to the collection of pertinent data that allows to tackle the student participants' needs, wants and lacks. In order to do this, several aspects must be taken into consideration. For this reason, conducting a needs analysis is of major importance for it will provide the necessary data to create a course that responds to the participants' needs.

The participants for this project belong to the Faculty of Microbiology from the University of Costa Rica (UCR). Participants have provided us with sufficient information to create a group profile that allows to target specific needs of English for their academic and professional lives. In that sense, this course design report will highlight (I) the needs analysis results of the target population, (II) the syllabus designed based on those results, (III) samples of the lesson plans and materials, and finally (IV) samples of the assessment instruments that will be used in the course.

Chapter I: Needs Analysis

One crucial step within the course design process is the development of a needs analysis that aims to gather pertinent information regarding the needs, wants, and lacks of the population that was assigned to our group. In that sense, this first part of the report intends to highlight the results obtained from analyzing the diverse needs of the target population.

The purpose of designing the English for Microbiology Course – Online (EMS) is to provide participants from the Microbiology Faculty with the proper tools in terms of English skills so that they can feel confident about using the language in their professional lives. Therefore, the project intends to expose participants as much as possible to the target language, creating opportunities where they can find the appropriate way to use the new language acquired successfully. The importance of a needs analysis relies on the valuable information that the researchers will be able to gather regarding the target population. The whole process of designing a series of questionnaires and conducting interviews with the target population provides the necessary details to create an English course that can attempt to effectively meet their needs and wants. This will help the student teachers to become more familiarized with the participants who will eventually become the direct receivers of this project.

Moreover, it is important to keep in mind that “the needs analysis is not a once-for-all activity. It should be a continuing process, in which conclusions drawn

are constantly checked and re-assessed" (Hutchinson & Waters, 1987, p. 59). Therefore, the researchers are aware that the needs analysis can serve as an important starting point, but not as the ultimate destination, as modifications along the way are a true possibility. This chapter will describe the participants' field and context as well as the methodology used to carry out the NA, followed by a section of discussion of the most relevant findings.

General Description of the Field

As it was mentioned before, microbiology participants for this project belong to the Faculty of Microbiology from UCR. The Microbiology program offered at UCR incorporates courses in basic sciences such as Chemistry and Biology at the outset of the degree. As it progresses, more specialized courses in topics related to clinical analysis, parasitology, and immunology are introduced. Students will have the opportunity to engage in lab work and research in order to expand their knowledge in these key areas and discover their own interests. This will be considered for content and vocabulary purposes. It is important to mention that although English is not part of the academic program of studies, the participants may require some level of proficiency in order to accomplish specific academic or field-related tasks. Depending on interests and goals, a microbiologist may strive to work in the pharmaceutical, medical, food processing, or agriculture industry in the role of a clinician, educator, researcher, or lab professional (Eco Canada, n.d.). There are many opportunities in both private and public sectors, especially

pertaining to the environment and public health. This is relevant because the sector of choice will directly influence the English language abilities that participants require. Furthermore, the settings can vary and include primary workplaces in an office, lab, field, classroom, or a combination of settings. Although there is considerable variation in job duties, some common tasks any microbiologist may expect to engage in include the analysis of samples, specimens, reports and test results, the development of research projects, and collaboration with members of the scientific and medical communities regarding regulations, standards, research, and problem resolution (Eco Canada, n.d.).

English may play an important role in enabling microbiology participants to engage in the various tasks mentioned before. Students may require English reading and writing skills to conduct research and design projects, as they will need to read and comprehend scientific journal articles and analyze data in order to have an understanding of current trends and knowledge in the field. They may also need English to write research proposals in order to receive grants and to write a research report upon consolidating findings/results. Furthermore, this population may require English speaking and listening skills to present research findings/results at scientific conferences that often consist of an international audience and to collaborate with other professionals in the field such as medical doctors, government officials, scientific experts, and clients (Eco Canada, n.d.). The microbiologists will also need to have a solid understanding of the scientific or medical terminology in order to ensure fluid verbal and/or written communication,

especially when it comes to reporting findings. English may play an important role in helping them to progress in areas of research and collaboration within the scientific and medical communities.

Methods

This section describes the process of collecting and analyzing pertinent data regarding the participants' needs, wants, and lacks. The section is divided into four main subsections that deal with the research approach, the participants, the data collection instruments and the procedures to administer them.

Research approach

The researchers adopted a mixed-methods approach in order to conduct this study. This approach integrates the characteristics of both qualitative and quantitative approaches. Creswell (2014) stated that when "integrating the two forms of data, and using distinct designs that may involve philosophical assumptions and theoretical frameworks," (p. 4) the method results in a more complete understanding of the data collected. The mixed-methods approach was beneficial to this study, as the quantitative results from the questionnaire could be better explained with qualitative follow-up interviews and analysis. These instruments are described in the following section.

Participants

The initial stage of the course design involved a group of 55 participants from the Faculty of Microbiology at the University of Costa Rica. The participant selection process initiated with a simple form for purposes of registration, and those interested participants shared their contact information on a list posted within their faculty. Initially, the list had 55 people registered, and a follow up email was sent to all of the prospective participants asking if they were still interested in taking the course (see Appendix A). The number of responses to that invitation was 41. The majority of respondents were students of microbiology; however, two microbiology teachers and one person from the administration department of the faculty also confirmed their interest. There were three microbiology stakeholders. Two of them are teachers working at UCR and the third one works in the private sector.

Instruments

In terms of data collection instruments, we will first refer to the questionnaire completed by the participants. This questionnaire (see Appendix B) was created in order to gather valuable information regarding the participants' background knowledge of English as well as some of their wants and needs. The questionnaire was developed based on the research that the team had previously done regarding the field of microbiology and some of the tasks this population might face in their professional future or studies. Brown (2005) stated that to avoid participants feeling

confused while completing the questionnaire, the questions should be organized into topics. Therefore, in order to have a clearer idea of the target population, the questionnaire was divided into five sections. The first part dealt with general information regarding the participants' educational or professional status and the previous experiences they had had with English classes. The second section focused on their perceived English proficiency in terms of the four macro-skills. For the third section, the intention was to collect as much information as possible regarding the different tasks they have to perform using English in their major or professional field, and the frequency in which they have to do such tasks. The fourth section was focused on their perception of how many tasks involving English they would have to perform in their future careers or studies. The final section explored the participants' learning styles and their preferred class activities. Additionally, they were asked about their general expectations of the classes and the main focus of the course. The questionnaire included closed-ended questions to find out the participants' preferences, and these were presented in the form of multiple-choice, dichotomous questions and ranking items. It also included open-ended questions to gather the participants' perspectives and expectations.

The second data collection instrument that was implemented was an interview/ video-conference with the three stakeholders and nine randomly selected students. According to Richards (2001), "interviews allow for a more in-depth exploration of issues than is possible with a questionnaire" (p. 61). Therefore, the purpose of having these interviews with the stakeholders and some

of the students was to collect more precise information regarding the use of English in the professional field of microbiology and how the language is used in their program of studies. The open-ended questions asked during the interviews with the stakeholders (see Appendix C) dealt with the specific tasks that microbiologists perform using English in their careers and which of the macro-skills is the most used in their workplace. These interviews were semi-structured, as the main objective was to listen to the respondents' opinions.

Similarly, for the interview with the students (see Appendix D), the questions were focused on clarifying some of the information collected from the questionnaire. It was of major interest to find specific information regarding the English-related activities that microbiology students are required to do in addition to the different procedures these students follow in order to complete those tasks. The interviews allowed us to collect detailed information that will be necessary during the following stages of this project. It is important to mention that at the beginning of each interview, the participants were asked permission to be recorded and a disclaimer was made that all of the information gathered would be confidential. Furthermore, all participants and stakeholders were assigned a code in order to protect their privacy and ensure anonymity. The code for each of the participants was based on the order they replied in the questionnaire or participated during the interviews conducted. For the participants, a P plus a number from 1-37 was used, for the stakeholders an S plus a number from 1-3 was used, and finally, for the interviewees an I plus a number from 1-9, separated by a

dash was used. The order in which each instrument was applied will be described in the next section.

Procedures

The questionnaire was created using a Google Form document, taking advantage of its accessibility in terms of distributing it to all the participants. After receiving approval on the final version of the questionnaire, the team wrote an email to all the participants with a link attached so that they could respond to the survey. This channel of communication with the participants facilitated a fast response rate, as the majority of answers were received within the three following days, making the data collection process easier for the researchers. However, the questionnaire was answered by 37 people out of the 41 who initially responded the invitation-email. After collecting the participants' responses to the questionnaire, the researchers proceed to organize different interviews with the stakeholders and the microbiology students.

In order to schedule the virtual meetings with the stakeholders, an email was sent asking for their time availability to meet. They were interviewed individually by one or two members of the instructor-team. The same procedure and steps were followed to conduct the interviews with the students. The sessions were divided into two meetings as there were a total of nine interviewees, and the three researchers collaborated conducting the interviews.

To analyze the data, figures and tables were used to present the most meaningful data with visual aids. In addition, by means of general discussion, we addressed the aspects that were relevant for the study but did not require extensive visual representation.

Finally, it is important to mention that there was no diagnostic test administered to the participants to determine the target students' language proficiency level. The aforementioned test was not possible to be administered due to the current emergency the country is facing with COVID-19. Therefore, all of the learners who are willing to take this ESP course will be accepted, and the classes, as well as the methodology used, will be adapted to the participants who decide to be a part of the program.

Results and Discussion

As mentioned above, the field of microbiology is quite diverse, enabling graduates to choose from a plethora of roles and industries within the public and private sphere. Through the administration of an extensive questionnaire and follow up interviews with a randomly selected few, we have gathered general and specific information regarding the needs, wants and lacks of the target population. In this section, we will discuss the results obtained using the aforementioned data collection methods, as well as some important information gathered from primary stakeholders.

Interests of Primary Stakeholders

The primary stakeholders play an important role in the development of an ESP course, as they are able to provide invaluable insight into the diverse needs of microbiologists within the field. In order to gauge the most relevant needs for English upon graduating from an undergraduate program, three stakeholders were consulted. This included Stakeholder 2 and 3 (S2 and S3), two microbiology professors who are currently teaching within the bachelor's program at UCR (Licenciatura), and who will both participate in the ESP course, and Stakeholder 1 (S1) a microbiologist who works in the private sector in the area of foodstuffs and water. According to all three stakeholders, English proficiency is very important within the field of microbiology. According to S1, it is especially crucial in order to succeed in the private sector because all roles involve communicating with native English speakers and other non-native English speakers abroad. This communication is often through email correspondence, online conferences, and face-to-face meetings with other microbiologists, consultants, and medical doctors. Therefore, both speaking and listening proficiency are required at a high intermediate level. In addition, all stakeholders stated that even when working in the public sector, it is imperative to have strong reading skills, as new kits and their instruction manuals that are sent to laboratories are in English. It is also important for microbiologists in both sectors to stay current with the latest technologies within the field since most research is published in English. There is no doubt that English proficiency is important for the success of future microbiologists. However, the

degree to which a microbiologist should be proficient in speaking and listening might depend on the use of English employed at work because the private sector requires more use of these English skills than the public sector.

Moreover, there is consensus that reading and writing skills are necessary to succeed in any role and sector as a future microbiologist. A more thorough analysis of the various needs of the target population from the perspective of primary stakeholders will be reviewed in this section.

Group profile

The target population under study consists of a group of 37 participants that are currently enrolled in, or affiliated with, the University of Costa Rica's Faculty of Microbiology. Within this faculty, 92% of participants are enrolled in the bachelor's degree (Licenciatura) of Microbiology and Clinical Chemistry, which is a 12-semester full-time program of studies. The remaining participants (5.4%) are professors from the undergraduate program, and 2.7% are laboratory technicians. Although most of the participants are students enrolled in the program, the age range varies as shown below in Table 1.

Table 1

Age Range of Target Population

Percentage of Participants	Age Range
81.1	19-25
10.8	26-30
2.7	31-35
5.4	40+

As shown in Table 1, 5.4% represents a professor (P22) and a laboratory technician (P28) who belong to the 40 years of age range or more. Furthermore, there is another professor (P27) who belongs to the 26-30 age range. The remaining participants are students who are part of the 19-25 and 26-30 age range with the exception of P7, who is between the ages of 31-35. It may be important to consider the element of status and power when considering classroom dynamics, as some participants may currently be professors to the student participants. This has a couple of potential implications. Firstly, the professors might feel uncomfortable to underperform in front of their students. Secondly, students may feel uncomfortable working in groups with their professors and providing constructive feedback. Within the classroom setting, all participants should be of

equal status, and thus it will be up to the language instructors to mitigate any uncomfortable dynamics, and ensure that everyone is engaged.

Educational Background

As stated above, most participants are students enrolled in the microbiology program at UCR. However, they are in different years of their major. Table 2 displays the distribution of 35 students on the program.

Table 2

Distribution of Student Participants within the Microbiology and Clinical Chemistry Program at UCR

Academic Year	Second	Third	Fourth	Fifth
Percentage of Students	10.8	40.5	35.1	8.1

As displayed in Table 2, the majority of the student participants are in the third and fourth academic year; this means they have had substantial exposure to specific microbiology content and have done extensive reading on the subject. Fifth-year students may be externally motivated, as they are close to graduating and may strive to get a job within the private sector which requires a high level of English proficiency.

In addition to the current academic year of students, we surveyed all participants regarding the English language training they have received over the

course of their lives. In this section, results varied considerably; however, 73% of participants said that they took English classes in elementary school, and 94.6% of participants stated that they took English classes in high school. These results are to be expected, as English is a mandatory subject in many elementary and high schools throughout Costa Rica. Furthermore, 27% of participants stated that they have taken additional English courses at a language institute. This may indicate their acknowledgment of the importance of having proficiency in the language, and may also indicate potential intrinsic or extrinsic motivation to learn. Another potential indicator of the aforementioned motivation is that 18.9% of the participants claim to have self-taught themselves English. It is unclear whether this pertains to all macro skills or only to reading or speaking. The University of Costa Rica offers students courses in English for specific majors, and 21.6% of the participants confirmed having taken one of these courses. Although the majority of participants have some knowledge of English from mandatory courses prior to university, many of them have pursued additional language courses and/or instruction.

In order to gain more insight into the type of prior language instruction the participants have received historically, we asked them to select from a list of possible course types. Participants could select all options that applied. Results indicate that 59.5% of participants have taken conversational English courses and 54.1% have taken courses in reading and writing. This may indicate that participants recognize the need to be proficient in speaking, reading and writing, or

it may indicate a personal interest in these skills. Furthermore, 27% of participants stated that they have taken courses in TOEIC or TOEFL preparation. This may indicate an interest in working or studying abroad or working the private sector as a microbiologist.

Lastly, pertaining to the educational profile of the participants, the participants were asked to rate their perceived level for each of the macro skills as well as grammar, pronunciation, and vocabulary. Table 3 displays the results of the participants' self- assessment using descriptive indicators. These indicators included characteristics each proficiency level entails.

Table 3

Participants' perceived proficiency levels reported in percentages

Skill	Low Beginner	High Beginner	Low Intermediate	High Intermediate	Advanced
Speaking	13.5	24.3	24.3	35.1	2.7
Listening	16.2	21.6	32.4	18.9	10.8
Reading	8.1	8.1	37.8	24.3	21.6
Writing	24.3	13.5	37.8	18.9	5.4
Pronunciation	10.8	27	37.8	21.6	2.7
Vocabulary	10.8	18.9	40.5	24.3	5.4

The results show that the majority of participants (37.8%) perceived themselves as low intermediate in the reading and writing macro skills. In regard to the speaking macro skill, 35.1% of the participants ranked themselves as high

intermediate. However, 40.5% considered themselves as low intermediate for vocabulary proficiency and 37.8% categorized themselves as low intermediate when it comes to pronunciation. Although there might be a contradiction in the proficiency level the students reported for pronunciation and vocabulary compared to speaking, this might be because their major does not require any speaking activities. Overall, with the exception of speaking skills, all other skills in Table 3 indicate that most participants perceive their level to fall within the low intermediate category.

As mentioned in the procedures section, a diagnostic test was not possible to administer due to the pandemic. Therefore, these results are based on participants' perception. The self-reported data gathered from the needs analysis questionnaire suggests that the majority of participants perceive themselves to have a good foundation in English. The majority have engaged in English language practice outside of elementary and high school, whether through language institutes or teaching themselves through online applications. This pursuance of English acquisition may be due to their recognition of the role and importance English plays in the field of microbiology, their own personal interest in the language, or perhaps both. In the next section, we will review the reported needs of the participants and their views on the role English plays in their current academic program, and future needs as professionals in the field of microbiology.

Description of the Needs

Contribution of stakeholders

As previously mentioned, experts in the microbiology field collaborated as stakeholders for this research. They provided information pertinent to the involvement of the English language in the field, providing the perspective of both students and microbiologists. These contributions helped to clarify what type of needs students currently have in addition to the needs they will have in the future. In the following subsections, we analyze the needs of the students regarding the four macro skills.

Reading

In regard to reading comprehension, the three stakeholders interviewed and identified as S1, S2, and S3, agreed that reading is the strongest skill to develop during the UCR major and as a professional. The need for reading becomes crucial as almost all of the scientific articles consulted and read as a student and microbiologist are written and available in English. Some of these articles are about topics for processes to discover the origin of bacteria, transfusion practices, pandemic origins, toolkits to operate laboratory equipment, and the process of oxidation-reduction reactions.

S2 and S3 indicated that the best information to consult is often only available in English, and they prefer to read directly in that language without considering consulting translated books or articles, as sometimes the interpretation

presented contains errors. These errors are often a result of incorrect translation of terms that were not supposed to be translated. Translation is not available in the readers' native language; therefore, the meaning is lost. S3 acknowledged that in the UCR program for microbiologists, the English courses were removed from the course program back in 2012 due to a restructuring of the curriculum. S3 also mentioned that there is no requirement to know English in order to be accepted in this major, but it is assumed that students know English if they desire to be part of the microbiology program. Thus, people who are admitted are given or requested to read texts in English without the need for confirming if they understand the language.

Writing

S3 indicated during the interview that writing research papers on scientific themes is a task that a microbiologist might be involved in. This responsibility is to be performed in English even when the microbiologist belongs to a non-English-speaking country. If they want their research paper, whether it is an article or any other scientific document to be read within the scientific community, it must be written in English. The reason for this is that science needs to be understood worldwide, and English is an accessible language within the scientific community. This notion was supported by all stakeholders and participants interviewed. S1 stated that when working within the private sector, it is important that reports are sent to an auditor or to a Food and Drug Administration (FDA) agent. Thus, these

reports must also be in English. Additionally, daily duties such as writing emails, which are directed to other microbiologists in other parts of the world, are written in English. These emails must include information from the aforementioned reports. S2 mentioned that writing skills are often necessary in the university environment, as students may be asked to read an article and then take an exam in which those terms are to be explained. The terms they have to define will depend on the topic covered in class. These topics may be about virology, immunology, or bacteriology to mention just a few, and the exam questions and definitions are to be answered/written in Spanish. Moreover, S3 stated that those terms are to be explained in Spanish by completing an exam that includes the terms in English.

Speaking

S1, S2, and S3 indicated that in microbiology, students can opt for a higher degree than the one they currently receive when they finish studying at UCR. This degree can be a Ph.D., a Master's, Medical Doctor, among others. These higher education opportunities can take place internationally, and the curricula are all in English; therefore, English speaking skills may be necessary for international programs. Moreover, they all mentioned that if the student or professional has the possibility to partake in conferences or seminars, they would want to ask questions to clarify doubts or get more information about what is being transmitted. As far as what the major concerns, all stakeholders indicated that English is not spoken in any of the classes, but that it is necessary if working in the private sector. The

more eminent employer is Caja Costarricense del Seguro Social (CCSS). With this employer, students communicate in Spanish. However, if working for the private sector, S3 confirmed that everything is handled in English. For instance, in the most high-profile companies such as ICU Medical Inc., Boston Scientific, and other laboratories, communication is managed in English. Reports are reviewed in daily status meetings and microbiologists often provide assistance with audits that are commonly administered by the FDA. Based on personal and professional experience, S1 reported that a microbiologist is required to cooperate in these audits, as they are the ones signing the final permission that approves the quality of air in a room or the quality of the results of a laboratory test. This type of interaction happens in English if the auditor comes from a non-Spanish speaking country.

S2 and S3 also mentioned the importance of including speaking activities to help the students identify how to address and maintain a proper conversation mostly for conventions, seminars, and conferences where other scientists are present.

Listening

S1, S2, and S3 had a common agreement concerning the importance of including listening skills in the course, as the students and professionals may wish to participate in conferences where there is a strong need to understand what is being narrated and discussed. However, they stated that it is not imperative to

focus on this skill since not all graduates and students of microbiology have the financial means to participate in these types of events. When students were interviewed, they confirmed what the stakeholders reported by stating that listening skills are not a priority and are not required to a great extent within their major or at work. The following section will provide details regarding the students' needs of English.

Students' needs

Within this context, needs can be defined as the knowledge students are to have in order to perform properly in a situation they may encounter as experts. These circumstances can include, but are not limited to, managing linguistic features, discourse, functional and structural language, among others that are used in specific situations (Hutchinson & Waters, 1987). This statement supports the comments made by stakeholders as well as what the students revealed their needs were which focused on scenarios they would encounter as professionals. To support the aforesaid, the students were requested to foresee where they would use English the most in their future work environment. 62% of the participants indicated that reading is the skill they use the most as students. This response rate confirms what the stakeholders endorsed when they asserted that reading was one of the skills used the most in class and in a professional career, regardless of whether the microbiologist works in the public or private sector. S2 provided some material that students will need to read and consult within their academic program.

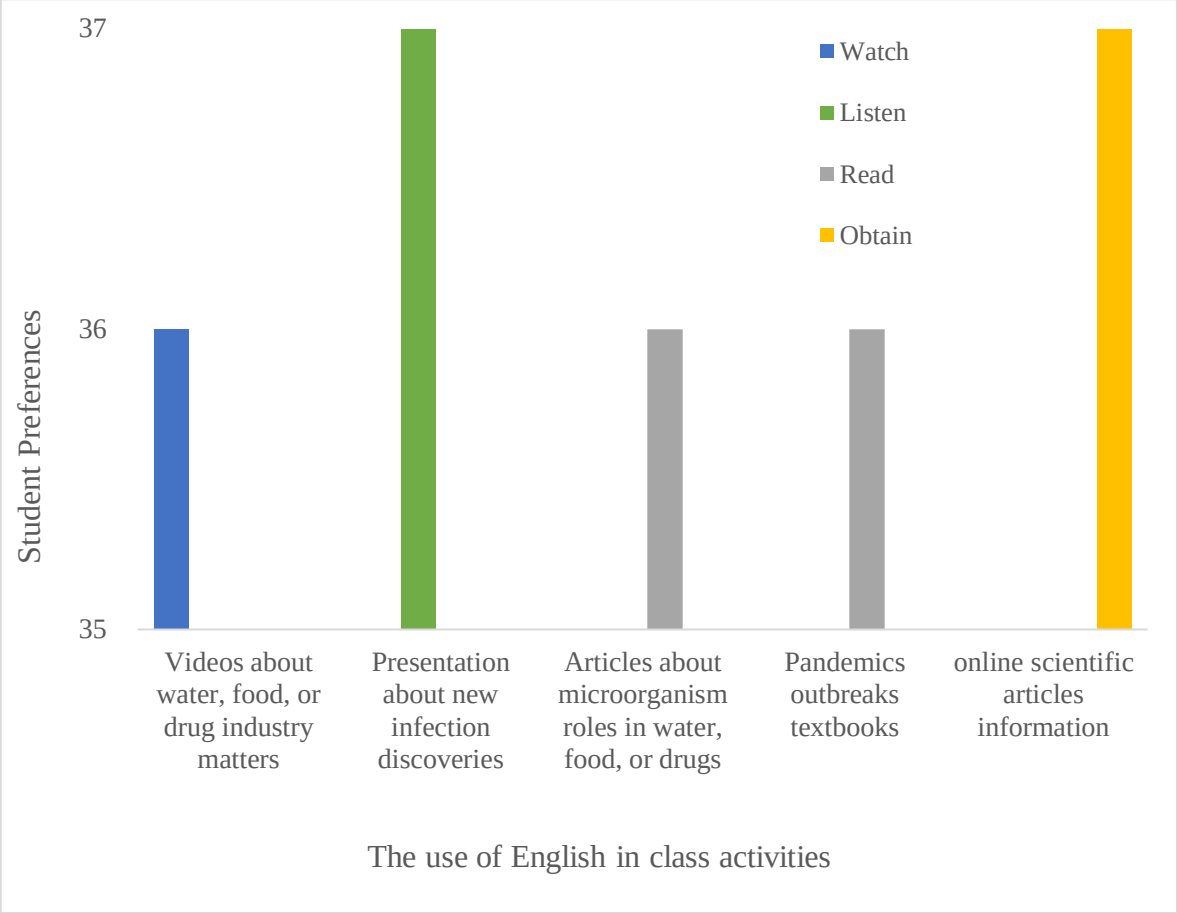
The topics found in these materials included case studies where the students need to read a specific problem. Those problems include information regarding the type of pain the patient is having, family history, biochemical profile analysis, lipid results, disease definition, types of disorders manifested, clinical features, type of treatment, and drug therapy components. S2 indicated that the students are often given these types of case studies to read, and I-7 confirmed that this is a type of activity that is frequently done in class.

In contrast, 54% of the students acknowledged that writing was the second skill they hardly ever use at school. During the interviews conducted with the students, they indicated that they are most likely to combine both of the skills, reading and writing, when they start working, but writing in English is not necessary at school, unlike reading which is the most important and relevant skill that they need to develop and master. Listening and speaking received a total of 51% of the responses stating that they hardly ever use it at school.

As displayed in Figure 1, participants indicated that they needed English for a variety of subject matter in their academic program. Numbers indicate student responses to each item.

Figure 1

Student and professors use of English in class activities



Note. The bars represent the frequency of English activities used in class.

All of the participants indicated they needed English in class for listening to presentations pertaining to topics about new infection discoveries, as well as obtaining information about scientific articles to obtain more information by doing research. The graph above conveys the tasks which include developing listening and reading skills.

The students reported in the interviews that sometimes, they need to attend scientific conferences which are normally in English. Also, researching online articles and textbooks is a strong task, and according to the students, the best material to read is available in English. Furthermore, 36 out of 37 participants indicated that watching videos about water, food, and drug matters is a common exercise for them. The same number of students reported that reading textbooks or articles that cover topics such as pandemic outbreaks and the roles of microorganisms is a normal task as well. During the interviews, the students mentioned that they also need to read medical instructions and forms.

All of the 37 participants stated that they see themselves in the future using English in activities that involve the need to evaluate the exactness of results and samples of water treatment, food, or drugs. The same number of participants indicated that they need English for understanding seminars or conferences they attend where analysis of samples and procedures are covered. More than 90% of the students also see themselves writing reports and/or emails to communicate the outcomes of tests performed with vaccines, antibodies, and drugs. Additionally, 95% of the respondents stated they will need to read technical manuals or toolkits to operate laboratory equipment.

These findings validate the usefulness of including reading as the main need since this population spends a prominent portion of their time reading. Likewise, based on the data gathered, it might help to include some speaking skills since 90% of participants reported they will have to participate with other microbiologists to analyze samples of food, drugs, and water. To clarify future workplace priorities, S3 indicated that the area in

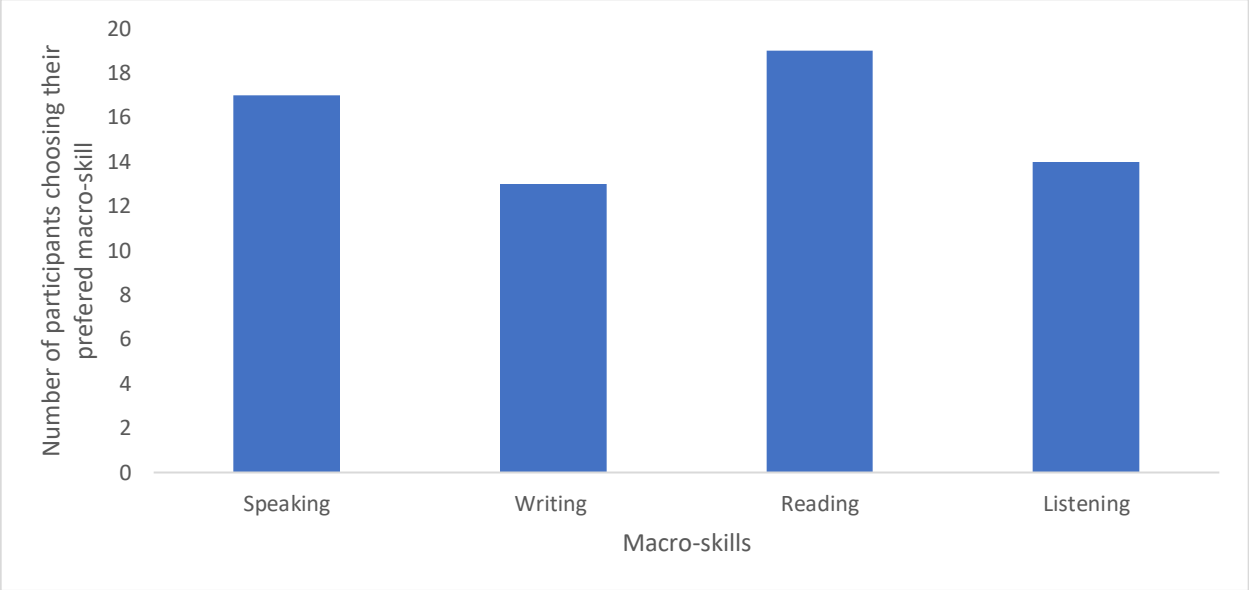
which the UCR program concentrates the most is in the clinical sector, and that subjects pertaining to water and food cover approximately 10% of the major.

Description of the Wants

This section will explore the data collected on the reported wants of the participants, which has been extracted from the questionnaire (see Appendix B) and interviews (see Appendix C and D). Hutchinson and Waters (1987) explained that "bearing in mind the importance of learner motivation in the learning process, learner perceived wants cannot be ignored" (p. 57). Even though the information gathered from the needs analysis and the interviews leads us to believe that this target population's biggest need is reading comprehension tools, a desire to improve speaking skills has also been expressed by the participants. For example, within the initial questionnaire, the participants were asked what specific macro-skill they wanted to learn and improve during the course (see Appendix B, section 5, question 2). The majority of participants stated that reading should be the major focus of the course. However, in second place, 34% expressed a desire to improve and develop their speaking proficiency, as shown in Figure 2.

Figure 2

Students' preferences regarding macro-skills to be developed



Note. The bars represent the number of students who have chosen the skill they would like to improve in the course.

The information presented in Figure 2 should be taken into consideration when creating an ESP course because it shows the interests of the target population. In spite of not being their primary need, students placed major importance in being able to develop their speaking abilities as well. As instructors, this information cannot be ignored, for students' motivation might decrease, and consequently, they might lose interest in the course when feeling that their wants and wishes are not being considered. Yet, it is important to recognize that the target population is aware that their primary need is focused on reading skills.

Nonetheless, and following what Hutchinson and Waters (1987) recommend, instructors should be aware of students' wants and wishes, as this will help to design a course methodology and materials that take into consideration these aspects, increasing students' motivation to learn.

During the application of the interviews with the students, this want of practicing oral skills was also demonstrated. For instance, several of the students interviewed explained that it is important for a microbiologist to have good oral skills in case they are sent to a conference to share their research findings, or if they want to participate in an international program or internship. Similarly, when asked what skills participants think they would need in their professional futures (see Appendix D, section IV, question 2), I-1 expressed that she would like to improve her oral abilities, especially focusing on how to formulate questions during a conference, as she knows that microbiologists have the opportunity to attend to scientific conferences frequently. Thus, knowing how to express herself orally would be something important. This train of thought was reinforced by Stakeholder 3 (S3). S3 explained that, as a teacher herself, she sees the need of her students to be able to communicate in English because students can apply for scholarships to attend international conferences. Therefore, they would need spoken English to perform well in a foreign country. Moreover, according to the responses given in the questionnaire (see Appendix B, section 5, question 2), some of the participants stated their wants regarding taking classes on speaking and vocabulary

acquisition, mainly the correct pronunciation of technical vocabulary, based on their professional future. P30 indicated that proper pronunciation of clinical vocabulary would be helpful in order to communicate properly with future colleagues and perform better at the workplace. These examples are to be considered because they show participants' delayed needs and their preoccupation with their professional careers.

Furthermore, during the interview with the stakeholders (see Appendix C, question 5), it was shown that depending on the workplace, private or public sector, a microbiologist's needs of English may vary. They agreed that in the private sector speaking abilities become important, as they often are required to report to superiors, or ask for information from foreign colleagues since English is considered the official language of the scientific community. This fact supports students' wants of engaging in a course where they can expand their oral skills, for it would be beneficial for them when working in this field. Another example of this type of interaction was explained during the video conference with students. When asked about the type of workplace interactions that may require the use of English (see Appendix D, section IV, question 2a), I-6 mentioned that speaking was important on the job because they may receive foreign auditors who do not necessarily speak Spanish. Therefore, microbiologists are often obliged to know at least some expressions regarding their field in order to respond appropriately to other professionals, and comply with what is required in their jobs.

Jordan (1997) explains that sometimes students would like to focus on what they perceive as their weakest skill, in spite of that skill not being what the needs analysis shows or even what the instructors perceive they will need. However, taking into consideration this subjective information and the participants' expectations of the course is important in order to provide them with an appropriate and engaging learning experience. Similarly, Graves (2000) suggests that "subjective information is important because if you don't take it into account, the objective information may be useless" (p. 104). The previous statement shows that for an ESP course to be successful it has to deal not only with what students might need but also with something that they are interested in. Therefore, even though the needs analysis has shown that this target population's primary need is related to reading skills, it is important that the instructors take into consideration the participants' desire for the course to also explore the speaking component. By doing this, the design of a course would include something that interests students and, at the same time, something challenging and new for them to do with the target language.

Description of the Lacks

The students of microbiology have indicated that they need proficiency in reading and writing. A total of 61% of the responses indicated that students struggle with grammar and vocabulary whenever reading new topics. Nevertheless, if these are daily common topics, they do not represent a problem.

Additionally, 57% of the participants stated that they had no issues when writing about common daily topics, but when new subjects were covered, grammar and vocabulary represented an obstacle. I-1 admitted that reading is not a problem since she is able to understand the articles adequately; however, when asked to write a report, she struggles. I-1 stated that if she were requested to write a summary in English of what was read, she would have a hard time since understanding is possible but verbal tenses are easy to forget and confuse.

Furthermore, I-5 stated that in her current major courses, it is essential to understand technical concepts and she struggles with understanding what she reads, as according to her, her level is low basic. In addition to that, I-5 finds support to understand textbooks by using online translators to obtain the gist of the passage.

Hutchinson and Waters (1987) stated that, once the lack of particular learners is recognized, the target proficiency must be matched against the learners' current skills. By doing this, the gap that is identified is what the learner lacks. The gap indicated by the students, which was supported by stakeholders, shows a need to reinforce reading and writing skills to develop new techniques to understand the topics, whether they are read or written.

In terms of speaking, 59% of the students indicated they are limited when it comes to dealing with topics or scenarios that cover new vocabulary or pronunciation. The same problem, but with a percentage of 51%, was the rate of

response related to listening issues. For these two skills, it appears to be that covering common topics is not the problem, but new ones are.

On the other hand, 24 students reported that pronunciation was one of the areas they had to improve, as facing new vocabulary and topics caused problems. In addition, I-2 stated that it is often a struggle to manage grammatical structures and conjugation of verbs.

In both of the interviews held with the students, many informed they knew English because they have enrolled in the ESP courses taught at UCR. However, these students have expressed that even though these courses have helped them when doing reading tasks, they still need support when dealing with specific terminology from the field that is included in dense texts they sometimes do not understand. To process those texts, I-7 reported that one strategy she applies is to read the text repeatedly until she understands the passage. Based on the comments from the interviews conducted with the students, there is no specific strategy defined when reading, they use a plethora of strategies to decipher what is read in articles or scientific magazines.

To summarize, the students identified lacks when reading and writing. Grammar and structures were terms they repeated a few times to be lacking. It seems that those two grammatical areas tend to be confused when reading, making a report, or completing an assignment. The participants requested that the

course focus on how they can better comprehend texts that are too technical or dense in the subject.

Learning Styles and Strategies

Cohen (as cited in Richards, 2016) refers to learning strategies as conscious thoughts and actions that students use to help themselves learn the language in order to complete specific tasks. Interestingly, when the participants were asked what types of learning strategies they use, some of them claimed not to know. However, during the interviews, when asked what type of procedures were followed when reading, several participants stated that they highlight the most important sections of a text. Furthermore, some of them expressed they look for the main idea of the text, which refers to cognitive strategies being part of their learning strategies. In terms of social learning strategies, I-4 and S-3 stated they looked for support on other students who have higher proficiency in the language to clarify doubts and verify that they understood the texts.

The participants were asked about their learning styles in the questionnaire. The majority of them claimed they preferred pairwork. Additionally, the students stated they rather have activities that involve engaging in conversations with another classmate instead of having to do oral presentations or group discussions in class.

In order to obtain more details about the participants learning styles, the researchers asked during the interviews what techniques they usually used when

studying to which the majority answered they rely on visual elements to remember the topics assigned. For instance, they regularly use word maps or color-coding systems using highlighters to remember key terms.

This information will help the instructors to create a syllabus that involves these types of learning styles to aid students in their process of learning English, for as Richards and Rodgers (2014) explain, these preferences will influence how learners respond to different learning situations. The above information reflects what the majority of students prefer; however, it is important to consider individual preferences. The following section will provide details on the individual student profiles.

Individual Student Profiles

Individual student profiles have been developed for each participant and they will be used as reference during the Practicum. However, they will not be included in the appendices section for this course design report. As described in the previous sections of the discussion and results, the majority of the target population are students enrolled in the microbiology program and the majority (81.1%) fall with the age range of 19-25. Three participants are working as professionals in the microbiology field, and although their needs and wants are quite similar to those of the student population, there are some differences. Perhaps the most important difference is the age range, with two of the three professionals being over the age of 40. Dörnyei (2009) explains that “a further

complicating factor is that age-related issues by definition concern the learning of an L2 rather than an L1" (p. 236). However, he also explains that older learners are advantaged by "greater learning capacity, including better memory for vocabulary and greater analytic ability… since they are able to understand and apply explicit grammatical rules (Dörnyei, 2009, p. 89). Furthermore, professionals have a stronger awareness of the role that English plays in the field, and perhaps may feel more motivated to improve their proficiency. This awareness also enables them to narrow their focus when it comes to deciding which skills need to be developed. For instance, P22 (a professor) did not select the option ¨Write reports about research pertaining to vaccines, antibodies, and pharmaceuticals¨ as a need in the field, while almost all other participants anticipated this task as a future need. P22 also expressed a preference to work alone and not in pairs or groups, while P28 (a laboratory technician) expressed a preference to work in pairs and groups, but not alone. These personal preferences may be due to the anticipated dynamics of working with students. Furthermore, although self-reported perceived proficiency levels varied amongst participants depending on the macro skill, P28 (a professor) and P31 (a student) stand out, as they both rated themselves as low beginners across all skills. It is unclear whether these results are accurate assessments of their language skills, or if it is due to self-doubt or insecurities, as P28 is a professor who would most likely have been exposed to a plethora of English texts, and P31 is in the third year of studies and would have been required to read English articles and understand the terminology. If their self-assessment is

accurate, then it is possible that their reading comprehension has been primarily based on direct text translation. When it comes to perceived advanced proficiency, P3, a student who did not specify his current year of study, ranked himself as advanced in speaking, writing, reading, and vocabulary. In addition, P3 has taken additional English courses at a language institute in conversational English and reading and writing. This participant (P3) wishes to acquire more vocabulary through the ESP course. It is unclear if the participant's perceived advanced proficiency has been developed as a result of intrinsic or extrinsic motivation. Similarly, P33 (a student) rated himself as advanced in listening, reading, pronunciation, and vocabulary, which results in the highest-ranking alongside P3. P33 is a third-year student who, like P3, has taken additional lessons at a language institute in courses such as conversational English and English for specific majors. Overall, aside from P28, P31, P33, and P33, participants claim to vary in their perceived English skills and abilities, and thus, have specific goals and priorities regarding areas they deem important to improve.

Needs Analysis Conclusion

After analyzing the data, we can conclude that the ESP course to be designed for microbiology students and personnel will take the direction of being focused on their primary need: reading. The results show that reading comprehension skills are what this target population will need in their professional future. Nevertheless, participants also expressed their wants for learning and

expanding their oral skills. Therefore, the course will explore those skills as well to keep students motivated and interested in the program. At the same time, the needs analysis showed that the students' level of proficiency is low-intermediate. However, this is based on their own perception as a diagnostic test was not administered due to the COVID-19 crisis. The purpose of this needs analysis was to gather as much information as possible that would allow us to better understand the population that will be a part of the class. In that sense, the research allows the instructors to enlist participants' gaps of knowledge that can be addressed later on during the lessons. The information provided in this needs analysis report will allow the facilitators to design a course that focuses on the participants' primary needs, but at the same time, it will include practice in other language skills that will challenge them to be able to perform adequately in their professional life.

Chapter II: The Syllabus

Hutchinson and Waters (1987) claimed that the syllabus defines what will or should be learned in a class (p. 80). Therefore, this chapter includes a description of the learning tasks, teaching techniques, methodology, and rationale to follow in the English for Microbiology Students (EMS) course. As the syllabus helps to distribute the amount of knowledge into manageable units (Hutchinson & Waters, 1987), this section is a guide for the class topics to be organized in order to achieve the goals set by the researchers during this program. Moreover, a student-friendly syllabus version will be provided to the microbiology students during the first week of their course. This syllabus can be found in Appendix E.

Course Logo

The logo created for the EMS course was inspired by the Gram Stain Technique. This process is commonly used by microbiologists to categorize and recognize two paramount bacteria cell types using a microscope. The types of bacteria are regularly categorized using two colors: The Gram-positive bacteria (blue/purple) and Gram-negative bacteria (red) (Smith & Hussey, 2005). Since microbiology students and professionals have to constantly utilize microscopes to run tests on bacteria samples, the purpose of the logo is to represent a day-to-day activity these specialists perform at school or work.

Figure 3

Course Logo

Course Name

The name of our (EMS) course was chosen based on the purpose the whole program has, which is an English course specially designed for the students of this field. Since it is an English course that will cover microbiology tasks, the researchers' intention is to help these learners experience a perfect class setting where tasks are successfully accomplished, and goals are achieved as expected.

Course Description

The purpose of this course is to incorporate microbiology topics relevant to the UCR students of that faculty. The program encompasses the skills that students considered to be essential and includes reading as the main focus. However, the participants also expressed an interest and need to develop other abilities such as speaking and listening which will also be developed in class. As this is a short-term ESP course, the instructors decided to include most of the

abilities mentioned in the questionnaire and interviews by the majority of the students during the needs analysis phase. These abilities enclose reading because it is their primary need and speaking to address their wants. However, it was decided to provide the students with writing exercises as well as they expressed that when working for international companies, this is a desirable skill by headhunters.

There will be a total of fourteen lessons during this ESP course where attendance is mandatory; thirteen of those lessons will cover content and the last class will be used to administer a final assessment. Each class is expected to last 2 hours approximately. The sessions will be held on Wednesdays from 5:00 p.m. to 7:00 p.m. supported by three facilitators in every class. In order to have effective communication with the students, the facilitators created a group in Remind, which is a mobile application similar to WhatsApp used for educational messaging, and the code is included in the students' syllabus. The instructors will focus on developing a task-based oriented course because some of the most successful activities in the classroom involve a spontaneous exchange of meaning (Willis, 2007, p. 8). This will help the UCR microbiology students to experience tasks they might encounter while being at school or as future professionals. Finally, there is no room number to teach this ESP lessons because the COVID-19 pandemic continues affecting the nation; therefore, this course will be developed fully online through the Zoom platform. This information has been confirmed by the director of

the master's program. It is important to mention that the class time for this ESP course was reduced due to the pandemic; therefore, it might not be possible to teach all three units. However, the student teachers decided to include and keep unit 3 in this report for it might be useful later. The following section will cover the goals and objectives developed for the online practicum classes.

Goals and Objectives

Graves (2000) stated that "materials development is the planning process by which a teacher created units… to carry out the goals and objectives of the course" (p. 249). In that sense, the development of lesson plans and materials becomes an important part of the course design process for they would work as a guide while teaching the EMS course online. Due to the nature of the course, which follows the TBLT approach, having authentic tasks and materials is of major importance for an ESP course. At the same time, the materials should be challenging yet achievable (Dudley-Evans & St John, 1998) for this would motivate students to complete the tasks. Following the principle of authenticity, the materials used during the course should resemble real life activities and scenarios students might face in their academic and professional life. Similarly, having a lesson plan that follows the task cycle would provide a more organized model for teaching. The following section will describe two lesson plans and display their corresponding materials which have been created as samples for the EMS course. Some content

and vocabulary will be recycled throughout the course in order to focus on and develop the target reading and speaking strategies.

Unit 1: Deconstruction of a text: an insight of its parts

Goal: By the end of the course, students will be able to effectively demonstrate comprehension of academic and scientific articles related to microbiology by analyzing and selecting specific and meaningful information relevant for their studies.

General Objectives

1. By the end of the unit, students will be able to successfully identify the usefulness and relevance of a scientific text by skimming and scanning specific information from the abstract, justification, methods, or results section.
2. By the end of the unit, students will be able to effectively report results and conclusions in a written form from microbiology cases of study by summarizing the main findings.
3. By the end of the unit, students will be able to successfully define key microbiology concepts presented in a text by filling a vocabulary log.
4. By the end of the unit, students will be able to accurately interpret laboratory procedures and instructions in a set of kits and manuals to operate

equipment by completing a sequence anchor chart and presenting it to the classmates.

Unit 2: Tests Do Not Lie

Goal: By the end of the course, the students will be able to orally deliver information about microbiology to an audience of microbiologists, stakeholders, and other members of the scientific community by communicating in a clear and concise manner.

General Objectives

1. By the end of the unit, students will be able to promptly deliver relevant information requested by an FDA/BSI auditor by using the proper register and vocabulary.
2. By the end of the unit, students will be able to effectively express ideas related to clinical best practices when interacting with members of the scientific community in meetings by stating opinions supported by facts.
3. By the end of the unit, the students will be able to accurately present microbiology related processes to members of the scientific community by stating facts in a structured manner about a microbiology related topic.

Unit 3: Interacting with Microbiologists

Goal: By the end of this course, students will be able to successfully interact with members of the scientific community in various academic and professional settings

regarding microbiology related topics by communicating with intelligibility and comprehensibility.

General Objectives

1. By the end of the unit, students will be able to appropriately request information from a speaker by asking specific direct and indirect questions about a microbiology related topic.
2. By the end of the unit, students will be able to aptly ask for clarification during presentations and open dialogues by repeating, restating, and summarizing ideas presented by a speaker.
3. By the end of the unit, students will be able to successfully engage with members of the microbiology field in meaningful conversations related to microbiology by using strategies to start and maintain a dialogue.

Methodology

Approach

The design and execution of this ESP course will be based upon the principles of Task-Based Language Teaching (TBLT) which focuses on the development of communication and meaning as the top priorities. When working within this framework, course development, lesson plans, tasks, and student interactions should all focus on the discovery of language which is achieved through negotiation of meaning. According to Willis and Willis (2007), TBLT should

consider what learners want to do with the target language and what they intend to express. Language learning should be viewed as a meaning system (Willis & Willis, 2007). In addition, accuracy plays a minor role in language learning when it comes to communicative approaches such as TBLT. Meaning and fluency are prioritized, as these two factors have a greater impact on the degree to which meaning is effectively communicated. Effective communication can be achieved through examining the functions of language, engaging with real-world language and authentic materials, and acquiring vocabulary that is relevant to the target situations.

The TBLT approach is appropriate for ESP course design, as it enables the instructors to examine the needs, wants, and lacks, of the learners and create a meaning-based course. Through the needs analysis process, course designers can gauge what will be needed to help learners express their intended meaning in specific work-related or academic situations. Students of microbiology will be exposed to a plethora of reading and aural input in which they will interact and discover language in order to produce meaningful outcomes that they deem to be important for their current and future needs. TBLT encourages instructors to utilize scaffolding and provide learners with authentic material that will prepare them for real-world tasks. Furthermore, TBLT strives to motivate learners on an intrinsic level by appealing to their true language needs and desires. According to the target population and stakeholders within the microbiology field, there is a great need for

English reading proficiency for both academic and professional purposes, and learners are encouraged to develop their speaking and listening skills if they desire to work within the private sector. Common tasks include having to read microbiology related research reports to understand the findings and read instruction manuals for equipment operation. Therefore, this course will aim to engage students through formalized activities by providing microbiology articles and instruction manuals as forms of input that learners can interact with and extract meaning from. The instructions will utilize scaffolding to support the students as they discover language that produces effective output/outcomes.

Classroom Dynamics

Through classroom dynamics, the instructors will strive to implement the principles of TBLT which involves ample scaffolding and supporting the individual needs of each learner. As a result, the course will be executed by three instructors through team teaching. This dynamic will involve a rotation of the lead instructor and supporters. There will be one lead instructor in each session that will carry out the lesson plan and the stages of the task cycle which include the pre-task, task, and post-task. Furthermore, the lead instructor will be responsible for providing clear instructions and explanations, evaluating the performance of the learners, and engaging the students. The supporters will assist the lead instructor with scaffolding, modeling tasks such as dialogues, speeches, and presentations, providing learners with both on-the-spot and delayed feedback, and by assisting

weaker learners as needed. Therefore, through teamwork, the classroom dynamic should be one of support, engagement, and successful language acquisition. Learners will feel supported during each phase of the task cycle and will be able to have their needs met in a different way than they would with a single instructor.

Tasks and Techniques and their Rationale

Within the TBLT approach, the task plays an imperative role, as it is through the task that meaning is derived and expressed. According to Willis and Willis (2007), tasks enable learners to achieve specific outcomes through which they are able to explore meaning and engage in meaningful communication. This process should be one of exploration and discovery, in which learners can take responsibility for their learning and play an active role in the process. Tasks can be developed as pedagogical tasks to support an outcome, but learners will strongly benefit from tasks that reflect real-world situations (Willis & Willis, 2007). Furthermore, Richards & Rodgers (2001), state that TBLT provides an opportunity for learner engagement within a setting that encourages spontaneous participation and creates a safe space for learning through errors. When learners are able to explore the language in a less restricting environment that allows for discovery and errors, they are more likely to experience meaningful communication, as opposed to a more rigid environment that focuses on accuracy. Therefore, within this framework, learners should be exposed to relevant vocabulary and lexical units to support their language development and enable communication.

This ESP course will incorporate tasks that meet the current and future needs and desires of the target population, which include reading and demonstrating comprehension of microbiology articles and excerpts from textbooks, reading and demonstrating comprehension of instruction manuals for laboratory equipment, discussing microbiology research results in groups, explaining microbiology processes, and listening and demonstrating comprehension of microbiology speeches and presentations. The course will also include tasks that focus on interactional exchanges and learners will learn how to express ideas and ask for clarification in a clear and coherent manner.

In an attempt to design tasks that reflect real-world events and situations, authentic materials will be used such as updated research articles from the American Microbiology Association, as well as some readings from the textbooks that the students currently use within their program of study. According to Richards & Rodgers (2001), learners can be exposed to real-life situations through the incorporation of realia in tasks such as academic articles, informative videos, and conference recordings. This type of authentic material exposes learners to relevant vocabulary, content-specific information, and differences in accent and rate of speech. Furthermore, simulations of common professional events will be used such as conference simulations, laboratory audit simulations, and microbiologist meetings about samples and research studies. Therefore, a high level of collaboration will occur in units that focus on speaking and listening, as interactions

and the exchange of information will be central to these tasks. In the unit that focuses on reading skills and comprehension, individual task completion will be utilized in addition to group work and pair work, as a variety of pairing techniques can enable the negotiation of meaning and facilitate learning. Lastly, pedagogical tasks will also be incorporated into the task cycle in order to promote communication. Tasks such as role-plays, information-gaps, and jigsaw activities will be used to support the lessons and engage learners.

The task cycle includes stages that aim to support learning in different phases. The initial stage of TBLT includes background activation activities that attempt to activate learners' schemata in order to make meaningful connections. Once meaningful connections are established, learners are more likely to be engaged and will be better equipped to complete tasks throughout the other phases of the task cycle. This stage is followed by a pre-task in which learners are exposed to input such as vocabulary and ideas. This input will help learners to work through the main task in which students produce output and demonstrate an outcome. The last stage of the cycle is the post-task in which learners are given an additional activity to complete. This may involve a reflection, a follow-up or extension of the main task, or the exploration of a relevant grammar point.

Role of the Learners

Learners and learning play a central role in the TBLT approach, and the task cycle is established to enable scaffolding and support the learner through

each stage in order to produce a meaningful outcome. Therefore, an ESP course that is designed with TBLT in mind should strive to develop the target macro skills, which in this course are reading and speaking, and micro skills such as guessing meaning from context (using context clues), skimming and scanning for information, asking for clarification during interactions, and negotiating meaning. According to Richards & Rodgers (2001), spontaneous interactions should be encouraged throughout each stage of the task cycle and learners should strive to communicate ideas without focusing extensively on accuracy. When learners engage as active participants, they aim to express themselves and utilize the vocabulary and concepts derived from input when communicating an idea. This spontaneous exchange of information is quite meaningful and promotes learning. These exchanges are facilitated through interactive tasks that involve pair or group work and can lead to meaningful communication (Richards & Rodgers, 2001). Furthermore, active learners should be able to recognize their errors and learn from them, and this course will aim to equip learners with the tools they need to identify their errors and pay attention to structure and form when required.

Role of the Instructors

Instructors that teach within a TBLT framework play the role of facilitator, as they facilitate learning and provide appropriate and relevant input with which learners can engage. Throughout the stages of the task cycle, instructors are the facilitators and strive to maintain a student-centered learning environment

(Richards & Rodgers, 2001). To the instructor, it is imperative that learners are engaged throughout each stage of the cycle, that they are negotiating meaning, that they are engaging in spontaneous exchanges of information, and that they are effectively producing the target output. In order to achieve this, instructors must have an understanding of the needs, wants, and lacks of the learners, and know what their interests and learning styles/preferences are. The needs analysis, an ongoing process that provides insight into the needs of learners, should be consulted in the development of the course units and learning materials in order to design and tailor the course content. Meaningful tasks will include engaging input and realia in order to appeal to the current and future needs of microbiologists. Instructors will need to set the learners up for success through scaffolding and supporting them at each stage of the cycle. Therefore, having two supporting instructors to provide assistance when the lead instructor is teaching will benefit the learners. Overall, the role of the instructors will be to plan, design, execute, and evaluate the lessons that will make up the course. They must ensure that materials and tasks are aligned with the course goals and objectives which have been created to meet the needs and wants of the learners. There is ample responsibility in the development phase, but when it comes to in-class execution of lesson plans the role shifts to that of facilitator in order to promote active learning and a student-centered dynamic.

Assessment

The teaching of a second language has undergone significant changes throughout time. As time passes, different teaching approaches have moved from being teacher-centered to allow students to be the real participants of the class, focusing on what students can do and will be able to do in the target language when facing the real world. This shift from teacher to student-centered classes also affected the way in which language learning is assessed. Since this course will follow the TBLT approach which adopts the idea that engaging learners in task-work provides a better context for the activation of learning processes (Richards & Rodgers, 2001, p. 223), the instructors have also opted to follow a Task-based Language Assessment (TBLA). The nature of this course involves preparing students to use the target language in a context that is already familiar to them. Therefore, using TBLA, the tasks used to assess students should resemble those tasks they will have to perform in real-life scenarios. Shehadeh explains, “the main goal and validity of TBLA is measured against the extent to which it can successfully achieve a close link between the testee’s performance during the test and his/her performance in the real world” (as cited in O'Sullivan & Stoynoff, 2012, p. 157). Taking into consideration these aspects of TBLA, the student-teachers will design assessment tasks that replicate those authentic scenarios in which students are involved in their real lives.

Formal Assessment

Brown (2004) referred to formal assessment as the “exercises or procedures specifically designed to tap into a storehouse of skills and knowledge” (p. 6). Formal assessment has the intention to give teachers and students an idea of what they have achieved in their learning process after a certain period. Brown added that these exercises are systematic and planned. It is due to these characteristics that this type of assessment has a specific time to be applied, which is usually established at the beginning of a course. Formal assessment follows the structure of being summative because the assessment tasks are graded according to the extent to which an objective was accomplished by the student. The most common example of formal assessment is the application of tests, which are commonly applied at the end of a unit or a course in order to show how well students have accomplished those objectives. Additionally to tests, quizzes that are planned and systematic can also be considered examples of formal and summative assessments. Nevertheless, the student teachers are also taking into consideration what Brown (2004) stated when saying that “all tests are formal assessment, but not all formal assessment is testing,” (p. 6) for a variety of assessment tasks can be implemented in order to assess and comply with the needs of the participants.

Informal Assessment

TBLT has gained a lot of attention in language teaching classrooms, especially because it has brought new forms to assess the learning process of our students. Following TBLA, Shehadeh (as cited in O'Sullivan & Stoynoff, 2012) explains that one of the main characteristics of this type of assessment is that it is formative. Therefore, having that characteristic in mind, when it comes to formative and informal assessment, it is said that all kinds of informal assessments should be considered formative (Brown, 2004, p. 6). Informal assessment provides the opportunity of an ongoing and constant process of assessing your students without the pressure that an exam or quiz will have on them. In that sense, Brown (2004) explained that informal assessment can take different forms and shapes, “starting with incidental, unplanned comments and responses, along with coaching and other impromptu feedback to the students” (p. 5). This type of constant interaction with the students provides more opportunities for them to know what they are doing well and those aspects in their language learning that might need improvement. Due to the nature of this course, which follows a TBLT approach, the student teachers have decided that using informal assessment will provide more benefits for the students, for the tasks used will reflect real-life scenarios for them and how they perform in those scenarios will be of major interest for the instructors. In order to take full advantage of informal assessment, there will be dedicated time for feedback sessions throughout the course; however, impromptu feedback occasions will also be taken into consideration.

Assessment Tasks

This syllabus has been divided into three units. The first unit, *Deconstruction of the text: an insight of its parts,* deals with reading skills. The unit aims to instruct students on how to fully understand academic and scientific texts related to their field of study by extracting specific information that they considered useful and reporting the most important findings in written form. Microbiology students are constantly asked to show understanding of the articles and report their findings. Therefore, the first assessment task will be a simulation in which students will receive authentic microbiology cases of study for them to report the most important findings. This task follows the principle of authenticity because it is something microbiology students are required to do in their major. In order for students to complete the task, they will have to put into practice the techniques and strategies taught during class to extract the most important information. Even though the major focus of the unit is on reading skills, microbiology students are often asked to read and report in written form what they gather from the texts. Therefore, this assessment task will address the two skills. The student teachers intend to provide a complete and enjoyable learning experience for the participants, keeping in mind the real tasks that they face as students and the ones they might face in their professional lives. Therefore, this first unit assessment task will be linked to the first oral assessment for the second unit of the course. The reasoning behind this is to create assessment tasks that are interconnected among the units so that students can have a more organized and progressive learning experience.

The second and third assessment tasks will be oral presentations. Unit 2, *Tests do not lie,* focuses on speaking skills. This unit aims to instruct students on how to provide information related to microbiology to colleagues and members of the scientific community. To assess this unit, the student teachers have decided to assign two oral presentations for students to formally present and share their findings on certain microbiology topics to an audience during a conference. In order to achieve this, students will have to put into practice the oral techniques covered during class. The first oral presentation will be connected to the written report that students had prepared for the first unit. During the first lessons of the second unit, students will learn how to properly deliver a formal oral presentation using the information they already had from the written report. This first oral presentation will address the speaking abilities that students need in order to aptly express their ideas in one-on-one speaking scenarios. The second oral presentation, however, will be addressed to a bigger audience in a conference setting. The purpose of this second oral presentation is to assess students' abilities to formally share their research findings related to a microbiology topic during a scientific conference. The authenticity of this task relies on the fact that it resembles a real-life situation for microbiologists, for in the future they might have the opportunity to participate in international scientific conferences sharing their research results with an audience.

The fourth assessment will be a roleplay simulation. Unit 3, *Interacting with Microbiologists*, also deals with speaking and listening skills, but here the major focus is on communicative interaction. The scenario for this roleplay will involve a meeting type-of-setting in which students will have to interact with other members of the scientific community. The task will focus on the communicative abilities necessary to solve problems and discuss important issues related to microbiology studies. Furthermore, Nunan (as cited in Richards & Rodgers, 2001) explains that a communicative task is "a piece of classroom work which involves learners in comprehending, manipulating, producing or interacting in the target language while their attention is principally focused on meaning rather form" (p. 224). TBLA allows us to have realistic tasks in which the student-teachers can assess students' performance in specific scenarios, which is something of major interest for the instructors.

In order to measure students' performance during the four assessment tasks presented above, the instructors are following Shehadeh's *external ratings* method. This method encourages instructors to have a holistic or analytic measure that helps to efficiently and, in a more subjective manner, assess the students' proficiency and performance during each task. Since units 2 and 3 involve speaking skills, students' speaking abilities can be rated by considering the different levels in which learners "can speak with authority on a variety of topics; can initiate, expand and develop a theme" (Ellis, as cited in Shehadeh, 2005, p.

158). To improve the assessment process, external scales and checklists with the different performance levels that students might have to achieve will also be developed. Having scale-like tools will complement the TBLA approach, for as Shehadeh (2005) explains this assessment approach should not be implemented in isolation but as a part of the whole assessment process (p. 160).

In addition to the four formal assessment tasks described above, students are also required to complete a personal vocabulary log which will be filled out throughout the course. Microbiologist students are constantly in the need of learning and remembering key concepts related to their field of study. These concepts do not necessarily have a Spanish equivalent; therefore, students are required to recall the English name only and interpret the meaning. Therefore, vocabulary logs will help students to keep track of the scientific concepts and important phrases related to their studies. Having vocabulary logs encourages students to actively take responsibility for their learning, as they can select the words they want to revise or consider highly useful for the microbiology field. In line with this, Anderson (1999) recommends the use of vocabulary logs and explains that “since it is the students’ learning list, they can put whatever information they need” (p. 24). Anderson (1999) also makes reference to the different ways in which students might fill in their personal vocabulary log. For instance, he explains that some students will write down a definition, others will use an equivalent word or term in their first language, and others will write their own sentences using the new

word (p. 24). Based on this, the student-teachers have decided that the format in which students complete their vocabulary logs will be based on their personal learning styles and strategies. Students will be required to add new entries to their log every week after class; however, they will be checked by the instructors at the end of every unit. In order to obtain the final grade, students will be required to submit the final version of their vocabulary log.

It is important to mention that due to the COVID-19 situation, the student teachers have come to an agreement on using these assessment tasks by taking into consideration their practicality and reliability to be performed during virtual lessons with the students. For instance, for the role-play simulations, the application that will be used for the online lessons enables the separation of students into smaller groups so that they can interact with each other during the respective activity.

Lastly, due to the fact that the course will be taught online, student teachers have decided to dedicate 5% of the final grade to attendance in order to guarantee students' participation in most of the classes. Students will be required to log in and participate for a minimum of 11 class sessions (corresponding to 80% of the course) allowing three absences whether they are justified or unjustified. It has also been decided that if students miss a fourth class, they will not be eligible to receive a participation and completion certificate and their attendance percentage will be zero. Yet, students will still have the opportunity to continue and finish the course.

Distribution of Assessment Tasks

The information presented in Table 4 shows the assessment tasks to be used during the English for Microbiology Students course. It includes the distribution of percentages that each task will have, as well as the number and time during the course in which they will be applied. It is important to note that due to time constraints, unit 3 will most likely not be delivered or assessed and therefore, the assigned percentage will be distributed between unit 1 and 2.

Table 4: English for Microbiology Students Assessment Plan EMS Assessment Plan

Table 4

English for Microbiology Students Assessment Plan

EMS Assessment Plan

What	How	Percentage
Case study written report	1 at the end of unit 1	20
Case study oral presentation	1 in the middle of unit 2	15
Conference Presentation	1 at the end of unit 2	25
Microbiologists' meetings roleplay	1 at the end of unit 3	25
Vocabulary/Expressions log	1 throughout the course	10
Attendance	Throughout the course	5

G. Contents

English for Microbiology Students is a fourteen-week course to be taught in the second semester of 2020. During this period, the instructors will teach three units with their corresponding lesson plans and materials (see appendix J) that will incorporate the following content areas.

Unit 1: Deconstruction of a text: an insight of its parts

Goal: By the end of the course, students will be able to effectively demonstrate comprehension of academic and scientific articles related to microbiology by analyzing and selecting specific and meaningful information relevant for their studies.

General Objectives

1. By the end of the unit, students will be able to successfully identify the usefulness and relevance of a scientific text by skimming and scanning specific information from the abstract, justification, methods, or results section.
2. By the end of the unit, students will be able to effectively report results and conclusions in a written form from microbiology cases of study by summarizing the main findings.
3. By the end of the unit, students will be able to successfully define key microbiology concepts presented in a text by filling a vocabulary log.

4. By the end of the unit, students will be able to accurately interpret laboratory procedures and instructions in a set of kits and manuals to operate equipment by completing a sequence anchor chart and presenting it to the classmates.

General Objectives	Tasks	Skills	Language Focus	Strategies	Time Allotted
1	Identify the useful and relevant information of a text by skimming and scanning specific information from the abstract, methodology and result section of an article.	R W S	**Vocabulary** Words related to the division of scientific written articles E.g.: review of the literature, methods, results, appendix… **Grammar** Passive voice to express the continuity and validity of research findings through time E.g.: “A specific PCR assay was	Skimming and scanning Reading for the gist of the text	2 lessons

			demonstrated to be a useful…" "antibiotics that were not introduced into clinical practice…" **Pronunciation:** -ed endings		
2	Report results and conclusions in a written form from microbiology cases of study by summarizing the main findings.	R W S	**Vocabulary:** Cause and effect connectors E.g.: Resulting in, consequently, therefore, hence **Grammar:** Modal verbs to express possible findings E.g.: "ATCC 43339 can be used as the negative control for the E. rhusiopathiae-specific PCR"	Summarizing Monitoring comprehension	2 lessons

			"Cyanobacterial cells <u>may block</u> water filters" "Internal organs as the liver and spleen, which <u>might later trigger</u> septicemia…" **Pronunciation:** word stress and intonation		
3	Define key microbiology concepts presented on the text by filling a vocabulary log.	R W	**Vocabulary:** Comparison and contrast connectors E.g.: unlike, similarly, on the contrast, however **Grammar:** Simple present tense to express general information and truths (Focus on verb "to be") E.g.:	Guessing meaning from context Filling vocabulary logs	2 lessons

			“Sodium chloride works well with most samples and is cheap.” “miRNAs are tiny RNA molecules that control gene expression…” “This principle is similar to that of the cell-free conversion assay…”		
4	Recall laboratory procedures by completing a sequence anchor chart after reading microbiology kits and manuals to	R W S	**Vocabulary** Sequence linking word E.g.: Next, then, following, after that, finally Adverbs of time E.g.: weekly, daily, monthly, annually, every # months… **Grammar**	Metacognitive awareness and verbal reports Filling sequence anchor chart	2 lessons

	operate equipment.		Imperative form to provide instructions on how to use and handle microbiology kits and equipment E.g.: “Wipe inner walls with antiseptic solution weekly.” “Check and adjust water level before each run” “Replace brushes annually” Connected Speech and linking		

Unit 2: Tests Do Not Lie

Goal: By the end of the course, the students will be able to orally deliver information about microbiology to an audience of microbiologists, stakeholders, and other members of the scientific community by communicating in a clear and concise manner.

General Objectives

1. By the end of the unit, students will be able to promptly deliver relevant information requested by an FDA/BSI auditor by using the proper register and vocabulary.
2. By the end of the unit, students will be able to effectively express ideas related to clinical best practices when interacting with members of the scientific community in meetings by stating opinions supported by facts.
3. By the end of the unit, the students will be able to accurately present microbiology related processes to members of the scientific community by stating facts in a structured manner about a microbiology related topic.

General Objectives	Tasks	Skills	Language Focus	Strategies	Time Allotted
1	Deliver relevant information requested by an FDA/BSI auditor by using the proper register and	S L	**Vocabulary** Verbs to exchange information with auditor: show, reveal, portrait, analyze, demonstrate **Grammar** Simple present Third-person singular	Addressing others formally Memorizing useful phrases Negotiating meaning Paraphrasing	2 lessons

	vocabulary.		**Pronunciation** -s, es, ies endings		
2	Express ideas related to clinical best practices when interacting with members of the scientific community in meetings by stating opinions supported by facts.	S L	**Vocabulary** Words used to describe the proper function of a microbiology lab. E.g.: hazardous, regulation, approval Reassuring phrases: absolutely, definitely, certainly **Grammar** Simple present for expressing general truths **Pronunciation** Intonation to answer Y/N and WH Questions in a formal context	Describing processes Reporting actions taken Asking for clarification Self-monitoring	2 lessons
3	Present microbiology		**Vocabulary**	English stress	2 lessons

	related processes to members of the scientific community by stating facts in a structured manner about a microbiology related topic.	L S	Expressions to show research findings: based on, according, as stated by **<u>Grammar and Useful language</u>** In my opinion… I believe/think that… I agree/disagree with… That is a good point because… In fact…	patterns and intonation Reported speech Recognize parts of speech and word order	

Unit 3: Interacting with Microbiologists

Goal: By the end of the course, students will be able to interact with members of the scientific community in various academic and professional settings regarding microbiology related topics by communicating with intelligibility and comprehensibility.

General Objectives

1. By the end of the unit, students will be able to appropriately request information from a speaker by asking specific direct and indirect questions about a microbiology related topic.
2. By the end of the unit, students will be able to aptly ask for clarification during presentations and open dialogues by repeating, restating, and summarizing ideas presented by a speaker.
3. By the end of the unit, students will be able to successfully engage with members of the microbiology field in meaningful conversations related to microbiology by using strategies to start and maintain a dialogue.

General Objectives	Tasks	Skills	Language Focus	Strategies	Time Allotted
1	During an interaction with an auditor, ask specific direct and indirect questions to receive relevant information	L S	**Vocabulary** Expressions to interact with an auditor: I understand the procedure includes..., let me check that report, how about results X and Y **Grammar**	Negotiating meaning Question formation	1 lesson

			WH questions such as What is/are, Why do/does, When is/are, Where is/are Indirect questions such as Could you tell me what this means / what this is? Yes/No questions such as Is/Are there…, Do/Does… **<u>Pronunciation</u>** English stress patterns and intonation		
2	During an online meeting with other microbiologists, ask for clarification during an exchange of information	L S	**<u>Vocabulary</u>** Expressions and questions to verify scientific information. E.g.: What do you mean by… Can you please elaborate..	Negotiating meaning English stress patterns and intonation	1 lesson

			So, you are saying that… In other words… **Grammar** Question structures and structures for stating information Present continuous **Pronunciation** English stress patterns and intonation		
3	Engage in and carry on a conversation about current research within the field of microbiology with other microbiolog	L S R	**Vocabulary** Expressions and questions to verify microbiology information. E.g.: In your opinion…. Do you agree that… What do you think about…	Negotiating meaning English stress patterns and intonation Recognize parts of speech and word order	1 lesson

	ists at a conference		What has your experience been with… **<u>Grammar</u>** Present perfect Simple present review		

Assessment Instruments

The creation of assessment forms is an important part of course design for it allows student teachers to evaluate not only students' performance but also teachers' performance and the overall execution of the course. As a result, the student teachers have created three different instrument samples that will help the assessment process for the EMS course. The three sample instruments include Likert scales (Appendices F, G, H, and I). Likert scales are useful and effective when it comes to gathering information pertaining to the respondents' views, opinions, and attitudes regarding various language-related issues (Brown, 2005). This section will describe each sample instrument, its use, and when it will be applied.

Students' Performance

The students' performance evaluation rubric (Appendix F) is to be applied during the oral presentation project the EMS students have to present at the end of the second unit of the course. The evaluation sheet is divided into two sections. Section A refers to the overall performance of the students when presenting the topic. This section includes statements to evaluate students' level of achievement in terms of the objective of the task assigned, the topic selected, speech rate, pronunciation, organization of ideas, and message delivery. Students will be assigned a number from 1-4 based on their performance where 1 means below average, 2 means average, 3 means very good, and 4 means excellent. At the top

of the evaluation rubric, students can see their points obtained, grade, and percentage. The evaluation scale definition is located at the end of the sheet for students to read what each number represents. Section B is to be used for additional comments and more detailed feedback for each student.

The student teachers decided to use a Likert scale in order to promote the use of formative and summative assessments as the students will receive a grade, and at the same time, they will have a description that will help them understand what the grade means.

The ESP Course

The content of the course and its development and delivery will be assessed through two instruments, and samples have been designed and included in the appendices. The first instrument aims to gather feedback regarding the unit. Students will be provided with the tool called Unit Evaluation Form (Appendix G) in which they will be asked to respond to three sections. The first section involves a Likert scale with 10 statements regarding various aspects of the unit such as the extent to which tasks were appropriate for a given level and if they were engaging. For each of the 10 statements, students will be asked to provide a rating on a scale from 1 to 5 which corresponds to the following: 1-strongly agree, 2-agree, 3-neutral, 4-disagree, and 5-strongly disagree. Secondly, students will be asked to complete 3 statements with their opinions regarding other aspects of the unit such as aspects they would like to continue or change. The third section provides a

space for students to give any feedback they would like, including comments, questions, or concerns pertaining to the unit. Students are able to respond to the last section in Spanish in order to have the freedom to fully express themselves. The instrument will be imperative for collecting valuable input from students regarding their views on a given unit so that appropriate/necessary changes can be implemented for the following unit.

The second instrument is a survey to be administered at the end of the course. The survey is called Course Evaluation Form (Appendix H) and the structure is similar to the Unit Evaluation form with three sections including a Likert scale with 10 statements. This instrument was designed to elicit feedback from the students regarding the extent to which the course helped them to reach their language goals and the extent to which the students felt that their needs, wants and lacks were taken into consideration throughout the course. The information gathered from this instrument will assist the instructors in understanding the overall results pertaining to student performance and engagement and will provide insight into future course design projects.

The Student Teachers' Performance

The student teachers' evaluation form (Appendix I) is divided into two sections. The first part deals with the student teacher's demonstration of lesson planning and the extent to which they were prepared to teach the lesson. The second part includes statements describing the teacher's performance during the

class. These statements represent characteristics that the student teachers are expected to have during the course. Students are required to evaluate the teachers by checking the option that best reflects their level of agreement with each statement. At the end of the form, students will have a space for them to write comments or additional feedback for the instructors.

In order to measure the effectiveness of the course, the participants' opinions are of great value for they would point out teaching-related aspects that can be improved or modified in order to comply with their needs and wants. Therefore, this questionnaire will be used to adjust and make any necessary changes during the course. In this sense, the student teachers have decided to be evaluated twice. The questionnaire will be given to the students towards the middle of the course and again when reaching the end of the course.

Additionally, this teacher evaluation form aims to collect data regarding the teachers’ efficiency and performance when teaching online. The student teachers have decided to include this aspect in the research project for the valuable insights that can be offered to future teachers, as this is the first time that the practicum will be carried out virtually and the outcomes may be helpful to other teachers and/or colleagues.

In conclusion, assessment plays an important role in many stages of the course and its development. The purpose of these sample instruments is to provide the students with an opportunity to give and receive feedback in a safe manner and to consider their own learning process. Throughout the course, active

participation and autonomous learning will be encouraged, and the students will be provided with opportunities to become metacognitively aware when it comes to their learning process. The feedback instruments will also provide the instructors with valuable insight into how the course is progressing in the opinion of the learners, as well as the extent to which the learners feel their needs are being met. Furthermore, the instructors will continuously provide opportunities for formative assessment in order to promote reflection on engagement and learning outcomes. Overall, the aim is to develop a healthy learning environment in which learners are comfortable and are given the opportunity to play an active role in the ongoing development and execution of the course.

Conclusions

Based on the information gathered from the needs analysis, the following conclusions and recommendations can be made in order to design an ESP course for microbiology students. The majority of the participants for the EMS course perceived their English level to be low intermediate across macro skills. It is important to highlight that these results are based solely on the participants' perceptions, as there was no diagnostic test to confirm their level due to the modifications made for COVID-19. Therefore, it will be important to create tasks that accommodate the students' different levels and that, at the same time, are challenging for them. The tasks will be based on authentic materials so that

students can understand and learn key concepts related to their field, increasing their motivation and willingness to learn.

The course will be administered online through the interactive live platform called Zoom. This platform is suitable for learning, as it enables live interactions and discussions, as well as opportunities for group tasks and the incorporation of other online resources. Three units have been designed, however, due to time constraints it is likely that only two will be executed during the course time frame. The units will follow a task-based approach to learning and will focus on developing the reading and speaking skills of the learners, as per their request. Through blended learning and a variety of engaging tasks and online resources, the learners will acquire the knowledge and tools they need to succeed in various microbiology related academic and professional situations. For instance, upon completing this course, learners should be able to effectively read and comprehend microbiology texts by utilizing reading strategies, and they should be able to engage in meaningful conversations with other members of the scientific community by demonstrating an ability to speak and listen effectively. Overall, through the development and deliverance of this EMS course, we strive to help learners reach a higher level of communicative competence and become active and autonomous learners who have the confidence to use English within the field of microbiology.

Chapter III: Course Evaluation Report

Learning English as a second language has become one of the goals that many university students strive to accomplish. Even more, it has become imperative that learners acquire the specific language skills required for their professional paths. For many years, the Master's Program in Teaching English (MA in TEFL) at the University of Costa Rica (UCR) has offered English for specific purposes (ESP) courses to various populations as part of a required practicum to complete this program. As practicum student teachers, the three of us designed and team taught an ESP online course, which we named English for Microbiology Students (EMS). This course intended to help the learners not only to increase their microbiology-related vocabulary but also to develop their speaking skills. Although the main focus of the course was speaking and vocabulary development, we did not ignore the fact that writing and listening were also necessary to complete certain microbiology tasks. As a final graduation requirement, we conducted a research project whose objective was to evaluate the effectiveness of this course in terms of vocabulary development, speaking skills, and materials selection. This evaluation was done through the use of a vocabulary log, the administration of two tests, and oral assessments. We also administered an end-of-course questionnaire as a research tool to gather information about the participants' perceptions of course materials.

The following sections of this report will explore the literature in terms of themes relevant to this research. Then we describe the methodology of this study and discuss the key findings that helped us answer our research questions. Finally, we present some conclusions and recommendations for future ESP research projects and ESP practitioners' teaching practices.

Literature Review

Over the last few years, online English course delivery has become a convenient method for teaching and learning. With the emergence of the COVID-19 pandemic, many academic institutions have had to move their language programs online and deliver synchronous and/or asynchronous classes to students (Negoescu, Boştină-Bratu, & Morar, 2021). As a result, educators have had to be creative in their teaching methods and strive to ensure that classroom tasks are effective in helping students to build their vocabulary and speaking skills (Negoescu et al., 2021). Although live sessions involve a type of face-to-face interaction, the level of student-student and teacher-student interaction is most likely limited in an online environment compared to a classroom setting. Therefore, to maximize student engagement and participation, extra attention needs to be paid to the development of speaking and vocabulary tasks and activities. Furthermore, student perceptions of course materials should be carefully considered, as they provide valuable insight into what types of activities and resources are engaging and useful in the absence of face-to-face interactions with

peers and teachers. This literature review aims to explore what researchers have stated regarding effective activities and resources for enhancing vocabulary and oral activities that promote the development of speaking skills. We will refer to online activities due to the fact that the EMS course was entirely taught in an online setting because of the COVID-19 pandemic. Since this course was designed following the principles of Task Based Language Teaching (TBLT), we include a description of TBLT before examining the main components of this literature review.

Task-Based Approach

Newton (2001) stated that the Task-Based Approach is an effective communicative method that enables learners to focus on vocabulary learning through strategies such as “the use of context cues, negotiating meaning with others, and the means to attend to new items under communicative pressure” (p. 30). A task can be defined as “a piece of classroom work which involves learners in comprehending, manipulating, producing or interacting in the target language; while their attention is principally focused on meaning rather than form” (Nunan, 1989, as cited in Sánchez, 2004, p. 49). TBLT promotes the use of authentic materials and contexts to encourage learners to communicate relevant and meaningful content. Furthermore, through Task-Based Learning, students are exposed to language through pre-tasks, in-tasks, and post-tasks that are carefully designed to promote authentic language use (Newton, 2001). According to this

author, cooperative learning can take place by including pre-tasks that involve "predicting, cooperative dictionary search, [and] words and definitions" (p. 31). Brainstorming, building semantic maps, and information gaps are common pre-tasks that involve collaboration. Suitable in-tasks involve using a glossary and engaging in interactions that allow the learner to negotiate meaning. Lastly, post-tasks may include communicative activities that bring learners' attention to form and enable them to practice the language autonomously or collaboratively.

Vocabulary Acquisition through Tasks

Learning vocabulary is an important part of language development. When it comes to effective communication, learners often find the incorporation of new vocabulary into their conversations challenging (Newton, 2001). The Task-Based Approach is useful for vocabulary teaching, as through an authentic context/task, learning of vocabulary can be both intentional and incidental, and a communicative focus can be maintained (Newton, 2001). Tasks that target vocabulary building may include external resources such as glossaries and dictionaries. However, learners can also be encouraged to rely on other strategies to negotiate meaning without the assistance of external sources.

Vocabulary Logs

When working within a TBLT framework, post-tasks are a great stage to incorporate supplemental activities to support learners in their vocabulary acquisition. Post-tasks can include vocabulary logs as a means for learners to take

responsibility for their vocabulary learning and work autonomously both outside and inside the classroom. According to Newton (2001), “vocabulary logs help learners to reinforce their own learning by building a record of the new words they encounter in communication, and setting up a procedure for reviewing them” (p. 36). In 2009, Walters and Bozkurt implemented the use of vocabulary notebooks to help students acquire new vocabulary. The study was done with three lower intermediate EFL classes. The researchers used the vocabulary notebooks in one of the groups only; the other two classes acted as control groups following the same class-program but without keeping the vocabulary notebooks. The results of their study showed great improvement in the treatment group which demonstrated significantly greater learning of the target words. For instance, the treatment group demonstrated “significant improvement in receptive knowledge of the target words, both in contrast to their knowledge of non-target words, and in comparison to the participants in both control groups” (Walters & Bozkurt, 2009, p. 410). In addition, the study showed that students in the treatment group were able to use the target words in free writing compositions. Walters and Bozkurt (2009) explained that participants “appeared to enjoy using the notebooks in classroom activities, and fully grasped the utility of returning to the notebooks for various activities” (p. 418). In addition, the participants’ direct feedback was quite positive. For instance, one participant wrote, “vocabulary notebook activities were fun. I think that the more we look in the notebook the more we deal with the words, the better we learn. We put them in our brains, in the long-term memory” (p. 413). According to this

participant's perception of vocabulary learning, they were very satisfied with the use of vocabulary logs.

Similar results have been found in Uzun's (2013) research. The study explored whether there was actual vocabulary acquisition taking into consideration (a) the formal instruction and feedback on vocabulary notebooks, and (b) the amount of information recorded in those vocabulary logs. Uzun (2013) stated that "keeping vocabulary notebooks requires learners to note down unknown words while also writing their meanings and related information, such as synonyms, antonyms, collocations, sample sentences (p. 2). To study the effectiveness of keeping vocabulary notebooks and providing ongoing feedback, Uzun (2013) used five groups of second-year university students: four groups kept the vocabulary logs; however, only two groups (the experimental groups) received ongoing feedback regarding the recorded words. Two other groups (control groups) did not receive any ongoing feedback, and the last group neither received any instruction to keep a vocabulary log nor feedback regarding any vocabulary related notes they took during class activities. It was found that "the feedback provided by the instructor added about 4 words to the vocabulary knowledge of the student" (Uzun, 2013, p. 8). These results suggest that providing ongoing feedback motivates the learners and guides them in their vocabulary learning process. Regarding the use of the vocabulary logs as a tool for vocabulary learning, results indicated the following:

> Recording extra information related to the unknown words, apparently, created a 10% difference between the group of students who recorded just the L1 equivalent of the words and the group of students who noted down more and varied information about the unknown words, in favour of the latter. (Uzun, 2013, p. 8)

The results of the experimental groups after receiving treatment showed that “keeping vocabulary notebooks makes a considerable contribution to the acquisition and knowledge of the students” (p. 8). Uzun (2013) concluded his study by stating that students also needed “formal instruction and encouragement and regular feedback as well in order to keep their motivation fresh and to improve their work” (pp. 8-9). Therefore, taking into consideration these elements when using a vocabulary log may result in students’ having a better experience with this learning tool.

Engaging Vocabulary Tasks

Studies show that online vocabulary tasks can be quite engaging and fun for language learners (Utku & Dolgunsöz, 2018). According to Korkmaz (2012, as cited in Utku and Dolgunsöz, 2018), games and fun activities have advantages such as creating an opportunity for learners to negotiate meaning, be creative in their approach to language, interact with others, and develop an interest in their learning. When evaluating the usefulness and potential effectiveness of online websites that allow learners to practice their vocabulary, it is important that

instructors consider both the educational and technical features before assigning them to learners. According to Wood (2001, as cited in Utku and Dolgunsöz, 2018), website content should “promote active, in-depth processing, provide multiple exposures to new words, [and] teach students to be strategic readers” (p. 117) while keeping the learners engaged. Technical features include “animations, video clips of related information, sound components, hyperlinks to related information, the ability to pause, repeat information, or replay videos, hints or clues to word meaning, and online definitions, glossaries, or thesauruses” (Wood, 2001, as cited in Utku & Dolgunsöz, 2018, p. 117). Teaching in an online setting requires that teachers take into consideration these aspects for a class to be conducted successfully.

In their study on the effects of online activities for young EFL learners, Utku and Dolgunsöz (2018) discovered that online activities had a positive effect on vocabulary learning. In this study, 25 Turkish fifth-grade students were assigned to the experimental group in which online activities such as “matching game, word search, crossword puzzle, spelling game, [and] two board games” were carried out (Utku & Dolgunsöz, 2018, p. 121). In addition, 21 Turkish fifth-grade students were assigned to the control group where the same 22 target words were taught using traditional methods such as through “reading comprehension activities and flashcards” (Utku & Dolgunsöz, 2018, p. 121). The study took place over a period of six weeks. A pretest and post-test were administered in order to measure

improvement. The post-test measured the learners' recognition and production of the target language compared to the results they received on the pre-test. The post-test results of the experimental group were higher than those of the control group, and through a semi-structured interview, the participants expressed high levels of motivation and excitement caused by online activities.

Similarly, in a study on teaching vocabulary to EFL students online, Al-Jarf (2007) found that online vocabulary activities played a significant role in building the vocabulary of students who actively engaged in them compared to students who did not. Al-Jarf (2007), administered a pretest and a post-test to 53 female college students in Saudi Arabia to assess the extent to which weekly online supplementary vocabulary tasks were effective in improving vocabulary learning. Classroom-based teaching of vocabulary was conducted using a textbook and reading and writing activities, while online asynchronous vocabulary activities were assigned using a platform called Nicenet. Online activities included discussion boards that reflected topics covered in the classroom, daily vocabulary lessons, and links to websites that allowed the students to see examples and work through exercises to better learn the target words. In addition, the students were also encouraged to share useful links to online exercises they believed to be useful. Online vocabulary quizzes were also posted to help students gauge their level of comprehension and progress. Al-Jarf (2007) found that although a pre-assessment of computer literacy was done prior to the commencement of the course, low

participation rates were in part due to “inadequate computer competence” (p. 14) as discovered through the post-course feedback questionnaire. Therefore, when assigning our EMS course materials, we made sure to walk our learners through the online activities step-by-step so that they knew how to navigate them appropriately.

In another study, Yip and Kwan (2006), researched the extent to which online vocabulary activities were an effective tool for teaching and learning English vocabulary. The study involved 100 undergraduate engineering students in Hong Kong and involved three experimental groups and three control groups. Participants in the experimental group were assigned vocabulary and online activities to support their learning while the control group was assigned vocabulary to learn through activities such as semantic maps, pictures, and translation. Online vocabulary activities involved playing games on websites that were designed to help students gauge “word meanings in English, word forms, examples, [and] pronunciation” (p. 241). Furthermore, these online activities were encouraged both during class sessions with the guidance of the instructors and after class for extra practice. The program lasted nine weeks, and a pretest and a post-test were administered to compare the results in each group. Results indicated that participants in the experimental group outperformed the control group when it came to vocabulary retention. Yip and Kwan (2006) stated that students’ preference for online games and their improved vocabulary retention may be due

to the fact that students took learning into their own hands and became autonomous learners by engaging in online activities during their own time.

Activities for Speaking Skills Development

Language learners often consider the development of speaking skills very important. Ur (1996), stated the following:

> Of all the four skills (listening, speaking, reading and writing), speaking seems intuitively the most important: people who know a language are referred to as ‘speakers’ of that language, as if speaking included all other kinds of knowing: and many if not most foreign language learners are primarily interested in learning to speak. (p. 120)

Celce-Murcia (2001, as cited in Sirisrimangkorn, 2021) adds that “when a person can speak a language, he or she is seen as one who knows the language as speech is the most basic means of human communication” (p. 66). Learners often strive to become proficient speakers of English, and so teachers are tasked with finding useful and appropriate materials to promote speaking development. For online program delivery, speaking activities are very important in an EFL/ESP setting. According to Nikitina (2009, as cited in Yukselir & Komur, 2017), “the convergence of technology and pedagogy has a great potential in making teaching and learning experiences rich, memorable, motivating and enjoyable for both the learners and their teachers" (p, 259). Furthermore, Lyman (1999, as cited in Baniabdelrahman, 2013) states that “Internet-based learning offers many

advantages to the learner, including ease of accessibility, a range of activities and lessons that appeal to a wide range of learning types, and the ability to easily engage with multiple audiences" (p. 85). In other words, there are plenty of opportunities to make online learning engaging and useful to students.

When it comes to the design and implementation of speaking tasks, it is also important to consider the assessment of each task. By first considering what is to be assessed and establishing criteria for assessment, the instructor can then search for or create suitable and engaging speaking activities (Yukselir & Komur, 2017). For instance, according to Brown and Hudson (1998, as cited in Yukselir & Komur, 2017) when considering criteria for assessment, it is important to ensure that assessment instruments “require students to perform, create, produce or do something, use real-world contexts or situations, use tasks that represent meaningful instructional activities, and focus on processes as well as products” (p. 257). These criteria are present in a great number of helpful resources and real-life tasks which could be used as assessment tools.

Engaging, interactive activities can be adapted and incorporated into an online English class to support learners in the development of speaking skills. Researchers have claimed that role plays, oral presentations, and videos have proven to be effective in developing learners’ speaking skills (Aliakbari & Jamalvandi, 2010; Rojas & Villafuerte, 2018; Sirisrimangkorn, 2021; Yukselir & Komur, 2017). The following sections examine this claim.

Role Plays

Research has also indicated that implementing role play into EFL settings can be very effective in helping learners build their speaking skills, as it exposes them to real-life contexts and provides them with an opportunity to negotiate meaning (Rojas & Villafuerte, 2018). Educators have the opportunity to create interesting scenarios that reflect the learners' interests as well as their specific professional needs. According to Kusnierek (2015, as cited in Rojas & Villafuerte, 2018) role play is a "complete range of communication technique which develops language fluency and promotes student interaction during the class, increasing student's motivation, encouraging their learning, but also sharing responsibilities between teacher-student" (p. 727). Teachers should primarily take on the role of facilitator when it comes to implementing role play as a technique, and they should limit their interference by letting learners work autonomously and explore the language creatively with their peers. In this way, learners can utilize strategies such as negotiation of meaning and engage in peer error correction as well as self-error correction rather than relying on teacher feedback. However, it is imperative that instructors take the time to develop a safe and positive learning environment for students so that they can feel comfortable speaking and interacting with peers. According to Nation and Newton (2009, as cited in Rojas & Villafuerte, 2018) "inadequate vocabulary, limited control of grammar, lack of fluency, learners' shyness, and lack of encouragement" (p. 728) are some of the factors that can limit or impede learners' English-speaking development. Thus, collaboration should be

emphasized and encouraged from the onset of the course to optimize participation and engagement in role plays.

Furthermore, Aliakbari and Jamalvandi (2010) state that the use of role-play in Task-Based Language Teaching can enhance the speaking abilities of learners in an EFL context, as it "satisfies communicative needs of learners while the former methods were unable to meet actual demands of learners to communicate in the target settings" (p. 15). As a result, role plays can be quite suitable for ESP courses because they can reflect any professional interaction that is relevant to the needs and wants of the learners. In their study, Aliakbari and Jamalvandi (2010) have explored the extent to which using role-plays as a technique within a TBLT framework was effective in helping students develop their speaking skills. The two-month study involved 60 participants who were EFL sophomore students from various universities in Ilam, Iran. They were randomly assorted into two groups, the control and the experimental group. The participants in the experimental group were assigned role play cards twice a week to use to engage in speaking, while the control group engaged in other activities such as those in their English language textbook. This experimental study utilized the IELTS exam as a pretest and post-test to compare speaking results of the experimental and control group. Thus, speaking improvement was measured in terms of "fluency, accuracy, lexicon, and pronunciation" (p. 23). Results showed that the experimental group's scores on the speaking section of the IELTS exam was notably better than that of the control

group indicating that role play may be a highly effective task for improving speaking skills.

Oral Presentations

Like role-plays, oral presentations are a great way for students to enhance their speaking skills. Presentations can be done collaboratively or individually, and topics can be chosen to mirror the wants and needs of the learners. Graig (2013, as cited in Hammad, 2020) claims that “oral presentations allow FL/L2 (Foreign Language, Second Language) students to practice English pronunciation, develop fluency, and practice critical thinking and invention” (p. 2). Sirisrimangkorn (2021) conducted a mixed-method study to examine the extent to which the implementation of presentations was effective in improving the speaking skills of 31 EFL undergraduate students in Thailand. All the participants were enrolled in a Business English course and were second-year university students. A pre-and a post-test were administered prior to, and after, the presentation activities. Speaking improvement was measured through the tests which assessed participants’ “accent, grammar, vocabulary, fluency, and comprehension” (Sirisrimangkorn, 2021, p. 67). The results showed that “using presentations was positive for learners’ speaking skills," as the participants’ scores on the post-test were higher than their pre-test scores (Sirisrimangkorn, 2021, p. 65). According to Graig (2013, as cited in Hammad, 2020), “the main stages of oral presentation include preparation, practice, and presentation” (p. 2). The process of developing a

presentation often requires finding information from texts, articles, or videos, and developing PowerPoint Presentations or posters. Therefore, learners have the opportunity to enhance their reading, listening and writing skills in addition to their speaking skills. Furthermore, the rehearsal phase is often an important part of the oral presentation process and provides further opportunity for learners to practice their speaking skills and prepare for potential questions from the audience.

In a similar study, Hammad (2020) found that the implementation of oral presentations greatly improved the speaking performance of the participants based on higher post-test speaking scores. The study involved 60 EFL students attending Al-Aqsa University in Palestine. Participants were equally divided into a control group that learned content through lectures, and an experimental group that learned content through making oral presentations. Like in Sirisrimangkorn's (2021) study, the IELTS speaking test was administered as the pretest and post-test. Speaking improvement was measured by assessing participants' "accent, grammar, vocabulary, fluency, and comprehension" (p. 67). A follow-up questionnaire was also administered, and results indicated that learners felt that the environment was pleasant and non-threatening, which made them feel more confident and capable of delivering oral presentations in English (Hammad, 2020). Thus, oral presentations are a great way for learners to improve their speaking skills, especially when the environment is positive and conducive to learning.

Videos

Lastly, videos are another effective tool for engaging students and improving speaking and listening skills. According to Canning-Wilson (2000, as cited in Yukselir & Komur, 2017), playing a video in class or for homework can be a very effective tool for learning as it helps learners comprehend the language by enabling them to analyze the speakers' body language, gestures, eye contact, and their facial expressions. As a result, the language becomes more meaningful because there is an engaging context that may be visually appealing. Yukselir and Komur (2017) explored the extent to which having students watch videos from sources such as Youtube.com and Ted.com was effective in improving speaking skills. The study took place at Osmaniye Korkut Ata University in Turkey and 20 English Language prep class students voluntarily participated in the experiment. Participants' speaking skills were assessed prior to the experiment and at the end of it. However, the researchers did not specify how speaking improvement was measured on the pretest and post-test. The researchers provided the experimental group with five videos to watch over a period of five weeks and asked them to complete the supplementary activities. The results indicated that the participants who watched the videos had higher scores on the speaking exams.

Student Perceptions of Materials

When evaluating a course, learners have the opportunity to express their opinions regarding the materials selected by instructors for each topic. In several

studies, researchers have inquired about student perceptions of course materials by administering post-course/study questionnaires, surveys, and interviews to gather feedback. Based on what research has shown, students' perceptions rely on the content that teachers include in a course, emphasizing the implementation of different materials to accomplish the goals set in each lesson. Following those aspects, in Al-Jarf's (2007) study, all students reported to have "found the online vocabulary course useful and fun, and considered it a new way of learning English vocabulary and doing homework" (p. 12). However, only 53% of the target group actively and frequently posted to the online discussion board. According to Al-Jarf (2007), factors such as cultural views on the seriousness and effectiveness of online activities versus traditional methods, lack of learner autonomy and initiative, and whether or not a grade would be given for online work completion may have contributed to students' lack of participation.

Regarding student perceptions of the usefulness and attractiveness of materials such as website links and activities to practice vocabulary, Yip and Kwan (2006) found that 70 of the 100 participants considered using websites a positive experience that helped them to improve their vocabulary learning. Although 75% of the participants stated that the "level of difficulty of the games was just right" (p. 243), only 55% of the participants expressed that the online activities created a stronger interest in learning vocabulary. The simplicity and triviality of activities such as tic-tac-toe along with unclear instructions for some of the online materials

were examples of participants' responses in follow-up interviews. Furthermore, Yip and Kwan (2006) stated that "the findings suggest that respondents cherish a site providing readily available, relevant and useful resources" (p. 244). When asked about the most important factors that they believed could impact the usefulness and attractiveness of materials in an online setting, participants responded that "interaction with other players, audio-visual effects, the use of animation, [and] sounds and music" (p. 244) were essential factors. In addition, learners stated that participating in online activities in which they were assigned roles and were given a scenario to work with was also essential for increasing engagement. As a result of these findings, in our EMS course we designed online activities using websites that allowed us to create and import our own content to ensure that the material was challenging. Activities were modeled in the main session to ensure comprehension and participants were each given a specific role within their groups to complete the activities in breakout rooms. Online games/activities were assigned to students as warm up and/or pre-task activities to be completed during a short period of time (10 or 15 minutes) to keep them engaged.

The studies examined in this literature review have demonstrated the benefits of implementing engaging activities such as writing vocabulary logs, doing role plays, making oral presentations and watching videos to improve speaking skills. Through a TBLT framework, these tasks can be implemented at various stages of the task cycle, promoting a versatile, interactive, and collaborative class.

In addition, this literature review has explored studies on learners' perceptions of usefulness of course materials. Learners often rate course effectiveness based on the relevance of the materials used. Thus, having the students work with meaningful materials and engage in interactive activities that meet their needs will often result in student satisfaction.

The following research question and sub questions have been proposed in this research study:

Research Question

How effective was the English for Microbiology course in terms of vocabulary taught, speaking activities done, and materials used?

Sub questions

1. Did the vocabulary log help the students learn microbiology-related vocabulary?
2. Did the speaking activities done in class help the students improve their oral performance?
3. What are the students' perceptions about the activities and materials used?

Methodology

This section describes the methods, instruments and procedures followed to evaluate how effective the EMS course was in terms of vocabulary taught, speaking activities done, and materials used.

Research Approach

This research study used a mixed methods approach which involves qualitative and quantitative data. This approach allowed us to analyze the findings in a more concise and in-depth manner. Johnson and Turner (2003, as cited in Venkatesh, Brown & Bala, 2013) referred to this aspect when explaining that "mixed methods research can leverage the complementary strengths and non-overlapping weaknesses of qualitative and quantitative methods, and offer greater insights on a phenomenon that each of these methods individually cannot offer" (p. 25). Thus, this approach offers the opportunity to analyze quantitative results as well as qualitative information regarding students' perceptions of the activities and the materials used in the EMS course. Cross-examining the information collected from the surveys with the opinions and perceptions of the participants allowed us to offer a more accurate analysis of the most significant findings in our study.

Context

This research study was conducted while we team taught the 14-week long ESM course at UCR. Due to the pandemic, the course was taught virtually once a week in 150-minute-long sessions. The course intended to enhance microbiology students' comprehension of academic and scientific articles in their field and to develop their oral skills to successfully communicate with other members of the scientific community. The course syllabus included two units. Unit 1 focused on the development of reading skills, and Unit 2 emphasized speaking skills. Among other

aspects, the course evaluation included a vocabulary log project, an oral presentation (in a conference) among other in-class activities such as a role-play of a microbiologists' meeting. These assessments and class activities are the main instruments of our research study.

Participants

Twelve participants enrolled in the Microbiology Program at UCR took the EMS course. Due to the beginning of the COVID-19 pandemic, which caused a great deal of uncertainty and forced SEP authorities to make changes in the curricula, the course started three weeks later. Thus, because of time constraints that year, the Master's Committee in TEFL asked the student teachers not to administer a language test as part of the needs analysis prior to designing the EMS course. After conversations with the students in which they indicated how often they used English and how much they practiced the language, we thought that their proficiency levels were intermediate or low intermediate. This inference was made based on their language use during those conversations. Some of the aspects we took into consideration to infer their proficiency level were their ability to interact with us, their pronunciation, vocabulary selection and their ability to form sentences.

Instruments

We used seven instruments: Test 1 (See Appendix M), Test 2 (See Appendix O), three in-class assessment projects, and two surveys. The tests

intended to collect data of the students' initial and final performance in regard to their pronunciation and fluency. At the same time, the tests helped the researchers to determine if students were able to recognize specific vocabulary items used in a dialogue in the context of visiting a microbiology laboratory.

Test 1 and Test 2

Tests 1 and 2 consisted of two sections: (a) pronunciation and sentence formation, and (b) listening recognition of vocabulary items. The first part of the tests required students to record themselves pronouncing 20 words from a given list that included terms related to microbiology. Collecting samples of their pronunciation, helped us to compare the results of both tests to analyze how accurate the pronunciation of the terms was and if there were any changes from one test to the other. After pronouncing each word twice, students were asked to create a sentence using those words. By doing this, we could gather information regarding students' ability to use the words in context. We decided to use this section of the tests (sentence formation) to later compare the sentences students created with the ones they included in their vocabulary logs. This would allow us to assess the effectiveness and helpfulness, if any, of the vocabulary log project. The words were selected from various articles and news reports related to the SARS-CoV-2 virus, taking advantage of the extent media coverage on the topic so that students could later see the usage of the words and their pronunciation. Some of the words included were *asymptomatic, prophylactic, ibuprofen, inoculate,*

thermometer, among other scientific terms. The second part of the tests consisted of a listening activity in which students had to fill in the blank spaces by writing the word they heard. The dialogue simulated a conversation between a visitor and a laboratory worker who explains how the laboratory is working under the new COVID-19 requirements. Students had to complete sentences such as "*Many people are _____ and don't know they are sick, so they end up spreading the virus*," using the words from the vocabulary bank given (See Appendix M). This second part dealt with the same vocabulary items as the first part; however, both parts of the tests addressed different skills. We thought that the tests should be the same to accurately evaluate students' improvement from one test to the other. However, it is important to mention that for the listening section of Test 2 the dialogue was different. We decided to use the same vocabulary items from the Test 1 but in a different conversation because we did not want the students to feel that the exact same activity was being repeated. By doing this, we were allowed to have more accurate data regarding students' language learning progress as we were able to compare the same items from the two tests to check if there had been any improvement in their performance. The time elapsed between the Test 1 and Test 2 was of five weeks in which students received classes covering the course content.

Class Assignments

To gather valuable data pertaining to students' oral performance and vocabulary learning, we decided to use some of the assignments that students had to complete throughout the course in and outside of class. These evaluation instruments included two oral activities and one vocabulary log which allowed us to collect data to answer the first and second question of our research study.

Oral Assignments

The oral assignments were presented during the second unit, which specifically dealt with the development of oral skills. The purpose of the speaking activities performed in class was for students to put into practice the oral skills learned throughout the unit, including the techniques and strategies taught during the course to give a good speech, a formal presentation or perform a role play. This allowed us to gather the necessary data to evaluate students' progress when it comes to their speaking skills.

The first speaking activity was a role-play which intended to help students to effectively deliver information required by an inspector by asking and answering questions related to laboratory procedures. Even though this activity was not graded, we used the video recording of that day's class to later compare students' performance to their final oral presentation. Additionally, students were also asked to complete a checklist (See Appendix N) as peer assessment and share it with their classmates. Some of the aspects included in the checklist for students to

assess were related to the sentences structure and content, and their performance while role-playing the given scenario. The second activity was a formal oral presentation which was part of their final grade (See Appendix F for guidelines). The purpose of this project was to put into practice the oral skills learned throughout Unit 2, and it was graded using a rubric created by the student teachers (See Appendix G). Students were given the choice of working individually or in pairs, and their presentations had to be about 6 to 8 minutes long. We decided to create a rubric to assess students' performance and which allowed us to define the level of success reached by the learners. Having a rubric would also help us to gather formative and summative aspects that will be later analyzed in the results and discussion section. The rubric included statements to evaluate students' level of achievement in terms of the objective of the task assigned, the topic selected, speech rate, pronunciation, grammar, organization of ideas, and message delivery. Students were assigned a number from 1-4 based on their performance where 1 meant *below average*, 2 meant *average*, 3 meant *very good*, and 4 meant *excellent*. These indicators to measure learners' achievement during their presentations were specified as follows: *Below average* meant that the student's performance lacked accuracy and that she/he struggled a lot getting the message across. There was minimal consistency and little preparation from the student in the topic selected. There were more than 8 mistakes made in terms of grammar and pronunciation. *Average* referred to the student's performance being somewhat accurate. The student was able to get the message across with some difficulties.

He/she showed some preparation for the topic selected and there were 5-8 mistakes made in terms of grammar and pronunciation. *Very good* indicated that the student was able to get the message across with some minimal difficulties. He/she showed very good preparation for the topic selected and there were 3-4 mistakes made in terms of grammar and pronunciation. *Excellent* meant that the student's performance was able to get the message across with no difficulties. The student showed appropriate preparation for the topic selected and there were only 1-2 mistakes made in terms of grammar and pronunciation.

Vocabulary Log

To determine the vocabulary learning of the students, researchers decided to use the vocabulary log project (See Appendix K for guidelines) as an instructional instrument that would also allow us to collect data regarding the students' progress. The project involved creating a learning tool that promoted the learning of new vocabulary related to the field of microbiology while helping learners to keep track of scientific concepts and important phrases related to their studies. This project was to be completed individually for students to have the freedom to fill it in based on their own learning strategies and preferences. Students were requested to write down at least two new words after each session in a vocabulary log template (See Appendix L); however, they could include as many words as they thought necessary. To evaluate this project, researchers created a rubric that focused on aspects such as project organization, writing of

definitions and original sentences, mechanics, and overall performance of the students when completing their logs (See Appendix L). The scale went from 1 to 5 in which 1 meant *needs improvement* and 5 meant *excellent*. This project would help us to gather data regarding students' use of the vocabulary items taught in class. We decided that there had been successful learning of vocabulary items if the students could recognize the words and were able to use them correctly in a sentence in the appropriate context.

Questionnaires

To gather students' perceptions of course materials, we used two questionnaires using Google Forms. The first questionnaire included a Likert scale with response options that went from *Strongly agree* to *Strongly disagree* (See Appendix G). Additionally, some open-ended questions were included to gather students' opinions about the course. For this section, students were given the choice of writing in Spanish for them to feel more comfortable when expressing their thoughts and opinions. The second part of this questionnaire included questions related to vocabulary and vocabulary learning strategies which students knew at the moment. These questions would allow us to collect more specific information on how students perceived vocabulary being taught in their course. Additionally, one of the questions required students to rate their level of English in relation to microbiology related vocabulary. This was done using a self-rating method as we did not have a diagnostic test, and we needed to survey students'

level of vocabulary related to their major. To help the students complete this item, the questionnaire included the specifications on what each level of vocabulary proficiency meant. For example, *low-basic* meant that the students knew a few words and fixed expressions, but vocabulary was very limited. *High-basic* referred to students that know a limited number of common words and expressions with a survival level knowledge of vocabulary. *Low-intermediate* indicated that students were fluent, but they had difficulty with words and idioms. *High-intermediate* meant that students could manage familiar situations and topics with some difficulty with vocabulary. Lastly, *advanced* meant students were able to converse fluently and had little difficulty with vocabulary.

The second questionnaire (See Appendix L) was sent using a Google Form at the end of the course. This instrument intended to collect students' perceptions of the activities and materials used in the course. Additionally, this questionnaire included a section with open-ended questions in which students could provide their opinions about the effectiveness and usefulness of the vocabulary log project. We included the vocabulary log questions in the same questionnaire to reduce the number of instruments used and this way, avoid students' boredom and tiredness.

Procedures

The first step of this study was to assign the vocabulary log project during week 4. This assignment was due at the end of the course so that students could receive sufficient input. Students received instructions on how to keep their logs,

and they were asked to add new entries after each lesson. The following step to start collecting data was the administration of end-of-Unit 1 questionnaire. This instrument was emailed to the participants when we finished Unit 1.

At the beginning of Unit 2, Test 1 was administered. Some days prior to this test, the students received instructions for the first part, which had to be done individually and submitted before the first lesson of Unit 2. The second part of the test was done in class. We had already sent the students a link to open a Google forms questionnaire. To complete it, the students had to listen to a dialogue read aloud by two of us and fill in the blank spaces with the correct words they heard. The dialogue was read twice to give the students more opportunities to complete it. Additionally, students were provided with a word bank for them to complete the task. This word bank included the correct items to be used as well as other words that had been used in class. After the dialogue was finished, students submitted their responses.

The participants started receiving the treatment in Unit 2. It consisted of input (words, phrases, language chunks) during the warm-ups and the pre-tasks, which would prepare the students to successfully complete the main tasks. Then during week 8, the students role-played a meeting between an auditor and a microbiology lab technician, and they were assessed individually. Then the students took Test 2 on week 13 and presented their final speaking project which was a formal oral presentation of a microbiology-related topic. Test 2 instructions were the same as the ones for Test 1. After the listening section of the test was

completed, the students presented their oral assessment project. Like in the role-play, students worked in pairs, but they were graded individually using a rubric. To keep anonymity, codes from S1 to S12 were assigned to participants. Then, the overall results from the role-play and their final speaking assessment were compared. Twelve students took Test 1, but three did not take Test 2. Thus, the results of Test 2 include only nine participants. Finally, the end-of-course evaluation form was completed by participants using a new Google Forms document to obtain data on the perception of students regarding the activities and the materials used throughout the course. The data collected was analyzed by comparing the results gathered from the class activities to the participants' opinions about the effectiveness of the tasks performed.

Results and Discussion

This section analyzes the findings gathered regarding three aspects: 1) the effectiveness of the vocabulary log in the EMS course, 2) the usefulness of oral activities to help our students to develop their speaking skills, and 3) the perception students had of the activities and materials used throughout the course.

Effectiveness of the Vocabulary Log

One of the general objectives in Unit 1 was to enhance students' ability to successfully define key microbiology concepts presented in a text by filling a vocabulary log. To accomplish this goal, several tasks were created for students to be exposed to the necessary vocabulary that would help them to complete each

lesson. These tasks were presented in the form of different online interactive games following Al-Jarf's (2007) ideas about using online activities to build students' vocabulary. For example, EdPuzzle, Kahoot, and Trivia games were used during the warm-ups and pre-tasks to introduce the vocabulary items that were going to be covered during the main task. Even though students were exposed to different tasks in relation to vocabulary learning, this study will only analyze the effectiveness of the vocabulary log project to help the participants learn new vocabulary.

After checking the vocabulary logs, the results indicated that two of the participants wrote over 30 entries, and six of them had more than 20 entries. Only one participant created 18 entries, which was the expected number by the instructors. These findings reveal that most students exceeded our expectations regarding the number of words they included in their logs. The results also showed that only two participants (S4 and S11) did not comply with the minimum number of entries for the vocabulary log. One student wrote 17 entries and the other one 12. In the case of S11, we believe that her lack of interest in the vocabulary log might have been related to her long absenteeism. S4 answered that he did find the vocabulary log useful explaining that it had helped him to know the concepts. He also added that he felt more comfortable using some of the words after he had included them in his vocabulary log. This comment shows that even though the student did not comply with the minimum requirement, he was still able to recognize the usefulness of the project in learning new vocabulary. In the same

way, S3 expressed that including words in the vocabulary log made her feel more comfortable because when she had to use them, she was sure that they were being used correctly.

Interestingly, S2, who included the highest number of words in her log, reported that although she found the vocabulary log useful and helpful to learn words and their usage, she thinks that the course could have had a different approach to learn vocabulary. She explained that the words learned were indeed related to the major; however, they were not the ones she used the most. She added that it would have been more helpful to ask students to find commonly used words they usually learn outside of English classes and that by doing this, the course could have had a better approach to vocabulary learning. We found this comment interesting because it contradicted this student's performance during class. We could see that she correctly used more words than her classmates. During her presentations, she actually used a lot of the words that had been included in her vocabulary log. Based on her comments, this student was obviously more interested in learning everyday vocabulary, which was not part of the objectives of this ESP course, than strictly microbiology-related vocabulary. Another possible explanation of this participant's comment could be her interest in learning vocabulary words or expressions that were more frequently used in microbiology-tasks that she had already performed in her major. However, there was not further information in her comment for us to address this possibility.

Overall, results showed that 66.7% of the students agreed on the fact that the assignment helped them to learn new vocabulary related to microbiology. Students' perceptions of the effectiveness of having a vocabulary log as a tool for learning new vocabulary related to microbiology were very positive. For example, S9 expressed that completing the vocabulary project had helped her to increase her understanding of some of the words that she usually reads in several articles. Other students referred to the vocabulary log as an easy and fun tool to use when learning vocabulary related to their major. These positive findings mirrored what research has shown in the review of the literature, and they confirm the results shown by Walters and Bozkurt's (2009) study in which they concluded that participants enjoyed using the logs in classroom activities. Our results helped to reinforce these authors' claim that "students acquired valuable training in, and appreciation for, the use of an effective vocabulary learning strategy" (p. 418). Overall, the results showed that the use of vocabulary logs is a beneficial aspect that may have an impact on language learning.

Another interesting finding was related to the effects that the vocabulary logs had on the results of Test 2. Walters and Bozkurt (2009) explained that vocabulary notebooks have an impact on other areas of learning and tasks required during class. That information goes in accordance with our research since EMS students were able to use their vocabulary logs to learn the words that appeared during Test 1 and Test 2. The participants used the vocabulary log as a resource to practice and learn the vocabulary items included on these two tests. It

is important to mention that Tests 1 and 2 focused on gathering data regarding the students' oral performance in terms of pronunciation and fluency, but incorrect use of vocabulary was not penalized on the tests. However, the researchers decided to compare the results gathered from the participants' vocabulary logs to their improvement on this second part of the tests: the creation of sentences. We found that some of the participants, whose sentence formation on Test 2 was very accurate, had included the vocabulary items as part of their log entries. By the time Test 1 was administered, students were already familiarized with the idea of including new, challenging vocabulary words in their logs. The vocabulary log was only used as an instructional instrument to gather data on the students' progress on vocabulary learning. The fact that the participants correctly used this vocabulary to form more elaborate and accurate sentences on Test 2 was a very positive finding. In addition, one student commented that the vocabulary log works as a very helpful tool when the students start learning English. She added that during this time the number of unknown or misused words is very high. We believe that by using vocabulary logs, students were able to practice the words that were challenging to them, and they learned to use those words properly in a given context.

The results from Test 2 indicated that 88,8 % of the students were able to create 20 out of 20 correct sentences. This goes in accordance with what reported when saying that the use of vocabulary logs was highly important to expand their knowledge of microbiology-related English terms. S8, for example, was one of the

students who had great improvement on Test 2. Results on Test 1 indicate that she was able to create only 9 out of 20 sentences; nonetheless, for Test 2, she was able to formulate all 20 sentences correctly. We noticed that she had included 11 words from the items on Test 1 into her vocabulary log. On Test 1, she could not create sentences with the following words: *prion, apex, hyphae, prophylactic, inoculate, amphitrichous, lophotrichous,* and *diaphragm*. However, on Test 2, she was able to create complete and correct sentences using these words. It is important to note that the sentences that she created in the vocabulary log were not the same she used on Test 2; this fact suggests that the student was able to use the new words in different contexts. To show a few examples, in her vocabulary log she included this sentence: "*Porphyromonas gingivalis is an anaerobic bacterium in the tooth*." whereas on Test 2 she used this: "*There are a lot of anaerobic bacteria in the mouth*". Another example from her vocabulary log is "*Bacteria need a specific temperature for being alive*.", but in her sentence for Test 2 she expressed this: "*The temperature is an important parameter to review in case of sickness*". These sentences indicate improvement not only in vocabulary but also in structure; for example, the student used there are followed by the word bacteria, which is plural but does not take the common suffix *–s* or *–es*. The student also wrote the –ing form of the verb be after the preposition *for*. In addition, the student also started adding the vocabulary entries with words from the tests on the same day that Test 1 was administered. It is important to mention that the instructions for the vocabulary log indicated that students could only include words

that they were not familiarized with or that they did not know at all. Thus, these findings suggest that the student might have actually learned the vocabulary by the time that the second test took place.

S7 reported similar results to S8. She had a total of nine out of 20 correctly created sentences on Test 1. In her vocabulary log, she included five of the words with which she had failed to make complete sentences on Test 1. Those words were *amphitrichous, lophotrichous, peritrichous, hyphae,* and *prophylactic*. The data revealed that, on Test 2, she was able to successfully correct four faulty sentences from Test 1. That is, after including the words and creating more sentences in her vocabulary log, she was able to appropriately use four out of the five difficult terms for her. Thus, these results showed that she was able to improve her sentence creation process on Test 2 since she wrote 18 out of 20 correct sentences, twice as many as on Test 1.

Students' responses in the questionnaires show that working on the vocabulary logs helped them in two ways: (a) students felt comfortable using new, difficult words; and (b) creating full sentences with those words and saying them became easier. These results confirm that the students were able to actually learn the vocabulary items present in the tasks. The fact that majority of the students were able to create 20 out of 20 correct sentences on Test 2 showed that their range of microbiology-related vocabulary in the target language had improved.

Students' Speaking Skills Development

To determine if in-class speaking activities such as role-plays, videos and oral presentations helped students to improve their oral performance in terms of fluency and pronunciation, we will use the data gathered from Unit 2. This unit aimed to prepare students to orally deliver information to microbiologists, stakeholders, and other members of the scientific community by communicating in a clear and concise manner. Additionally, we will examine the findings obtained after comparing Test 1 and Test 2 results.

Results from Test 1 and Test 2

After checking the results from Test 1, these were compared to the results from Test 2 taking into consideration changes in pronunciation and their fluency when pronouncing each word and uttering a sentence. According to Nunan (2003), "fluency is the extent to which speakers use the language quickly and confidently, with few hesitations or unnatural pauses, false starts, [or] word searches" (p. 54). Therefore, based on the previous definition, we graded Test 1 and Test 2 by using our language criteria on pronunciation and fluency in which a yes or no selection would determine if the answers were a pass or fail depending on the students' speaking performance.

Table 1 displays results obtained on Test 1 and Test 2 regarding the correct pronunciation of words. We will discuss some emerging patterns.

Table 5

Percentages of Correct Sentences on Both Tests and Overall Student Improvement

Participant	Test 1	Test 2	Improvement
S6	30	80	50%
S5	55	100	45%
S9	55	95	40%
S3	50	85	35%
S8	55	85	35%
S2	70	95	25%
S4	70	95	25%
S7	35	55	20%
S1	80	95	15%

According to UCR passing grade, which is a 70, six students did not reach this standard on Test 1, but eight students did on Test 2. The findings show that the term *lophotrichous* was the one that most students failed to pronounce correctly. During Test 1, 89% of the students mispronounced the term; however, during Test 2 only 11% failed to pronounce this word. This shows a rate of improvement of 89% when it comes to pronunciation. A similar pattern was found

with 78% of the students mispronouncing the word *hyphae* during Test 1, whereas in Test 2, only 11% failed to pronounce this word. This indicates that also 89% of the students were able to correct their pronunciation of the term. This term was reviewed several times during different activities and lessons; therefore, it was easy to observe that students had used the term correctly. Additionally, the results showed that 67% of the students did not pronounce the word *ibuprofen* correctly during Test 1. Nevertheless, during Test 2, 78% managed to say this term in the correct way. 89% of the students improved their utterances in terms of words correctly pronounced compared to the first time they were exposed to the content the test had.

The tests also intended to evaluate students' fluency when they uttered full sentences using the given words in context as shown in Table 2.

Table 6

Percentages of Correct Sentences Uttered on Both Tests and Overall Student Improvement

Participant	Test 1	Test 2	Improvement
S8	45	100	55%
S7	45	90	45%
S2	70	100	30%
S1	75	100	25%
S6	75	100	25%
S3	85	100	15%
S4	90	100	10%
S5	90	100	10%
S9	100	100	0%

Fluency was acceptable if the student produced a grammatically correct sentence, and if the word “pass” was not used by the student. However, if there was some hesitation, but the student was still able to utter a sentence, that sentence would be counted as correct. Students showed great level of improvement when they formed sentences. For example, only 11% of the students demonstrated an acceptable level of fluency when forming a sentence with the

word *hyphae* during Test 1. Nonetheless, during Test 2, there was an improvement of 100% as a group when making use of this vocabulary item in a sentence. We believe that the students' fluency improved as they were able to express their ideas more accurately since they had been exposed to this term several times during former lessons. When it comes to the word *lophotrichous,* 67% of the students were able to produce a sentence with adequate fluency during Test 1. However, during Test 2, 89% of the students improved when creating a sentence using this term which indicates that students were able to use the word in an appropriate context. In addition to the previous words, *ibuprofen* was another term with which 100% of the students demonstrated to know how to form a sentence correctly with this concept.

These results show that there was a general improvement in the sentence formation process of the students when comparing Test 1 to Test 2. Students were able to use more complex words or structures when expressing their ideas. For example, S7 included the following sentence during Test 1: *There are a lot of bacterias that are anaerobic*. This is not a simple sentence, but when comparing it to what she included during Test 2, there was a noticeable change. Her sentence during the second test was: *An anaerobic organism is an organism that doesn't need oxygen to grow*. Besides the complexity and improvement of that sentence compared to Test 1, we noticed that her fluency when mentioning this word in her recording had increased. Similar improvement was noticed in the sentences of S8. She included this sentence during Test 1: *There are some bacteria that are*

peritrichous. Even when S8 was able to use this vocabulary item correctly in her sentence, it did not include much information of the term. However, during Test 2, S8 made use of a more complex structure as she expressed the following: *Peritrichous are bacteria that have flagellum in all the perimeters*. We noticed that in this sentence, S8 was able to utter the sentence more fluently than on Test 1, and she was able to include more content that explained what the term *peritrichous* enclosed.

The results of Test 1 and Test 2 show that students were able to improve their fluency and pronunciation when uttering sentences using microbiology-related terms in a given context. There was an improvement of 100% when it comes to correct sentences. After carrying out oral activities in class, correcting students during those tasks, and scaffolding unknown topics and vocabulary, students were able to show better results on Test 2. It is important to mention that not only were they able to produce the words correctly on this Test 2, but also students had the opportunity to practice, autocorrect and monitor themselves constantly while using a huge amount of vocabulary they had been studying in class.

Role-play Performance

Lesson 7 (Unit 2) aimed to prepare the students to play the role of an auditor, and it included preparation for question formation patterns, correct answers, proper register, and vocabulary. Students had to complete a series of tasks during class that were based on providing a realistic experience that

microbiologists can have when working for a company that is strictly monitored and audited regularly. We chose role-plays as part of the assessment projects since they are useful to represent real-life situations.

The role-play activity used for assessment showed that the students had learned the necessary aspects to perform a role-play: clear questions and answers, accurate structures, and well-explained procedures. During the previous lesson, in the warm-up students formulated questions that included the assigned vocabulary and that could be asked by an auditor. The pre-task included visual and listening input in the form of a video to expose students to a similar situation they would have to face in their future as microbiologists. At the same time, the video acted as a guide for students to perform their own role-plays. In the class when students had to present the role-play, the warm-up dealt with a review on question formation using the QUASM (question word, auxiliary, subject, and main verb) technique to remember question structures. The pre-task during that lesson involved the application of the second part of Test 1 which was a conversation between a visitor and a microbiologist giving a laboratory tour around the company. All these activities were intended to prepare students with enough input for them to present their role-plays.

During the role-plays students showed a great deal of engagement and they looked confident when they used the language expected for the given scenarios. Students seemed relaxed, and they had fun while they were completing the task.

These characteristics contributed to convincing student performance. In addition, most of the students reported that they had found the role play beneficial, but a striking case is worth mentioning here: S8. This student usually struggled during the first classes when providing an opinion, completing spoken tasks, and working in Zoom breakout rooms. She would hesitate when participating in class and her awkward sentences were somehow difficult to understand. Her performance in class probably lacked content and fluency because it was an impromptu interaction compared to the role-play in which they had time to practice. We decided to analyze her performance after providing her with the necessary tools to complete this task. Some of the tools we used in order to prepare students for the role-play were videos showing similar scenarios and conversations that students had to recreate. For example, one of the videos showed how a laboratory employee answered questions during an inspection. Another activity we used was based on analyzing a video where a speaker made several mistakes when presenting the information and students had to identify those errors. The role-play focused on sentence creation and register to use when in front of an auditor. S8 was able to perform in this task as expected by interacting with the auditor in an appropriate way using accurate structures and correct pronunciation of scientific terms. From these results, we can infer that the oral activities carried out in class during the warm-up and pre-task as preparation for this role-play, provided S8 with the necessary tools to perform at an improved level when completing this task. Since most of the students were able to explain operational procedures, give specific

information, confirm, and clarify information during the role play, we can say that this oral task helped the participants improve their English grammar and fluency.

Oral Assessment

The oral presentation consisted of developing a role-play or presenting an informative speech where students had to work in pairs or individually by choosing a microbiology-related topic to present to the class. We used a rubric for this presentation to assess students' organization of ideas, delivery of the message, tone of voice, pronunciation, and vocabulary use. Prior to this oral activity, the students did some pre-tasks in which they had to analyze a video about a speaker giving a presentation, and they had to pay attention to body language, the eye contact, and expressions used by the speaker. The students discussed why the speaker had done poorly in his presentation. Then they had to come up with solutions to have a better presentation and write tips and suggestions that could be used later in their own presentations. Additionally, to better prepare the students, we sent them a sample script with some useful expressions commonly used in oral presentations such as *Today, we would like to share some information about…*, *This bacterium is considered… because…*, *Furthermore, this bacterium is classified as…*, and *However, humans should be cautious because…* with the purpose to provide some guidance when presenting. The performance in this oral activity showed that the students implemented the recommendations on pronunciation and fluency that we made in Unit 2. For example, they were able to

properly say and fluently use expressions such as *Good evening, my name is… and I'm going to talk about the role of microbiologists in different fields, for example… in simple words this is…, our role as microbiologists is… to conclude, microbiology is a very extensive area that also has a lot of fields being the clinical one the main one is...* which helped them to thoroughly talk about their topics as we expected.

The results on this oral presentation indicate that 54.5% of the students scored between 90-100, 18% between 80-90, and 27.2% between 70-79. This means that more than half of the students were able to fluently express their ideas in their presentations. The rest of the students did not obtain high scores, but they were all passing grades. We believe that the students who obtained a lower grade were affected due to the number of classes they missed as they could not participate from the speaking practices and exercises done during class time.

A striking finding was that the level of difficulty of the topics the students selected seemed to be more advanced compared to the technical vocabulary covered in class. The topics were related to mosquitoes and the diseases they spread, microbiology principles and the areas this subject focuses on, types of microbes, cancer types, and the blood components. This topic selection was entirely the participants' choice, and it seemed they felt comfortable talking about a microbiology subject they understood and knew thoroughly. Based on the students' level of preparation, delivery of the message, speaking presentation techniques

that were taught in class, as well as their vocabulary use, it was evident that their engagement level during the presentations was high. The students were given a sample script that included a set of expressions to use as reference in their oral presentation. Before the final presentation, the students were provided with some scaffolding for them to have the necessary expressions, to know how to deliver information, and to use an appropriate tone of voice. We could see that the students made use of this material; however, some of them seemed to have memorized a great part of their presentation. S3 spoke considerably fast when she was giving her oral presentation. The reason why this might have happened may have been the student's anxiety since the task was their final speaking project. The student could have used a guide instead of memorizing the information. As stated by Nation and Newton (2009), memorizing useful phrases and sentences can help to gain fluency in the target language. However, the extent to which S3 may have memorized her entire presentation is unknown as the researchers observed that her presentation was properly done. Moreover, S8 presented a remarkable improvement during this assignment. As previously mentioned, she struggled with her Test 1 sentences and technical vocabulary. From the results of the Test 1, it was clear that her knowledge of the words assigned was limited. Nonetheless, the vocabulary and sentence formation used during her final oral presentation was appropriate and her Test 2 results when speaking were substantially better than on Test 1. During her presentation, S8 uttered sentences such as *I would like to share some information about the components of the blood because…*, *when you*

centrifuge a blood sample you will get three parts of the blood… the first part is composed by… the second part contains…, *the third part is contains the red blood cells… our presentation focuses on a problem with the white blood cells…* which were properly expressed and pronounced. Something to highlight is that even when she used a PowerPoint presentation, S8 presented the information by summarizing and explaining it in an adequate and fluent manner. We decided to focus on S3 and S8 as their results were outstanding and they were worth mentioning. Overall, students' presentations were properly made as we expected. They successfully completed this task by accomplishing a good level of vocabulary use, delivery of the message, and presentation skills.

Course Activities and Materials

This report also intends to analyze students' perceptions of the activities done in class. The participants' responses indicated that they were considerably grateful and satisfied with the activities done and that they found them useful. Results show that students were very pleased with the activities used throughout the units. In fact, 22.2% of the participants strongly agreed and 55.6% of them agreed on the fact that the activities helped them to fully achieve the unit goals. The resulting 22.2% of participants were neutral on this regard. These results showed the positive effect that the activities designed for the EMS course had on the students' learning process. For example, students mentioned that the way in which activities dealt with vocabulary helped them to recognize and understand it

easier when they were reading microbiology-related articles. This resulted in them not having to reach out to dictionaries or translators so often to grasp the meaning of certain terms and their thought-process was not interrupted to get the main idea of a text.

Since the success of class activities may depend on the quality of the materials used, we also asked the students to report their perceptions of the course materials. We found that 57.1% rated the materials used for class activities as excellent. The creation or adaptation of materials is a crucial step when planning lessons for an ESP course as it requires the student teachers to do prior research on what the students might need in their professional future as microbiologists. We decided to take advantage of the virtual class setting by incorporating the use of online applications that were available to create more dynamic and interactive activities. Therefore, student teachers created the materials for in-class activities using websites such as EdPuzzle, PinUp, as well as online trivia games. These activities often included authentic microbiology-related materials so that students could see relationships while gaining experience with real language use (Graves, 2000). Thus, it was of great importance for us to use adapted materials during the activities to help the students practice and learn new vocabulary related to their major.

The results from the evaluation of Unit 1 showed that 33.3% of the participants strongly agreed and 66.7% agreed on the fact that the activities included in the course were directly related to tasks they needed to carry out as

microbiology students. We took this aspect into consideration while designing the ESP course as we wanted to provide valuable information and learning techniques for our students to successfully complete tasks in their future as microbiologists. The results also showed that most students thought that the activities were well organized and that they found them dynamic and engaging. For example, S7 commented that she liked the way activities were carried out. She explained that the way in which Zoom breakout rooms were used encouraged her to speak even more than in the main session, where she felt shy when she had to interact with the rest of the class. She also stated that having experienced these group activities had helped her to improve her English greatly. This participant's comment reinforces what Demirel (2019) claims about cooperative learning. This author believes that cooperative learning provides and improves positive interdependence, face-to-face communication skills, and social skills to create a warm atmosphere for the learners. It is important to highlight that S7 had obtained the second-lowest grade on Test 1. However, we noticed some improvement in her language proficiency at the end of the course. She perceived that the course activities and materials had helped her do better on Test 2, on the role play, and on her final oral presentation. In addition, the activities helped her to regain a sense of confidence when using the target language, as she expressed in her comments in the unit evaluation form. These results support what Scrivener (2012) stated when saying that having students work in groups can develop the skills they need to train

and put into practice, as the students are allowed to participate more when working in pairs or groups.

In addition to the previous results, students voluntarily sent emails to the instructors stating that the course content covered in each of the activities was of great help to them as they were able to practice English and learn vocabulary related to microbiology every week. Along with these comments, 49.7% of the participants rated the content of the course as excellent and the resulting 57.1% rated as very good, explaining that it had been well organized and related to their needs. Participants had previously stated that one of the biggest challenges they had to face in their major involved reading a vast number of scientific articles. Therefore, when designing the course, the student teachers decided to address that need in Unit 1. One of the participants stated that she was able to learn some reading techniques to find the main ideas of a scientific article in a quick manner. Ur (2016) asserted that having students read the same text several times provides them with more understanding of the text than the first time they read it, and it gives them a wider comprehension of the text overall being able to go through the text at a faster speed. For that reason, the aforementioned procedure was part of the topics taught and covered during the unit. The students needed time to read and process scientific articles that included unknown vocabulary and structures that would have been meaningless without the application of those techniques.

Taking into account the context of the global pandemic and the fact that our students' major was closely involved with the study of the virus, we decided to use

recent articles related to coronavirus, its development and possible treatments, to engage students even more with the course activities. To cover the content of these articles, it was necessary to provide students with activities that dealt with reading techniques to help them become more efficient when reading and use time more effectively. In addition to this, vocabulary related to microbes and different diseases was also covered. This helped students to discover vocabulary and pronunciation of words they had not had the opportunity to work with or explore in the way we taught them to do. The aforementioned contents guided us to associate the topics to the speaking area the students also desired to study. During Unit 2, the participants were exposed to activities and materials that could help them interact properly with auditors that regularly visit the laboratories or companies where they may work. This unit included vocabulary related to the tools they used in a laboratory, and we added procedures the students will also use in their professional lives. For example, the standard operating procedures were added as part of the activities that were related to interacting with an auditor or the Food and Drug Administration specialists who might be one of the regulatory entities they can work closely with.

During the unit evaluation, the participants provided feedback to make changes they would like to include in Unit 2 regarding materials and activities implemented in the class. The students let the researchers know that they were very satisfied with the content, materials, and activities carried out in class because they had made them feel more confident and their level of fluency had improved.

However, they expressed that they wanted to have more vocabulary, listening comprehension, grammar, and individual work. Scrivener (2012) acknowledged that “altering just one variable… can make a group work activity different” (p. 204). Therefore, the student teachers made the necessary adjustments to include the suggestions above during Unit 2 which focused on speaking.

In spite of receiving positive comments and feedback regarding the content and materials selected for the course, there were some negative comments in particular that we considered important to discuss here. One of the students commented that the course could have been more challenging as he realized that some of the tasks were somehow simple for him. Based on the previous comment, the researchers agreed on the fact that it would have been better to administer a diagnostic test during the course design stage. Following this thought, the activities and materials were designed without knowing if they were challenging for the students. Additionally, one of the students, who had a higher level of proficiency than her classmates, commented that sometimes she would have rather worked individually as she was constantly concerned if her classmates were participating or understanding what they had to do, which seemed to affect her learning process. Because this comment was made during the end of the Unit 1 evaluation, student teachers decided to create more activities in which students were able to choose whether to work individually or in pairs. Therefore, the researchers decided to see this as an opportunity to improve the teaching methods to be implemented. As Scrivener (2012) pointed out, when having mixed-level groups, it is important to

distribute the work in pairs or larger groups. This can be done by mixing “stronger and weaker students together” and assigning to the stronger student “the task of guiding and supporting the other students” (p. 88). The previous technique was applied during the course by assigning roles to each student when working with peers. The idea was to reduce stress levels and increase confidence when speaking. Even though the student teachers adapted some of the activities to make them more challenging for the most proficient students, there was still a concern regarding not being able to fully accomplish this aspect because the tasks might have been difficult for the less proficient students.

Overall, participants graded the units with a score of 9, which shows their appreciation for the course designed for them. Regarding the activities, 77.8% of the participants strongly agreed on the fact that the activities were well organized and useful. Also, 57.1% of the participants rated the materials used as excellent, and the content was considered very good by 57.1%. The comments gathered in the questionnaires provided valuable input to make important adjustments that the course for microbiologists required to be better. By administering these questionnaires, it was possible to learn what the perceptions of the students were, as the feedback received gave the student teachers enough assessment to reflect on the previously created material to incorporate more challenging tasks. The responses showed that the participants were pleased with the class activities used to cover the course contents, and the course met the needs and expectations of the learners.

Conclusions

This study intended to determine the extent to which the English for Microbiology Online course was effective in terms of vocabulary learning, speaking activities, and materials used. After analyzing the data, several conclusions can be drawn. First, the study intended to determine if vocabulary learning could be improved by using a vocabulary log as a tool for learning. In this regard, the course was effective since students were able to complete their personal logs including more words than required. The students were able to explore scientific language covered in class, as well as terms they explored on their own. This showed a great level of engagement, as students fully took advantage of this tool. The students were able to use the vocabulary items that they had included in their projects in other ESP course assignments. Furthermore, students' perceptions were positive regarding the usefulness of the vocabulary log.

Second, this study showed that there was an overall improvement in the students' oral production, demonstrating the effectiveness of the speaking activities implemented throughout Unit 2. The participants improved their pronunciation and fluency when uttering sentences. This was demonstrated in their performance when they role played a real-life task in the microbiology field: an auditor interacting with a microbiologist. Most students used accurate grammar structures and correct pronunciation in this task. This performance was similar in the students' final oral presentation.

The participants showed great improvement. They expressed themselves clearly and fluently producing accurate sentences. This fact may be interpreted as enhancement of students' speaking skills, which was the main objective of Unit 2. Moreover, the topics they selected were at a higher level of difficulty than some of the topics covered in class. We concluded that the fact of selecting more challenging topics indicated that they might have not been as demanding or that the students were eager and motivated to take a challenge. They demonstrated that they had learned a great deal of vocabulary as a good number of their logged words were present in this oral task. In addition, their expressions used and the delivery of the message indicated thorough knowledge of presentation skills.

Third, participants agreed on the fact that the activities and materials were helpful for microbiology students. The students were incredibly motivated and pleased with the course as their comments included several notes full of gratitude. Most of the students agreed on the fact that the materials selected to teach microbiology-related topics were engaging and that this allowed the class activities to be more dynamic. Additionally, students showed a great deal of appreciation for the content taught throughout the course as it was directly related to activities that they would have to face in their future as microbiologists. In summary, we can conclude that the ESM course was effective since it helped the students learn technical vocabulary, enhance their pronunciation, fluency, and accuracy.

Recommendations

This section highlights some recommendations that may aid other English teachers to obtain better results in future research projects. Firstly, it would be important for future researchers to consider conducting an in-depth investigation of the type of material the students have to read as part of their program of study to obtain more detailed information about up-to-date scientific articles. This would help the instructors to develop more challenging and appropriate activities that cover the different English levels of the group. Secondly, future research should further investigate the impact of using a vocabulary log as a final project and form of both formative and summative assessment since this tool appeared to have helped participants learn vocabulary by exploring the language on their own and in a motiving way.

Furthermore, it would be beneficial for future research projects to ensure that proficiency examinations take place prior to the design of the course to assess the extent to which a group of participants is homogenous in their language level. This would help the researchers in their planning and design of course materials and activities. For future studies, it would be beneficial to investigate other job opportunities microbiology students have once they graduate. This would help to create more material to use in class that can adapt to a variety of scenarios they can face in the future.

Lastly, in terms of collecting data from participants taking an online course, we strongly recommend that questionnaires and surveys be administered well in advance to increase the likelihood of student participation, ensuring a high response rate. This strategy also enables the researchers to respond or follow up in ample time if data is insufficient, especially when physical gatherings where individuals fill out forms is not an option.

Limitations

This research faced several limitations that could have affected the overall performance of the group as well as the process of data collection. The first factor that might have affected the results regarding the group's performance was not being able to administer a diagnostic test. This would be the most important limitation of this study as it would have been better to perform a more rigorous analysis on the students' English knowledge to create tasks that better respond to the participants' needs. As the group assigned for this study was heterogeneous, some of the planned activities, which required a certain level of complexity to be completed, were not entirely accomplished because some students' English skills did not permit them to complete the tasks in a timely manner. This became a limiting factor because during the breakout room activities some students would work more rapidly than others leaving the less proficient students behind. To balance the amount of work to be done in each task, we grouped the students with

lower proficiency with the ones that demonstrated to have a higher proficiency level to have them work collaboratively and help each other.

In terms of limitations during the data collection process, there was a lack of participation from the students to answer the last questionnaire. We can assume that this happened because the questionnaire was sent at the end of the course which resulted in the researchers following up with the students for several weeks as the response rate was low, and more data was necessary to answer the last research question. Even though the response rate increased there was still a small number of students' responses missing. To remove this limitation, it would have been better to send out the last instrument at least one week before the course ended.

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Appendices

Appendix A: Student Needs Analysis Invitation

Estimados estudiantes y docentes de Microbiología

Esperamos estén muy bien. De parte de nuestro equipo de trabajo para el proyecto de Maestría en Enseñanza del Inglés, agradecemos su interés en recibir un curso de inglés con nosotros.

Nuestro mayor interés es crear un espacio de aprendizaje en el que ustedes se sientan a gusto y que así su experiencia sea provechosa. Es debido a esto que la naturaleza del curso se desarrollará basada en las necesidades que ustedes como estudiantes estén interesados en cubrir. El curso se ofrecerá de manera gratuita durante el segundo semestre del año lectivo 2020, dentro de las instalaciones del Campus Universitario Rodrigo Facio.

En este momento nos encontramos en el proceso de recolección de datos para así organizar un curso que responda directamente a sus necesidades e intereses. Es por esto, que su participación respondiendo los próximos formularios será de gran ayuda para nosotros. Estamos muy contentos de poder compartir este curso con ustedes y de antemano agradecemos su participación en el mismo.

Agradecemos la confirmación de recibido a este mensaje para así continuar recibiendo información sobre el curso.

Se despiden,

Mauli Chinambu

Diego Tenorio

Jessica Whitak

Appendix B: Student Needs Analysis Questionnaire

Cuestionario para Estudiantes de Microbiología

Este cuestionario tiene como finalidad obtener información para el diseño de un curso de inglés para estudiantes de la Facultad de Microbiología de la Universidad de Costa Rica. El mismo se realizará con el consentimiento de los/las participantes. Toda respuesta obtenida será confidencial. No anticipamos ningún riesgo durante este proyecto; sin embargo, el/la participante tiene el derecho de detenerse y retirarse del proyecto en cualquier momento. Además, los/las participantes pueden tener total certeza que las respuestas brindadas no afectarán su estadía en el curso. Agradecemos, de antemano, su colaboración.

I. Marque con una X la opción correspondiente.

1. Indique su edad.

   ( ) 19- 25 años

   ( ) 26- 30 años

   ( ) 31-35 años

   ( ) 40 años o más

2. Seleccione su situación profesional actualmente.

   ( ) estudiante ( ) profesor (a) ( ) otro

3. Si es un estudiante, indique el año de carrera que se encuentra cursando en este momento.

   ( ) Primer año ( ) Cuarto año
   ( ) Segundo año ( ) Quinto año
   ( ) Tercer año ( ) No aplica

4. Indique los lugares donde ha estudiado inglés.

( ) Pre-escolar
( ) Escuela
( ) Colegio
( ) Instituto
( ) Universidad
( ) Curso en línea
( ) Autodidacta
( ) Otro (especifique) : _____

5. Indique los cursos de inglés que ha tomado.
   ( ) Conversacional
   ( ) Curso de inglés específico para alguna carrera
   ( ) Curso de lectura y escritura
   ( ) Preparación para examen: TOEIC, TOEFL, IELTS.
   ( ) Otro: (especifique): _____
6. Indique el nivel de manejo del idioma en las siguientes habilidades.

Hablar	
( )	Básico (bajo): conoce unas cuantas palabras y expresiones, pero no puede sostener una conversación. Gramática, vocabulario y pronunciación limitado.
( )	Básico (alto): conoce algunas palabras y expresiones comunes. Puede sostener una conversación en temas de uso diario. Gramática, vocabulario y pronunciación algo limitado.
( )	Intermedio (bajo): tiene buena fluidez cuando se discuten temas comunes. Demuestra problemas con gramática, vocabulario y pronunciación con nuevos temas.
( )	Intermedio (alto): puede desenvolverse tranquilamente con temas y situaciones que ya conoce. Tiene problemas aún con vocabulario, gramática y pronunciación.
( )	Avanzado: puede conversar fluida y naturalmente en la mayoría de

	temas. Poca dificultad con vocabulario, gramática y pronunciación.

Escuchar	
( )	Básico (bajo): conoce unas cuantas palabras y expresiones, pero no puede sostener una conversación. Gramática, vocabulario y pronunciación limitado.
( )	Básico (alto): conoce algunas palabras y expresiones comunes. Puede sostener una conversación en temas de uso diario. Gramática, vocabulario y pronunciación algo limitado.
( )	Intermedio (bajo): tiene buena fluidez cuando se discuten temas comunes. Demuestra problemas con gramática, vocabulario y pronunciación con nuevos temas.
( )	Intermedio (alto): puede desenvolverse tranquilamente con temas y situaciones que ya conoce. Tiene problemas aún con vocabulario, gramática y pronunciación.
( )	Avanzado: puede conversar fluida y naturalmente en la mayoría de temas. Poca dificultad con vocabulario, gramática y pronunciación.

Leer	
( )	Básico (bajo): conoce unas cuantas palabras y expresiones, pero no puede sostener una conversación. Gramática, vocabulario y pronunciación limitado.
( )	Básico (alto): conoce algunas palabras y expresiones comunes. Puede sostener una conversación en temas de uso diario. Gramática, vocabulario y pronunciación algo limitado.
( )	Intermedio (bajo): tiene buena fluidez cuando se discuten temas comunes. Demuestra problemas con gramática, vocabulario y pronunciación con nuevos temas.
( )	Intermedio (alto): puede desenvolverse tranquilamente con temas y situaciones que ya conoce. Tiene problemas aún con vocabulario, gramática y pronunciación.
( )	Avanzado: puede conversar fluida y naturalmente en la mayoría de temas. Poca dificultad con vocabulario, gramática y pronunciación.

Escribir	
( )	Básico (bajo): conoce unas cuantas palabras y expresiones, pero no puede sostener una conversación. Gramática, vocabulario y pronunciación limitado.
( )	Básico (alto): conoce algunas palabras y expresiones comunes. Puede sostener una conversación en temas de uso diario. Gramática, vocabulario y pronunciación algo limitado.
( )	Intermedio (bajo): tiene buena fluidez cuando se discuten temas comunes. Demuestra problemas con gramática, vocabulario y pronunciación con nuevos temas.
( )	Intermedio (alto): puede desenvolverse tranquilamente con temas y situaciones que ya conoce. Tiene problemas aún con vocabulario, gramática y pronunciación.
( )	Avanzado: puede conversar fluida y naturalmente en la mayoría de temas. Poca dificultad con vocabulario, gramática y pronunciación.

7. ¿Cómo calificaría usted su nivel de manejo del inglés en términos de gramática?

   ( ) Básico (bajo)

   ( ) Básico (alto)

   ( ) Intermedio (bajo)

   ( ) Intermedio (alto)

( ) Avanzado

8. ¿Cómo calificaría usted su nivel de pronunciación del inglés?

( ) Básico (bajo)

( ) Básico (alto)

( ) Intermedio (bajo)

( ) Intermedio (alto)

( ) Avanzado

9. ¿Cómo calificaría usted su manejo de vocabulario en inglés?

( ) Básico (bajo)

( ) Básico (alto)

( ) Intermedio (bajo)

( ) Intermedio (alto)

( ) Avanzado

10. Indique el nivel de dificultad que cada habilidad en inglés presenta para usted.

Habilidad	Muy Fácil	Fácil	Difícil	Muy Difícil
Hablar				
Escuchar				
Leer				
Escribir				

II. Información sobre el uso de inglés en la universidad.

11. ¿Qué tan importante cree usted que es el uso del inglés para su carrera universitaria?

( ) No importante

( ) Poco importante

( ) Neutro

( ) Importante

( ) Muy importante

12. Indique la frecuencia con la que usted usa las siguientes habilidades en inglés en la universidad.

Habilidad	Nunca	Pocas veces	Muchas veces	Siempre
Hablar				
Escuchar				
Leer				
Escribir				

13. Seleccione la(s) opción(es) que indiquen las actividades en las que usted necesita inglés como estudiante para su carrera de Microbiología.

Hablando	Escuchando	Leyendo	Escribiendo
( ) Hablar con profesores/estudiantes extranjeros para tratar/resolver problemas sobre la industria del agua, alimentos y fármacos.	( ) Ver videos que tratan acerca de temas/problemas sobre la industria del agua, alimentos y fármacos.	( ) Leer artículos sobre funciones que microbios desempeñan en la industria de alimentos, medio ambiente y fármacos.	( ) Escribir investigaciones/reportes sobre estructuras celulares y genética.
( ) Explicar oralmente procesos de sobre resistencia de microbios a los antibióticos.	( ) Escuchar presentaciones sobre nuevos descubrimientos de infecciones.	( ) Leer libros sobre pandemias/brotes.	( ) Escribir correos electrónicos a otros profesores/estudiantes extranjeros para intercambiar información sobre investigaciones científicas.
( ) Hacer presentaciones al grupo o clase sobre casos de intoxicación alimenticia	( ) Asistir a conferencias científicas	( ) Leer instrucciones o formularios	( ) Escribir exámenes para su carrera

( ) Hablar en reuniones/conferencias con otros microbiólogos/expertos para determinar origen de brotes.	( ) Recibir clases de profesores extranjeros	( ) Investigar información en línea	( ) Escribir resúmenes de procesos de microbiología

( ) Otro: _____

III. Información sobre el uso de inglés en su futuro profesional.

14. Seleccione la(s) opción(es) que indiquen las actividades en las que usted, como futuro profesional en microbiología, va a tener que utilizar el idioma inglés.

Hablando	Escuchando	Leyendo	Escribiendo
( ) Analizar muestras de alimentos, agua o fármacos con otros microbiólogos.	( ) Ver videos sobre charlas/exposiciones acerca de vacunas, anticuerpos o fármacos.	( ) Leer investigaciones acerca de vacunas, anticuerpos o fármacos.	( ) Escribir reportes sobre investigaciones de vacunas, anticuerpos o fármacos.

( ) Participar en reuniones con otros microbiólogos para analizar muestras de alimentos, agua o fármacos.	( ) Tomar notas en reuniones/conferencias sobre análisis de microbios en alimentos y/o agua.	( ) Leer manuales para operar equipo de laboratorio científico.	( ) Escribir correos electrónicos para reportar muestras analizadas de alimentos, agua o fármacos.
( ) Organizar trabajos en equipo con otros microbiólogos	( ) Entender instrucciones en reuniones/conferencias sobre procesos de análisis de muestras.	( ) Leer reportes de investigaciones y evaluar la exactitud de los resultados de muestras de alimentos, agua o fármacos.	( ) Escribir planes y etapas para realizar una prueba o proyecto sobre infecciones para analizar.

( ) Otro: _____

15. Seleccione con quién es más probable que usted utilice el idioma.
( ) Personas nativas del idioma ( ) Otros no-nativos del idioma

IV. Preferencias

16. Seleccione la(s) opción(es) que indiquen sus preferencias sobre el desarrollo del curso de inglés para estudiantes de microbiología y futuros profesionales de microbiología.

Organización de Trabajo	Actividades Hablando	Actividades Escuchando	Actividades Leyendo	Actividades Escribiendo
( ) Trabajar solo	( ) Entablar conversaciones	( ) Ver videos en clase sobre temas relevantes	( ) Leer textos cortos	( ) Escribir resúmenes basados de textos científicos
( ) Trabajar en parejas	( ) Hacer presentaciones orales	( ) Escuchar podcasts o audios	( ) Leer secciones de investigaciones científicos	( ) Redactar explicaciones de sistemas o procesos
( ) Trabajar en grupo	( ) Discutir temas en grupos para investigar procesos.	( ) Escuchar la información dada en capacitaciones	( ) Leer artículos en línea	( ) Escribir instrucciones para el uso del equipo del laboratorio

( ) Otro:_____

17. ¿Qué habilidades le gustaría que el curso de inglés para microbiología le ayudara a desarrollar? Para cada una escriba un número del 1 al 4, donde 1 es la de mayor énfasis y 4 es la de menor énfasis.

Habilidad	Énfasis (1-4)
Hablar	

Escuchar	
Leer	
Escribir	

18. ¿Qué espera usted aprender en el curso de inglés para estudiantes de microbiología? Por favor, sea lo más específico posible.

_____
_____
__

19. El curso de inglés será ofrecido en el segundo semestre los miércoles de 5:00 pm a 7:30 p.m. ¿Este horario es conveniente para usted?

Sí _____ No _____

¡Muchas gracias por su participación!

Appendix C: Expert Needs Analysis Interview

Entrevista para Expertos en Microbiología

Esta entrevista tiene como finalidad obtener información para el diseño de un curso de inglés para estudiantes de la Facultad de Microbiología de la Universidad de Costa Rica. La misma se realizará con el consentimiento de los/las participantes. Toda respuesta obtenida será confidencial. Se les solicitará el consentimiento de los expertos en microbiología para grabar la entrevista con el fin de revisar sus respuestas cuando sea necesario. Las entrevistas se llevarán a cabo por medio de Zoom.

Parte I. Información Profesional

1. ¿Cuál es su título profesional en su trabajo o en la universidad?
2. ¿En cuál área de microbiología se especializa en su área de trabajo?
    a. Aguas
    b. Alimentos
    c. Salud
    d. Otro
3. ¿En cuál área podría trabajar como microbiólogo?
    a. ¿Dónde puede trabajar en el área clínica?
    b. ¿En dónde se encuentra su mayor empleador?
    c. ¿Puede trabajar en otro lugar que no sea el área clínica?
4. En la universidad, ¿le ofrecieron la opción de estudiar en algún área en particular o pueden elegir cualquier área?

Parte II. Área de Trabajo

1. En su área de trabajo, ¿utiliza en algún momento el idioma inglés?
    a. ¿Para qué lo utiliza?

   b. ¿Cuándo lo utiliza?
   c. ¿Con quién lo utiliza?
   d. ¿Qué hace con la información que obtiene en inglés?
2. ¿Como estudiante de microbiología, ¿que utilizó más cuando tuvo que estar en contacto con el idioma inglés?
   a. Hablar
   b. Escuchar
   c. Leer
   d. Escribir
3. En su área de trabajo y como microbiólogo, ¿que utiliza más a la hora de estar en contacto con el idioma inglés?
   a. Hablar
   b. Escuchar
   c. Leer
   d. Escribir
4. ¿Con qué fin utilizan las habilidades mencionadas anteriormente en el área de trabajo?
   a. ¿Hacen algún tipo de reportes?
   b. ¿Leen algún tipo de artículo en particular?
      i. ¿Para qué leen estos artículos?
      ii. ¿Qué deben hacer con esos artículos?
   c. ¿Tienen que escuchar algún tipo de conferencia en inglés?
      i. ¿Qué hacen en esas conferencias?
      ii. ¿Qué necesitan para desempeñarse bien en esas conferencias?
   d. ¿Hablan con alguien en particular?
      i. ¿Para qué hablan con esa persona?
      ii. ¿Tienen que utilizar cierta formalidad a la hora de dirigirse a esa persona?

5. ¿Cuál es la habilidad en inglés que se utiliza más a la hora de trabajar en el área de microbiología?
    a. ¿Por qué cree que se utiliza más esa habilidad?
    b. ¿Hay alguna otra habilidad que considere también importante después de la primera que mencionó?
    c. ¿En qué orden de importancia para su trabajo colocaría las habilidades mencionadas?
6. ¿En qué idioma son las entrevistas de trabajo? ¿Les solicitan algún nivel de inglés en particular?

Parte III. Microbiología en la Universidad

1. Como profesor de microbiología, cuando asigna un artículo en inglés, ¿en qué deben enfocarse los estudiantes? ¿se enfocan en un resumen, en los resultados, analizan todo el documento?
2. Después de leer, ¿qué actividades hacen los estudiantes con esos artículos?
    a. Esas actividades, ¿son en español o inglés?
    b. ¿Hay alguna necesidad de escribir o hablar en inglés?
3. ¿Sabe si los estudiantes ya están al tanto que deben saber inglés antes de entrar a la carrera?
4. ¿Hay alguna otra habilidad de peso, aparte de lectura, que se requiera para completar las asignaciones que tienen los estudiantes?
5. ¿Los estudiantes participan en congresos nacionales o extranjeros? ¿En qué idioma se imparten?
6. En su opinión, ¿en qué área deberíamos enfocarnos para enseñar el curso de inglés?

Parte IV. Curso de Inglés

1. ¿Cuál habilidad debería ser obligatoria para incluir en el curso de inglés?

2. Del 1-4 con 1 siendo menos importante y 4 siendo más importante, qué nivel de importancia en el trabajo le daría en inglés a:
    i. hablar
    ii. escuchar
    iii. escribir
    iv. leer
3. ¿Podría compartir con nosotros algún tipo de material, documento, artículos o páginas web en inglés que actualmente esté utilizando en el trabajo?

¡Muchas gracias por su participación!

Appendix D: Student Needs Analysis Interview

Entrevista para Estudiantes de Microbiología

Esta entrevista tiene como propósito dar seguimiento al cuestionario ya aplicado a los estudiantes de la Facultad de Microbiología de la Universidad de Costa Rica. El mismo se realizará con el consentimiento de los/las participantes. Toda respuesta obtenida será confidencial. Se les solicitará el consentimiento a los/las estudiantes para grabar la entrevista con el fin de revisar sus respuestas cuando sea necesario. Las entrevistas se llevarán a cabo por medio de Zoom.

Parte I

Inglés en la carrera de microbiología

1. ¿Reciben algún curso de inglés durante su carrera de microbiología?
2. ¿Podrían darnos ejemplos claros de cómo utilizan inglés en su carrera?
    - 2.1. ¿Qué tipo de actividades hacen en clase que involucren el idioma?
    - 2.2. ¿Qué actividades les piden sus profesores que involucren el idioma inglés en clase o fuera de ella?
3. Con los artículos/libros que tienen que leer en la carrera, ¿qué tipo de estrategias / técnicas utilizan para comprender los textos?
    - 3.1. ¿Para qué tienen que leer esos artículos?
    - 3.2. ¿Qué tipo de artículos son?
    - 3.3. ¿Qué asignaciones tienen después de leer esos artículos?
    - 3.4. ¿Tienen alguna evaluación después de que leen los artículos o kits?
        - 3.4.1. Esa evaluación, ¿es en español o en inglés?
        - 3.4.2. Las asignaciones, ¿son en español o en inglés?
        - 3.4.3. Los kits o artículos, por lo general, ¿vienen en inglés o español?

3.4.4. ¿Por qué tienen que leer todo en inglés?

3.4.4.1. ¿Por qué creen que casi todo lo que leen o les piden leer es en inglés?

3.4.4.1.1. ¿Qué consideran que tienen que mejorar para entender mejor lo que leen?

3.4.4.1.1.1. ¿Cómo hacen si no entienden algo?

4. En la carrera de microbiología, ¿qué habilidad utilizan más, escritura, lectura, escucha o habla?
5. ¿Cuáles habilidades utilizan menos en la carrera de microbiología y ya como profesionales basado en lo que ya han escuchado por parte de expertos?

5.1. ¿Qué podríamos nosotros como profesores incluir en el curso para ayudarles a mejorar la necesidad que tienen de aprender inglés?

Parte II: Tipos de aprendizajes

1. ¿Qué tipo de estilo de aprendizaje cree que tiene?

1.1. A la hora de estudiar consideran que son más ¿visuales, kinestésicos (necesitan tocar, hacer, crear), toman nota, auditivos, algún otro?

1.2. ¿Se explican a ustedes mismos la materia?

1.3. ¿Hacen algún tipo de resumen?

1.3.1. Esta práctica de resumir, ¿la llevan a cabo en clase?

1.3.2. ¿Cómo hacen esos resúmenes?

1.4. ¿Necesitan explicarles a otros lo que han aprendido?

1.5. ¿Crean algún tipo de esquemas?

1.5.1. Esos esquemas, ¿tienen colores o son neutros?

Parte III: Material

1. ¿Tienen algún libro que han usado en sus cursos que nos puedan proveer para que podamos revisarlo para ver qué tipo de lectura hacen?
2. ¿Utilizan algún website o base de datos que podamos nosotros utilizar como base para tener una idea de lo que leen?
3. ¿Pueden enviarnos el nombre de libros o artículos que les haya llamado la atención, les haya costado leer o entender?
    a. ¿Qué es lo que les ha costado entender de esos artículos?

Parte IV

Ámbito profesional

1. ¿En cuál año de la carrera se encuentran?
    a. ¿Qué área de microbiología les llama más la atención?
    b. ¿En cuál área le gustaría especializarse una vez se gradúe y comience a trabajar?
2. Pensando como profesionales a futuro, ¿qué tanto utilizarían el idioma inglés a diario?
    a. ¿Con quiénes estarían en contacto la mayor parte del tiempo?
    b. ¿Qué tipo de comunicación utilizarían en inglés en su área del trabajo?
    c. ¿Necesitan hablar con un auditor en un laboratorio?
        i. ¿Sobre qué hablan con ese auditor?
        ii. ¿Necesitan confirmar información por email, reuniones, utilizan alguna plantilla?
        iii. ¿Reciben alguna muestra?
            1. ¿Qué hacen con esa muestra?

2. ¿Qué tipo de información tienen que reportar y a quién?
3. ¿Para qué reportan esta información?
4. ¿Qué necesitan para reportar esa información?
5. ¿Cómo reportan esa información?

V Parte

Curso de inglés

1. ¿Cómo se siente teniendo tres profesores en el aula? Tendría un profesor guía y dos asistentes.
2. ¿Alguna vez han tomado algún curso en donde roten los profesores constantemente?
3. ¿Qué tipo de expectativas tienen del curso de inglés y de nosotros?
4. ¿Hay algo que debamos saber en particular para estar preparados antes de impartir este curso de inglés?
5. ¿Hay algo que ustedes puedan decir que necesitan saber sus profesores de inglés antes de impartir el curso para estudiantes de microbiología?

¡Muchas gracias por su participación!

Appendix E: Students' Syllabus

University of Costa Rica
Teaching English as a Foreign Language Master's Program
Instructors: Mauli Chinambu, Diego Tenorio and Jessica Whitaker
Remind code: @ems-ucr
Schedule: Wednesdays 5:00 p.m. - 7:50 p.m., Online

I. Course Description

English for Microbiology Students is an English for Specific Purposes online course designed to cover relevant microbiology scenarios a student or professional can face in the future. By the end of the course, the students will be able to properly interact with other professionals who belong to the same community in both written and spoken forms obtaining information from articles and scientific papers. The **EMS** course involves a total of fourteen lessons that will be taught by three teachers once a week every Wednesday. The following chart explains the tentative syllabus intended for this EMS course.

II. Goals

By the end of the course, students will be able to:

1. effectively demonstrate comprehension of academic and scientific articles related to microbiology (Unit name: **Deconstruction of a text: an insight of its parts**)
2. orally deliver information about microbiology to an audience of microbiologists, stakeholders, and other members of the scientific community (Unit name: **Tests Do Not Lie**)
3. successfully interact with members of the scientific community in various academic and professional settings regarding microbiology related topics (Unit name: **Interacting with Microbiologists**)

General Objectives

By the end of the units, students will be able to:

1. identify the usefulness and relevance of a scientific text
2. report results and conclusions from microbiology cases of study
3. define key microbiology concepts presented in a text
4. interpret laboratory procedures and instructions in a set of kits and manuals to operate equipment
5. deliver relevant information requested by an FDA/BSI auditor
6. express ideas related to clinical best practices when interacting with members of the scientific community
7. present microbiology related processes to members of the scientific community

Methodology

This course is based on real-life tasks microbiologists might experience while being at school or as future professionals. The purpose of the EMS program is to provide an enriching learning experience where English is practiced using scientific scenarios to develop and sharpen skills to communicate effectively in the language. Students are expected to attend at least 80% of the course. Although complete course participation is highly recommended, students are permitted to have a maximum of 3 justified or unjustified absences. After 3 absences the students will no longer be eligible to receive the participant's certificate.

In addition, students will be expected to sign into the Zoom platform 5 minutes prior to the session and make sure that their camera and audio are working effectively. The instructors will allow students to enter the class up until 5 minutes after the class start time. Students are required to use their camera at all times of the lesson, unless otherwise specified by the instructor. Please address the instructors as Ms. Chinambu, Mr. Tenorio, and Ms. Whitaker.

The course evaluation will be as follows:

Evaluation

Case study written report	**20%**
Case study oral presentation	**15%**
Conference Presentation	**25%**
Microbiologists' meetings roleplay	**25%**
Vocabulary/Expressions log	**10%**
Attendance	**5%**

Appendix F: Oral Presentation Guidelines

University of Costa Rica
Master's Program in TEFL
English for Microbiology Students
Chinambu, Tenorio, Whitaker
Project: Speaking Presentation
Handout 3

Instructions for Speaking Presentation (35%)

Remember this project is to be done in pairs or individually.

The purpose of this project is to put into practice the oral skills learned throughout Unit 2, including the techniques and strategies taught during class to give a good speech, formal presentation or perform a role play.

Organizing your presentation. In breakout rooms, you will:

1. Prepare to present your already chosen microbiology-related topic.
2. Return to the main session and tell us what you will present. Remember to mention your topic and the type of presentation you will do:
   a. Role Play
   b. Informative Speech

   **During your presentation, feel free to reuse and share the handouts we have used in class.
3. You can use any visual aid you desire: PowerPoint presentation, videos, audios…
4. Presentation time: **6 to 8 minutes**.

   If you are working in pairs, the presentation should be long enough to have equal participation from both students.

Appendix G: Evaluation of Oral Presentation

University of Costa Rica
Teaching English as a Foreign Language Master's Program
English for Microbiology Course – Online

Evaluation of Oral Presentation

Instructions: The student teachers will use this rubric to provide feedback to the students when doing their oral presentations. This evaluation sheet intends to gather information on how the students performed during their project presentation.
Part A: Indicate the degree of student performance in the oral presentation by checking the corresponding box for each statement.

1 – below average **2 – average** **3 – very good** **4 – excellent**

Total points obtained: Grade:

Percentage:

Student's name:		**Assigned rate**			
		1	**2**	**3**	**4**
1.	Student's preparation to present the topic was				
2.	The organization of student's ideas was				
3.	Student's message delivery during the presentation was				
4.	Student's oral abilities were				
5.	The student's tone of voice was				
6.	Student's pronunciation was				
7.	Student's use of vocabulary was				
8.	Student's use of grammar was				

9.	The way the student handled all the questions asked was				
10.	Student's overall performance during the whole presentation was				

Part B: Provide any additional comments on students' overall performance and aspects to be improved.

Observations:

Evaluation scale definition			
1 – Below average	**2 – Average**	**3 – Very good**	**4 – Excellent**
The student's performance lacks accuracy. Student struggles a lot getting the message across. There is minimal consistency shows little preparation from the student in the topic selected. There were more than 8	The student's performance is somewhat accurate. Student is able to get the message across with some difficulties. Student shows some preparation for the topic selected. There were 5-8 mistakes made in	The student's performance is very good. Student is able to get the message across with some minimal difficulties. Student shows very good preparation for the topic selected. There were 3-4 mistakes made in	The student's performance is excellent. Student is able to get the message across with no difficulties. Student shows appropriate preparation for the topic selected. There were 1-2 mistakes made in

mistakes made in terms of grammar and pronunciation.	terms of grammar and pronunciation.	terms of grammar and pronunciation.	terms of grammar and pronunciation.

Appendix H: Unit 1 Evaluation Form

University of Costa Rica
Teaching English as a Foreign Language Master's Program
English for Microbiology Course – Online

Unit 1 Evaluation Form

Instructions: At the end of each unit, please use the form below to provide valuable feedback about the unit and its content. This survey intends to gather information on your experience throughout the unit and your opinion on the class activities/tasks in order to make improvements for the next unit(s). There are 3 parts (A, B & C).

Name of the unit: _____

Part A: Please give your opinion on each aspect below by checking the box that best describes your opinion.

		1	2	3	4	5
1.	The activities in this unit helped me to achieve the overall target unit goal.					
2.	The activities were appropriate for my level of English.					
3.	The activity instructions in this unit were clear and easy to understand.					
4.	The activities in this unit were dynamic and engaging.					
5.	The unit included activities that I need to perform as a microbiology student.					
6.	The unit included activities that I will need to perform as a future microbiologist.					

7.	This unit helped me to learn new microbiology related vocabulary.					
8.	The unit and sequence of activities was well organized.					
9.	This unit helped me to improve the target English skills.					
10.	The unit included an appropriate final assessment activity that only evaluated content that was taught in class.					

Part B: Please complete the statements below with your opinion and/or ideas.

A. In the next unit, I would like to **continue to do/learn about**

_____

_____

_____

B. In the next unit, I would like to **change or include**

_____

_____

C. Overall, I would give this unit a grade of _____ (1=lowest and 10=highest score)

Part C: Please provide any additional feedback (comments, concerns, or questions) you have about the unit. This information will help the instructors to make any necessary changes for the next unit(s). You can write in Spanish if you prefer.

_____

_____

_____

Part D: Vocabulary Learning

1.Do you think learning vocabulary is important for your speaking skills?

( ) Strongly agree
( ) Agree
( ) Neutral
( ) Disagree
( ) Strongly disagree

2. Do you think vocabulary is important for your listening skills?

( ) Strongly agree
( ) Agree
( ) Neutral
( ) Disagree
( ) Strongly disagree

3. Based on your perception, how would you describe your English level in microbiology vocabulary?

( ) Low-basic
( ) High-basic
( ) Low-intermediate
( ) High-intermediate
( ) Advance

4. Do you have any strategies to learn new microbiology vocabulary? Explain.

_____

_____

_____

_____

Thank you for completing this survey!

Appendix I: End of Course Evaluation

University of Costa Rica
Teaching English as a Foreign Language Master's Program
English for Microbiology Course – Online

End of the Course Evaluation

Instructions: The questions below will present several statements related to the second unit taught during the English for Microbiology Course - Online. Read each statement and select the option that best describes your opinion regarding the teacher's performance (excellent, very good, average, or below average). Please mark only one option per statement.

Date: _____

Part A. Lesson Planning and Preparation				
	Excellent	Very Good	Average	Below Average
1. The teacher showed _____ preparation for the class.				
2. The class content organized by the teacher was				
3. The understanding and knowledge the teacher showed about the class content was				
4. The allotted time for each activity was				
5. The materials used during the class were				
Part B. Vocabulary log project				

	Very Useful	Useful	Somehow Useful	Not Useful
13. Based on your experience creating the vocabulary log, do you consider that it was:				

14. Did you feel more conformable using some of the words after you included them in the vocabulary log? Explain.

15. Overall, what do you think about using the vocabulary log as a learning tool? Explain.

Part C. Thoughts and opinions

Use this space to provide any suggestions or general comments that you consider relevant for the teacher to know. Write in Spanish if you feel more comfortable.

Use this space to provide any suggestions or general comments (about the teachers' performance or vocabulary log) that you consider relevant for the teachers to know. Write in Spanish if you feel more comfortable.

Thank you for completing this survey and for your participation in this course!

Appendix J: Lesson Plans and Materials

University of Costa Rica
Master's Program in TEFL
English for Microbiology Students
Chinambu, Tenorio, Whitaker
Lesson Plan # 1

Date: 08/19/2020
Student teacher: Diego Tenorio
Assistants: Mauli Chinambu and Jessica Whitaker

Lesson Plan 1 and Materials

ESP Course: EMS

Unit # 1: Deconstruction of a text: an insight of its parts **Approximate time for task cycle:** 120 minutes

Unit goal: By the end of the course, students will be able to effectively demonstrate comprehension of academic and scientific articles related to microbiology by analyzing and selecting specific and meaningful information relevant for their studies.

General objective: By the end of the unit, students will be able to successfully identify the usefulness and relevance of a scientific text by skimming and scanning specific information from the abstract, justification, methods, or results section.

Specific objectives: By the end of the lesson, students will be able to:

1. Promptly recognize the name of the main sections in a scientific paper by selecting an answer during a trivia game.
2. Successfully identify the steps involved in skimming and scanning by answering comprehension questions in a group discussion and on a quiz.
3. Efficiently demonstrate the use of skimming and scanning in an academic article by filling out a graphic organizer in small groups.
4. Effectively discriminate information in an article to extract the main ideas and supporting details by skimming and scanning.
5. Accurately apply skimming and scanning by completing a text organization chart.
6. Successfully report findings by sharing the details of the text organization chart to classmates.

7. Accurately recognize the past tense of commonly used verbs in articles by listing them and numbering the times they appear in a scientific text.
8. Appropriately revise their own reading process by answering some monitoring comprehension questions.

Objectives	Procedures	Language (Vocabulary, expressions, useful language, grammatical or phonetic features)	Strategies	Macro Skills	Time allotted
1	**Warm-up** T will greet Ss and ask them to select one emoticon figure from Zoom's annotations feature as their game counter. Ss can choose the same emoticon because their names will also appear to avoid confusion. T will explain that Ss will work individually in a Trivia game to get familiarized with some vocabulary related to the different sections of academic articles. The game will also	**Vocabulary:** Research articles: Abstract, Introduction, Methods, Results, Conclusion, References, Skimming, Scanning	Schema Activation	R L S	10'

	include some riddles to enhance Ss attention during the task. T will share a PPT with some questions. Each question will have four options. Ss will place their emoticon in the box with the answer they think is the correct one. T will review the correct answer with Ss. T will also clarify that it is fine if they do not know the answer right away as this is the topic to be studied during the class. **Materials** PPT Trivia Game (online resource)				
2	**Pre-task 1**	**Vocabulary** Skimming, scanning, key	Schemata activation	L S	5’

	T will tell the Ss that they will be doing background activation activity before learning the target reading strategies. Ss will be randomly assigned into BR in groups of 5 to discuss 2 questions. They must take notes and be prepared to share their ideas with the whole class. The questions will be posted in the chat box along with UL for discussion. T and AT will check in with each group to provide assistance as necessary. Question1: *What do you look for when you are about to read an academic article? Do you look for images? Do you look at bolded words?* Question 2: *Imagine that you have been asked to find an academic article*	words, content words, visual cues <u>Keywords in article to highlight during explicit teaching:</u> COVID-19, testing, therapy, cultures, virus, specimens, culturability, genome copy, genome integrity, clinical isolation. **Useful Language** <u>Sharing Ideas</u> I believe that _____. I usually/always/often _____. I prefer to _____. I would write _____.	Asking for Clarification	R	

	about culture-based virus isolation regarding COVID-19 specimens. What keywords would you write in the search engine in order to find an appropriate article? What keywords would you expect to find in the title? After 5 minutes, Ss will return to the main session. T will elicit responses from the whole group. T will then display an article on culture-based virus isolation pertaining to COVID-19. T will explicitly explain skimming and scanning by using the annotation feature on Zoom and highlighting the textual and visual features. Step 1: Skimming	I would search for _____. <u>Asking for Information</u> How about you? What do you think? <u>Asking for Clarification</u> Can you please repeat that? Can you please explain that again? What do you mean by ____?	Listening for specific information Taking notes		10’

	- look for headings, titles, subtitles, visual cues, and key points from introduction, conclusion, and paragraph topic sentences Step 2: Scanning - look for content words such as key verbs, nouns, adjectives - look for textual cues such as bold-faced words, variations in font, and bullet points Step 3: Evaluating - decide if the article meets your research needs, if so, read thoroughly Ss will then be given a quiz on skimming and scanning using				

	Handout #2. The quiz will have 5 questions and will elicit responses anonymously. *Note*: there is an answer key for the quiz shared in the Google Drive folder *Note*: UL will be provided in the Zoom chat box **Feedback** T will check for understanding during the quiz. The quiz results will provide feedback to the Ss regarding the extent to which they are understanding the concepts. **Materials**				

	Handout #1: Article on COVID-19 Test (online PDF article) https://jcm.asm.org/content/jcm/58/8/e01068-20.full.pdf Handout #2: mentimeter.com (online quiz) The digit code 54 81 50 7 https://www.menti.com/xf7xrkf439				
3	**Pre-task 2** T will explain the following task and scenario to the Ss in the main session. Ss will be sent back to their BR with their initial group of 5. You are doing research on how to reduce the transmission of COVID-19 in order to write a report for your	**Vocabulary** Keywords in article: Transmission, acute respiratory syndrome, built environments, pathogen, infection disease, mediated pathways, droplets, receptors	Asking for clarification Negotiating	L S R W	15’

	supervisor. You are looking for appropriate articles. Skim and scan the article in Handout #4 with your group and then fill out the graphic organizer on Handout #3 with the information you found. Assign roles to each group member: 1 timekeeper, 2 writers to write the information into the graphic organizer, 2 presenters to share the findings with the class. You must time yourself to make sure you are not spending too much time reading. Use the online timer to keep track of time. You have 5 minutes to skim and scan. You have 10 minutes to fill out the graphic organizer. T and AT will check in with each group and provide feedback and support.	**Useful Language** <u>Sharing Ideas</u> I think we should look for _____. The key words we need are _____. I think that this is important because _____. This is relevant because _____. This is an example of _____.	meaning Skimming and Scanning Reporting information to the class		

	Ss will return to the main session after 15 minutes and T will have each group present a section of the graphic organizer to the whole group. The distribution will be as follows: Group 1: Before skimming and scanning (Part A) Group 2: While skimming (Part B) Group 3: While scanning (Part C) Group 4: After skimming and scanning (Part D) Group 5: After skimming and scanning (Part D) *Note*: the UL will be provided on Handout #3 *Note*: AT will be in charge of moving	<u>Asking for Information</u> How about you? What do you think? <u>Asking for Clarification</u> Can you please repeat that? Can you please explain that again? What do you mean by ____?			10’

	the observers around the BR. *Note*: there is an answer key with examples, however, answers may vary. **Feedback** T will tell each group how they did in terms of finding appropriate information through skimming and scanning. **Materials** Handout #3 – Graphic Organizer: Skimming and Scanning an Academic Article (online PDF) Handout #4 **–** Reducing transmission of COVID-19 (online PDF) https://msystems.asm.org/content/msy				

	s/5/2/e00245-20.full.pdf https://www.online-stopwatch.com/countdown-clock/full-screen/				
Break: from 5:50 to 6:50 p.m.					
4, 5	**Main task** T will explain the difference between “main ideas and supporting details” in a text. This explanation will happen with all the Ss in the main session. Then, T will explain to Ss that they need to complete Handout #5 in which they will put into practice skimming and scanning. Ss will be granted access to a Google Drive folder where a series of scientific COVID-19 articles are located. Ss will select only one	**Useful Language** Which article should we select? We can use _____ as a key word. I don’t think ____ could be used as a keyword. I think the first / second / third main idea is ____.	Skimming and scanning Summarizing information Identifying main ideas and supporting details	R W L S	40’

6	article from the folder to complete the handout. Then, the Ss will be divided into groups of 4-5 people to work in BR. Once in the BR, the T will visit each group and will clear any doubts the Ss may have. After all groups have completed the handouts, they will return to the main session to share their findings and ideas with the rest of the class. To do this, each group will select a person from their team to present this information and they will share their screen if needed. The other groups will ask questions about the article discussed. These questions will be part of the UL provided to the Ss.	I think this part can be a supporting detail because ____. This article could work because it is about_____. We selected this article because_____.			

	Note: the UL will be provided in a Zoom chat box. *Note*: In case two groups select the same article, T will explain that even though they are working with the same material, they have selected different supporting details and different sections from the article. **Feedback** A PPT will be filled out with the information obtained from the BR. Ss will receive feedback on the use of skimming and scanning, use of verbs in past and grammar. *Note*: during the BR, the T and the AT will collaborate on a shared PPT to make notes on certain aspects that might require feedback. In the main				

	session, one of the AT will be in charge of taking notes as needed for additional feedback. *Note*: AT will be in charge of moving the observers around the BR. *Note*: there is no answer key as answers may vary. However, we have highlighted some of the options in the articles. **Materials** Handout #5 – Text organization chart				
7	**Post-task 1** T will ask Ss the tense in which most of the verbs are written in the scientific papers. T shows all the articles used during the lesson on the screen. T	**Useful Language:** **Simple Past verbs Activity:**	Monitoring Comprehension		10’

8	explains that Ss will go over them focusing on the past tense verbs that they had previously highlighted. Using Handout #6, Ss will complete the chart by listing all of the past tense verbs they found. They will write next to the past tense form the present tense form of the verbs and the number of times each verb appears in the different articles. **Post-task 2** T will explain the importance of monitoring one's reading process. Using Handout #7, Ss will work individually and they will answer some metacognitive questions regarding their process of reading. T will emphasize that all answers all valid as	What do you think this verb means? This one appears # times. I don't know what this verb means… **Monitoring Comprehension:** I think I read this part first… First, I did… and then… I'm not sure/ I don't remember how I read this…	Looking for specific information		

	each person's reading process is different. T will ask some Ss to share their answers about their reading process and the T will check the past tense verbs. *Note*: there is no answer key as answers may vary. However, we have highlighted some of the options in the articles. Handout #6 – Past tense verb chart Handout #7 – Monitoring comprehension questions				

Abbreviations: BR= breakout rooms, T= teacher, AT= assistant teacher(s), Ss=students, L= listening, S= speaking, W= writing, R= reading, UL= useful language, PPT= PowerPoint Presentation

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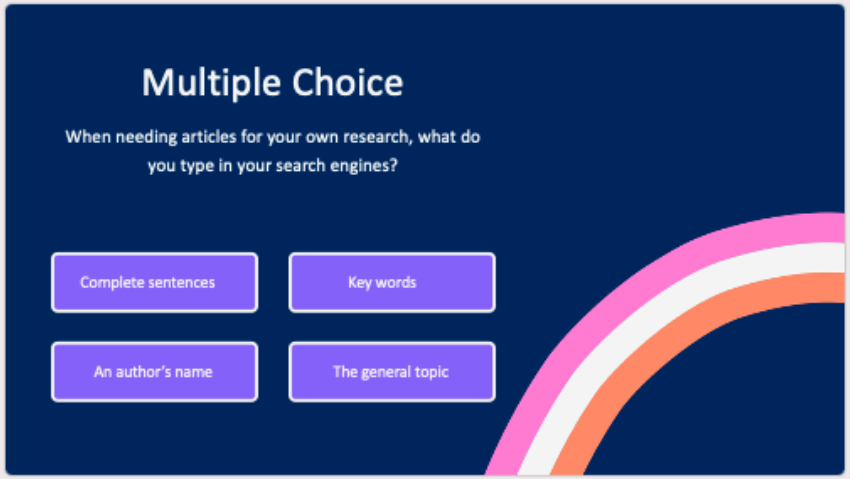
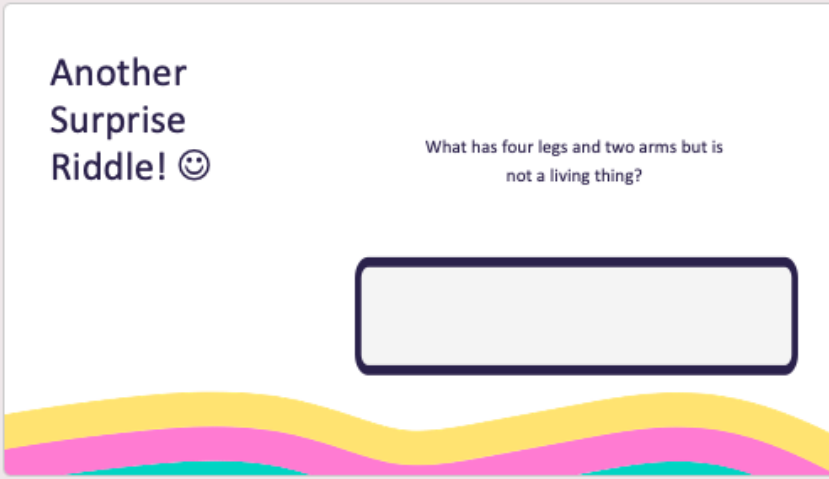
Warm up


Reading, reading, reading...
TRIVIA GAME
1
The Game Rules
1. Place your counter within one minute.
2. Do not change your answer once you have placed your emoticon.
3. Some surprise questions might pop up!
4. Enjoy and have a good time!
2
Multiple Choice
What is the first section you look at an article?
Abstract
Introduction
Methods
Conclusions
3
Multiple Choice
Where do you find the information about the author mentioned in the article?
Justification
Results
References
Appendices
4
Surprise Riddle ☺
What has cities, but no houses; forests, but no trees; and water, but no fish?
5
Multiple Choice
Where in an article can you find information about the research process?
Abstract
Introduction
Methods
Conclusions
6


Multiple Choice
When needing articles for your own research, what do you type in your search engines?
Complete sentences
Key words
An author's name
The general topic

7


Another Surprise Riddle! ☺
What has four legs and two arms but is not a living thing?

8

Pre-tasks

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VIROLOGY

Culture-Based Virus Isolation To Evaluate Potential Infectivity of Clinical Specimens Tested for COVID-19

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ABSTRACT Real-time reverse transcription-PCR (RT-PCR) is currently the most sensitive method to detect severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) that causes coronavirus disease 2019 (COVID-19). However, the correlation between detectable viral RNA and culturable virus in clinical specimens remains unclear. Here, we performed virus culture for 60 specimens that were confirmed to be positive for SARS-CoV-2 RNA by real-time RT-PCR. The virus could be successfully isolated from 12 throat and nine nasopharyngeal swabs and two sputum specimens. The lowest copy number required for virus isolation was determined to be 5.4, 6.0, and 5.7 $\log_{10}$ genome copies/ml sample for detecting the *nsp12*, *E*, and *N* genes, respectively. We further examined the correlation of genome copy number and virus isolation in different regions of the viral genome, demonstrating that culturable specimens are characterized by high copy numbers with a linear correlation observed between copy numbers of amplicons targeting structural and nonstructural regions. Overall, these results indicate that in addition to the copy number, the integrity of the viral genome should be considered when evaluating the infectivity of clinical SARS-CoV-2 specimens.

KEYWORDS RT-PCR, SARS-CoV-2, culturability, genome copy, genome integrity

The pandemic of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) that is the cause of the respiratory disease coronavirus disease 2019 (COVID-19) has resulted in tens of thousands of deaths globally since it was first identified in Wuhan, China, at the end of 2019 (1, 2). Clinical manifestations of COVID-19 range from mild symptoms to severe illness and even death. Most patients develop respiratory symptoms such as fever, cough, and shortness of breath (3). Other nonrespiratory symptoms, including diarrhea, anosmia, and neurological and myocardial injuries, have also been reported despite the uncertain etiology (4). A broad tissue tropism and transmissibility have been proposed for SARS-CoV-2 based on sequence comparison combined with structure analyses of the viral spike protein (5–7). Viral RNA is detectable not only from respiratory specimens but also in the urine, serum, and stool using reverse transcription-PCR (RT-PCR), and viral RNA has been detected in COVID-19 patients for more than 30 days (8–13). However, no virus has been isolated from either stool or respiratory specimens collected after day 8 of illness, even in samples with a high viral RNA concentration (9). Thus, nucleic acid detection by RT-PCR requires validation by

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additional assays such as labor-intensive culture-based virus isolation to assess the extent of virus shedding or infectiousness of the specimens (14).

To clarify the correlation between the culturability of the virus from clinical specimens and the RNA copy number, in the present study, we investigated the culturability of a total of 60 specimens from 50 laboratory-confirmed COVID-19 patients that were collected from 25 January to the end of March 2020 in Taiwan. We assessed the association between the cycle threshold (C_T) value and RNA levels for genes encoding RNA-dependent RNA polymerase (*nsp12*), envelope (*E*), and nucleocapsid (*N*) proteins according to World Health Organization guidelines (15) from respiratory specimens of the throat, including oropharyngeal (OP) and nasopharyngeal (NP) swabs, or sputum (SP). These findings can provide relevant practical insight for determining the infectivity of clinical specimens toward helping to control the spread of this virus and curb the current pandemic.

MATERIALS AND METHODS

Ethics statement. This study was approved by the Institutional Review Board of Chang Gung Medical Foundation, Linkou Medical Center, Taoyuan, Taiwan (approval no. 202000468B0B1).

RT-PCR analysis of samples from confirmed COVID-19 patients. As a reference laboratory of the Taiwan Centers for Disease Control (CDC; https://www.cdc.gov.tw/En/), we have been performing viral diagnosis for suspected COVID-19 patients. Specimens of suspected COVID-19 cases collected by border control systems and different hospitals around Taipei county are routinely sent to our clinical virology laboratory. This study included 60 specimens from 50 cases. Respiratory specimens of the OP swab or NP swab and/or sputum were collected depending on the sample availability for each case/patient, and specimen sampling and transportation were handled according to the criteria of the Taiwan CDC. All respiratory samples were maintained in a universal transport medium (UTM-RT; Copan Diagnostics) for further analysis. SARS-CoV-2 nucleic acids were detected by real-time RT-PCR according to the guidelines of the Taiwan CDC. In brief, RNA was extracted from clinical specimens by the automatic LabTurbo system (Taigen, Taiwan) following the manufacturer's instructions for the most part, except that the specimen was pretreated with proteinase K prior to RNA extraction. Reagents and primer/probe sets used to respectively detect *E*, *N*, and *nsp12* RNA were described by Corman et al. (15), and RT-PCR was performed in a 25-μl reaction mixture containing 5 μl of RNA.

Calculation of the genome copy number from the C_T value. SARS-CoV-2 cDNA was prepared using RNA extracted from the specimens of the first patient with confirmed COVID-19. RT was performed using the Moloney murine leukemia virus (MMLV) reverse transcription kit (Protech, Taiwan) according to the manufacturer's instructions. Amplified *E*, *N*, and *nsp12* cDNA was subsequently cloned into the pCRII-TOPO vector (Thermo Fisher Scientific, Waltham, MA, USA) in antisense orientation. *In vitro* transcription using the linearized plasmid as the template to synthesize *E*, *N*, and *nsp12* RNA was performed as described by Lee et al. (16). Purified RNA was then quantified by a Qubit fluorometer (Thermo Fisher Scientific), and serially diluted standard RNAs were prepared for subsequent real-time RT-PCR (15). The primer sequences used to amplify the *E*, *N*, and *nsp12* genes were as follows: SARS-CoV-2-E-For, 5′-ATGTACTCATTCGTTTCGGAAGAGAC-3′; SARS-CoV-2-E-Rev, 5′-TTAGACCAGAAGATCAGGAACTCTAG-3′; SARS-CoV-2-N-For, 5′-ATGTCTGATAATGGACCCCAAAATCAGC-3′, SARS-CoV-2-N-Rev, 5′-TTAGGCCTGAGT TGAGTCAGCACTGCTC-3′; SARS-CoV-2-nsp12-For, 5′-ATGCTTCAGTCAGCTGATGCACAATCGT-3′; and SARS-CoV-2-nsp12-Rev, 5′-CTGTAAGACTGTATGCGGTGTGTACATA-3′.

Culture-based virus isolation. All procedures for viral culture followed the laboratory biosafety guidelines of the Taiwan CDC and were conducted in a biosafety level 3 facility. Vero-E6 (American Type Culture Collection [ATCC], Manassas, VA, USA) and MK-2 (ATCC) cells were maintained in modified Eagle's medium (MEM; Thermo Fisher Scientific) supplemented with 10% fetal bovine serum and 1× penicillin-streptomycin at 37°C in the presence of 5% CO_2. Viral culture was initiated from standard screw-cap culture tubes (16 × 125 mm; Thermo Fisher Scientific), and cells grown to 80 to 90% confluence were inoculated with 500 μl of the virus solution containing 33 μl of the specimen and 2× penicillin-streptomycin solution for absorption at 37°C for 1 h. Subsequently, 5 ml of the virus culture medium composed of MEM, 2% fetal bovine serum, and 1× penicillin-streptomycin solution was added to the tubes, and the cells were maintained in a 37°C incubator with daily observations of the cytopathic effect. RT-PCR analysis was performed using the RNA extracted from the culture supernatant every 2 days after the initial inoculation to validate the presence of SARS-CoV-2.

Statistical analysis. The chi-square test was used to compare the culture rate of specimens that were subjected to a freeze cycle and those that were not. Student's *t* test was used to analyze the differences in culture days required and RT-PCR results. Both analyses were performed using GraphPad Prism 7.00 (GraphPad Software, Inc., CA, USA) to compare the means for two groups. Data were presented as the mean ± SEM, and $P < 0.05$ was considered to indicate a statistically significant difference. Linear regression models were used to determine the correlation between the genome copies of structural and nonstructural genes with C_T values from RT-PCR, and the R^2 value was used to assess model fitness. This statistical analysis was conducted using R software (version 3.6.1) (17), and the distributions of genome copies and their correlations were visualized using the R package ggplot2 (18).

RESULTS

Isolation of SARS-CoV-2 from respiratory specimens. Among the 60 specimens analyzed in this study from 50 cases, cases 3, 4, 6 to 10, and 12 to 15 were from a cluster infection at a single hospital, and cases 27 and 49 were from a household cluster; the C_T values of each gene from individual specimens are listed in Table S1 in the supplemental material. Specimens collected before March (16 of the 60) were stored at −70°C until the SARS-CoV-2 isolation procedures obtained certification from the Taiwan CDC. Starting in March, virus culture was attempted on all specimens without a freeze-thaw cycle. We successfully obtained 23 isolates from different specimen types (12 from OP, nine from NP, and two from SP). We also obtained five isolates among the 16 specimens that underwent a single freeze-thaw cycle, although a significantly longer culture time was required compared to that of non-freeze-thaw specimens (13.8 ± 1.91 and 4.28 ± 0.39 days, respectively; $P < 0.0001$). The culture rate was low (3/19, 16%) for samples from patients who were characterized by a longer duration between the date of symptom onset and sample collection. Overall, our results suggested that a freeze-thaw cycle might not significantly affect the culture rate as previously described (19), with a success rate of 31% (5/16) obtained for the freeze-thaw samples compared to 41% (18/44) for the others (chi-square statistic 0.2136, *P* value, 0.6440; not significant [ns]). However, multiple freeze-thaw cycles should be prevented, because a significantly longer culture time was required for specimens subjected to a freeze-thaw cycle, which might disrupt the integrity of the virus and decrease its infectivity. In addition, the sample collection time might be a determinant in culturability, as specimens collected closer to the start of the illness date tended to be more culturable.

Association of culturable samples with C_T value. We next compared the RT-PCR results of the culturable and nonculturable specimens. The mean C_T values for the *nsp12*, *E*, and *N* genes from all specimens and for each type of specimen (OP, NP, and SP) are summarized in Table 1. For all specimen types, the culturable specimens were characterized by a significantly lower C_T value for all three genes (Fig. 1A to C), and the highest C_T value that was sufficient for virus isolation was determined to be 31.47, 31.46, and 35.2 for the *nsp12*, *E*, and *N* genes, respectively (Table 1). We further compared the C_T values of different specimen types. Regarding the *nsp12* and *E* genes, the mean C_T value of culturable OP and NP specimens was similar to that of the total group (Fig. 1A and B). However, the culturable SP specimens were associated with much lower C_T values despite the small number of cases analyzed for this group. Interestingly, differences between C_T values of the *N* gene were clearly detected between the culturable and nonculturable specimens for the total, OP, and SP groups; however, no significant difference was detected for NP specimens (Fig. 1C). These results suggested that culturable specimens are characterized by a lower C_T value in RT-PCR analysis, indicating the presence of more viral RNAs that allow for obtaining more virus isolates for culture.

Genome copy requirement for virus isolation. To better assess the viral load of the specimens, we evaluated the genome copy number for each gene using *in vitro*-synthesized *E*, *N*, and *nsp12* RNA as the standard. The detailed C_T to genome copy conversion of each gene is shown in Table S2, and the converted genome copy numbers of the *nsp12*, *E*, and *N* genes of different specimens in the culturable and nonculturable groups are summarized in Table 1 and illustrated in Fig. 1D. Consistent with a recent finding reported by Wolfel et al. (9), the majority of the culturable specimens (20/23, 87% regarding *nsp12* gene) contained viral genome copy numbers higher than 6 $\log_{10}$ genome copies/ml sample (Fig. 1D, upper part). The lowest genome copy numbers of *nsp12*, *E*, and *N* were 5.4, 6.0, and 5.7 $\log_{10}$ genome copies/ml sample, respectively (Table 1). In contrast, although the estimated genome copy numbers of the nonculturable specimens were lower than 6 $\log_{10}$ genome copies/ml sample (Table 1), a certain portion of nonculturable specimens (13/34, 38% > 6.5; 4/34, 12% > 7 regarding *nsp12* gene) also had genome copy numbers near or higher than 7 $\log_{10}$ genome copies/ml sample (Fig. 1D, lower part). Thus, a threshold copy number

TABLE 1 Cycle threshold values and genome copy numbers of three SARS-CoV-2 genes from specimens with and without isolation of the virus

Gene	Sample (*n*)	C_T value			Log_{10} genome copies/ml		
		Mean ± SEM	Highest	Lowest	Mean ± SEM	Highest	Lowest
Culturable ($n = 23$)							
nsp12	Total (23)	23.90 ± 0.78	31.47	17.75	7.37 ± 0.20	8.98	5.40
	OP (12)	24.21 ± 0.89	31.47	19.69	7.29 ± 0.23	8.47	5.40
	NP (9)	24.67 ± 1.37	29.87	18.94	7.17 ± 0.36	8.67	5.82
	SP (2)	18.57 ± 0.82	19.38	17.75	8.76 ± 0.21	8.98	8.55
E	Total (23)	22.39 ± 0.75	31.46	16.85	8.21 ± 0.18	9.55	6.01
	OP (12)	22.79 ± 1.01	31.46	18.85	8.11 ± 0.24	9.07	6.01
	NP (9)	22.89 ± 1.19	28.74	18.36	8.09 ± 0.28	9.19	6.67
	SP (2)	17.77 ± 0.92	18.68	16.85	9.33 ± 0.22	9.55	9.11
N	Total (21)	27.29 ± 0.77	35.20	22.14	7.87 ± 0.21	9.30	5.67
	OP (11)	27.21 ± 0.85	32.81	23.13	7.89 ± 0.24	9.03	6.33
	NP (8)	28.01 ± 1.61	35.20	22.14	7.67 ± 0.45	9.30	5.67
	SP (2)	24.8 ± 2.07	26.86	22.73	8.56 ± 0.58	9.14	7.99
Nonculturable ($n = 37$)							
nsp12	Total (34)	29.26 ± 0.69	36.52	22.32	5.98 ± 0.18	7.78	4.09
	OP (15)	30.32 ± 1.03	36.52	23.47	5.70 ± 0.27	7.49	4.09
	NP (15)	28.06 ± 0.91	35.60	23.92	6.29 ± 0.24	7.37	4.32
	SP (4)	29.74 ± 2.78	34.43	22.32	5.85 ± 0.72	7.78	4.63
E	Total (37)	28.92 ± 0.65	38.33	20.89	6.62 ± 0.16	8.57	4.34
	OP (17)	29.61 ± 0.97	38.33	22.61	6.46 ± 0.23	8.15	4.34
	NP (15)	28.22 ± 0.97	36.31	24.39	6.79 ± 0.24	7.72	4.83
	SP (5)	28.68 ± 2.13	32.93	20.89	6.68 ± 0.52	8.57	5.65
N	Total (31)	31.49 ± 0.59	42.47	26.39	6.70 ± 0.17	8.12	3.64
	OP (13)	32.81 ± 0.99	42.47	29.55	6.33 ± 0.28	7.54	3.64
	NP (13)	29.86 ± 0.62	33.34	26.39	7.15 ± 0.17	8.12	6.18
	SP (5)	32.27 ± 1.60	36.45	26.89	6.48 ± 0.45	7.98	5.32

required for virus isolation could not be defined. Nonetheless, the overall copy numbers were clearly higher in culturable specimens.

Assessment of culturability based on genome integrity of the specimens. Since the C_T value alone does not appear to be sufficient to determine whether the virus can be cultured from clinical specimens, we next tried to identify other parameters that might be used to assess infectivity. Coronavirus is characterized by a very large genome (~30 kb) and a unique replication mechanism. Along with noncanonical RNAs, a total of 10 canonical RNAs composed of genomic and subgenomic RNAs are synthesized by multiple discontinuous transcription events during viral replication, including the *E* and *N* genes, which encode structural proteins and dominate the viral transcriptome (20, 21). Therefore, if signals of viral RNA detected in the clinical specimen originate from an intact genome, we would expect to observe a linear relationship between copies of nonstructural (*nsp12*) and structural (*E* and *N*) genes despite the use of different amplicons. The genome copy distributions of the *nsp12*, *E*, and *N* genes in culturable and nonculturable specimens are shown in Fig. 2A and B. Genome copies of individual genes in each of the specimens were connected, demonstrating higher expression of the *E* and *N* genes in both culturable and nonculturable samples. To avoid sampling bias, only samples that did not undergo a freeze-thaw cycle were first selected for analysis (Fig. 2C and D), showing a higher correlation between nonstructural and structural genes (R^2 = 0.854 and 0.829 for *E* and *N*, respectively) in the culturable specimens than in the nonculturable specimens (R^2 = 0.673 and 0.722, respectively). Moreover, the nonculturable specimens tended to contain additional copies of *E* and *N* RNAs. This disproportionate phenotype might be related to breakdown of the viral genome or contamination of subgenomic RNAs from host cells. To clarify these possibilities, we examined this correlation in specimens that underwent a freeze-thaw

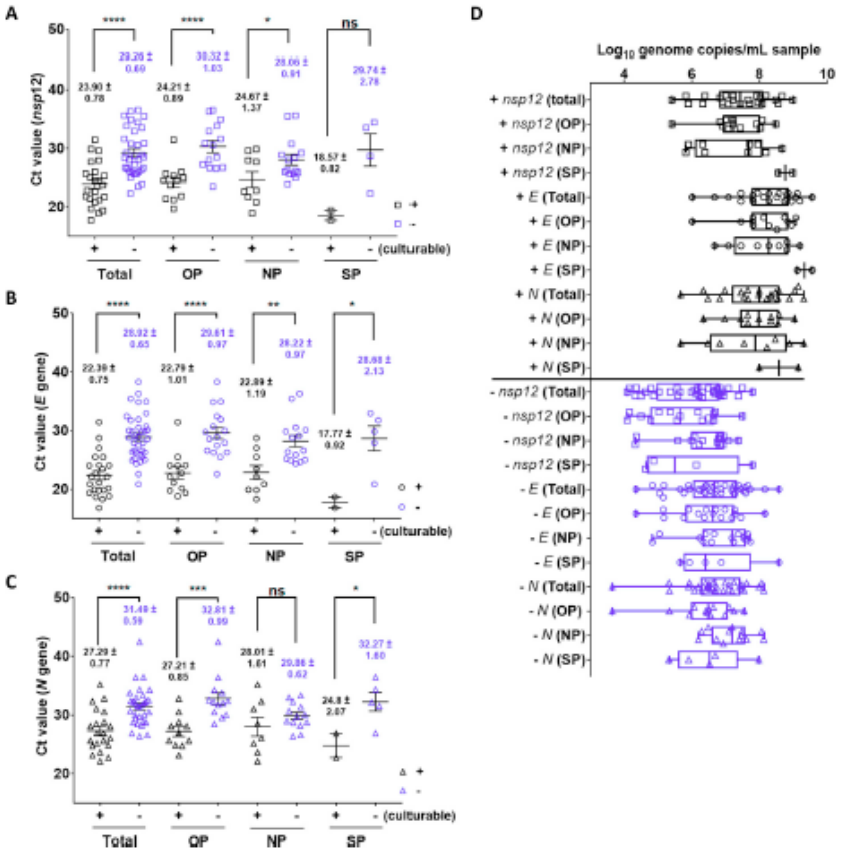

FIG 1 (A to C) Distribution of cycle threshold (C_T) values and genome copies of the *nsp12* (A), *E* (B), and *N* (C) SARS-CoV-2 genes in culturable (black) and nonculturable (blue) specimens. Data are presented as means ± SEM (****, $P < 0.0001$; ***, $P < 0.001$; **, $P < 0.01$; *, $P < 0.1$; ns, not significant). (D) A box plot shows the calculation of $\log_{10}$ genome copies/ml from the C_T value, including the minimum to maximum values. The median is depicted as a line within the box.

cycle (cases 1 to 12), since freeze-thaw might disrupt enveloped virus and genome integrity. Interestingly, as shown in Fig. 2E, we found a perfect correlation between the *nsp12* and *E* RNA copies in the culturable samples ($R^2 = 0.996$) in sharp contrast to the nonculturable samples ($R^2 = 0.510$). Further, the nonculturable samples were characterized by a markedly higher *nsp12* RNA level, suggesting the existence of degraded intermediates. Based on these findings, we speculated that nonculturable specimens containing higher or lower *nsp12* levels might reflect the detection of degraded genomes or replication intermediates, respectively. Therefore, monitoring the correlation of copy number among SARS-CoV-2 genes could be a useful parameter to determine whether the virus from a given specimen can be cultured.

DISCUSSION

In this study, we investigated the infectivity of clinical specimens by virus culture and examined whether the infectivity was correlated with the level of viral nucleic acids. We provided quantitative results to show that specimens for which viral culture was successful contained more viral RNAs than those for which culture did not succeed. We also estimated the lowest genome copy numbers of specimens that would be sufficient for virus isolation. Since some nonculturable specimens also contained high

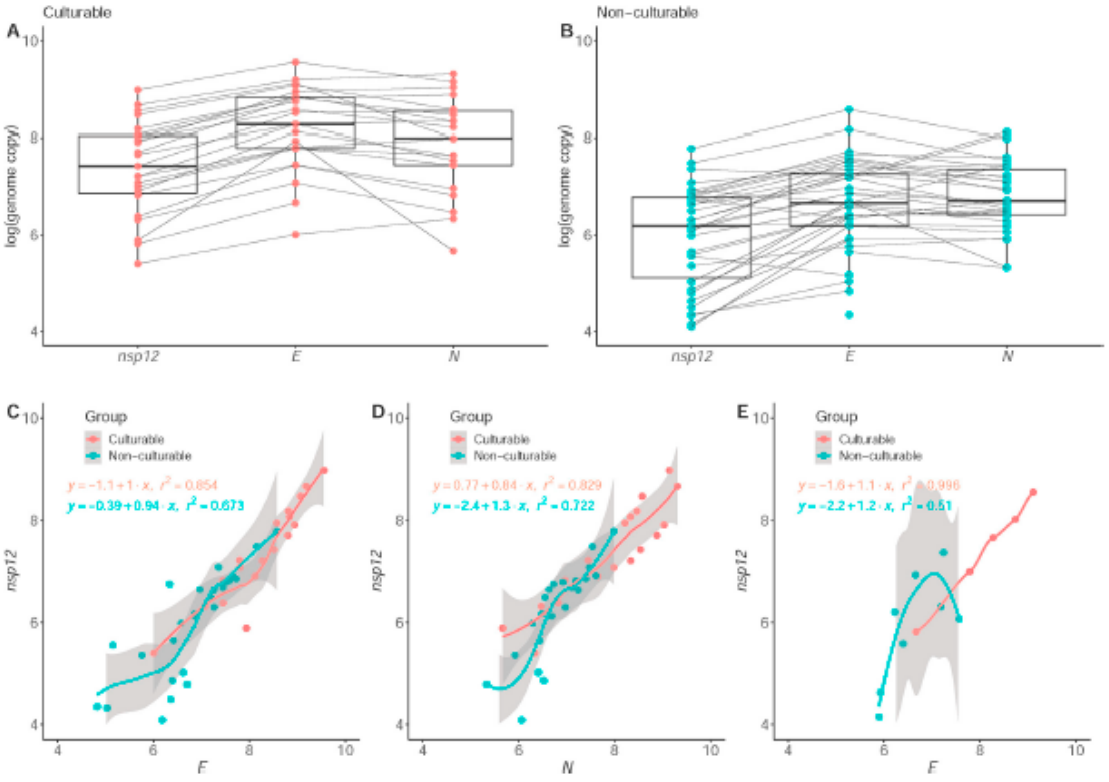

FIG 2 Distributions of genome copies in SARS-CoV-2 nonstructural (*nsp12*) and structural (*E* and *N*) genes of culturable (A) and nonculturable (B) specimens. Correlations of *nsp12* genome copies with those of the *E* (C) and *N* (D) genes in samples without a freeze-thaw cycle, and with *E* gene copy numbers in freeze-thawed samples (E), along with the respective regression equations and R^2.

genome copy numbers, the presence of viral nucleic acid alone cannot be used to assess the infectivity directly. By monitoring the correlation between amplicons targeting different genome loci, we found that examining the genome integrity might be another important criterion to evaluate the culturability/infectivity of clinical specimens. Although our conclusions are limited by the small sample size, potential sampling bias related to specimen collection and handling (e.g., source of specimen and timing), multiple types of storage and preservation before viral culture attempts, and lack of serial samples, these findings provide additional insight into assessing the infectiousness of COVID-19 patients.

Detection of SARS-CoV-2 by RT-PCR remains the gold standard test for confirming COVID-19, and two negative tests at least 24 h apart in a clinically recovered patient are one of the important criteria for hospital discharge as recommended by the World Health Organization (22). Viral shedding of SARS-CoV-2 has been estimated to occur more than 30 days after symptom onset (13, 23). Such prolonged and persistent detection of viral RNA in stool specimens, even after the negative conversion of respiratory specimens, led some researchers to suggest the potential for fecal-oral transmission of SARS-CoV-2 (10, 24), and the virus was recently proven to replicate in the human small intestinal epithelium and organoids (25). However, direct evidence for the infectiousness of these specimens collected long after symptom onset is lacking, and no virus culture from stool specimens has been achieved to date (9). Therefore, caution is needed when evaluating the infectivity of specimens simply based on the detection of viral nucleic acids (14). In the current study, we used a cell culture-based

system to evaluate the infectivity. Several factors can affect virus isolation, including sampling bias, the cell line used, and the culture environment; however, culture remains the most reasonable approach to assess the infectivity of clinical specimens (26, 27).

As expected, specimens containing high copy numbers of the viral genome (suggesting high viral loads) tended to be culturable compared with those with fewer genome copies. A previous study indicated that 6 $\log_{10}$ genome copies/ml sample might be required for virus isolation based on analysis of a series of specimens from patients hospitalized for COVID-19, and no virus could be isolated from specimens collected after day 8 of illness irrespective of the high viral loads (9). The lowest genome copy number detected in our culturable specimens was 5.4 $\log_{10}$ genome copies/ml sample of the *nsp12* gene. This difference from the previous study might be related to differences in experimental conditions and laboratories. Thus, 5 to 6 $\log_{10}$ genome copies/ml sample seems to be a reasonable viral load required for virus isolation. However, more and systematically collected specimens should be compared in the future to validate this prediction. Another feature associated with culturable specimens was the strong linear correlation between copy numbers of structural and nonstructural genes, indicating that the viral genome of cultural specimens was intact, possibly reflecting an infectious virion. In contrast, the considerably higher RNA level of structural genes detected in nonculturable specimens might reflect the presence of replication intermediates retained in epithelium cells (21), while the nonculturable specimens characterized by highly nonstructural genes might contain viral genomes yet to be degraded. For specimens containing high viral loads with a high correlation among genes, the virus can be inactivated by neutralizing antibodies that might cause aggregation of the virus to prevent nucleic acid degradation (14). This hypothesis was supported by the finding that seroconversion occurred 7 to 14 days after symptom onset when no rapid decline in viral load was observed (9).

Overall, this study provides evidence that the infectiousness of clinical specimens from COVID-19 patients can potentially be determined by both the SARS-CoV-2 gene copy numbers and genome integrity. Nucleic acid detection is undoubtedly valuable in detecting SARS-CoV-2; however, other serological tests should be performed in parallel to best evaluate the disease course of a COVID-19 patient as demands of health care systems are robustly increasing due to the pandemic.

SUPPLEMENTAL MATERIAL

Supplemental material is available online only.

SUPPLEMENTAL FILE 1, PDF file, 0.7 MB.

SUPPLEMENTAL FILE 2, PDF file, 0.3 MB.

ACKNOWLEDGMENTS

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Teaching English as a Foreign Language Mater's Program
Instructors: Chinambu, Tenorio, Whitaker
Lesson 1.1 - Handout 3

Reading Strategy: Skimming and Scanning

Instructions: You are doing research on how to reduce the transmission of COVID-19 in order to write a report for your supervisor. You are looking for appropriate articles. Skim and scan the article in Handout 4# with your group and then fill out the graphic organizer below with the information you found.

Each group member should choose a role:

- 1 timekeeper
- 2 writers to write the information into the graphic organizer
- 2 presenters to share findings with the class

You must time yourselves to make sure you are not spending too much time reading. Use the online timer to keep track of time. You have 5 minutes to skim and scan. You have 10 minutes to fill out the graphic organizer.

Part A: Before you skim and scan
Instructions: Before skimming and scanning, consider the following questions. Then write your answers in the box.

What information are you looking for?

What key words do you need to see?

Example: transmission

Useful Language

Sharing Ideas
I think we should look for _____.
The key words we need are _____.
I think that this is important because _____.
This is relevant because _____.
This is an example of _____.

Asking for Information
How about you?
What do you think?

Asking for Clarification
Can you please repeat that?
Can you please explain that again?
What do you mean by ____?

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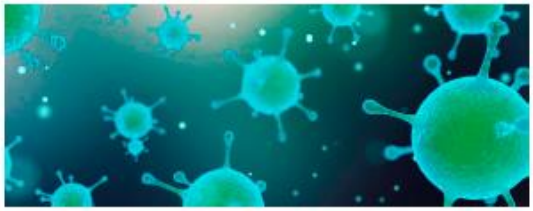
Lesson 1.1 - Handout 3

Part B: While skimming (to get the main idea)
Instructions: Consider the following questions and fill out the chart below:

What important information can we find in the headings, titles, and subtitles?
What visual cues are helpful?
What key information can be gathered from the first sentence of each paragraph? What information can be gathered from the introduction and conclusion?

Headings, titles, subtitles	*Example: The subtitles indicate the different phases of research which are …...*
Visual Cues (graphs, tables, charts, images, photographs)	*Example: The graph represents trial results and shows that …...*
Key points (from introduction, conclusion & the first sentence of each paragraph)	*Example: The topic sentences show that the focus is on steps/processes related to…...*

Image retrieved from: https://blog.oup.com/2020/03/learning-microbiology-through-comics/



Useful Language

Sharing Ideas
I think we should look for _____.
The key words we need are _____.
I think that this is important because _____.
This is relevant because _____.
This is an example of _____.

Asking for Information
How about you?
What do you think?

Asking for Clarification
Can you please repeat that?
Can you please explain that again?
What do you mean by ____?

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Lesson 1.1 - Handout 3

Part C: While scanning (to get specific details)
Instructions: Consider the following questions and fill out the chart below:

What content words are important to write down?
What information can we gather from textual cues?

Content Words (key verbs, nouns, adjectives)	*Example: Acute, transmission, …*
Textual Cues (bold faced words or phrases, variations in font size, colour and style, organization of the text with bullet points, numbers or letters)	*Example: The bullet points indicate the different steps that were taken to….*

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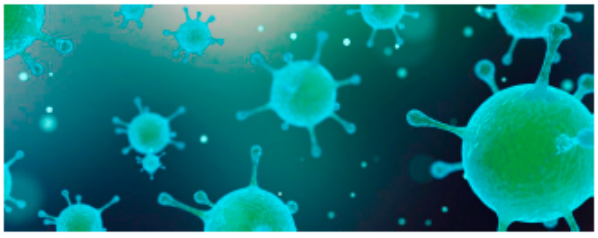
from: https://blog.oup.com/2020/03/learning-microbiology-through-comics/



Useful Language

Sharing Ideas
I think we should look for _____.
The key words we need are _____.
I think that this is important because _____.
This is relevant because _____.
This is an example of _____.

Asking for Information
How about you?
What do you think?

Asking for Clarification
Can you please repeat that?
Can you please explain that again?
What do you mean by ____?

Useful Language

Sharing Ideas
I think we should look for _____.
The key words we need are _____.
I think that this is important because _____.
This is relevant because _____.
This is an example of _____.

Asking for Information
How about you?
What do you think?

Asking for Clarification
Can you please repeat that?
Can you please explain that again?
What do you mean by ____?

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Lesson 1.1 - Handout 3

Part D: After skimming and scanning

Instructions: After skimming and scanning, answer the following questions as best you can without reading the article.

1. What is the main idea of this article?

_____
_____

2. What are some of the factors that can affect the spread of COVID-19 in built environment (BE) pathways?

_____
_____

3. Who can benefit from learning about these BE mediated pathway measures?

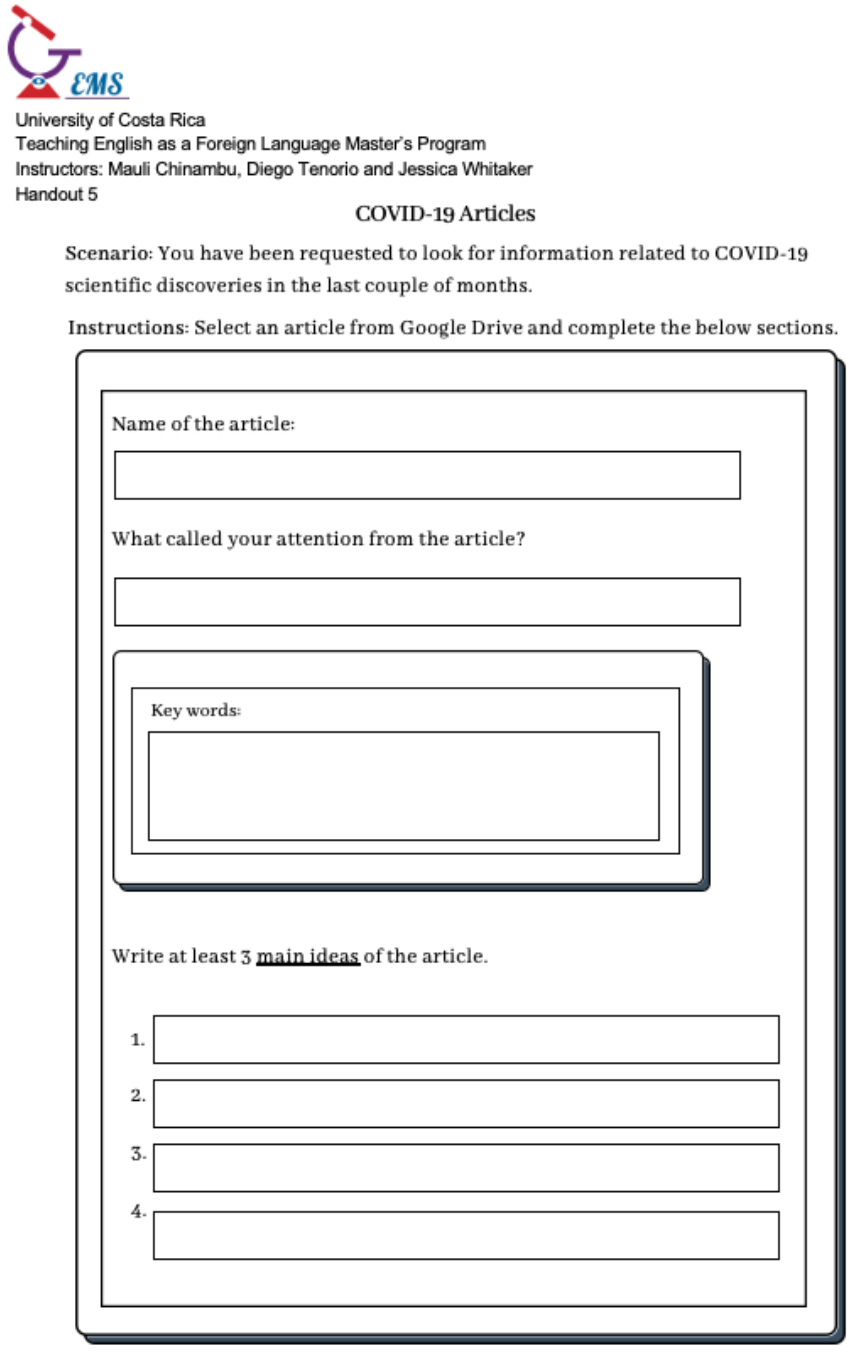
_____
_____

4. Make a decision. Does this article have relevant information to help you with your research project? Would you read the entire article?

_____
_____

Be prepared to present your ideas to the class!

Main task



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Instructors: Mauli Chinambu, Diego Tenorio and Jessica Whitaker
Handout 5

COVID-19 Articles

Scenario: You have been requested to look for information related to COVID-19 scientific discoveries in the last couple of months.

Instructions: Select an article from Google Drive and complete the below sections.

Name of the article:

What called your attention from the article?

Key words:

Write at least 3 main ideas of the article.

1.
2.
3.
4.

Write 3 supporting details from the article.

1.

2.

3.

What steps did you follow to select the article? Mention 3 at least.

1.

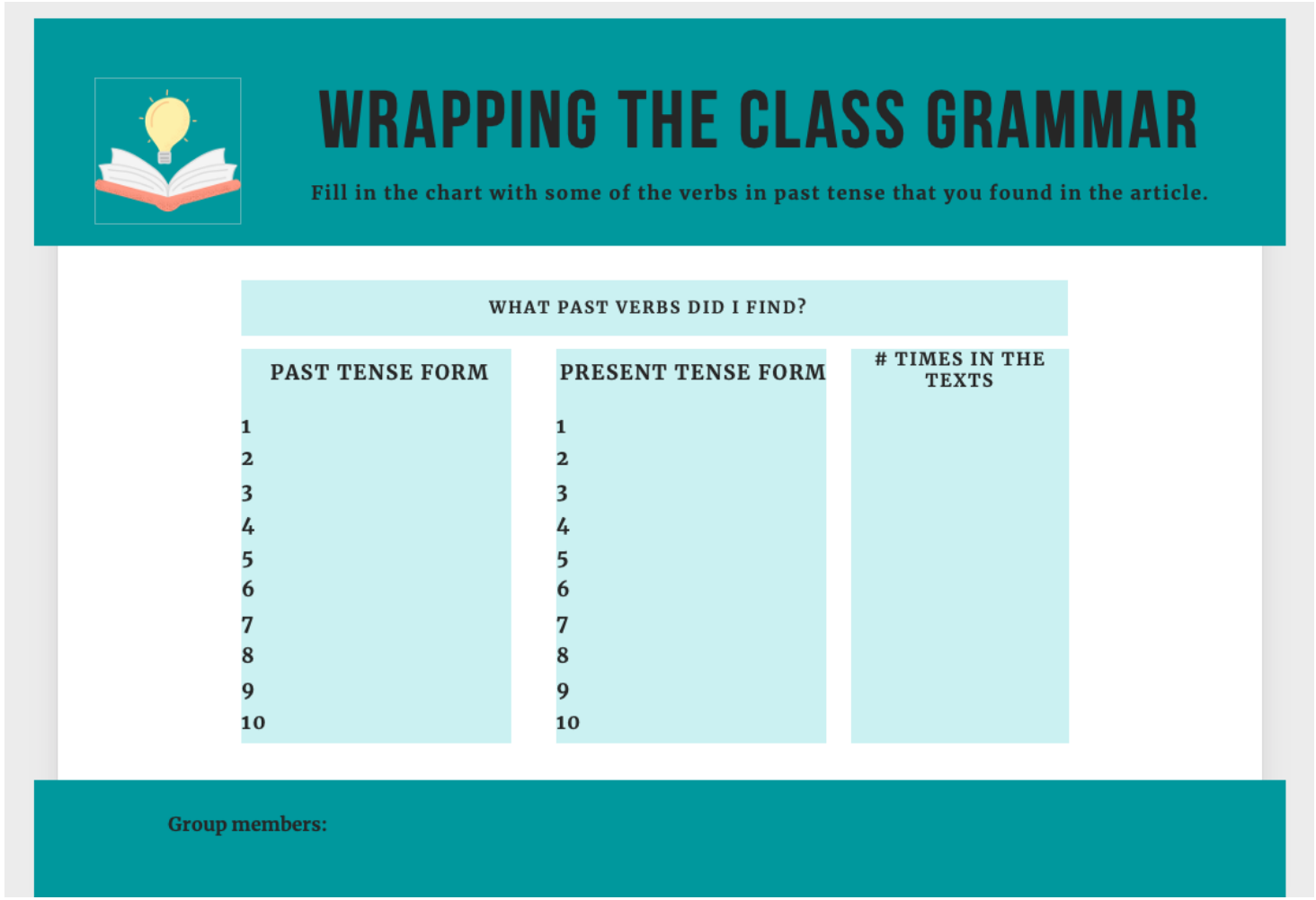
2.

3.

4.

5.

Post-tasks



WRAPPING THE CLASS GRAMMAR

Fill in the chart with some of the verbs in past tense that you found in the article.

WHAT PAST VERBS DID I FIND?		
PAST TENSE FORM	PRESENT TENSE FORM	# TIMES IN THE TEXTS
1	1	
2	2	
3	3	
4	4	
5	5	
6	6	
7	7	
8	8	
9	9	
10	10	

Group members:

WRAPPING THE CLASS

Answer the questions below based on your own reading process and the abstracts you just read.

MONITORING MY READING

- WHY DID I READ THESE MATERIALS?
- DID I UNDERSTAND WHAT I WAS READING?
- HOW DID I FIND THE ANSWERS FOR THE ACTIVITIES?
- WAS I INTERESTED IN THE TOPICS?
- WHAT CAN I IMPROVE WHILE I AM READING?

University of Costa Rica
Master's Program in TEFL
English for Microbiology Students
Chinambu, Tenorio, Whitaker
Lesson Plan # 2

Date: 08/26/2020
Student teacher: Jessica Whitaker
Assistants: Mauli Chinambu and Diego Tenorio

Lesson Plan 2 and Materials

ESP Course: EMS

Unit # 1: Deconstruction of a text: an insight of its parts **Approximate time for task cycle:** 120 minutes

Unit goal: By the end of the course, students will be able to effectively demonstrate comprehension of academic and scientific articles related to microbiology by analyzing and selecting specific and meaningful information relevant for their studies.

General objective: By the end of the unit, students will be able to successfully identify the usefulness and relevance of a scientific text by skimming and scanning specific information from the abstract, justification, methods, or results section.

Specific objectives: By the end of the lesson, students will be able to:

9. Properly recognize the differences between skimming and scanning by completing an online game quiz.
10. Efficiently identify the main idea in the different sections of a scientific abstract by highlighting them.
11. Effectively discriminate information in an article to extract the main ideas and supporting details by skimming and scanning.
12. Accurately apply skimming and scanning by completing a text organization chart.
13. Successfully report findings by sharing the details of the text organization chart to classmates.
14. Accurately recognize the passive voice of commonly used verbs in articles by listing them and numbering the times they appear in a scientific text.
15. Appropriately revise their own reading process by answering some monitoring comprehension questions.

Objectives	Procedures	Language (Vocabulary, expressions, useful language, grammatical or phonetic features)	Strategies	Macro Skills	Time allotted
1	**Warm-up** T will greet Ss and start the class with an online game to review the differences between skimming and scanning with all Ss in the main session. Before playing the game, T will explain to the Ss that they have to use their cellphone or have a separate window open on their computers to answer the questions as the game information will only display the leaderboard in the main room of the game. The game includes some memes with phrases and puns to enhance Ss attention during the task. T will send Ss the link through the Zoom chat box. T will wait for all Ss to be in the main room of the game and then will start the quiz. After the quiz is done, T will go through the questions and will finish the warm-up by explaining key terms of the game content based on the answers the Ss provided. T will clarify any questions that may have been difficult for the Ss.	**Vocabulary:** Articles, skimming, scanning, main idea	Schema Activation	R L S	10’

	Materials Online game on Quizizz https://quizizz.com/admin/quiz/5f44286a68336e001bf59fd4				
2	**Pre-task 1** In the main session, T will explain the difference between “main ideas and supporting details” in a text. Using Handout #1, Ss will be sent to the BR in groups of 4 or 5. By skimming and scanning, Ss will highlight the main idea of each section of the abstract. T and AT will check in with each group in the BR and provide feedback and support. Ss return to the main session to check their answers. Each group will share the main idea of each of the sections: • Group 1: Objective • Group 2: Methods • Group 3: Results	**Vocabulary** Keywords in article to highlight during explicit teaching: COVID-19, cohort study, virus... **Useful Language**	Skimming Scanning Identifying main ideas	L S R	20’

	• Group 4: Conclusions **Feedback** T will tell each group how they did in terms of finding appropriate information through skimming and scanning. **Materials** Handout #1: Article on Ibuprofen use and clinical outcomes (online PDF article)	<u>Sharing Ideas</u> I believe that _____. I think this part is the main idea. <u>Asking for Information</u> What do you			

		think? Do you agree?			
Break: from 5:50 to 6:50 p.m.					
3,4 5	**Main task** T will explain to Ss that they will be working in the same group of 4 or 5 from the pre-task to complete the next activity in their BR. Ss will be granted access to a Google Drive folder where a series of scientific COVID-19 articles are located. As a team, Ss will select only one article from the folder (based on their interests) to complete the group task. Ss will be given Handout #2 to get organized and assign group roles before starting the task. T will explain to the Ss that they have to replace "Article's name" and "Student's name" with the corresponding information. Then, once the article is chosen and roles are assigned, T will explain to Ss that they need to complete Handout #3 in which they will put into practice skimming and scanning.	**Useful Language** Which article should we select? We can use _____ as a key word. I don't think ____	Skimming and scanning Summarizing information Identifying main ideas and supporting	R W L S	45'

	Once in the BR, the T and TA will visit each group and will clear any doubts the Ss may have. After all groups have completed the handouts, they will return to the main session to share their findings and ideas with the rest of the class. To do this, the selected speaker of each group will present this information and share their screen if needed. The other groups will ask questions about the article discussed. These questions will be part of the UL provided to the Ss. *Note*: the UL will be provided in a Zoom chat box. *Note*: It will not be considered a problem if more than one group selects the same article because what is important is the process of skimming and scanning to extract pertinent information. Each group will also present their information in a different way. **Feedback** A PPT will be filled out with the information obtained from the BR. Ss will receive feedback on the use of skimming and scanning, the use of verbs in past, and grammar. *Note*: during the BR activity, the T and the AT will collaborate on a shared PPT to take notes on	could be used as a keyword. I think the first / second / third main idea is ____. I think this part can be a supporting detail because ____. This article could work because it is about_____.	details		

	certain aspects that might require feedback. In the main session, one of the AT will be in charge of taking notes as needed for additional feedback. *Based on doña Xinia's recommendation, Mauli will help us to provide pertinent feedback regarding the pronunciation of some vocabulary.* *Note*: AT will be in charge of moving the observers around the BR. *Note*: there is no answer key as answers may vary. However, we have highlighted some of the options in the articles. **Materials** Handout #2 - Group organization for role assignment Handout #3 – Text organization chart	We selected this article because_____. Why did you select this article? How did you find the main idea? Were there any visual cues in the article? When you skimmed & scanned, what			

		did you look for? What did you find?			
6	**Post-task 1** T will share a slide with different main ideas of the article and will ask Ss what those sentences have in common. T will explain the reasoning of most scientific articles being written using the passive voice. Using the PPT, T will explain how to identify the passive voice verbs in a text. T explains that Ss will go over the abstract of their article used for the main task, focusing on the passive voice verbs that they find. Using Handout #4, Ss will complete the chart by listing all of the verbs they found. They will write next to each verb the number of times they appear in the different articles.	**Useful Language:** **Simple Past verbs Activity:** What do you think this verb means? This one appears # times. I don't know what this verb means…	Monitoring Comprehension Looking for specific information		10'

7	*Note*: Ss can write down the meaning of the verbs in Spanish; however, this will be optional and only if they need it. *Note*: there is no answer key as answers may vary. However, we have highlighted some of the options in the articles. **Post-task 2** T will explain the importance of monitoring one's reading process. Using Handout #5, Ss will work individually and they will answer some metacognitive questions regarding their process of reading. T will emphasize that all answers all valid as each person's reading process is different. T will ask some Ss to share their answers about their reading process and the T will check the passive voice verbs available in the scientific articles. **Materials:** Handout #4 – Passive voice verb chart Handout #5 – Monitoring comprehension questions	**Monitoring Comprehension:** I think I read this part first… First, I did… and then… I'm not sure/ I don't remember how I read this…			10'

	Note: depending on time, post task 2 can be assigned as homework.				

Abbreviations: BR= breakout rooms, T= teacher, AT= assistant teacher(s), Ss=students, L= listening, S= speaking,

W= writing, R= reading, UL= useful language, PPT= PowerPoint Presentation

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Warm up

QUIZIZZ

NAME : _____

CLASS : _____

DATE : _____

Skimming and Scanning Warm-up

7 Questions

1. Skimming helps me to:

☐ a) quickly decide if I want to share the article online

☐ b) quickly decide if the text is useful enough

☐ c) quickly obtain specific details of the article

2. Scanning helps me to:

☐ a) quickly decide if I want to share the article online

☐ b) quickly decide if the text is useful enough

☐ c) quickly obtain specific details of the article

3. _____ helps you when you want to identify the main ideas of the text.

☐ a) Skimming

☐ b) Scanning

4. Reading an entire document is not necessary to understand it as long as you apply "skimming and scanning"

☐ a) True

☐ b) False

5. I can find the main idea of the text by skimming.

☐ a) True

☐ b) False

6. While skimming you need to look for:

☐ a) headings, titles, subtitles, visual cues

☐ b) headings, textual cues, bold-faced words

☐ c) headings, titles, nouns, adjectives

7. While scanning, you need to look for:

☐ a) key points from headings, subtitles, and paragraph topic sentences

☐ b) textual cues and key points from introduction, conclusion

☐ c) content words such as key verbs, nouns, adjectives

Pre-task

University of Costa Rica
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English for Microbiology Students
Chinambu, Tenorio, Whitaker
Handout # 1

Ibuprofen use and clinical outcomes in COVID-19 patients

Abstract

Objective: It was recently suggested that ibuprofen might increase the risk for severe and fatal corona-virus disease 2019 (COVID-19) and should therefore be avoided in this patient population. We aimed to evaluate whether ibuprofen use in individuals with COVID-19 was associated with more severe disease, compared with individuals using paracetamol or no antipyretics.

Methods: In a retrospective cohort study of patients with COVID-19 from Shamir Medical Centre, Israel, we monitored any use of ibuprofen from a week before diagnosis of COVID-19 throughout the disease. Primary outcomes were mortality and the need for respiratory support, including oxygen administration and mechanical ventilation.

Results: The study included 403 confirmed cases of COVID-19, with a median age of 45 years. Of the entire cohort, 44 patients (11%) needed respiratory support and 12 (3%) died. One hundred and seventy-nine (44%) patients had fever, with 32% using paracetamol and 22% using ibuprofen, for symptom-relief. In the ibuprofen

group, 3 (3.4%) patients died, whereas in the non-ibuprofen group, 9 (2.8%) patients died (p 0.95). Nine (10.3%) patients from the ibuprofen group needed respiratory support, compared with 35(11%) from the non-ibuprofen group (p 1). When compared with exclusive paracetamol users, no differences were observed in mortality rates or the need for respiratory support among patients using ibuprofen.

Conclusions: In this cohort of COVID-19 patients, ibuprofen use was not associated with worse clinical outcomes, compared with paracetamol or no antipyretic**.**

E. Rinott, Clin Microbiol Infect2020;26:1259.e5e1259.e7

Main task

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Handout 3

COVID-19 Articles

Scenario: You have been requested to look for information related to COVID-19 scientific discoveries in the last couple of months.

What called your attention to the article?

Key words:

Write at least 3 main ideas of the article.

1.
2.
3.
4.

Useful language:

We can use _____ as a key word.
I don't think _____ could be used as a keyword.
I think the first / second / third main idea is _____.
I think this part can be a supporting detail because _____.
This article could work because it is about_____.

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Handout 3

Write 3 supporting details from the article.

1.

2.

3.

What steps did you follow to select the article? Mention 3 at least.

1.

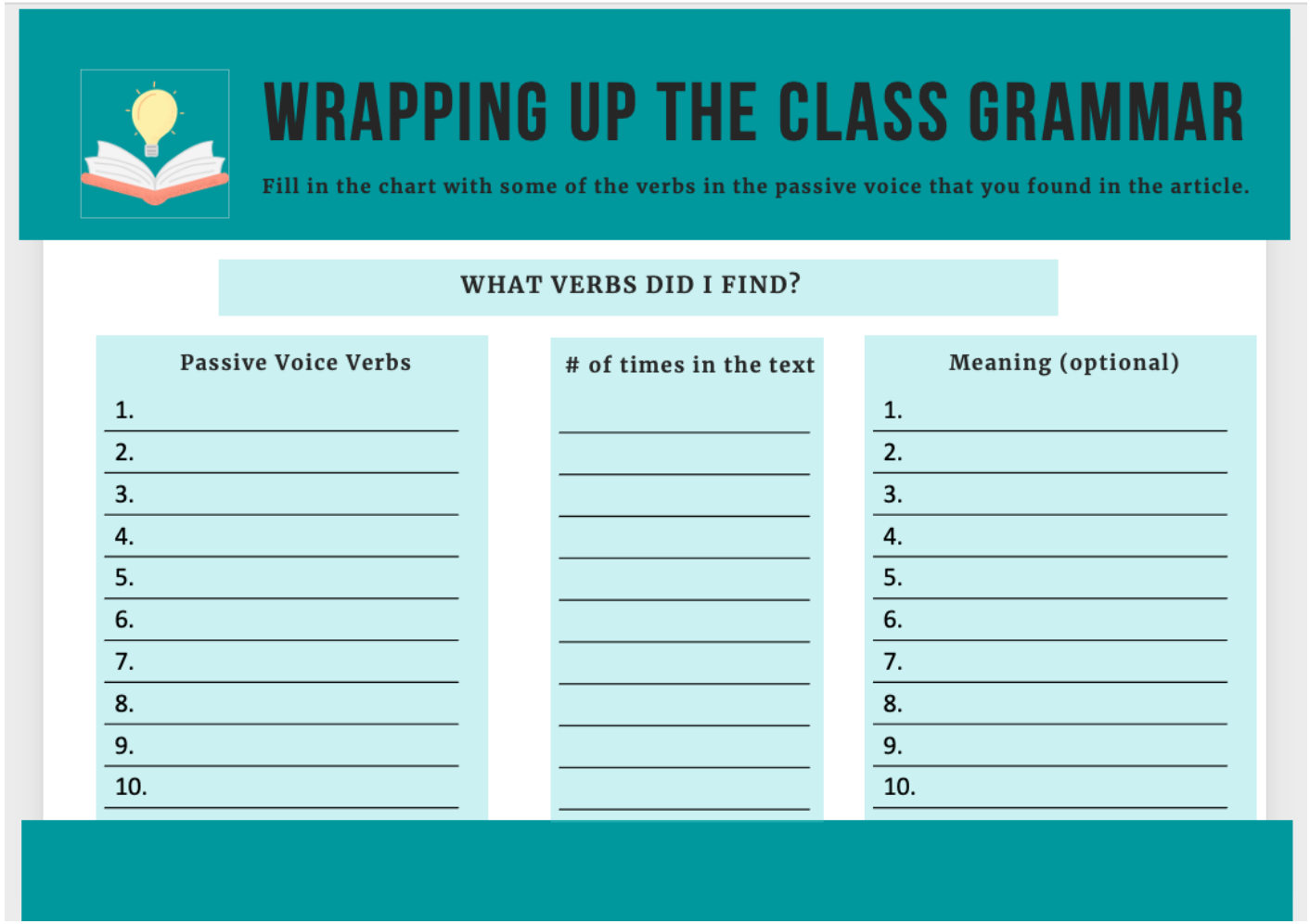
2.

3.

Useful language:

We selected this article because_____.
Why did you select this article?
How did you find the main idea?
Were there any visual cues in the article?
When you skimmed & scanned, what did you look for? What did you find?

Post-tasks



WRAPPING UP THE CLASS GRAMMAR

Fill in the chart with some of the verbs in the passive voice that you found in the article.

WHAT VERBS DID I FIND?

Passive Voice Verbs	# of times in the text	Meaning (optional)
1.		1.
2.		2.
3.		3.
4.		4.
5.		5.
6.		6.
7.		7.
8.		8.
9.		9.
10.		10.

WRAPPING UP THE CLASS

Answer the questions below based on your own reading process and the articles you just read.

MONITORING MY READING

- WHY DID I READ THIS MATERIAL?
- DID I UNDERSTAND WHAT I WAS READING?
- HOW DID I FIND THE ANSWERS FOR THE ACTIVITIES?
- WAS I INTERESTED IN THE TOPICS?
- WHAT CAN I IMPROVE WHILE I AM READING?

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Chinambu, Tenorio, Whitaker
Lesson Plan # 3

Date: 09/02/2020
Student teacher: Mauli Chinambu
Assistants: Diego Tenorio and Jessica Whitaker

Lesson Plan 3 and Materials

ESP Course: EMS

Unit # 1: Deconstruction of a text: an insight of its parts **Approximate time for task cycle:** 110 minutes

Unit goal: By the end of the course, students will be able to effectively demonstrate comprehension of academic and scientific articles related to microbiology by analyzing and selecting specific and meaningful information relevant for their studies.

General objective: By the end of the unit, students will be able to effectively report results and conclusions in a written form from microbiology cases of study by summarizing the main findings.

Specific objectives: By the end of the lesson, students will be able to:

1. Correctly identify key terms covered in lesson 2 such as skimming, scanning, main idea, supporting details, and discover new concepts by completing an online matching exercise.
2. Successfully demonstrate their ability to recognize the parts of a summary by re-organizing a scrambled summary.
3. Demonstrate clear understanding of a scientific summary by paraphrasing selected sentences.
4. Appropriately identify main findings in an article by skimming and scanning for information in small groups.
5. Effectively demonstrate their understanding of an article by summarizing main findings into a paragraph in small groups.
6. Promptly judge classmates' poster by accessing an online cork board and posting feedback using sentence starters.
7. Effectively modify groups' summary by rewriting the document applying the feedback and corrections provided.

Objectives	Procedures	Language (Vocabulary, expressions, useful language, grammatical or phonetic features)	Strategies	Macro Skills	Time allotted
1	**Warm-up** T will greet Ss and start the class with an online matching exercise to review key concepts covered in lesson 2 and to introduce new topics to teach in this lesson. The game will be played in the main session while sharing the screen using Handout 1. T will explain to the Ss that they have to use the Annotations tool available in Zoom to complete this exercise. T will ask for a volunteer to answer the first question. Then, that S will select another S to continue with the next word and definition until all of the words have been matched with the definition. After finishing the matching exercise, T will go through the new concepts and will mention that they will be covered in this class. **Materials**	**Vocabulary** Topic sentence Summary Paraphrasing Sentence starters Adjectives	Schema Activation	R L S	10’

	Handout 1: Warm up				
2	**Pre-task 1** Using Handout 2, T will explain the different components of a paragraph (topic sentence, supporting statements, examples, etc.) This explanation will happen with all the Ss in the main session. Ss will be sent to BRs in groups of 4 or 5. Using Pinup, Ss will receive a summary paragraph cut into pieces and scrambled. Taking the paragraph structure into consideration, Ss will have to reorganize the paragraph into the appropriate order, making sure that the final version makes sense and that it flows accordingly. T will ask Ss to select 3 sentences (regardless what they are about) by highlighting them as they will be used during the next activity. **Feedback** Ss will return to the main session to check their answers. T will show the original summary (Handout 3) to clarify any doubts about the order.	**Vocabulary** Topic sentence, supporting details, key words, introduction, conclusion <u>Keywords in article to highlight during explicit teaching:</u>	Organizing a paragraph Identifying paragraph components	R W S	15’

	Materials Handout 2: Summary Explanation Handout 3: Scrambled article's summary on *Antimicrobial resistance of Neisseria gonorrhoeae…* (Answer Key) Pinup links: ● Group 1: https://pinup.com/s7uOZNN5N ● Group 2: https://pinup.com/DaZ4CuApx ● Group 3: https://pinup.com/N2lKOTa8R ● Group 4: https://pinup.com/-8v4afK9P ● Group 5: https://pinup.com/Cx_uteKlR	The researchers investigated, In order to conduct the study, The article highlights the results, To conclude **Useful Language** Sharing Ideas I think this part goes			

		first/second/third. This should be the next one. <u>Asking for Information</u> What part should go next? Do you think this is the right order?			

		Classroom Language: What is the word for ….? What is the pronunciation of -…? Can you move the sticky to the top/bottom?			
3	**Pre-task 2** Using the summary on Handout 3, T will emphasize some expressions and sentence starters used in the different sections of a summary. Using those examples, T will show	**Vocabulary** Summary,	Paraphrasing	R W	15’

	similar phrases that Ss can use to paraphrase while writing a summary. T explains the steps to follow (Handout 4) to write a summary, emphasizing the importance of not just copying and pasting information, but of using synonyms and adjectives, keeping the main ideas and using their own words. Ss will be sent to their BRs in the same groups as in Pre-task 1. To practice paraphrasing, Ss will go over the sentences they have previously selected and using the sentences starters on Handout 4, they will paraphrase them using Handout 5. **Feedback** Ss come back to the main session to review their paraphrased sentences. T will ask each group to share 1 or 2 examples. **Materials:** ● Handout 3: Summary on *Antimicrobial resistance of Neisseria gonorrhoeae…* ● Handout 4: How to paraphrase ● Handout 5: Template for paraphrased sentences	paraphrasing, adjectives, sentence structure, sentence starters **Useful** **Language** Maybe we can write this … instead of … What is a synonym for…? Can you think of			

		another word for…?			
Break: from 5:50 to 6:50 p.m.					

4,5	**Main task** With all Ss in the main session, T will explain and model the main task by displaying Handout 6 and a sample article. T will model the task with AT so that Ss have a clear idea of the steps that need to be followed. Ss will work in their BR in the same groups of 4 or 5. Handout 6 (the PPT) will be sent to them via Zoom chat for them to open and download. **Part A** Once in the BR, students will go to the shared Google Drive folder and download the article assigned to their group. Ss will decide on roles for each group member. **Part B** Then, through skimming, scanning, and reading,	**Vocabulary** Antibiotic resistance, summary, paraphrasing, main idea, adjectives **Useful Language (Part A)** I'd like to be the _____. I prefer to _____. Who wants to be the _____? Is that okay? What do you think about _____?	Skimming and scanning Identifying main ideas and supporting details Negotiating meaning Paraphrasing Summarizing information	R W L S	10' 15'

	they will extract and take notes on the key words, main idea, supporting details, and concluding statement of the article. **Part C** Ss will use the notes they took to write a summary of the article and display it as a poster with 1 or 2 pictures. They must appropriately paraphrase the information they extracted in order to write their summary. The designated speaker of the group will present the poster and summary to the class in the main session. Note: UL for discussion and paraphrasing is provided on Handout 6. **Feedback** A PPT will be filled out with the information	**Useful Language (Part B)** I think we should write… Some key words are… In my opinion, the main idea is… I believe we should include _____ because _____. What do you think about…? What does _____ mean? Should we mention……?			20’ 5’

	obtained from the BR discussions and group presentations. Ss will receive feedback on their use of vocabulary, pronunciation, and grammar. *Note:* The T and the AT will collaborate on the shared PPT to take notes on the aspects that require feedback. In the main session, one of the AT will be in charge of taking notes as needed for additional feedback. *Note*: Observers will be granted co-host status and will be able to move to different BRs on their own. **Materials** Handout 6: PPT for main task Articles for summaries (PDF)	**Useful Language (Part C)** We should mention that…. We could write …… What do you think about saying…..? How can we restructure or rephrase …..? Which sentence starter would be best to….? What do you think about this picture? **Language for Paraphrasing in a Summary (Part**			

	Group 1: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4034547/pdf/UPS-119-113.pdf Group 2: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4959660/pdf/mBio.00598-16.pdf Group 3: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4034560/pdf/UPS-119-205.pdf Group 4: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3579749/pdf/1741-7007-11-14.pdf	**C)** **Introduction sentence** In _____(name of the article), _____(last names of authors) explain that… According to the authors…. The authors state/claim that…. The authors say/identify/show/ suggest….. **Supporting details sentences** The authors support this			

	Group 5: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1049 95/pdf/jm002169.pdf	argument/idea by explaining/presenting….. In addition, …./ Furthermore, …./ Moreover,….. According to this article _____ is an example of _____. _____ is a result of _____ because… One example provided by the authors is _____. **Concluding statement** In conclusion, …./ To conclude, …. /			

		Lastly, ….. / Overall, ….			
6	**Post-task 1** T will use an online cork board to have Ss leave feedback on the poster each group created. AT will post the poster's image as a cover page and below that picture, the poster's PDF or PPT will be attached. Ss will be assigned one group to evaluate and they will select one person from their group to write the feedback on the poster. All Ss in the group will help provide ideas to finish the sentence starters that will be available in the cork board. Ss will leave the feedback by opening a sticky note and posting it on the group's board. T will also provide feedback on the same cork board. **Materials** Linoit links:	**Useful Language** I agree with your comment… I disagree because I think the poster… We could mention the… We shouldn't include that because… **Sentence Starters for Feedback**			10'

	Group 1: http://linoit.com/users/Diegojts_32/canvases/Lesson%203%20-%20Group%201 Group 2: http://linoit.com/users/Diegojts_32/canvases/Lesson%203%20-%20Group%202 Group 3: http://linoit.com/users/Diegojts_32/canvases/Lesson%203%20-%20Group%203 Group 4: http://linoit.com/users/Diegojts_32/canvases/Lesson%203%20-%20Group%204 Group 5: http://linoit.com/users/Diegojts_32/canvases/Lesson%203%20-%20Group%205	This group's structure is… I like the poster's organization because… They can change… We would modify the… because it looks… It's better to include… This poster is missing… This adjective can be changed to…			

7	**Post Task 2 (Homework)** Using the feedback provided by their classmates and instructors, Ss will rewrite the summary making any necessary changes. Ss will upload the final version of the summary to their Google Classroom for T revision.		Revising and editing a paragraph	R W	HW

Abbreviations: BR= breakout rooms, T= teacher, AT= assistant teacher(s), Ss=students, L= listening, S= speaking,

W= writing, R= reading, UL= useful language, PPT= PowerPoint Presentation, HW=homework

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Warm up

University of Costa Rica
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Chinambu, Tenorio, Whitaker
Handout 1

Review time!

Use the Annotations tool in Zoom to match the definition on the right to the words on the left.

1.	Main idea	a. Describe things, people, places
2.	Supporting details	b. Summarizes the main idea of a paragraph... usually it is first sentence
3.	Topic sentence	c. Contains facts, examples, details about the article
4.	Summary	d. What the author says about the article
5.	Paraphrasing	e. Ideas to complete a sentence
6.	Sentence starters	f. Restates the meaning of a paragraph
7.	Adjectives	g. Gives the main points of a piece of writing

Pre-task

University of Costa Rica
Master's Program in TEFL
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Chinambu, Tenorio, Whitaker
Handout 2

Antimicrobial-resistant CC17 *Enterococcus faecium*: The past, the present and the future

Abstract

Enterococcus faecium is a robust opportunistic pathogen that is most commonly found as a commensal of the human and animal gut but can also survive in the environment. Since the introduction and use of antimicrobials, *E. faecium* has been found to rapidly acquire resistance genes that, when expressed, can effectively circumvent the effects of most antimicrobials. The rapid acquisition of multiple antimicrobial resistances has led to the adaptation of specific *E. faecium* clones in the hospital environment, collectively known as clonal complex 17 (CC17). CC17 *E. faecium* are responsible for a significant proportion of hospital-associated infections, which can cause severe morbidity and mortality. Here we review the history of *E. faecium* from commensal to a significant hospital-associated pathogen, its robust phenotypic characteristics, commonly used laboratory typing schemes, and antimicrobial resistances with a focus on vancomycin and its associated mechanism of resistance. Finally, we review the global epidemiology of vancomycin-resistant *E. faecium* and potential solutions to problems faced in public health.

Color code explanation:

Green: Topic sentence
Pink: Supporting statements/details
Yellow: Concluding ideas

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Handout 3 Answer Key

Antimicrobial resistance of *Neisseria gonorrhoeae* isolates from high risk men in Johannesburg, South Africa: a summary

Liteboho D. Maduna, Marleen M. Kock, Brian M. J. W. van der Veer, Oscar Radebe, James McIntyre, Lieke B. van Alphen, Remco P.H. Peters

DOI: 10.1128/AAC.00906-20

(1. Objective) In the article *Antimicrobial resistance of Neisseria gonorrhoeae isolates from high risk men in Johannesburg, South Africa,* by Maduna et al, the researchers explain the how *Neisseria gonorrhoeae* antimicrobial drug resistance has emerged worldwide; yet, the situation in Sub-Saharan Africa is not well-documented. The researchers investigated the molecular epidemiology and occurrence of antimicrobial resistance in *Neisseria gonorrhoeae* infections in two core transmission groups of men in Johannesburg, South Africa.

(2. Methods) In order to conduct the study, the authors recruited men who have sex with men (MSM) presenting with urethral discharge and men with a recurrent episode of urethral discharge. Then, molecular testing and culture for *N. gonorrhoeae* followed by antimicrobial susceptibility testing was performed. The researchers used whole genome sequencing (WGS) to identify resistance conferring mutations and to determine genetic relatedness of the isolates.

(3. Results) The article highlights the results of the study when saying that from the fifty-one men who were recruited; 42 (82%) had *N. gonorrhoeae* infection. They also mentioned that most gonococcal isolates were resistant to ciprofloxacin (78%) and tetracycline (74%); 33% were penicillin resistant.

(4. Results) Also, all gonococcal isolates were susceptible to cephalosporines and spectinomycin. Additionally, they report that Azithromycin resistance was observed in four (15%) isolates (epidemiological cut-off); all with mutations in the *mtrR* promoter region.

(5. Results) Lastly, the researchers report that most of the isolates (19/27) harbored the gonococcal genetic island; associated with antimicrobial resistance and that WGS revealed a diverse epidemic with mostly novel NG-STAR (70%) and NG-MAST (70%) sequence types.

(6. Conclusion) To conclude, the researchers demonstrated high prevalence of antimicrobial-resistance in *Neisseria gonorrhoeae* strains obtained from high-risk men in South Africa. It is suggested that the introduction of diagnostics and scale-up of surveillance are warranted to prevent emergence of multidrug-resistant infections.

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Handout 4

How to Paraphrase

When we summarize information we cannot copy and paste. We need to modify the sentence. We can do this by doing the following:

A. Using synonyms (use a thesaurus on Google)

B. Restructuring the sentence

C. Keeping the main idea

Let's do an example:

Sentence from article: Then, molecular testing and culture for N. gonorrhoeae followed by antimicrobial susceptibility testing was performed.

	Original	Revised
Use synonyms where possible	a. antimicrobial susceptibility testing b. performed	a. a test to determine antimicrobial vulnerability b. conducted
Restructure the sentence	passive voice: testing was performed	active voice: the researchers conducted a test
Keep the main idea	testing was done	testing was done

Paraphrased sentence: The researchers conducted a molecular and culture test for N.gonorrhoea as well as a test to determine antimicrobial vulnerability.

Phrases for paraphrasing and summarizing:

Introduction sentence	In _____(name of the article), _____(last names of authors) explain that…… According to the authors, ….. The authors state/claim that…… The authors say/identify/show/suggest…
Supporting details sentences	The authors support this argument/idea by explaining/presenting.. … In addition, / Furthermore, / Moreover, .. According to this article _____ is an example of _____. _____ is a result of _____ because ….. One example provided by the authors is _____.
Concluding statement	In conclusion, …./ To conclude, …. / Lastly, ….. / Overall, ….

Let's Paraphrase!

Using the sentences you selected from the previous summary, write a new version by paraphrasing them.

Original Sentence:

Paraphrased Version:

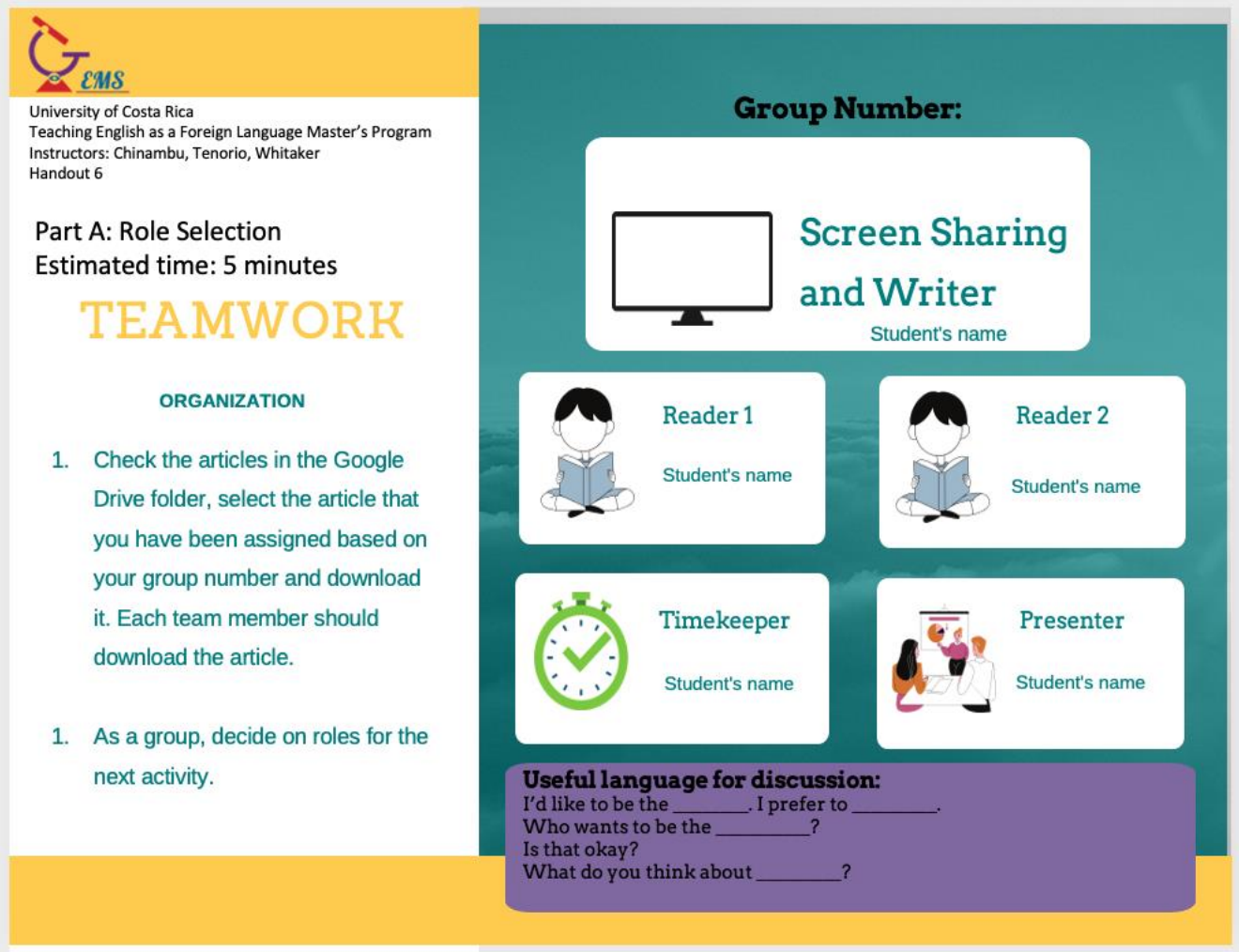
Original Sentence:

Paraphrased Version:

Original Sentence:

Paraphrased Version:

Main task


EMS
University of Costa Rica
Teaching English as a Foreign Language Master's Program
Instructors: Chinambu, Tenorio, Whitaker
Handout 6
Part A: Role Selection
Estimated time: 5 minutes
TEAMWORK
ORGANIZATION
1. Check the articles in the Google Drive folder, select the article that you have been assigned based on your group number and download it. Each team member should download the article.
1. As a group, decide on roles for the next activity.
Group Number:
Screen Sharing and Writer
Student's name
Reader 1
Student's name
Reader 2
Student's name
Timekeeper
Student's name
Presenter
Student's name
Useful language for discussion:
I'd like to be the _____. I prefer to _____.
Who wants to be the _____?
Is that okay?
What do you think about _____?

University of Costa Rica
Teaching English as a Foreign Language Master's Program
Instructors: Chinambu, Tenorio, Whitaker
Handout 6

Part A: Role Selection
Estimated time: 5 minutes

TEAMWORK

ORGANIZATION

1. Check the articles in the Google Drive folder, select the article that you have been assigned based on your group number and download it. Each team member should download the article.

1. As a group, decide on roles for the next activity.

Group Number:

Screen Sharing and Writer
Student's name

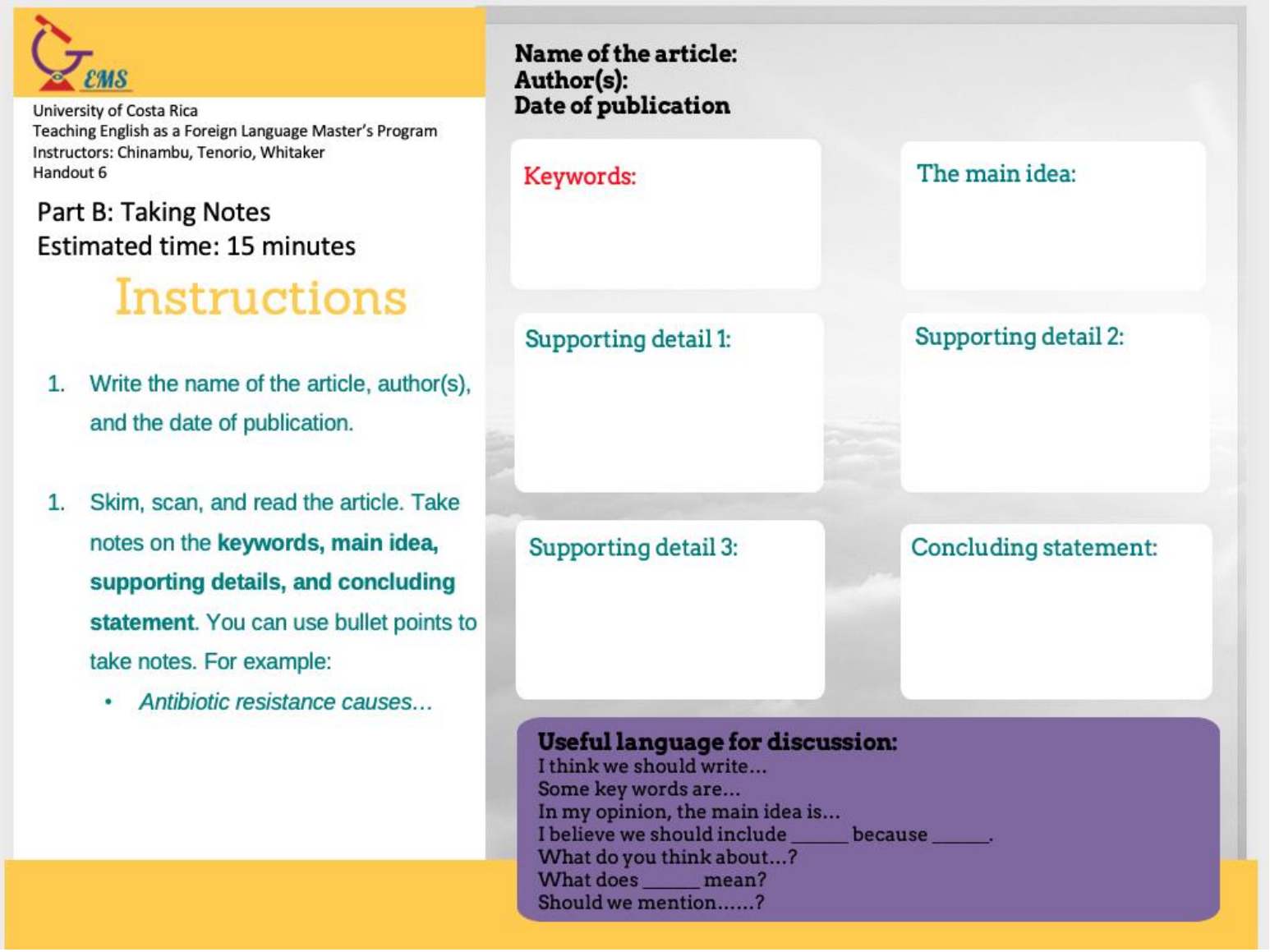
Reader 1
Student's name

Reader 2
Student's name

Timekeeper
Student's name

Presenter
Student's name

Useful language for discussion:
I'd like to be the _____. I prefer to _____.
Who wants to be the _____?
Is that okay?
What do you think about _____?


EMS
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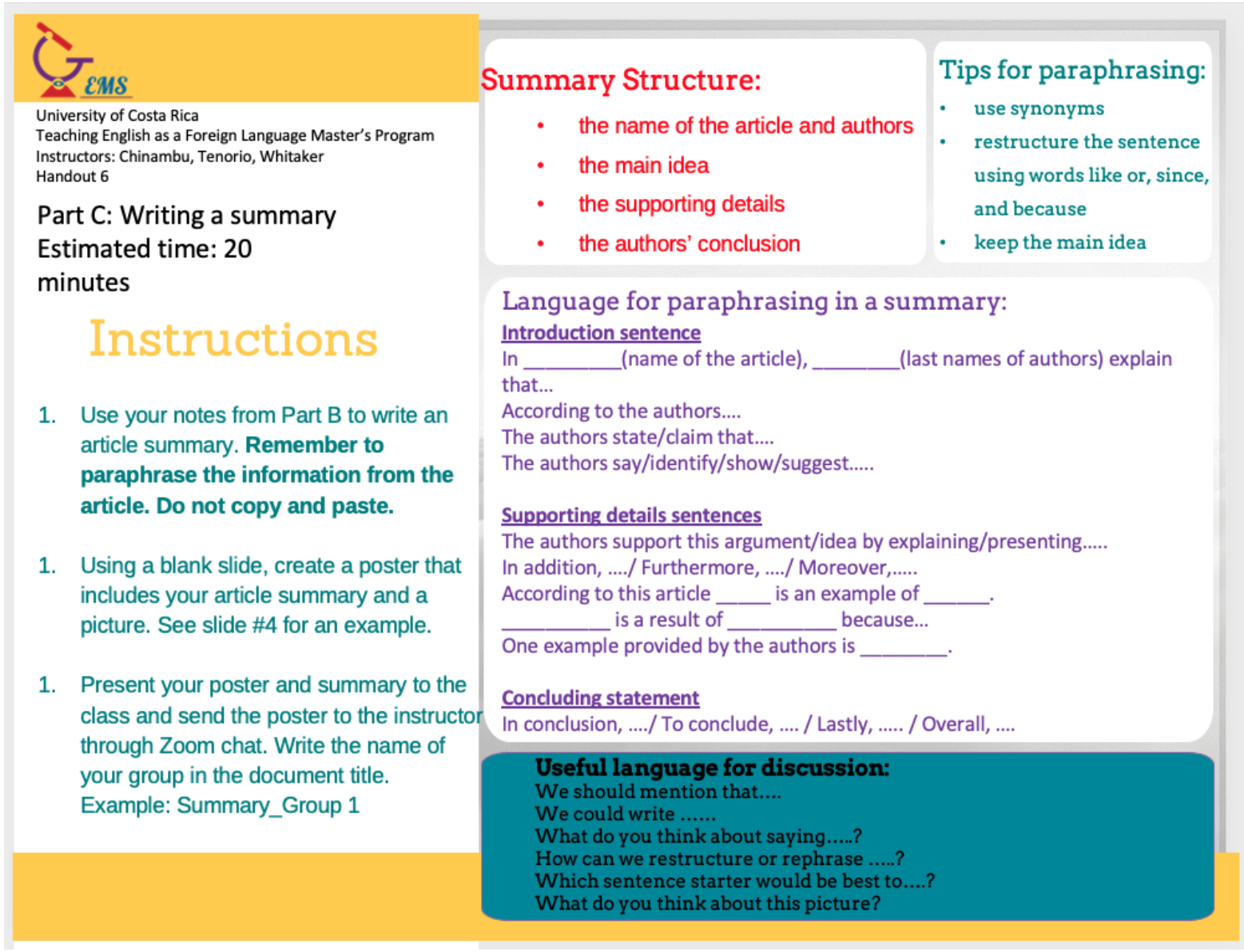
Teaching English as a Foreign Language Master's Program
Instructors: Chinambu, Tenorio, Whitaker
Handout 6
Part B: Taking Notes
Estimated time: 15 minutes
Instructions
1. Write the name of the article, author(s), and the date of publication.
1. Skim, scan, and read the article. Take notes on the keywords, main idea, supporting details, and concluding statement. You can use bullet points to take notes. For example:
• Antibiotic resistance causes…
Name of the article:
Author(s):
Date of publication
Keywords:
The main idea:
Supporting detail 1:
Supporting detail 2:
Supporting detail 3:
Concluding statement:
Useful language for discussion:
I think we should write…
Some key words are…
In my opinion, the main idea is…
I believe we should include _____ because _____.
What do you think about…?
What does _____ mean?
Should we mention……?



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Teaching English as a Foreign Language Master's Program
Instructors: Chinambu, Tenorio, Whitaker
Handout 6

Part C: Writing a summary
Estimated time: 20 minutes

Instructions

1. Use your notes from Part B to write an article summary. **Remember to paraphrase the information from the article. Do not copy and paste.**

1. Using a blank slide, create a poster that includes your article summary and a picture. See slide #4 for an example.

1. Present your poster and summary to the class and send the poster to the instructor through Zoom chat. Write the name of your group in the document title. Example: Summary_Group 1

Summary Structure:

- the name of the article and authors
- the main idea
- the supporting details
- the authors' conclusion

Tips for paraphrasing:

- use synonyms
- restructure the sentence using words like or, since, and because
- keep the main idea

Language for paraphrasing in a summary:

Introduction sentence

In _____(name of the article), _____(last names of authors) explain that...
According to the authors....
The authors state/claim that....
The authors say/identify/show/suggest.....

Supporting details sentences

The authors support this argument/idea by explaining/presenting.....
In addition, .../ Furthermore, .../ Moreover,.....
According to this article _____ is an example of _____.
_____ is a result of _____ because...
One example provided by the authors is _____.

Concluding statement

In conclusion, .../ To conclude, ... / Lastly, ... / Overall, ...

Useful language for discussion:

We should mention that....
We could write .....
What do you think about saying.....?
How can we restructure or rephrase .....?
Which sentence starter would be best to....?
What do you think about this picture?

Poster Example:

Drug metabolism and antibiotic resistance in microorganisms

A Summary by Chinambu, Tenorio & Whitaker

In ¨Drug metabolism and antibiotic resistance in microorganisms¨ by Sim and Ryan, drug metabolism……..

Image taken from: https://www.medicalnewstoday.com/articles/327050

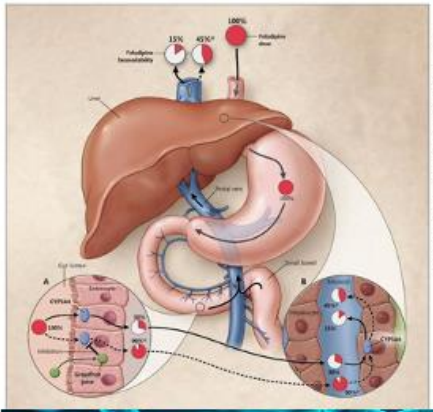


Image taken from: https://www.nejm.org/doi/full/10.1056/NEJMra032424

Image taken from: https://www.sciencefriday.com/segments/what-microbes-are-hiding-in-your-home/

University of Costa Rica
Master's Program in TEFL
English for Microbiology Students
Chinambu, Tenorio, Whitaker
Lesson Plan # 4

Date: 09/09/2020
Student teacher: Diego Tenorio
Assistants: Mauli Chinambu and Jessica Whitaker

Lesson Plan 4 and Materials

ESP Course: EMS

Unit # 1: Deconstruction of a text: an insight of its parts **Approximate time for task cycle:** 110 minutes

Unit goal: By the end of the course, students will be able to effectively demonstrate comprehension of academic and scientific articles related to microbiology by analyzing and selecting specific and meaningful information relevant for their studies.

General objective: By the end of the unit, students will be able to successfully define key microbiology concepts presented in a text by filling out a vocabulary log.

Specific objectives: By the end of the lesson, students will be able to:

1. Successfully demonstrate their understanding of terminology related to COVID-19 and antimicrobial resistance by brainstorming a list of key terms for a mind map.
2. Promptly judge classmates' poster by accessing an online cork board and posting feedback using sentence starters.
3. Promptly identify key vocabulary terms from a scientific article by skimming and scanning.
4. Successfully choose appropriate synonyms for key terms from a scientific article by using a thesaurus.
5. Efficiently create sentences using the key terms found in the scientific article by filling out a vocabulary log.
6. Correctly recognize sentence structure by transforming active voice sentences into passive voice.

7. Effectively demonstrate understanding of the main idea behind a sentence by paraphrasing it.

Objectives	Procedures	Language (Vocabulary, expressions, useful language, grammatical or phonetic features)	Strategies	Macro Skills	Time allotted
1	**Warm-up** T will greet Ss and start the class with an online mind map activity. T will give instructions and model the activity with AT by following instructions provided on Handout 1. *Note:* Ss were given Handout 1 on Monday 9/7/2020 in order for them to get familiar with the	**Vocabulary** Keywords, mind map, brainstorm <u>Possible words from mind map</u> COVID-19, pandemic, transmission, spread, built	Schema Activation	S L W	10’

	website GoConqr and review vocabulary from previous classes. Ss will be provided with a link and UL for discussion in the main session chat box. Half of the groups will be assigned the topic ¨COVID-19¨ and the other half will be assigned ¨Antimicrobial Resistance¨ for the mind map. Ss will be put into groups of 3 or 4 and sent to the BR rooms. They must open the link (GoConqr website) and follow the instructions on Handout 1 to create a mind map and brainstorm words connected to their assigned topic. T and AT will move to each BR to check on Ss progress and to clarify any doubts. *Note*: Observers will be granted co-host status and will be able to move to different BRs on their own. Once Ss are back in the main session, T will elicit responses from them by asking each group to	environments, asymptomatic, pathogen, antibody, safety measures, antimicrobial resistance, antibiotics, bacteria, genome, isolates, susceptibility **Useful Language** I think we should write…. In my opinion, an important word			

	share some of the words they came up with by sharing their screen and presenting their mind maps. **Feedback** A PPT will be filled out with the information obtained from the BR discussions and presentations. Ss will receive feedback on their use of vocabulary and pronunciation. *Note:* The T and the AT will collaborate on the shared PPT to take notes on the aspects that require feedback. In the main session, AT Chinambu will provide feedback on pronunciation. **Materials** Handout 1: Warm up instructions for GoConqr Links to GoConqr:	is… Do you think we should include…? What about the word…?			

	https://www.goconqr.com/en-CA/mindmap/25424121/COVID-19-Mind-Map https://www.goconqr.com/en-CA/mindmap/25424453/Antibiotic-Resistance-Mind-Map				
2	**Pre-task** *Note:* During the previous class, Ss were asked to complete an assignment in which they had to finish creating a poster using the articles covered during last class. The same articles will be used once again during the main task as input for Ss to complete a vocabulary log. Ss will be asked to extract key terms, write a definition for each term, look for possible synonyms, and create a sentence using each term in order to demonstrate their ability to use the word.	**Useful Language** I agree with your comment… I disagree because I think the poster… We could mention the…	Organizing a paragraph Identifying paragraph components	R W S	30’

	To complete this pre-task and review the assigned homework, Ss will begin by presenting their posters. One S per group will share their screen and the assigned speaker will read the summary. T will use an online cork board to have Ss leave feedback on the poster each group created. T and AT will model the task for the Ss in the main session. *Note*: AT will post the poster's image as a cover page and below that picture, the poster's PDF or PPT will be attached. Ss will go back into their groups of 3 or 4 and be sent to BR. Ss will be assigned one group to evaluate and they will select one person from their group to write the feedback on the poster. All Ss in the group will help provide ideas to finish the sentence starters that will be available on the cork board. Ss will provide the feedback by opening a	We shouldn't include that because… **Sentence Starters for Feedback** This group's structure is… I like the poster's organization because… They can change… We would modify the… because it looks…			

	sticky note and posting it on the group's board. T will also provide feedback on the same cork board. *Note:* Ss must select the link that corresponds with the group they have been assigned to evaluate. Ss will evaluate a group that worked with the same article in order to be familiar with the content and be able to give appropriate feedback. ○ Group 1 will evaluate Group 3 ○ Group 3 will evaluate Group 5 ○ Group 5 will evaluate Group 1 ○ Group 2 will evaluate Group 4 ○ Group 4 will evaluate Group 2 **Feedback** T and Ss will provide feedback on the posters directly on the cork board. Once finished, Ss should review the comments and suggestions and	It's better to include… This poster is missing… This adjective can be changed to…			

	make any necessary changes/corrections for homework. **Materials** Linoit links: Group 1: http://linoit.com/users/Diegojts_32/canvases/Lesson%203%20-%20Group%201 Group 2: http://linoit.com/users/Diegojts_32/canvases/Lesson%203%20-%20Group%202 Group 3: http://linoit.com/users/Diegojts_32/canvases/Lesson%203%20-%20Group%203 Group 4: http://linoit.com/users/Diegojts_32/canvases/Lesson%203%20-%20Group%204				

	Group 5: http://linoit.com/users/Diegojts_32/canvases/Lesson%203%20-%20Group%205				
Break: from 5:50 to 6:50 p.m.					
3, 4, 5	**Main task** With all Ss in the main session, T will ask the Ss to open the documents they have previously downloaded prior to the session. These files will be placed into the Zoom chat box in case the Ss are not able to promptly locate the files on their computer. T will explain that from now on, a vocabulary log needs to be filled out with the terms covered in class. T will also mention that this is part of the final project assigned for this course and guidelines have been posted in Google Classroom. T will model how to complete the vocabulary log	**Vocabulary** Vocabulary log, antibiotic resistance, key terms, synonyms, definition, sentence **Useful Language** What other terms can I include for	Skimming and scanning Identifying key terms and synonyms Negotiating meaning	R W L S	45’

	with a pre-filled exercise. The link to the vocabulary log is available in Google Slides and it will be sent to the Ss during this explanation. T will ask the Ss to skim and scan the articles assigned per group. Ss will have to identify key vocabulary terms using skimming and scanning. At the same time, Ss will have to start filling out the vocabulary log in which they have to enter the term and a synonym from an online thesaurus (whenever possible and applicable). The synonym to be used will have to match according to the topic and the T will briefly mention that negotiation of meaning is needed to determine which synonym to choose. The Ss will also need to provide a definition taken from an online dictionary and write a sentence of their own to demonstrate they understood the term.	_____ ? Is that okay? What do you think about _____? I think you should write… Some key terms are… What do you think about…? What does _____ mean? Should we mention……?			

	A rubric will be used to evaluate this activity. Each S will own their personal vocabulary log as this is part of the final project as well. However, for the purposes of this lesson, T will send Ss to the BR to work in groups of 3 or 4 so that all Ss can get some extra help completing this task. T will close the BR and in the main session, T will ask some volunteers to share their screen to show their progress on their vocabulary log. T will ask other Ss to provide feedback after the presenter has finished with the information of the vocabulary log. *Note:* UL for completion of vocabulary log and feedback will be provided in the Zoom chat box. **Feedback** A PPT will be filled out with the information obtained from the BR discussions and group presentations. Ss will receive feedback on their	Where can I find the _____ ? **Useful Language (Feedback)** I think you need to write_____ for_____. You could write …… You could modify the _____ section. I believe _____ sounds better. What do you think			

	use of vocabulary, pronunciation, and grammar. *Note:* The T and the AT will collaborate on the shared PPT to take notes on the aspects that require feedback. In the main session, one of the AT will be in charge of taking notes as needed for additional feedback. **Materials** Vocabulary Log in Google Slides https://docs.google.com/presentation/d/1KMasNcqcfaCgWYAscSDuQaqiFUJxqC7wNWb4o5jvHJ8/edit?usp=sharing Articles for vocabulary log information (PDF) Groups 1, 3 and 5: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4034547/pdf/UPS-119-113.pdf Groups 2 and 4:	about including…..? What do you think about this definition / term / synonym?			

	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC104995/pdf/jm002169.pdf Online thesaurus: https://www.thesaurus.com/ Online dictionary for definitions: https://www.dictionary.com/				
6, 7	**Post-task** Using Pinup, T will ask one volunteer to put the words in the correct order to form a proper sentence. The sentence will be in active voice, extracted from the article used in previous activities. T will explain the structure of active sentences being Subject + Verb + Complement. Then using a similar example, T will ask for another volunteer to put the words in the correct order to form a proper sentence, but this time in the passive voice. T will ask Ss what changes they can find in the second sentence compared to the	**Useful Language** I think ___ should go at the beginning/end of the sentence. Maybe a synonym for ___ is ___.	Recognizing patterns Paraphrasing		15’

	first one. T will explain the structural changes for passive voice sentences, emphasizing the usefulness of this change for paraphrasing. Using Handout 2, Ss will work in groups to transform sentences from active voice to passive voice. First, Ss will arrange the scrambled words to form an active voice sentence. Next, Ss will transform those active sentences into passive voice. Then, Ss will select one of the sentences in passive voice to paraphrase. They can use synonyms to do this while keeping in mind the original intention of the sentence. **Feedback** Ss will come back to the main session to review their paraphrased sentences. T will ask each group to share 1 or 2 examples. **Materials**	What do you think about this sentence? Are we keeping the original meaning/intention of the sentence?			

	Handout 2: From active to passive sentences. https://docs.google.com/presentation/d/1CU_bnGObn4m2o7nCVtfgKYbZnT9nr9oC3_2zTQ7fgeI/edit?usp=sharing Pinup: Sentence structure teaching https://pinup.com/BdSSyrBZL ● **Active voice sentence**: studies indicate transmission of resistant bacteria from human rest products to wild birds. ● **Passive voice sentence**: antibiotic resistance among baboons was correlated with the degree of human interactivity				

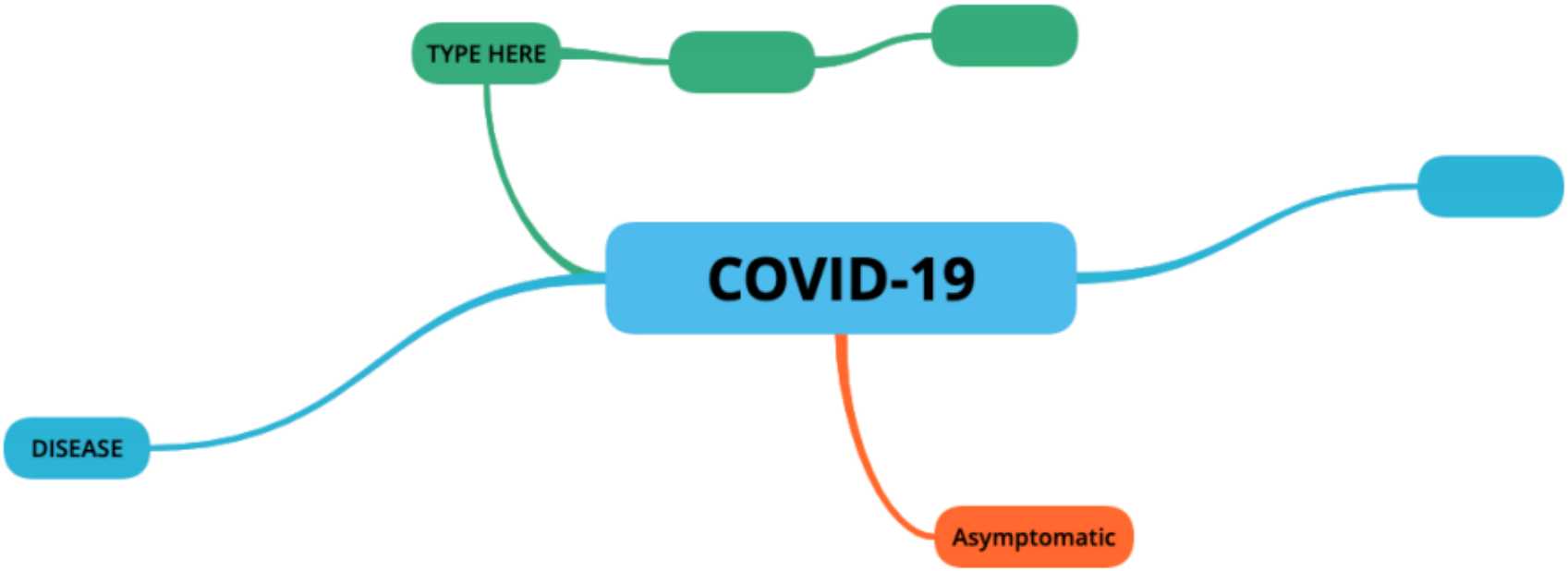
Abbreviations: BR= breakout rooms, T= teacher, AT= assistant teacher(s), Ss=students, L= listening, S= speaking, W= writing, R= reading, UL= useful language, PPT= PowerPoint Presentation, HW=homework

References

Bergeron, M. G., & Ouellette, M. (1998). Preventing antibiotic resistance through rapid genotypic identification of bacteria and of their antibiotic resistance genes in the clinical microbiology laboratory. *Journal of clinical microbiology*, *36*(8), 2169–2172. https://doi.org/10.1128/JCM.36.8.2169-2172.1998

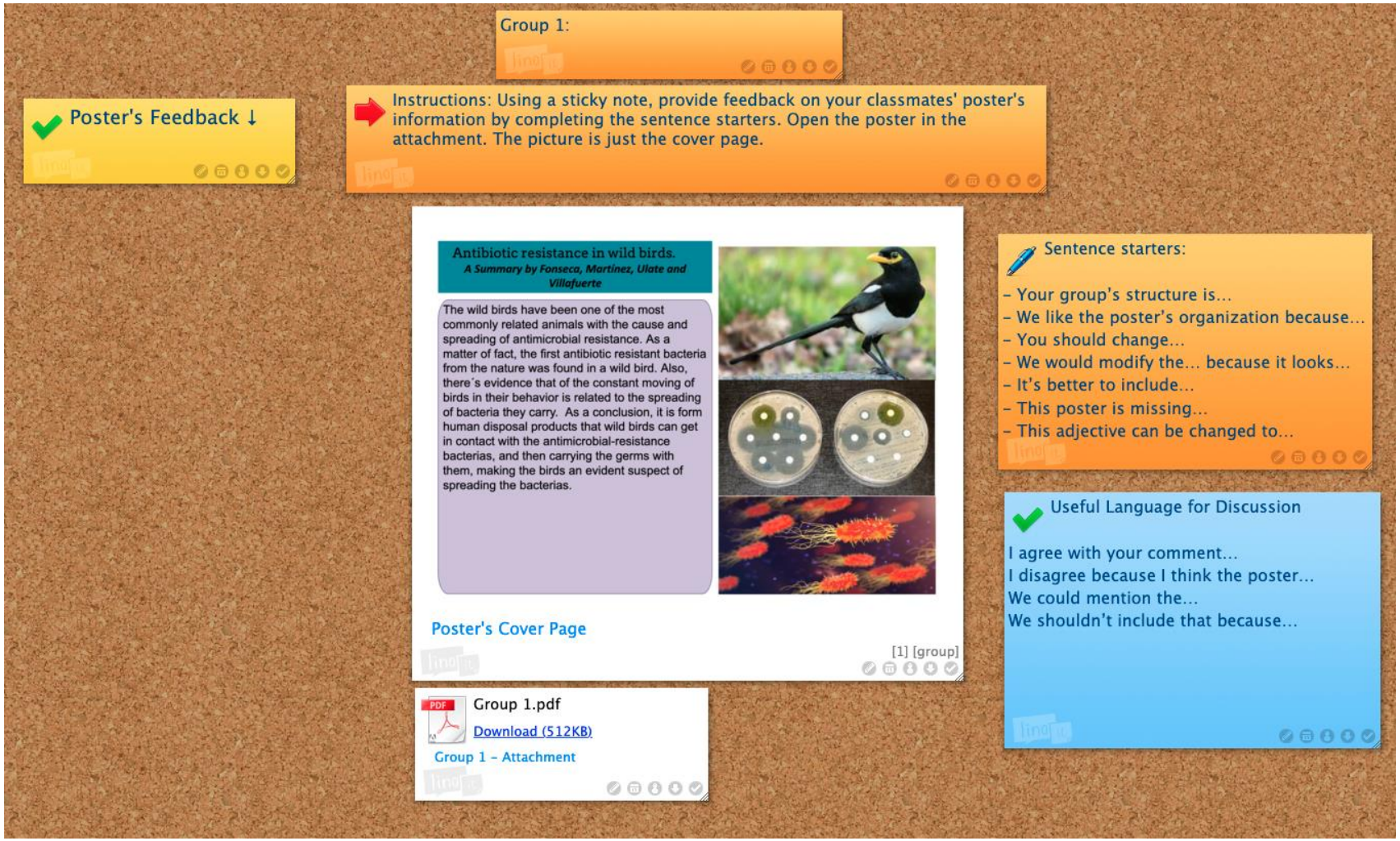
Bonnedahl, J., & Järhult, J. D. (2014). Antibiotic resistance in wild birds. *Upsala journal of medical sciences*, *119*(2), 113–116. https://doi.org/10.3109/03009734.2014.905663

Warm up




Antimicrobial Resistance

Pre-task


Group 1:
Poster's Feedback ↓
Instructions: Using a sticky note, provide feedback on your classmates' poster's information by completing the sentence starters. Open the poster in the attachment. The picture is just the cover page.
Antibiotic resistance in wild birds.
A Summary by Fonseca, Martínez, Ulate and Villafuerte
The wild birds have been one of the most commonly related animals with the cause and spreading of antimicrobial resistance. As a matter of fact, the first antibiotic resistant bacteria from the nature was found in a wild bird. Also, there´s evidence that of the constant moving of birds in their behavior is related to the spreading of bacteria they carry. As a conclusion, it is form human disposal products that wild birds can get in contact with the antimicrobial-resistance bacterias, and then carrying the germs with them, making the birds an evident suspect of spreading the bacterias.
Poster's Cover Page
[1] [group]
Sentence starters:
- Your group's structure is...
- We like the poster's organization because...
- You should change...
- We would modify the... because it looks...
- It's better to include...
- This poster is missing...
- This adjective can be changed to...
Useful Language for Discussion
I agree with your comment...
I disagree because I think the poster...
We could mention the...
We shouldn't include that because...
Group 1.pdf
Download (512KB)
Group 1 – Attachment

Appendix K: Vocabulary Guidelines

University of Costa Rica
Master's Program in TEFL
English for Microbiology Students
Chinambu, Tenorio, Whitaker
Project: Vocabulary Log

Guidelines for Vocabulary Log (10%)

(Final version due on November 4th, 2020)

This project is to be conducted individually.

The purpose of this project is to create a learning tool that promotes learning new vocabulary related to the field of microbiology. This vocabulary log will help you to keep track of scientific concepts and important phrases related to your studies.

Filling in the Vocabulary Log:

1. Use the template uploaded in Google Classroom.
2. After each class, write down new words or phrases that you found interesting during class.
3. Write down at least 2 new words per class. *
4. Provide a synonym, a definition and an original sentence for each new word.
5. Save your progress and upload the document to Google Classroom by Sunday at 10pm each week.

*We require a minimum of 2 new entries after each class. However, the total number of new terms added will be based on your individual learning process. The instructors will check your weekly progress and will evaluate your vocabulary log towards the end of the course.

Attached you will find the evaluation rubric with which your project will be assessed.

Appendix L: Vocabulary Log Template and Rubric

Main task

Vocabulary Log

Date:	Topic:

Term	Synonym	Definition	My Sentence
Susceptible	Vulnerable	Likely to be influenced or harmed by a particular thing.	Since I have celiac disease I may be susceptible to developing other autoimmune diseases.

Vocabulary Log Assessment Rubric				
	Needs Improvement **2 pts**	**Fair** **3 pts**	**Good** **4 pts**	**Excellent** **5 pts**
Vocabulary Log Organization	Vocabulary log is **not complete** and/or is **not carefully done**.	Vocabulary log may be **missing** a few entries or some entries **may not be complete.**	Vocabulary log is complete and **reasonably well done.**	Vocabulary log is complete and neat, and there is evidence that **great care** was taken with the assignment.
Write definitions	The student provides only a few definitions.	The student provides some definitions.	The student provides most definitions.	The student provides all definitions.
Write original sentences	The student provides a sentence for only a few words. The expectations for the sentences were **not met.**	The student provides a sentence for some of the words. The expectations for the sentences were **mostly met.** 1 or 2 sentences may be weak, incomplete or missing components.	The student provides a sentence for most of the words. The expectations for the sentences were met and were **well done.**	The student provides sentences for all of the words. The expectations for the sentences were **exceeded.**

Mechanics	The sentences **did not meet** the expectations. Student **often** misspells words, does not capitalize, does not use correct punctuation.	The sentences **mostly met the** expectations. Student **sometimes** makes grammar errors**,** misspells words, does not capitalize, does not use correct punctuation.	The sentences met the expectations **well.** Student **seldom** makes grammar errors, misspells words, does not capitalize, does not use correct punctuation.	The sentences **exceeded the** expectations in terms of grammar, context, capitalization, and punctuation.
Overall Performance	Work shown **does not make it clear that understanding has been developed**.	The student has developed connections for each word that are **understandable.** The student seems to have taken the assignment seriously but **may not demonstrate his/her best work.**	The student has developed a variety of connections for each word that **demonstrate engaged thinking.** The student has clearly taken the assignment seriously and **demonstrates an attention to detail.**	The student has developed a variety of connections for each word that **demonstrate *highly* engaged thinking.** The student has clearly challenged him/herself and demonstrates **thoughtful engagement with the assignment** through depth, development, insight and/or creativity.

Post-task

University of Costa Rica
Teaching English as a Foreign Language Master's Program
Instructors: Chinambu, Tenorio, Whitaker
Handout 2

Transforming Sentences

Instructions:
1. Put the words in order to create active voice sentences.
2. Transform the active voice sentences into the passive voice.
3. Select only ONE passive voice sentence to paraphrase. Remember to use synonyms when possible and to keep the main idea.

Scrambled Sentence Words	Active Voice Sentence	Passive Voice Sentence
observed / streptococci/ researchers / recently /in/ /vancomycin-resistance-genes/	1.	1.
clinical-microbiology / molecular / diagnostic / laboratories / methods/ use /	2. Nowadays,	2. Nowadays,
infected / a / patient / bacterium / the	3.	3.

Sentence # ____ Paraphrased version:

University of Costa Rica
Master's Program in TEFL
English for Microbiology Students
Chinambu, Tenorio, Whitaker
Lesson Plan # 5

Date: 09/16/2020
Student teacher: Jessica Whitaker
Assistants: Mauli Chinambu and Diego Tenorio

Lesson Plan 5 and Materials

ESP Course: EMS

Unit # 1: Deconstruction of a text: an insight of its parts **Approximate time for task cycle:** 120 minutes

Unit goal: By the end of the course, students will be able to effectively demonstrate comprehension of academic and scientific articles related to microbiology by analyzing and selecting specific and meaningful information relevant for their studies.

General objective: By the end of the unit, students will be able to accurately interpret laboratory procedures and instructions in a set of kits and manuals to operate equipment by completing a sequence anchor chart and presenting it to the classmates.

Specific objectives: By the end of the lesson, students will be able to

1. adequately recognize vocabulary related to laboratory equipment by identifying the different parts of a microscope in a matching exercise;
2. successfully demonstrate understanding of instructions on how to use a microscope by answering questions embedded in a video;
3. correctly organize sentences from a manual/procedure by completing a jigsaw activity using sequence adverbs;
4. correctly identify imperatives and sequence adverbs by placing them in the right order;
5. appropriately identify imperative verbs in a microscope manual by creating a list of them;
6. recognize appropriate synonyms for imperative verbs by selecting the correct one based on context.

Objectives	Procedures	Language	Strategies	Macro Skills	Time allotted
1	**Warm-up** T will greet Ss and start the class with a matching exercise with vocabulary related to the parts of a microscope. T will give instructions and model the activity with AT. Ss will work in groups of 3 or 4 in the BR. They will be asked to complete the matching activity in their groups using Handout 1. Using the annotation tool, Ss will work as a team to label the different parts of the microscope with the target vocabulary. T will check on Ss progress in their BR. They will then return to the main session and T will elicit answers from Ss. *Note*: the UL will be provided in a Zoom chat box. *Note*: Observers will be granted co-host status and will be	**Vocabulary** Objective lens, slide clips, diaphragm, nosepiece lens, eyepiece lens, base, stage, glass slide, light, and arm. **Useful Language**	Schema Activation	L S R W	10’

	able to move to different BRs on their own. **Feedback** A PPT will be filled out with the information obtained from the BR discussions and presentations. Ss will receive feedback on their use of vocabulary and pronunciation. *Note:* The T and the AT will collaborate on the shared PPT to take notes on the aspects that require feedback. In the main session, AT Chinambu will provide feedback on pronunciation. **Materials** Handout 1: Labelling a Microscope (Google Drive online doc)	This part is called a _____. I think the ____ goes here. What is this part called? What do you think?			
2	**Pre-task** T will explain that the class will focus on the interpretation of laboratory procedures and instructions to operate the different laboratory equipment. T will give instructions and	**Vocabulary** Objective lens, slide clips,	Listening for specific information	L S R	30’

	model the activity with AT. Working in groups of 3 or 4, Ss will be sent to the BRs. Ss will receive the link to a video and to the page where the activity will be posted. One Ss should share their screen and play the video. First, Ss will watch the short video which explains the appropriate use of a microscope. The video will be played once to get Ss familiar with the topic. Then, using ***EdPuzzle,*** Ss will replay the video which will incorporate several pop up questions that Ss will have to answer. The questions are embedded in the video and the video pauses automatically for Ss to have time to select or write the correct answer. Ss can write their answers directly on the screen when prompted. *Note*: the UL will be provided in the Zoom chat box. Once finished, Ss will return to the main session and T will elicit answers from Ss. A member from each group will	diaphragm, nosepiece lens, eyepiece lens, base, stage, glass slide, light, and arm. **Useful Language** What do you think the mistake is? I couldn't hear the error, could you?	Retrieving meaning from visual input	W	

	share their answers to 1 or 2 of the questions in the EdPuzzle. **Feedback** A PPT will be filled out with the information obtained from the BR discussions and presentations. Ss will receive feedback on their use of vocabulary, pronunciation, and grammar. *Note:* The T and the AT will collaborate on the shared PPT to take notes on the aspects that require feedback. In the main session, AT Chinambu will provide feedback on pronunciation. **Materials** YouTube Video: *Microscope for Beginners* https://youtu.be/eZX9U15F5Q8 EdPuzzle (online video)	What is step #___? I think the answer is…			

	https://edpuzzle.com/media/5ee8054f137ae53f3494b88d				
3, 4	**Main Task** With all Ss in the main session, T will explain how imperative sentences are used to give instructions in manuals and procedures to follow in a laboratory environment. T will include information regarding the different adverbs of time and sequence that can be used to give and follow instructions. Using PinUp, Ss will go back to their BR to complete a jigsaw activity regarding steps involved in using a microscope. Ss will have to organize the sentences given to convey an appropriate order of the instructions to use by moving around the online sticky notes presented on the Pinup cork board. Ss will use sequence adverbs to number the steps consecutively. All the groups will use the same handout with the same information.	**Vocabulary** **Sequence linking word**: Next, then, following, after that, finally **Adverbs of time**: weekly, daily, monthly, annually, every # months…	Sequencing events Selecting, connecting, and explaining information. Identifying imperative verbs	R S L	35’

	Feedback After completing the exercise, Ss will come back to the main session to check their work. T will encourage Ss to justify the selection of the adverbs of sequence and the sentence order. T will explain that some adverbs can be used in different orders, but others have a specific order to be followed. *Note*: the UL will be provided on a sticky note on each cork board. **Materials** PinUp: Jigsaw online activity – Organizing instructions. ● Group 1: https://pinup.com/s7uOZNN5N ● Group 2: https://pinup.com/DaZ4CuApx ● Group 3: https://pinup.com/N2lKOTa8R	**Ordinal numbers:** The first, second, third… **Useful Language** Where do you think this sentence goes? Should this one be after or next to this one?			

	• Group 4: https://pinup.com/-8v4afK9P • Group 5: https://pinup.com/Cx_uteKlR	We should move this one.			
5,6	**Post Task** T will review the imperative form (positive and negative), recalling the importance of this topic to give and understand instructions properly. Then, using Handouts 2, 3, and 4, Ss will read through different microscope manuals. The manuals are related to instructions on how to properly use a microscope in terms of how to see a specimen, troubleshooting, and maintenance. Ss will go to the BRs and as a group, they will go over the manuals identifying the imperative verbs in the text. One S should share the screen and display the handouts. All Ss should read the text and assist in identifying the imperative	**Useful Language** I think we should write…. In my opinion, _____ is in the imperative form. Do you think	Identifying specific information Negotiating meaning	W R S L	25’

	form. They will each create a list on their program of choice (Microsoft Word) with those verbs and write possible synonyms for them. They are asked to negotiate meaning as some synonyms might not be appropriate for the context. *Note:* this task will prepare them for the main task in the following lesson. *Note*: the UL will be provided in the Zoom chat box. Once finished, Ss will return to the main session where T will elicit answers by giving members of each group an opportunity to share some examples and synonyms they found. **Feedback** A PPT will be filled out with the information obtained from the BR discussions. Ss will receive feedback on their use of vocabulary, pronunciation, and grammar. *Note:* The T and the AT will collaborate on the shared	we should include…? What about the verb…? Is _____ an appropriate synonym for _____? I believe that _____ is a good synonym because it fits within the context.			

	PPT to take notes on the aspects that require feedback. In the main session, AT Chinambu will provide feedback on pronunciation. **Materials** ● Handout 2 – Viewing specimens ● Handout 3 – Troubleshooting ● Handout 4 - Electronic Maintenance				

Abbreviations: BR= breakout rooms, T= teacher, AT= assistant teacher(s), Ss=students, L= listening, S= speaking, W= writing, R= reading, UL= useful language, PPT= PowerPoint Presentation, HW=homework

References

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Warm up

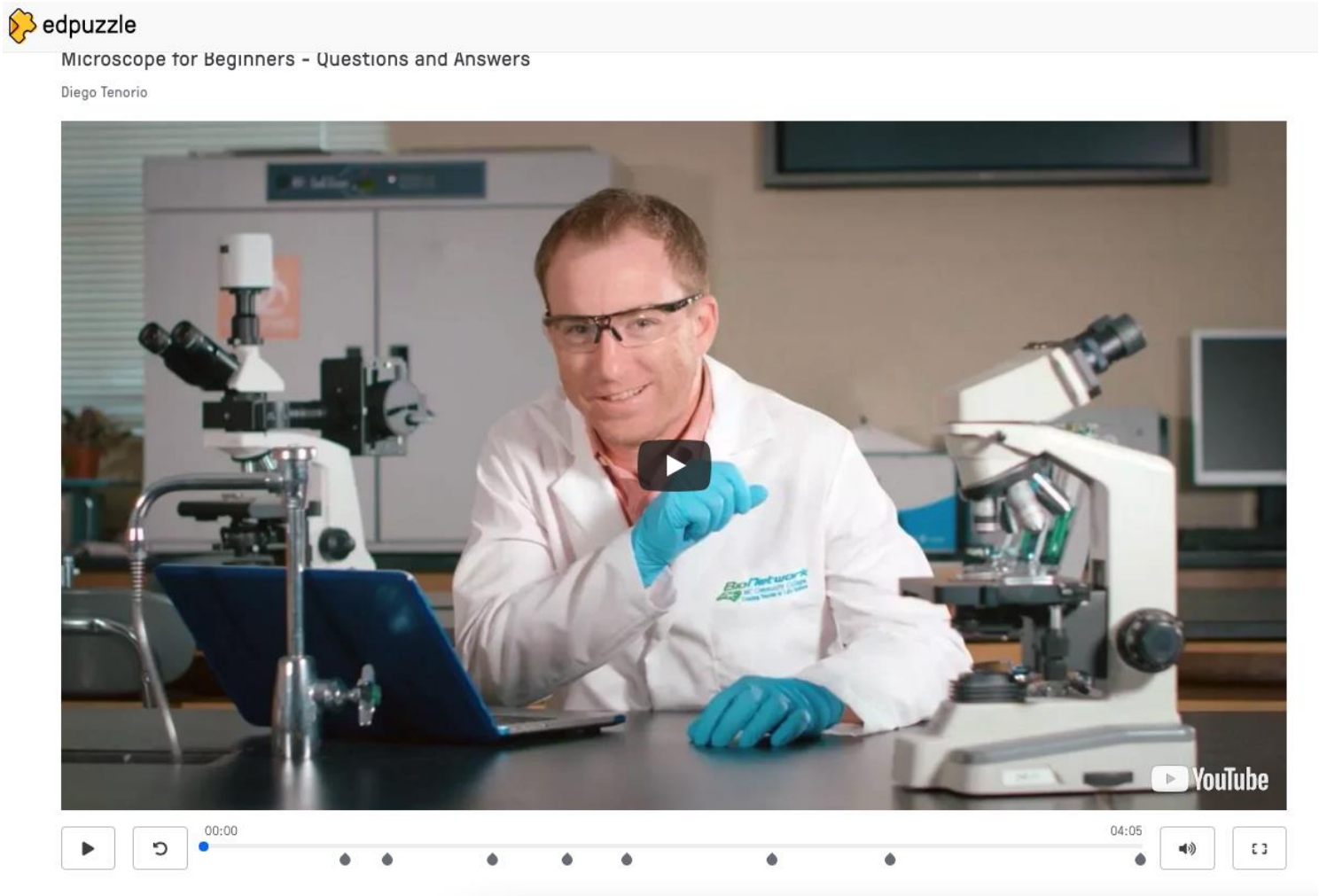
University of Costa Rica
Teaching English as a Foreign Language Mater's Program
Instructors: Chinambu, Tenorio, Whitaker
Handout 1

Vocabulary Practice - Labelling a Microscope

Instructions: As a group, use the words in the box to label each part of the microscope appropriately. Draw a line to connect the word to the picture.

Base
Eyepiece Lens
Objective Lens
Nosepiece
Diaphragm
Objective Lens
Stage
Arm
Glass Slide
Slide Clips
Light

Pre-task


edpuzzle
Microscope for Beginners - Questions and Answers
Diego Tenorio
YouTube
00:00
04:05

Main task

Useful language

- Where do you think this sentence goes?
- Should this one be after or next to this one?
- We should move this one.
- I think the first one is...

Instructions:

Using the given adverbs of sequence, accommodate the sentences in a logical order for a microscope to work.
Discuss with your partners what would be the most appropriate order for the set of instructions.
The adverb of frequency "then" is used **twice**.
Hint: this is a compound microscope :)

Adjust intensity (rheostat) control knob or dial to its minimum before operating microscope.

Rotate coarse focus knobs in a direction that stage moves "away" from the objective lenses as far as possible.

Move specimen slide until it is centered over lens in center condenser lens located in middle of the stage.

Position objective by rotating the nosepiece (revolving turret) until the 4x (smallest) objective lens clicks into position in the optical path.

Initiate diaphragm adjustment by turning disc until largest aperture is positioned beneath condenser lens.

While looking through the eyepiece, rotate coarse focusing knobs until specimen comes into focus.

Turn illuminator on in order to illuminate the specimen.

Focus your compound microscope.

Place specimen slide cover slip facing up, under the two stage clips located on stage.

Adverbs of Sequence

Second
Then
Third
Next
Then
First
Finally
Fourth
After (that)

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Chinambu, Tenorio, Whitaker

Main task Answer Key

Compound Microscope

First, adjust the intensity (rheostat) control knob or dial to its minimum before operating the microscope.

Second, turn the illuminator on in order to illuminate the specimen.

Third, focus your compound microscope.

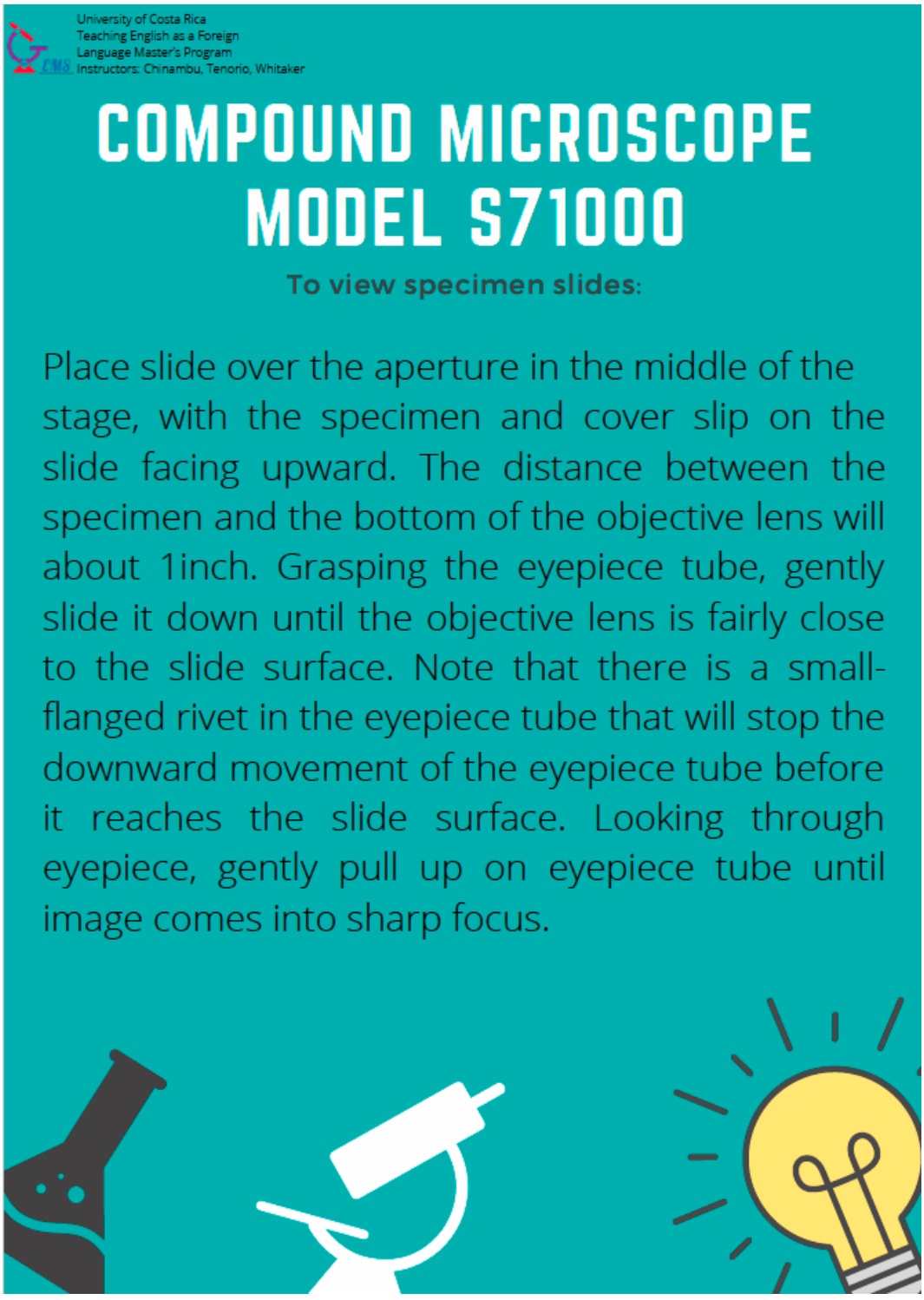
Fourth, rotate coarse focus knobs in a direction that stage moves "away" from the objective lenses as far as possible.

Then, place specimen slide coverslip facing up, under the two-stage clips located on the stage.

After that, move the specimen slide until it is centered over the lens in the center-condenser lens located in the middle of the stage.

Next, initiate diaphragm adjustment by turning disc until the largest aperture is positioned beneath the condenser lens.

Post-task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Teaching English as a Foreign
Language Master's Program
Instructors: Chinambu, Tenorio, Whitaker
COMPOUND MICROSCOPE
MODEL S71000
To view specimen slides:
Place slide over the aperture in the middle of the stage, with the specimen and cover slip on the slide facing upward. The distance between the specimen and the bottom of the objective lens will about 1inch. Grasping the eyepiece tube, gently slide it down until the objective lens is fairly close to the slide surface. Note that there is a small-flanged rivet in the eyepiece tube that will stop the downward movement of the eyepiece tube before it reaches the slide surface. Looking through eyepiece, gently pull up on eyepiece tube until image comes into sharp focus.

University of Costa Rica
Master's Program in TEFL
English for Microbiology Students
Chinambu, Tenorio, Whitaker
Lesson Plan # 6

Date: 09/23/2020
Student teacher: Mauli Chinambu
Assistants: Diego Tenorio and Jessica Whitaker

Lesson Plan 6 and Materials

ESP Course: EMS

Unit # 1: Deconstruction of a text: an insight of its parts **Approximate time for task cycle:** 120 minutes

Unit goal: By the end of the course, students will be able to effectively demonstrate comprehension of academic and scientific articles related to microbiology by analyzing and selecting specific and meaningful information relevant for their studies.

General objective: By the end of the unit, students will be able to accurately interpret laboratory procedures and instructions in a set of kits and manuals by creating their own set of instructions/steps on how to properly use a given laboratory instrument and presenting it to the classmates.

Specific objectives: By the end of the lesson, students will be able to

1. promptly recognize vocabulary related to laboratory equipment by efficiently providing the correct answer in a jeopardy game;
2. effectively demonstrate understanding of how to operate a microscope by paraphrasing selected sentences;
3. successfully interpret a laboratory manual regarding how to operate a microscope by filling in an anchor chart;
4. demonstrate appropriate interpretation of laboratory procedures and instructions by writing a set of clear instructions/steps regarding how to use a piece of laboratory equipment;
5. appropriately explain laboratory procedures by sharing the instructions/steps with classmates;
6. properly provide feedback during a presentation regarding the clarity of instructions by making use of a checklist.

Objectives	Procedures	Language	Strategies	Macro Skills	Time allotted
1	**Warm-up** T will greet Ss and start the class and explain that they will be put into Teams of 3-4 and given a team name. Team 1: Microscopes Team 2: Resistance Team 3: Microbes Team 4: Transmission T will explain to the Ss that they will be sent to BR where they will go over their answers on the homework vocabulary activity (Handout 1) and compare them with the answer key	**Vocabulary** Objective lens, slide clips, diaphragm, nosepiece lens, eyepiece lens, base, stage, glass slide, light, and arm. Centrifuge, incubator, colony counter, Bunsen burner, hot plate, funnels, watch glasses. **Useful Language** (group discussion) I believe that _____	Schema Activation	S L R	20’

	that will be posted in the Zoom chat box. They should check their answers and then answer the following discussion questions: A. What laboratory devices/items are most commonly used in the field of microbiology? B. Which devices/items require a lot of caution? Why? *Note*: Discussion questions will be provided in the Zoom chat box along with the UL. Ss will return to the main session and T will elicit responses. In the same teams, Ss will play a game of Jeopardy to review	are most commonly used in our field because… It is important to use _____ with caution because…. **Useful Language** (Jeopardy) I'd like to choose _____ for _____. We want _____ for ____ points. I think this is called a(n) ____. I want to guess that it's			

	vocabulary related to the parts of a microscope and some laboratory related words that were assigned for homework in Handout 1. T will give instructions and model the activity with AT. Ss will see an image displayed on the PPT (Handout 2) and will need to guess/say the name of the item in order to receive a point. The team that recognizes the most pictures will win. One of the instructors will keep track of the points to announce the winning team. *Note*: the UL will be provided in a Zoom chat box. *Note*: Observers will be granted co-host status and will be able to move	a(n) _____. I don't think it's that one. Do you think this is a _____? What do you think it is? Yes, I agree. / I disagree. This item/device is called a(n) _____			

	to different BRs on their own. **Feedback** A PPT will be filled out with the information obtained from the BR discussions and presentations. Ss will receive feedback on their use of vocabulary and pronunciation. *Note:* The T and the AT will collaborate on the shared PPT to take notes on the aspects that require feedback. In the main session, feedback will be provided. **Materials** Handout 1: Labelling items in a laboratory (PDF) Handout 2: Jeopardy Game (online PPT)				

2,3	**Pre-task** T will briefly mention the importance of manuals and procedures when it comes to operating laboratory equipment. T will go over the imperative form and sequence adverbs and highlight some examples from Handout 3. T will then explain that Ss will use the manuals from Handout 3 to create an anchor chart. T will model activity with AT. Ss will be sent to BR in the same groups. One Ss should share their screen and open Handouts 3 and 4 which will be provided in the Zoom chat box. Ss will be asked to choose <u>from one</u>	**Vocabulary** Sequence Adverbs: First, second, third, then, later, after that, next, finally, lastly. Imperative Verbs: Separate, clean, wash **Useful Language** I think the first step is to ____. That goes before/after _____.	Filling out anchor charts Sequencing steps to follow Applying grammatical patterns (imperatives) Problem-solving Summarizing information	R W L S	30’

	of the three manuals regarding microscope use: A: To view specimen slides B: Electrical Maintenance: Replacing Incandescent Lamp C: Troubleshooting: Poor resolution image *Note:* These manuals were assigned as homework in Week 5. Ss were asked to read through each one, identify the imperative form, and find appropriate synonyms for some key words. Ss will then follow the instructions on Handout 4 to create an anchor chart to display the instructions as outlined in their chosen manual. Ss	The last step is _____. I think we can paraphrase by saying _____. A good synonym for _____ is _____.	Interpreting key words Paraphrasing information		

	will present their anchor chart to the class and each group member must present a section. Ss must use appropriate sequence adverbs, imperatives, and must paraphrase appropriately. Ss will have the freedom to organize their anchor chart as they consider convenient/ appropriate. However, the only section they cannot remove will be the microscope picture as that is the model to be used. *Note*: the UL will be provided in a Zoom chat box. T and AT will visit each BR to check on Ss progress and clarify any doubts. Once finished, Ss will present their anchor chart to the				

	class in the main session. Answers may vary. **Feedback** A PPT will be filled out with the information obtained from the BR discussions and presentations. Ss will receive feedback on their use of vocabulary, pronunciation, and grammar. *Note:* The T and the AT will collaborate on the shared PPT to take notes on the aspects that require feedback. In the main session, feedback will be provided. **Materials** Handout 3: Microscope Manuals (PDF)				

	Handout 4: Anchor Chart Template (PPT)				
4,5	**Main Task** T will explain to the Ss in the main session that they will work in their groups to create their own set of instructions for how to safely use a piece of laboratory equipment. T will go through the steps and model the activity with AT. Handout 5 will be sent to Ss via Zoom chat box. Each group of Ss will be assigned a device/item that is commonly used in a laboratory. The assignment is as follows: Group 1: Bunsen burner	**Vocabulary** **Sequence linking word**: Next, then, following, after that, finally **Adverbs of time**: weekly, daily, monthly, annually, every # months… **Ordinal numbers:** The first, second, third… **Useful Language**	Sequencing events/steps to follow Selecting, connecting, and explaining information. Applying grammatical patterns (imperatives) Paraphrasing	R W S L	40’

	Group 2: Hot plate Group 3: Incubator Group 4: Centrifuge Ss must go to the assigned link provided via the Zoom chat box to retrieve information about how to safely operate that piece of equipment. Ss must then work together to write a set of instructions for their classmates. Each set of instructions should include about 5 to 6 points listed in appropriate order with sequence adverbs and imperatives. Ss must paraphrase the information. Each group will display their instructions on a PPT slide with appropriate visuals. Once finished, Ss will return to the	What should be the first step/rule? How can we paraphrase this idea? Do you think we should include _____? We should probably mention _____. What do you think about using this picture?	information		

	main session for presentation and post-task instructions. T will explain that Groups 1 and 2 will be combined in a BR. Groups 3 and 4 will be combined in another BR. Group 1 will present their set of instructions to Group 2, and vice versa. The same will take place between Groups 3 and 4. During the presentations, AT Tenorio will remain with Groups 1 and 2, and AT Whitaker will remain with Groups 3 and 4. T will go between each group to watch presentations and provide feedback. **Feedback** A PPT will be filled out with the information obtained from the BR				

	discussions and presentations. Ss will receive feedback on their use of vocabulary, pronunciation, and grammar. *Note:* The T and the AT will collaborate on the shared PPT to take notes on the aspects that require feedback. In the main session, feedback will be provided as necessary. **Materials** Handout 5: PPT for Instructions Links for equipment manuals: Group 1: Bunsen burner : https://research.wayne.edu/oehs/pdf/factsheet-bunsen-burner.pdf Group 2: Hot plate:				

	https://www.labmanager.com/lab-health-and-safety/10-tips-for-working-with-hot-plates-19728 Group 3: Incubator: https://microbenotes.com/incubator/ Group 4: Centrifuge: http://med.stanford.edu/content/dam/sm/medfacilities/documents/centrifuge_use.pdf				
6	**Post Task** After watching another group present their instructions, Ss will complete a checklist in order to provide feedback to the other group. Ss should use the checklist on Handout 6 which will be sent to the	**Useful Language** I think you could change this part for_____. It might be a good idea	Identifying specific information Negotiating meaning Revising and editing	W R S L	10’

	Ss via Zoom chat box. Once complete, Ss should share their feedback with the other group within the BR through a brief discussion. *Note*: the UL will be provided in a Zoom chat box. Upon receiving feedback from peers, each group should make any necessary changes to their set of instructions and then submit the revised poster on the EMS Classroom for homework. **Feedback** T and AT will check the revised posters and provide feedback as necessary.	to add/change_____. Maybe you should write_____ instead of _____. To make this point clear, you could rephrase it by saying _____. What did you mean by _____?	written information.		

	Materials Handout 6: Feedback checklist (PPT)				

Abbreviations: BR= breakout rooms, T= teacher, AT= assistant teacher(s), Ss=students, L= listening, S= speaking, W= writing, R= reading, UL= useful language, PPT= PowerPoint Presentation, HW=homework

References

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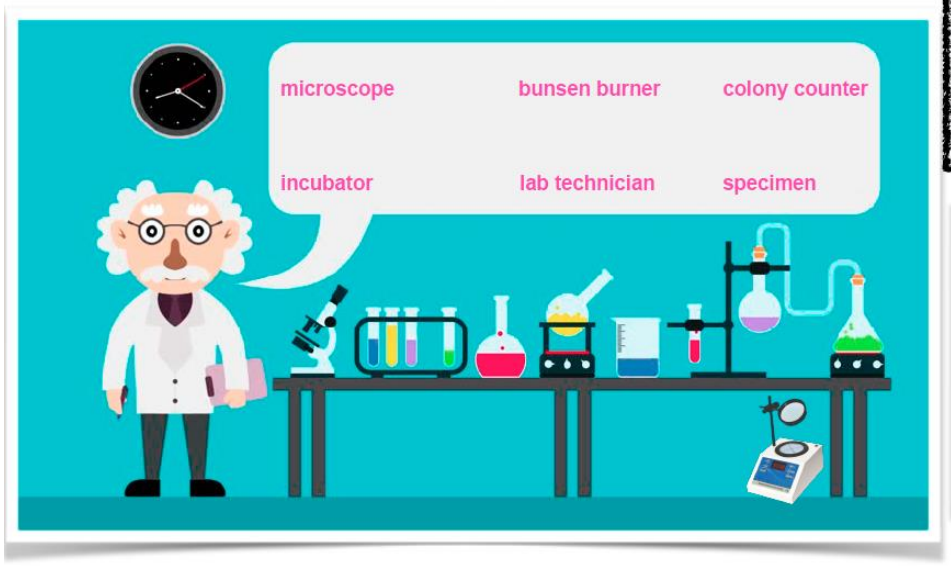
Warm up

University of Costa Rica
Teaching English as a Foreign Language Master's Program
Instructors: Chinambu, Tenorio, Whitaker
Handout 1

Vocabulary Practice - Matching



Part 1
Instructions: Use the words in the box to label each item in the picture appropriately. Draw a line to connect the word to the picture.


JEOPARODY
HERE ARE TODAY'S CATEGORIES
Easy
Medium
Difficult
General
Feeling Lucky
EASY MEDIUM DIFFICULT GENERAL FEELING LUCKY
$100 $100 $100 $100 $100
$200 $200 $200 $200 $200
$300 $300 $300 $300 $300
$400 $400 $400 $400 $400
Name this part
Nosepiece
Name this part
Objective Lens
Name this equipment
Bunsen burner
Name this equipment


Centrifuge
16
Name this equipment
17
Colony Counter
18
Name this part
19
Stage
20
Name this part
21
Base
22
Name this equipment
23
Hot plate
24
Name this part
25
Arm
26
Name this part
27
Eyepiece
28
Name this equipment
29
Microscope
30


Name this part
Illuminator / Light Source
Name this part
Diaphragm
Name this part
Glass Slide
Name this part
Fine Focus
Name this part
Coarse Focus
What type of microscope is this?
Compound Microscope
Name this part
Rack Stop
Name this part
JEOPARDY
31
32
33
34
35
36
37
38
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51

Pre-tasks

University of Costa Rica
Teaching English as a Foreign Language Master's Program
Instructors: Chinambu, Tenorio, Whitaker
Handout 4

S71000 Microscope

Instructions for anchor chart creation.

1. Elaborate an anchor chart based on the chosen topic.
2. Modify the template in the next slide conveying the instructions to use the S71000 microscope.
3. Use your creativity when designing the anchor chart. (You can organize the text and arrows in different ways)
4. **Paraphrase** the information on the manual applying the strategies practiced in class. (Use the list of synonyms for imperative verbs that you created as homework)
5. Remember to include the sequencing adverbs to show the steps to follow.

Sequence Adverbs

First, second, third, fourth…
After that, next, then, following that, finally…

S71000 Microscope

SUBTITLE

First, reposition the…

INFO

INFO

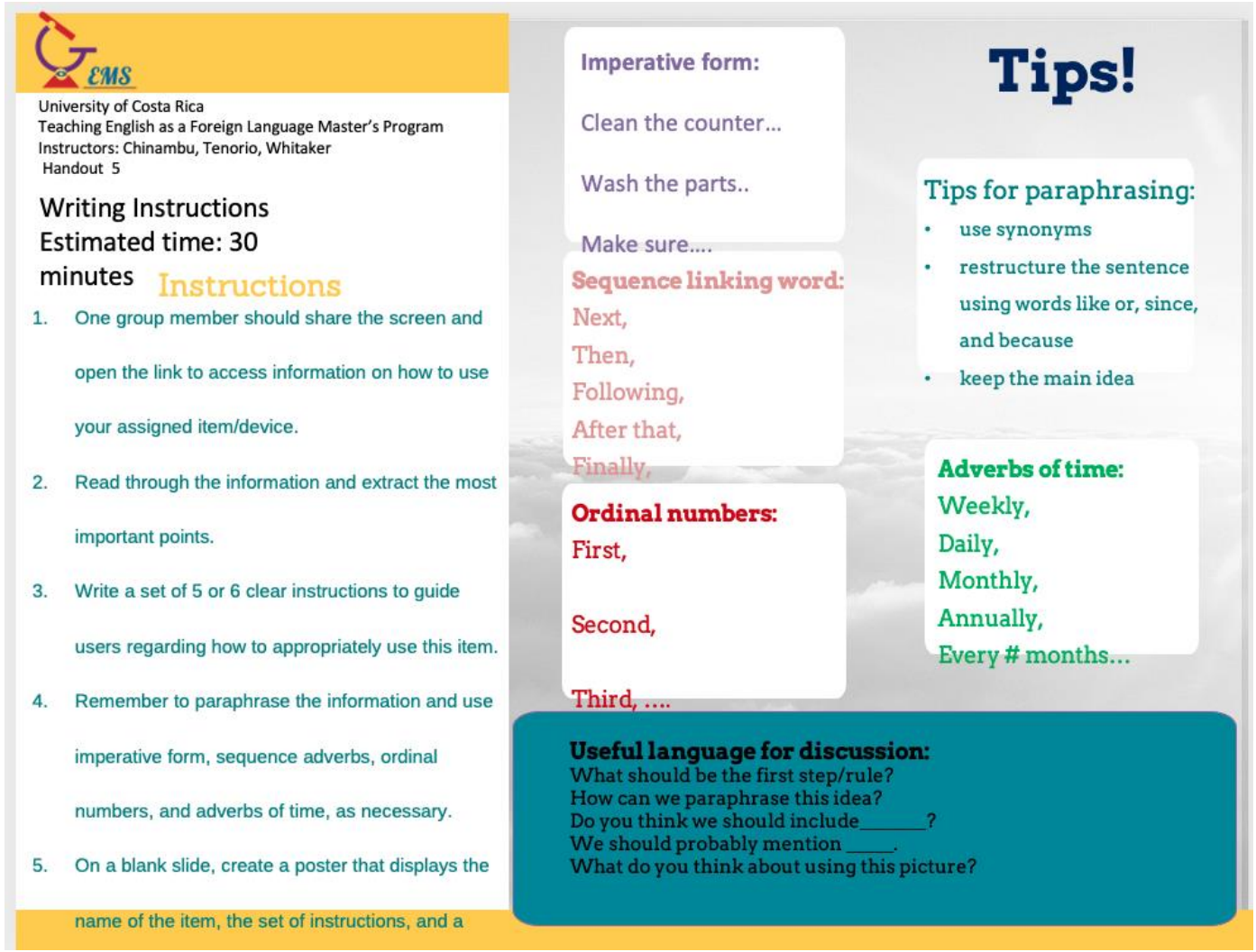
INFO

INFO

INFO

INFO

Main task


EMS
University of Costa Rica
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Instructors: Chinambu, Tenorio, Whitaker
Handout 5
Writing Instructions
Estimated time: 30 minutes
Instructions
1. One group member should share the screen and open the link to access information on how to use your assigned item/device.
2. Read through the information and extract the most important points.
3. Write a set of 5 or 6 clear instructions to guide users regarding how to appropriately use this item.
4. Remember to paraphrase the information and use imperative form, sequence adverbs, ordinal numbers, and adverbs of time, as necessary.
5. On a blank slide, create a poster that displays the name of the item, the set of instructions, and a
Imperative form:
Clean the counter...
Wash the parts..
Make sure....
Sequence linking word:
Next,
Then,
Following,
After that,
Finally,
Ordinal numbers:
First,
Second,
Third, ...
Tips!
Tips for paraphrasing:
use synonyms
restructure the sentence using words like or, since, and because
keep the main idea
Adverbs of time:
Weekly,
Daily,
Monthly,
Annually,
Every # months...
Useful language for discussion:
What should be the first step/rule?
How can we paraphrase this idea?
Do you think we should include_____?
We should probably mention ____.
What do you think about using this picture?

Poster Example:

How to use a microscope

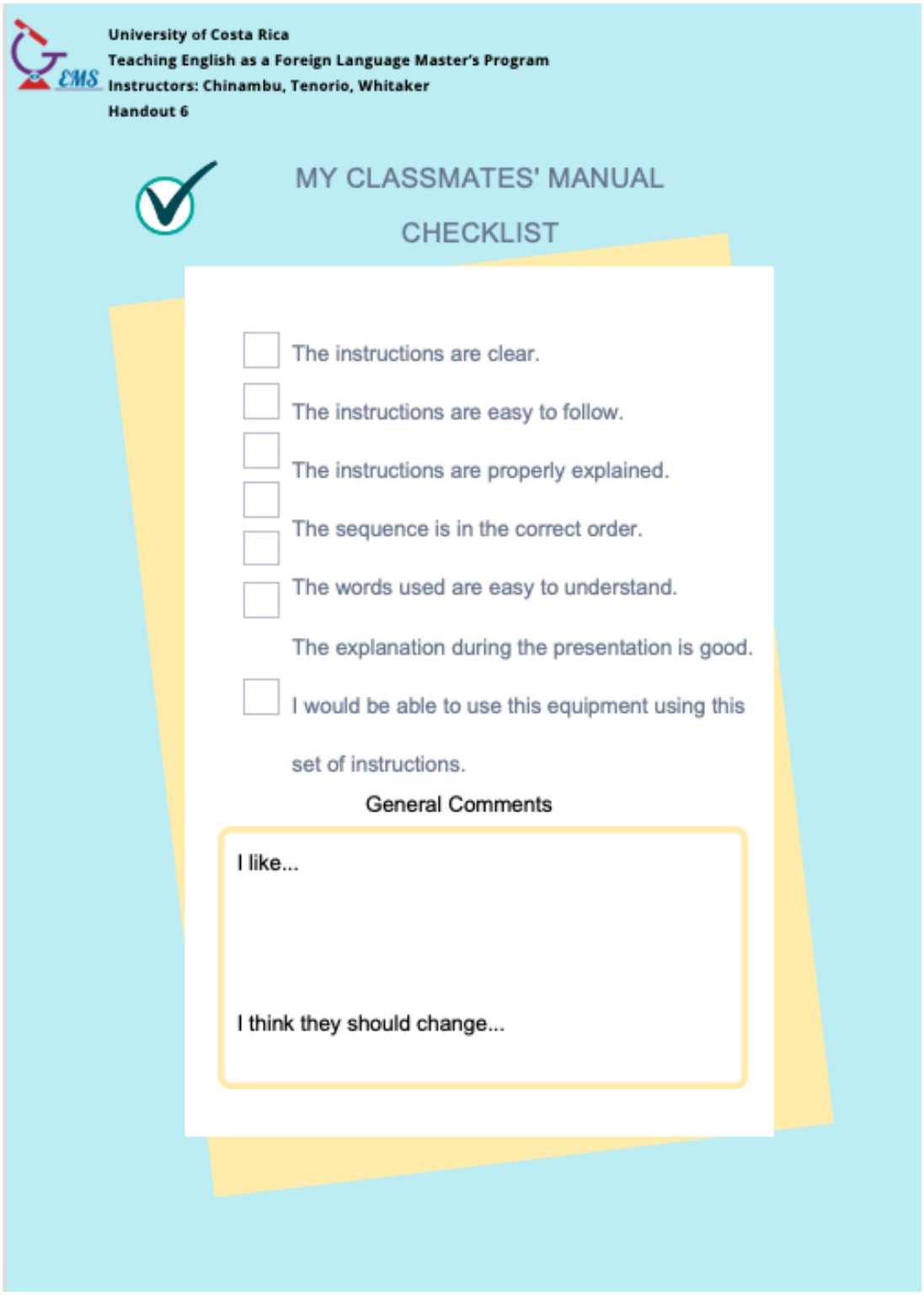
By Chinambu, Tenorio & Whitaker

Microscopes are very important devices and are often used in laboratories by microbiologists.

To safely use a microscope, follow these steps:

First, place the microscope on a sturdy surface and .....

Post-task



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Instructors: Chinambu, Tenorio, Whitaker
Handout 6

MY CLASSMATES' MANUAL

CHECKLIST

- ☐ The instructions are clear.
- ☐ The instructions are easy to follow.
- ☐ The instructions are properly explained.
- ☐ The sequence is in the correct order.
- ☐ The words used are easy to understand.
- ☐ The explanation during the presentation is good.
- ☐ I would be able to use this equipment using this set of instructions.

General Comments

I like...

I think they should change...

University of Costa Rica
Master's Program in TEFL
English for Microbiology Students
Chinambu, Tenorio, Whitaker
Lesson Plan # 7

Date: 09/30/2020
Student teacher: Diego Tenorio
Assistants: Mauli Chinambu and Jessica Whitaker

Lesson Plan 7 and Materials

ESP Course: EMS

Unit # 2: Tests do not lie **Approximate time for task cycle:** 120 minutes

Unit goal: By the end of the course, the students will be able to orally deliver information about microbiology to an audience of microbiologists, stakeholders, and other members of the scientific community by communicating in a clear and concise manner.

General objective: By the end of the unit, students will be able to promptly deliver relevant information requested by an auditor / inspector by using the proper register and vocabulary.

Specific objectives: By the end of the lesson, students will be able to

1. effectively develop questions about the process of laboratory cleaning by using key words and picture prompts;
2. successfully demonstrate understanding of question formation patterns in the simple present by filling in the missing words in a video;
3. appropriately judge an employee's answers given during an inspection interview by answering questions embedded in a video;
4. correctly create questions to ask a microbiologist about laboratory processes by playing the role of an auditor;
5. properly evaluate laboratory instructions on a poster by completing a checklist and including comments for improvement;
6. thoughtfully evaluate speaking and presentation skills by completing a self-assessment tool.

Objectives	Procedures	Language	Strategies	Macro Skills	Time allotted
1	**Warm-up** T will greet Ss and ask them to retrieve Handout 1 which was sent to them before class. *Note*: Ss were sent Handout 1 in advance and asked to look at each image and write 2-3 key words and then describe the procedure/activity represented in the picture in 1-2 sentences. T will share the screen and display Handout 1. For each image, T will elicit student responses by asking them about the key words and sentences they wrote. T will use the annotation tool to make note of some answers. Ss will also be asked to use the annotation tool to write some of their words and sentences directly on the screen.	**Vocabulary** Lab glassware, distilled water, sterilization, lab specific cleaners, personal protective equipment (PPE), gloves, disinfect, contaminants, protocol, residue, thermal sanitizing,	Schema activation	S L W	15’

	T will then ask Ss to create and share some questions using WH words that they could ask about the procedure/activity in each picture. Ss will have 5 minutes to come up with 2 or 3 questions in groups of 3-4 in BR. For example: *What solution is being used to sanitize the table?* *Note:* UL will be provided in the Zoom chat box to help Ss form questions. *Note*: Observers will be granted co-host status and will be able to move to different BRs on their own. Once Ss return to the main session, T will ask Ss to share some of the questions they came up with in their groups. T will assess Ss ability to form appropriate questions. **Feedback** A PPT will be filled out with the information obtained	pathogens **Useful Language** **Handout 1** This picture shows/demonstrates …… The process being shown here is ------- In this image we can see a …….			

	from the BR discussions. Ss will receive feedback on their use of vocabulary and pronunciation. Ss will also receive feedback and corrections on the spot as necessary during the main session. *Note:* The T and the AT will collaborate on the shared PPT to take notes on the aspects that require feedback. In the main session, feedback will be provided. **Materials** Handout 1: Cleaning a laboratory- procedures (PPT)	The purpose of this process/procedure is to ……. **Generating Questions** Using question words such as who/what/where /when For example: *Why does the person need to wear a*			

		protective gown? *What solution is being used to clean the counter?* *Where is the personal protective equipment stored?*			
2, 3	**Pre-task** **Part I** Explicit teaching: Using a mind map in GoConqr, T will explain how to structure questions and the question formation process, focusing on simple	**Useful Language** **Vocabulary to cover before sending Ss to**	Listening for specific information Identifying	L S W	25’

	present tense only. **Part II** Working in groups of 3 or 4, Ss will receive the link to a video and to the page where the activity will be posted. Ss will be sent to the BRs. First, Ss will play a short video on how to survive a Regulatory Interview on-site by learning the do's and don'ts. The video will be played once to get Ss familiar with the topic of answering and making questions during an inspection interview. Then, using ***EdPuzzle,*** Ss will replay the video which will incorporate several questions for Ss to answer. The questions are embedded in the video and the video will pause automatically so that Ss have time to fill in the answers. The questions are related to what an employee should and should not do when answering regulatory inspection questions. Additionally, Ss will be asked to create 2 possible	**BR** I shadowed him for a couple weeks. SOPs = standard operating procedures) **During the activity** What do you think the scenario is about? I think it is about….	question formation patterns		

	questions that they would ask if they were in the inspector's position. *Note*: the UL will be provided in a Zoom chat box **Feedback** T will check Ss answers in the main session, paying attention to and correcting their questions, as necessary. **Materials** Online Resource**:** GoConqr Mind Map Online Resource: YouTube Video: *Surviving a Regulatory Interview: In the Facility* *https://www.youtube.com/watch?v=dyywkciZ2Hs* Online Resource: EdPuzzle (video) https://edpuzzle.com/media/5f724da000b786411910c836	I couldn't hear that part, could you repeat it? I'm not sure how to write that, could you spell it for me? I would ask *how they do.../ what steps do they follow for*…			

	EdPuzzle Answer Key: 1. What is the problem that Scenario 3 deals with? - Answer: *giving more information than is necessary to answer the inspector's questions. They don't respond concisely.* 2. What happens when the answers are not concise? - Answer: *it leads the inspector to ask even more questions.* 3. What is the first question that the inspector asked? - Answers: *How long have you been working here?* 4. Do you think her answer was appropriate for an inspection? How would you answer that question? - *Answers may vary.* 5. Complete the missing words. - <u>Do you have</u> a copy of those copies?				

	6. Complete the missing words in a confirmation question. - *Are you telling* me that your SOPs are confusing and hard to understand? 7. If you were inspectors, what other questions would you ask? *-Answers may vary.*				
Break from 5:50 p.m. to 6:00 p.m.					
4, 5	**Main Task** With all Ss in the main session, T will provide Ss with a scenario in which they will have to prepare a set of questions imagining they are auditors (Handout 2). Ss have to work in groups of 3-4 people to generate 4-5 questions based on the posters their classmates created during the previous class and finished as homework. These questions should include	**Vocabulary** **Sequence linking word**: Next, then, following, after that, finally	Brainstorming Sequencing events Selecting, connecting, and	R S L	50’

	confirmation or verification of cleaning steps, suggestions regarding how to use the tool and/or safety measures of the tool presented. Ss will brainstorm the questions in advance so that they are prepared to ask them after the poster presentations. The group presentations and observations are: Group 1: Bunsen burner – Observers: Group 2 Group 2: Hot plate – Observers: Group 3 Group 3: Incubator – Observers: Group 4 Group 4: Centrifuge – Observers: Group 1 T will ask the Ss to present the posters. During the presentation, the observers have to complete a checklist (Handout 3) to evaluate the poster's content and they have to ask the questions created in Handout 2. If the questions were covered during the presentation, the Ss will ask for clarification if needed.	**Adverbs of time**: weekly, daily, monthly, annually, every # months… **Ordinal numbers:** The first, second, third… **Useful Language** **Questions:** I think we can include a question about the_____.	explaining information Identifying imperative verbs Verifying information Confirming information Question formation and structures		

	Note: the UL will be provided in a Zoom chat box. **Feedback** T will check the question structures and provide feedback as needed. *Note*: the UL will be provided on the Zoom chat box and in the handouts. **Materials** Handout 2: Poster's Questions (PPT) Handout 3: Checklist (PPT)	Maybe it's a good idea to confirm the use of_____. We might need to clarify_____. I think it's a good idea to verify_____. **Useful Language** **Clarification:** Could you explain one more time_____.			

		Can you clarify step #____. How can you verify _____ is working? / is correctly installed? **Comments:** I think you could change this part for_____. It might be a good idea to add/change_____.			

		Maybe you should write_____ instead of _____. To make this point clear, you could rephrase it by saying _____. What did you mean by _____?			
6	**Post Task** T will tell the Ss that they will be going back into their	**Useful Language**	Self-reflection, expressing	W S	10’

	BR (groups of 3 or 4) to work on a diary entry/reflection. Ss should complete this handout individually. Ss will use Handout 4 to respond to prompts by completing the sentences in order to reflect on how they performed in the speaking task. Ss will be given 10 minutes to discuss their reflections with their groups in the breakout room to share their thoughts and feedback about their performance. T and TA will provide support in breakout rooms as needed. *Note*: UL for the discussion is provided directly on the handout. **Feedback** A PPT will be filled out with the information obtained from the BR discussions. Ss will receive feedback on their use of vocabulary, pronunciation, and grammar.	I believe that….. Next time we should…. What do you think about….? What do we need to improve? **Grammatical Features**	feelings, analyzing performance, and setting goals Expressing and sharing ideas	L	

	Note: The T and the AT will collaborate on the shared PPT to take notes on the aspects that require feedback. In the main session, feedback will be provided as necessary. **Materials** Handout 4 – Reflection Prompts (Google Drive Word Doc)	The simple past will be used to reflect on performance. For example: *I really enjoyed….. I thought it was difficult to…… During this presentation, I felt*			

Abbreviations: BR= breakout rooms, T= teacher, AT= assistant teacher(s), Ss=students, L= listening, S= speaking, W= writing, R= reading, UL= useful language, PPT= PowerPoint Presentation, HW=homework

References

An Easy Way To Form (Almost) Any Question In English. *https://www.espressoenglish.net/an-easy-way-to-form-almost-any-question-in-english/*

GMPTraining.com (2014, April 17). *Surviving a Regulatory Interview: In the Facility* [Video]. YouTube. *https://www.youtube.com/watch?v=dyywkciZ2Hs*

Warm up

University of Costa Rica
Teaching English as a Foreign Language Master's Program
Instructors: Chinambu, Tenorio, Whitaker
Handout 1

Warm up

Instructions

1. Look at the pictures on the slides below.
2. For each picture, write 2-3 key words to describe the objects, and then write 1 or 2 sentences to describe the process/activity that is taking place.
3. Please see the example on the right.
4. Use the useful language to help you.
5. Please save this document on your computer and have it ready to use in class on Wednesday.

Example:

Image taken from: https://blog.gotopac.com/2018/01/26/cleanroom-cleaning-procedure-contamination-control-iso-14644-1-protocol/

KEY WORDS: cleanroom, gowning, protocol, contamination control

SENTENCE: This picture shows a person putting on a protective gown in a cleanroom as part of protocol. A cleanroom is a controlled environment where microbes shouldn't be able to damage products.

Useful language for discussion:
This picture shows/demonstrates .....
The process being shown here is -------
In this image we can see a .....
The purpose of this process/procedure is to .....

Image taken from: https://www.usalab.com/blog/tips-for-cleaning-lab-glassware/

KEY WORDS:

SENTENCE:

Image taken from: https://www.mlo-online.com/management/lab-safety/article/21146886/cleaning-protocols-for-covid19-prevention

KEY WORDS:

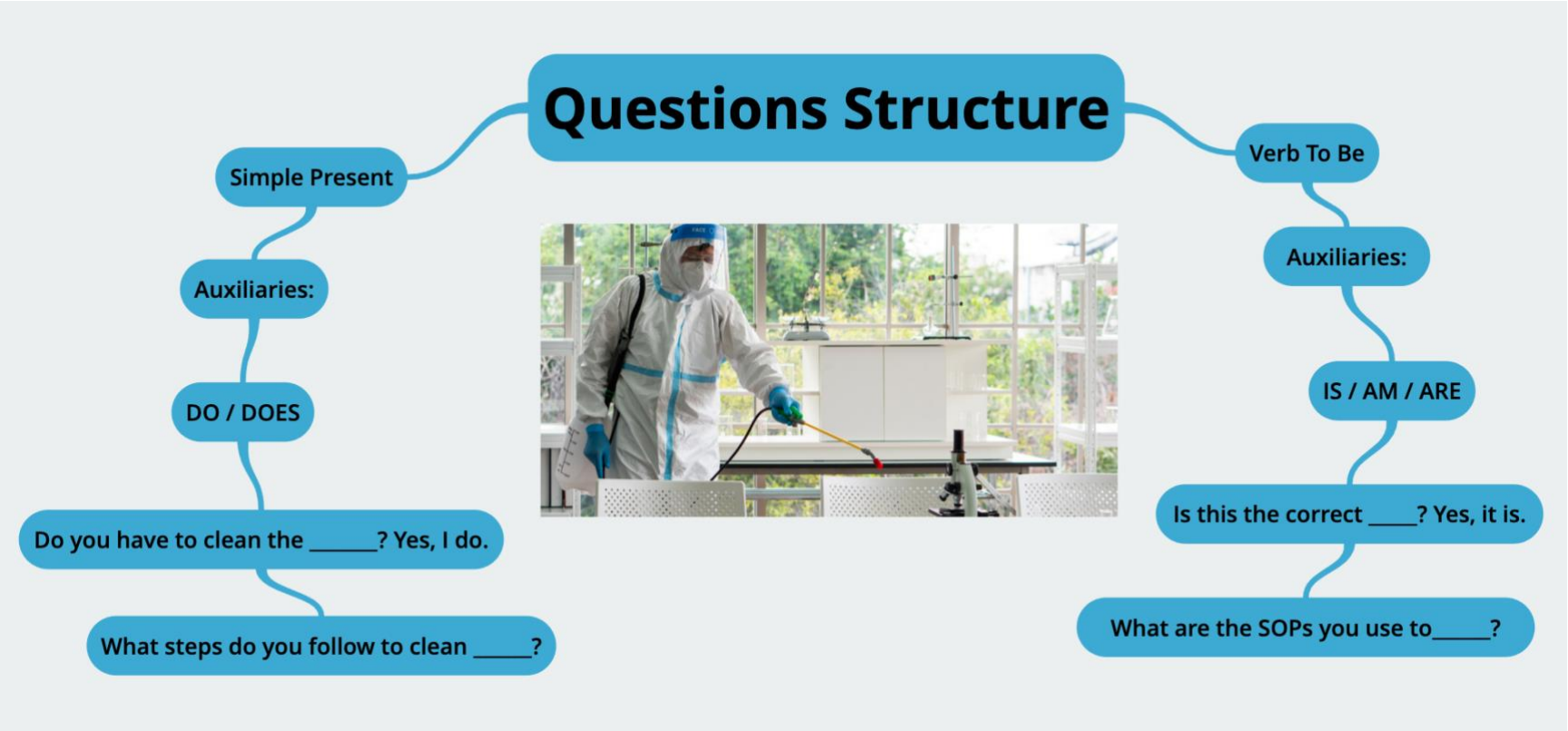
SENTENCE:

Image taken from: https://www.duplexcleaning.com.au/pathology-laboratory-cleaning.html

KEY WORDS:

SENTENCE:

Pre-task


Questions Structure
Simple Present
Auxiliaries:
DO / DOES
Do you have to clean the _____? Yes, I do.
What steps do you follow to clean _____?
Verb To Be
Auxiliaries:
IS / AM / ARE
Is this the correct ____? Yes, it is.
What are the SOPs you use to_____?

edpuzzle

Surviving a Regulatory Interview: In the Facility

Jessica Whitaker

Main task

University of Costa Rica
Teaching English as a Foreign Language Master's Program
Instructors: Chinambu, Tenorio, Whitaker
Handout 2

Poster's Questions

Instructions: Imagine you are going to a lab as an auditor. Create 4-5 possible questions to ask during your audit to supervise the proper use, safety measures or precautions of the laboratory tool according to the group assigned. Feel free to include more question categories depending on the tool you will observe.

Group 1: Bunsen burner
Group 2: Hot plate
Group 3: Incubator
Group 4: Centrifuge

I'm observing group: _____

1. _____
2. _____
3. _____
4. _____
5. _____

Useful Language

I think we can include a question about the_____.
Maybe it's a good idea to confirm the use of_____.
We might need to clarify_____.
I think it's a good idea to verify_____.

University of Costa Rica
Teaching English as a Foreign Language Master's Program
Instructors: Chinambu, Tenorio, Whitaker
Handout 3

MY CLASSMATES' MANUAL CHECKLIST

I'm observing group: _____

- [ ] The instructions are clear.
- [ ] The instructions are easy to follow.
- [ ] The instructions are properly explained.
- [ ] The sequence is in the correct order.
- [ ] The words used are simple to understand.
- [ ] The explanation during the presentation is good.
- [ ] I would be able to use this equipment using this set of instructions.
- [ ] The questions were correctly answered.
- [ ] The group provided clarification to my questions.

General Comments

I like...

I think they can change...

Post-task

University of Costa Rica
Teaching English as a Foreign Language Master's Program
Instructors: Chinambu, Tenorio, Whitaker
Handout 4

Instructions

Step 1: Reflect on your performance during today's presentation by completing the sentences below. Think about the feedback you received from your classmates.

1. During this presentation I felt ……because……..

_____

2. I really enjoyed ……. because……

_____

3. I believe that I did a good job with …….because……

_____

4. My classmates and teacher gave me good feedback about …….

_____

5. Next time, I would like to……

_____

6. It was difficult for me to……

_____

Step 2: Share your reflection with your group members. Discuss what you would like to improve for the next oral presentation.

Useful Language for Discussion

I believe that….

In my opinion, I/we….

Next time I think we should….

What do you think about….?

Do you think that we….?

What did we do a great job with?

What do we need to improve?

University of Costa Rica
Master's Program in TEFL
English for Microbiology Students
Chinambu, Tenorio, Whitaker
Lesson Plan # 8

Date: 10/07/2020
Student teacher: Jessica Whitaker
Assistants: Mauli Chinambu

Lesson Plan 8 and Materials

ESP Course: EMS

Unit # 2: Tests do not lie **Approximate time for task cycle:** 120 minutes

Unit goal: By the end of the course, the students will be able to orally deliver information about microbiology to an audience of microbiologists, stakeholders, and other members of the scientific community by communicating in a clear and concise manner.

General objective: By the end of the unit, students will be able to promptly deliver relevant information requested by an auditor / inspector by using the proper register and vocabulary.

Specific objectives: By the end of the lesson, students will be able to

1. properly demonstrate the ability to create questions to ask during a regulatory audit by filling out a word map;

2. appropriately fill in blank spaces with microbiology related terms from a word bank by listening to a dialogue;

3. effectively deliver information required by an inspector by asking and answering questions related to laboratory procedures during a role play;
4. properly evaluate a role-play interaction with a laboratory quality inspector by completing a checklist.

Objectives	Procedures	Language	Strategies	Macro Skills	Time allotted
1	**Warm-up** T will greet Ss and start the class by asking the Ss about the reflection they completed last week as homework. Then, T will tell the Ss that part of the reflection was to analyze how well they did in the question formation structure during the previous class and that there will be a short review of question formation. In the main session with all Ss, T will share the screen to have Ss complete a word map (Handout 1) with the QUASM (Question + Auxiliary + Subject + Main Verb) formula studied during the last session. Ss will be prompted to provide some questions they covered last week about the use, cleanliness and safety measures to consider when using laboratory	**Vocabulary** Bunsen burner, incubator, centrifuge, hot plate, safety measures, cleanliness, use, Regulatory inspection, Regulatory inspector, auditor, audit **Useful Language**	Schema activation	S L W	15’

	equipment such as a Bunsen burner, incubator, hot plate and centrifuge. Ss will create about 4-5 questions as there were 4 groups in total covering the laboratory equipment aforementioned. **Feedback** A PPT will be filled out with the information obtained from the BR discussions. Ss will receive feedback on their use of vocabulary and pronunciation. Ss will also receive feedback and corrections on the spot as necessary during the main session. **Materials** Handout 1: Question Formation on Laboratory Equipment	I think I can ask about the use of… I think I can ask about the cleaning procedure of… I will ask about safety measures for… What is the auxiliary for…? Do I have to use do / does for this question?			

2	**Pre-task** T will tell Ss that they will listen to a dialogue presented by Ms. Chinambu and Ms. Whitaker regarding a visit to a microbiology laboratory. Ss will be sent a link to Google Forms where they will see a word bank full of microbiology related terms. While they listen to the dialogue which is composed of a series of questions and answers, Ss must fill in the blank spaces with the words they heard in each response. Each response with the target word will be repeated twice for the Ss. This listening task will be done in the main session and once complete, Ss will submit their Google Form for assessment. T will ask Ss how they felt during the listening task and UL for responding will be provided in the Zoom chat box.	**Vocabulary** Mycelium, apex, monotrichous, prophylactic, lophotrichous, anaerobic, amphitrichous, hyphae, contagious, ibuprofen, spirilla, prions, inhibitory, diaphragm, thermometer, temperature, inoculate, peritrichous, carbohydrate	Listening for specific details Guessing meaning from context Expressing and sharing ideas	L S W	30’

	This task will help T to gain further insight into the words that Ss need to practice. It also serves as the listening section of the pretest for the research project. *Note*: Ss were provided with a document for HW which provided instructions for the speaking portion of the pretest. They were asked to pronounce the 20 target words and then use each one in a sentence, if possible. Audio recordings were uploaded to the EMS Classroom to use as the speaking part of the pretest for the research project. **Feedback** T will ask Ss how they felt about the task and will provide on-the-spot error correction on pronunciation, grammar, and vocabulary use. **Materials** Vocabulary Speaking Test (EMS Classroom for HW)	**Useful Language** During the task I felt…… It was challenging to ….. Many of the words were ….. Overall, I think I did ……. I would like to continue to practice …...			

	Vocabulary Listening Test (Google Forms Link)				
Break from 5:50 p.m. to 6:00 p.m.					
3	**Main Task** Ss will work in BRs in groups of 4. Two of the Ss will be inspectors while the other two will be microbiologists working in a laboratory. ● Planning: Using Handout 2, Ss will read about a company's SOPs regarding a piece of equipment used in a laboratory. Ss playing the role of microbiologists will read the document to get familiar with the piece of equipment they will be in charge of. The Ss playing the role of inspectors will use the document to create some questions to ask during the inspection. The handout includes prompts for each role on how they can interact during the role play. Ss are	**Vocabulary** SOPs, temperature, safety measures, Bunsen burner, centrifuge, incubator, hot plate, procedures… **Sequence linking word**: Next, then,	Explaining operational procedures Giving specific information Confirming and clarifying information	R W L S	45'

	encouraged to write a script that will help them perform the role play. During this stage, T will visit each BR and pay attention to Ss ability to form appropriate questions. T and TA will clarify any doubts they might have. Ss are encouraged to rehearse their role play at least once before presenting it in the main session. ● Presenting: The groups will take turns presenting their role play to their classmates. The group will briefly explain their roles and the piece of equipment they are in charge of. While one group is presenting, the rest of the class will be taking notes on their performance, using Handout 6. **Feedback** T will check the question structures and provide	following, after that, finally **Adverbs of time**: weekly, daily, monthly, annually, every # months… **Ordinal numbers:** The first, second, third… **Useful Language**			

	feedback as needed. *Note*: the UL will be provided on the Zoom chat box and in the handouts. *Note:* Observers will be made co-hosts in order to move from one BR to another as necessary. **Materials** Handout 2: SOPs for Centrifuge Handout 3: SOPs for Incubator Handout 4: SOPs for Hot Plate Handout 5: SOPs for Bunsen Burner Handout 6: Feedback Checklist	Types of questions to use for inspectors: ● How long have you worked here? ● How were you trained to use this equipment? ● What would you do if....? ● I'm not quite sure			

		what you mean by that. Could you perhaps explain it another way? ● Is this always done this way? ● Could you explain one more time_____.			

		• Can you clarify step #____. • How can you verify _____ is working? / is correctly installed? Microbiologists' Answers: • I/we have worked here for # years.			

		● The first step we do is to…			
4	**Post Task** Ss will go back to their BR (groups of 3 or 4) to discuss the overall performance of the role play they have just evaluated using the checklist (Handout 6). Ss will analyze every sentence on the checklist and will compare their answers based on the group assigned. Ss will be given 10 minutes to discuss their feedback with their groups in the BR sharing their thoughts and areas for improvement. T and TA will provide support in BR as needed.	**Useful Language** I think this group's question structure was… I think this group should change / modify…			10'

	Note: UL for the discussion is provided in the Zoom chat box. **Feedback** A PPT will be filled out with the information obtained from the BR discussions. Ss will receive feedback on their use of vocabulary, pronunciation, and grammar. **Materials** Handout 7 – Role play feedback checklist	The question auxiliaries were… I disagree with your comment because this group used…			

Abbreviations: BR= breakout rooms, T= teacher, AT= assistant teacher(s), Ss=students, L= listening, S= speaking, W= writing, R= reading, UL= useful language, PPT= PowerPoint Presentation, HW=homework

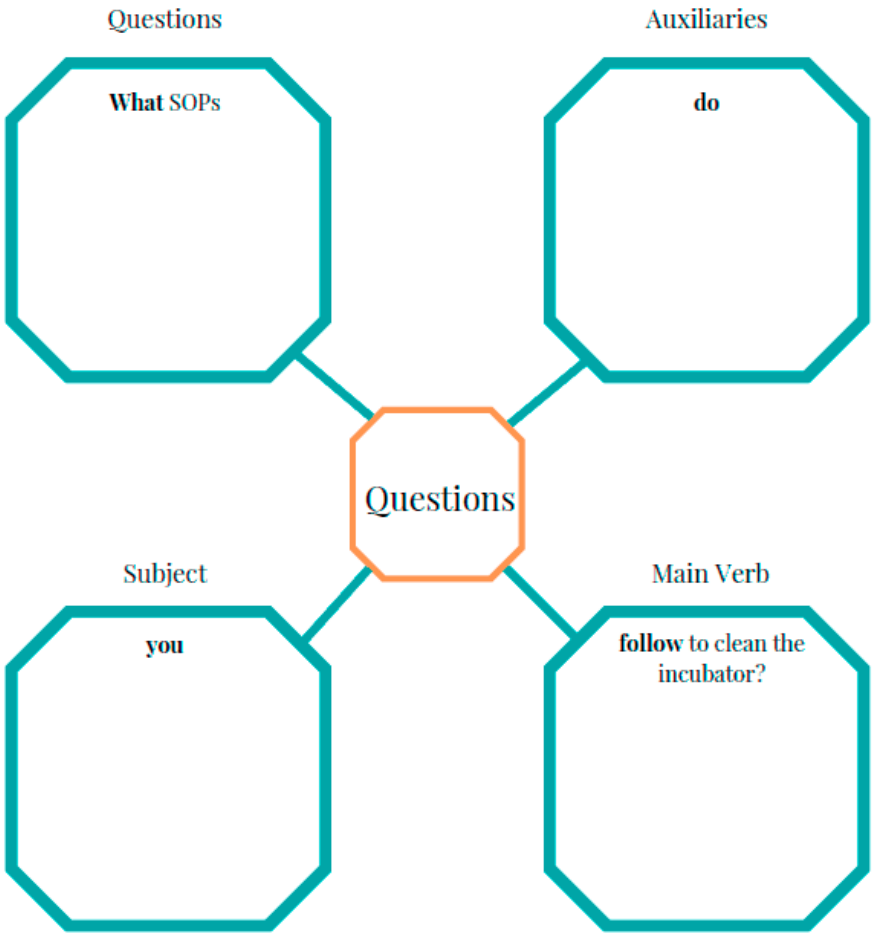
Warm up

University of Costa Rica
Teaching English as a Foreign Language Master's Program
Instructors: Chinambu, Tenorio, Whitaker
Handout 1

Question Formation

WHAT STRUCTURE DO YOU REALLY NEED?

Scenario: You are a **Regulatory auditor** who is going to check the **use, cleanliness** or **safety measures** of a centrifuge, an incubator, a Bunsen burner, or a hot plate. Create a question using the **QUASM** formula below. Use the annotations tools.



Appendix M: Test 1

Pre-tasks

University of Costa Rica
Masters Program in TEFL
English for Microbiology Students
Chinambu, Tenorio, Whitaker
Vocabulary Pre-Test

Purpose: The purpose of this short activity is for us to see what vocabulary we will focus on for the remainder of the course. Please do not use any websites or translators to help you with the activity because the idea is to understand which words we need to practice in class. You will need to record yourself speaking. You can use a device or program of your choice to do so. Here is a link to an online recorder: https://online-voice-recorder.com/. Once you finish your recording please upload it to EMS Classroom for us to review.

Important: Please complete this activity and upload your results before class on Wednesday, October 7th.

Instructions: This activity should take you less than 5 minutes to complete. There are two steps. For each word on the list below please record yourself doing the following:

A. Say the word twice (read it out loud)
B. Use the word in a sentence. If you do not know how to use the word please say "Pass".

For example: **Word**: Antibodies

My recording: *"Antibodies" "Antibodies" "Many antibodies for COIVD-19 are found in sick patients"* OR *"Pass"*

1. anaerobic	6. hyphae	11. amphitrichous	16. prophylactic
2. contagious	7. mycelium	12. lophotrichous	17. inhibitory
3. carbohydrate	8. prion	13. peritrichous	18. diaphragm
4. thermometer	9. spirilla	14. asymptomatic	19. apex
5. temperature	10. monotrichous	15. ibuprofen	20. inoculate

University of Costa Rica
Teaching English as a Foreign Language Master's Program
Instructors: Chinambu, Tenorio, Whitaker
Handout

Instructions

You will hear two people talking. One person will ask questions (J. W) and the other will answer the questions (M. C). Listen to the answers given by M. C and fill in the blank space by writing the word you heard. Select one of the words from the word bank below. M. C will repeat the response twice.

Word Bank
Mycelium Apex Bacterium Thyroid Monotrichous
Cilia Dendrite Aerobic Prophylactic Respiration
Asymptomatic Flagella Lophotrichous Locate
Oxygen Anaerobic Amphitrichous Hyphae
Contagious Ibuprofen Spirilla Temptation
Spiral Prions Diagram Inhibitory
Diaphragm Thermometer Symptoms Temperature
Inoculate Peritrichous Anaphylactic Carbohydrate

University of Costa Rica
Teaching English as a Foreign Language Master's Program
Instructors: Chinambu, Tenorio, Whitaker
Vocabulary Listening Pretest

Instructions

You will hear two people talking. One person will ask questions (J. W) and the other will answer the questions (M. C). Listen to the answers given by M. C and fill in the blank space by writing the word you heard. Select one of the words from the word bank below. M. C will repeat the response twice.

Word Bank	Mycelium Apex Bacterium Thyroid Monotrichous Cilia Dendrite Aerobic Prophylactic Respiration Asymptomatic Flagella Lophotrichous Locate Oxygen Anaerobic Amphitrichous Hyphae Contagious Ibuprofen Spirilla Temptation Spiral Prions Diagram Inhibitory Diaphragm Thermometer Symptoms Temperature Inoculate Peritrichous Anaphylactic Carbohydrate

J. W	Hi Ms. Chinambu! Thank you so much for letting me job shadow you today. I am really looking forward to learning more about microbiology. Is it ok if I ask you some questions?
M.C	Hi Jessica! I am happy to have you here. Yes, of course! Ask as many questions as you'd like.
J. W	Great! I noticed some screeners in the entryway. Do they use any equipment to test for COVID-19?
M.C	Yes, they do. At the moment they ask questions and use a _____.
J. W	Why do they use a thermometer?
M.C	They need to check each person's _____ to make sure they don't have a fever.
J. W	I understand. Why do you think that cities are on lockdown? How does that help the situation?
M.C	It is one of the _____ measures in place to prevent the transmission of COVID-19.
J. W	That makes sense. What do you think is one of the biggest causes of COVID-19 transmission?
M.C	Many people are _____ and don't know they are sick, so they end up spreading the virus.
J. W	Is it bad for COVID-19 patients to take Advil?
M.C	At the moment there is no scientific evidence that _____ worsens COVID-19 symptoms.
J. W	How do you think scientists are going to find a cure for COVID-19?
M.C	One testing method they are trying is to _____mice with the virus and then test different medicines to see what works.
J. W	Thanks. Why are you wearing protective gear right now?

M.C	I am wearing gloves and a mask because this virus that I'm inspecting is very _____.
J. W	Really? Wow! I have another question. What causes diseases like the mad-cow disease?
M.C	Diseases like mad-cow disease can be triggered by the interaction of _____and healthy proteins in the brain. Would you like to see some samples of different specimens through the microscope? Let's start with this one….
J. W	What is the first step if I want to illuminate the sample without interference from the light sources?
M.C	First, adjust the light intensity by opening the field _____.
J. W	Ok, great! What kind of bacteria is this?
M.C	This kind of bacterium is _____. It's called Clostridium botulinum. It's extremely dangerous if ingested. It's a bacillus, so it looks like a cylinder under the microscope. Here is another sample for you to look at.
J. W	What do you call bacteria that have a spiral shape?
M.C	We can refer to this type of bacteria as _____ and another characteristic is that it has flagella at both poles.
J. W	Is there a name for that second characteristic?
M.C	Yes, we can say that the bacteria is _____.
J. W	What if there is only one flagellum at one pole?
M.C	Then we can say that the bacteria is _____.
J. W	Oh, I see.
M.C	But we say that the bacteria is _____ if there is a group of flagella at one end, instead of a single flagellum.
J. W	Are there any other distribution types?
M.C	Yes, _____ bacteria have flagella all over. Let's look at another sample. This one here is a sample of nectar.
J. W	What is the difference between pollen and nectar?
M.C	Well, pollen is a protein and nectar is a type of _____. Ok, now look at this other sample.

J. W	When I look into the microscope, I see little threads. What are they called?
M.C	Those threads are called _____.
J. W	What do all those threads together create?
M.C	All together they form _____which are an important part of a mushroom's life cycle. Let's look at one more specimen.
J. W	Interesting! How can I describe this specimen?
M.C	You can say that it is about half an inch long and swollen from the _____ downward.
J. W	Ok perfect. Thanks for all your help today! I've learned so much! Before I go… what does MIC stand for?
M.C	It refers to the minimum _____concentration of a drug. It was great meeting you! Take care!

Main task

University of Costa Rica
Teaching English as a Foreign Language Master's Program
Program Instructors: Chinambu, Tenorio, Whitaker
Handout 2

SOP for Operation and Calibration of Hot Plate

1 OPERATION PROCEDURE

- Ensure that the instrument is clean and suitable for use. If not, clean all parts of the instrument with disinfectant and a dry cloth or tissue paper.
- Switch "on" the main power supply of the instrument.
- Set the required temperature. Speed low, medium or high with the help of knob.
- Put the sample container on hot surface.
- After completion of the work, switch "off" the main power supply.

2 CALIBRATION

- Operate the instrument according to instructions.
- Take 100 ml of purified water into a 500ml glass beaker.
- Set the temperature at 50, 60, 70, 80, 90, 100°C and record the results in Calibration Record.
- Limit of temperature variation is +/- 2°C from the desired temperature.
- Frequency of oven calibration is once in three months.

3 PRECAUTIONS

- Instruments should be handled properly.
- If the instrument does not produce satisfactory results it should be labeled "Under Maintanance" or "Out of Order."

4 FREQUENCY

- Calibration should be done every month.

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Handout 3

SOP for Bunsen Burners

1 WORK PRACTICE CONTROLS

- PLACE the Bunsen burner away from any overhead shelving, equipment, or light fixtures.
- REMOVE all papers, notebooks, combustible materials and excess chemicals from the area.
- TIE-BACK any long hair, dangling jewelry, or loose clothing.
- INSPECT hose for cracks, holes, pinched points, or any other defect and ensure that the hose fits securely on the gas valve and the Bunsen burner.
- REPLACE all hoses found to have a defect before using.
- NOTIFY others in the laboratory that burner will be in use.
- UTILIZE a sparkler/lighter with extended nozzle to ignite the Bunsen burner. Never use a match to ignite burner.
- HAVE the sparkler/lighter available before turning on gas.
- ADJUST the flame by turning the collar to regulate air flow and produce an appropriate flame for the experiment (typically a medium blue flame).
- DO NOT leave open flames unattended and never leave laboratory while burner is on.
- SHUT-OFF gas when its use is complete.
- ALLOW the burner to cool before handling.
- ENSURE that the main gas valve is off before leaving the laboratory.

2 ADITIONAL PRECAUTIONS

- Do not use a Bunsen burner in biological safety cabinet.
- For small fires, attempt to extinguish fire if you been trained in fire extinguisher use.
- In case of a large fire activate the fire alarm, evacuate the building and alert authorities.

3 PERSONAL PROTECTIVE EQUIPMENT

- Wear standard laboratory attire including safety glasses and avoid wearing synthetic clothing

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Handout 4

SOP for Bacteriological Incubator

1 GENERAL CLEANING PROCEDURE

- Ensure that the power supply to the incubator is switched OFF.
- De-dust the incubator externally with a clean dry cloth daily.
- Once a week remove adhered dust by mopping with soap solution. Afterwards wipe the surface with a clean dry cloth to remove the moisture.
- Mop the interior surfaces with a clean dry cloth, daily.

2 OPERATIONAL PROCEDURE

- Ensure that the incubator is properly connected to the power supply.
- Switch "ON" the main switch and then the cabinet switch.
- Set the required temperature to 37° C by pressing the set knob and soft keys.
- Monitor the temperature daily as per following procedures.
- Temperature shall be recorded as displayed on LCD controller of the incubator.
- Observe the temperature shown on the digital display. The temperature should not differ by + 2 ° C.
- Temperature of incubator should be recorded in a printout chart.
- Change the printout chart monthly.
- Report any discrepancy observed during operation or temperature monitoring to Manager-QC.
- Inform to Engineering Department for rectification and put the status label of "Under Maintenance."

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Handout 5

SOP for Centrifuge Machine

1 OPERATIONAL PROCEDURE

- Ensure that the instrument is clean and free from dust.
- Ensure that all the knobs are in normal position.
- Open the upper lid by releasing the lock and lifting it up.
- Place the centrifuge tubes in the compartment provided for it.
- The compartment is designed to place sixteen centrifuge tubes at a time.
- Switch "ON" the mains.
- Set the required time by "SET TIME." Push button having '0' to '60' minutes.
- The desired time can be selected by pressing "SET TIME" and push button again.
- Increase the RPM of the machine with the help of adjustment knob.
- Gradually , increase the RPM (maximum of 6000 rpm).
- When the desired RPM is attained, now select the time for centrifugation with the help of "SET TIME" button.
- After completion of the centrifugation time, a buzzer will beep indicating that the cycle is completed.
- After the beep, the motor will automatically cut off and RPM will come down to 0000.
- Switch "OFF" the mains when not required.

2 PRECAUTIONS

- Proper handling of the instrument.
- Ensure level and stability.
- Balance centrifuge tubes equally.
- Ensure use of rubber cushions for glass tubes.
- Bring speed knob to "OFF" and increase speed gradually.
- Do not open the lid in between the centrifugation cycle.

*RPM= Rotation per Minute

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Handout 6

LABORATORY INSPECTION
ROLE PLAY

INTRODUCTIONS

- Hello, my name is ... and I will be conducting the inspection today.
- Welcome, my name is ...

INSPECTORS' QUESTIONS

- How long have you worked here?
- How were you trained to use this equipment?
- What would you do if....?
- I'm not quite sure what you mean by that. Could you perhaps explain it another way?
- Is this always done this way?

CLARIFICATION QUESTIONS

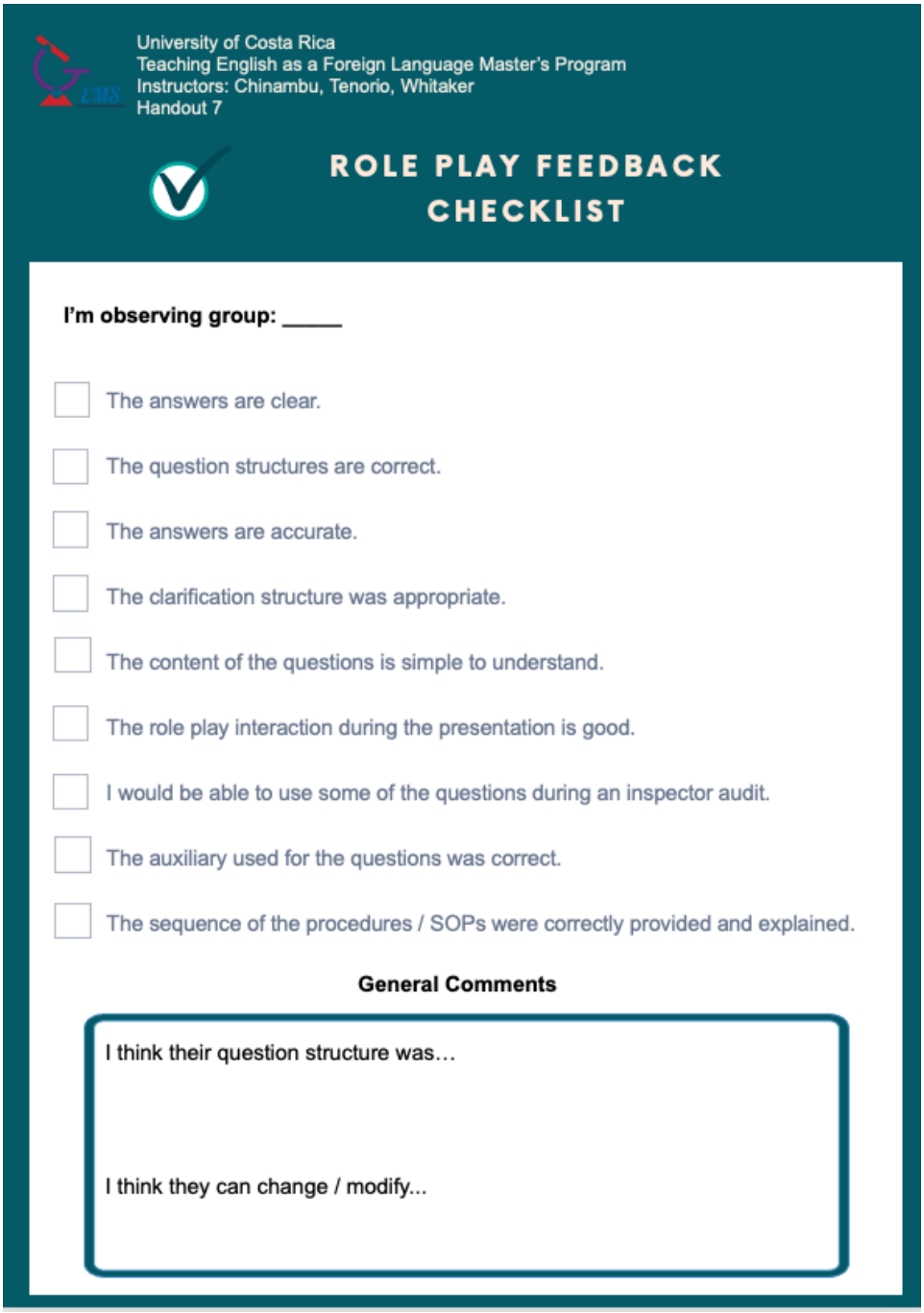
- I'm not quite sure what you mean by that. Could you perhaps explain it another way?
- Could you explain one more time_____.
- Can you clarify step # ?

MICROBIOLOGISTS' ANSWERS

- I/we have worked here for # years.
- Yes, I can explain that again.
- The first step we do is to...

Appendix N: Role Play Feedback Checklist

Post-task



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Handout 7

ROLE PLAY FEEDBACK CHECKLIST

I'm observing group: _____

- ☐ The answers are clear.
- ☐ The question structures are correct.
- ☐ The answers are accurate.
- ☐ The clarification structure was appropriate.
- ☐ The content of the questions is simple to understand.
- ☐ The role play interaction during the presentation is good.
- ☐ I would be able to use some of the questions during an inspector audit.
- ☐ The auxiliary used for the questions was correct.
- ☐ The sequence of the procedures / SOPs were correctly provided and explained.

General Comments

I think their question structure was…

I think they can change / modify...

University of Costa Rica
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English for Microbiology Students
Chinambu, Tenorio, Whitaker
Lesson Plan # 9

Date: 10/14/2020
Student teacher: Mauli Chinambu
Assistant: Diego Tenorio

Lesson Plan 9 and Materials

ESP Course: EMS

Unit # 2: Tests do not lie **Approximate time for task cycle:** 120 minutes

Unit goal: By the end of the course, the students will be able to orally deliver information about microbiology to an audience of microbiologists, stakeholders, and other members of the scientific community by communicating in a clear and concise manner.

General objective: By the end of the unit, students will be able to effectively express ideas related to the characteristics of bacteria when interacting with members of the scientific community by stating facts.

Specific objectives: By the end of the lesson, students will be able to

1. accurately recall vocabulary used to describe bacteria by answering questions in a trivia game;
2. successfully identify parts and structures of an informative speech in a video clip about mushroom mycelium by completing a graphic organizer;
3. appropriately provide information pertaining to the characteristics of bacteria by filling out a speech outline;
4. assertively propose advice regarding giving speeches effectively by creating a list of speaking tips.

Objectives	Procedures	Language	Strategies	Macro Skills	Time allotted
1	**Warm-up** T greets Ss and explains that the warm up will deal with the vocabulary regarding bacteria covered in last week's listening activity. T asks Ss to select one emoticon figure from Zoom's annotations feature as their game counter. Ss can choose the same emoticon for their names will also appear along with their answers to avoid confusion. T explains that Ss will work individually in a Trivia game to practice and recall bacteria-related vocabulary. The game will also include some riddles to enhance students' attention during the task. T will share a PPT with some questions. The questions can be multiple choice, true/false or open ended to answer some riddles. Ss will place their emoticon in the	**Vocabulary** monotrichous, amphitrichous, lophotrichous, peritrichous, hyphae, mycelium… **Useful Language** Can you repeat the options? I don't remember the name of… I think that is called…	Schema activation	S L R W	15'

	box with the answer they think is the correct one. T reviews the correct answer with Ss. T will also clarify that it is fine if they do not know the answer right away as this is the topic to be studied during the class. *Note*: The correct answers will be displayed on the slide following each question. **Feedback** T and AT will take notes on Ss oral production. Ss will receive feedback on their use of vocabulary and pronunciation. Ss will also receive feedback and corrections on the spot as necessary during the main session. **Materials** PPT: Bacteria Trivia Game *Note*: The answer key is included in the PPT game.				

2	**Pre-task** T will play a video about mushroom mycelium with all Ss in the main session. Then, T will do explicit teaching on how to write and present an informative speech, identify different parts and structures, and select the proper types of discourse markers to incorporate during a speech. After that, Ss will be sent to their BR to work in groups of 2-3 people where they will watch the same video one more time. Then Ss will complete Handout 1 to fill out an outline to learn how to break an informative speech into different parts. The speech outline will be divided into introduction, body and conclusion where Ss will write important information mentioned in each of those parts. Ss will also fill out the handout extracting expressions they can use as part of their own UL for the speech they have to present as part of the main task. **Feedback**	**Vocabulary** mycelium, mushrooms, hyphae, pinhead, spore, fruit body, protein-coding genes, primordia **Useful Language** Can you pause the video right there? Could you rewind the video? Can you go back please? Can you stop the video please? I think the introduction can have these expressions: _____. We can include these expressions:	Listening for specific details Expressing and sharing ideas	L S W	30’

	T and AT will take notes on Ss oral production. Ss will receive feedback on their use of vocabulary and pronunciation. Ss will also receive feedback and corrections on the spot as necessary during the main session. **Materials** Handout 1: Speech Outline Video link: What is mycelium? https://www.youtube.com/watch?v=vnRDzotcQ9U&t=2s	_____ as part of the body.			
Break from 5:50 p.m. to 6:00 p.m.					
3	**Main Task** T will tell Ss that they will be doing the research and planning phase involved in the speech development process. T will explain the task and model with TA. Ss will work in groups of 2 or 3 in the BR. Ss will have roles:	**Vocabulary** monotrichous, amphitrichous, lophotrichous, peritrichous, flagellum, flagella, spirilla, spirillum, salmonella typhi, vibrio cholerae, Alcaligenes faecalis,	Skimming and scanning Guessing meaning from context	R W L S	45’

	A. Pronunciation & Thesaurus Checker - Ss will be responsible for looking up the correct pronunciation of words as well as synonyms for words in the online thesaurus B. Screen sharer & Researcher - Ss will be responsible for sharing their screen and displaying the different webpage that the group will use to gather information C. Writer - Ss will be responsible for writing notes into the speech outline graphic organizer Each group will be assigned one of the characteristics of bacteria: Group 1: monotrichous Group 2: amphitrichous Group 3: lophotrichous Group 4: peritrichous Ss must go online and find the following information: 1. Name 1 type of bacteria that has	Helicobacter pylori, anaerobic, aerobic, gram-negative/positive Discourse Markers for: Adding information: *moreover, furthermore, additionally* Cause and effect: *therefore, consequently, thus* Comparing: *similarly, likewise* Contrast: *however, nevertheless, on the contrary*	Identifying paragraph components Paraphrasing Giving specific information		

	your assigned characteristic. 2. Name two or three other important characteristics of the bacteria you selected. 3. Explain where this type of bacteria can be found and why it is important/interesting to study. 4. Describe any necessary safety precautions that should be taken when working with this type of bacteria and the impact the bacteria can have on the human body. Ss will be given a link where they can access some basic information about the type of bacteria they have been assigned. This link is a starting point and Ss will need to do further research for more information. Ss will take notes on the information they gather by filling out the graphic organizer in Handout 2 (slide 1). Once all information has been gathered, Ss will write their informative speech outline using Handout 2 (slides 2-5). They must keep the structure in mind and use	**Useful Language (for discussing content)** We should mention that…. We could write …… What do you think about saying…..? How can we restructure or rephrase …..? Which discourse marker would be best to….? What do you think about this _____?			

	appropriate discourse markers. Once Ss have finished their outlines, they will present them in the main session so that their peers get a sense of what will be presented in their informative speeches. T and peers will be encouraged to give feedback. T will tell Ss that for HW they will be required to write out and practice their full speech. Each speech should be about 1-2 minutes and all group members must speak. They will present their speeches in the following class and will be allowed to use cue cards. In addition, Ss must write 3 or 4 quiz questions for the class that are based on the information they presented in their speeches. *Note*: Answers may vary **Feedback** T and TA will visit each BR and give Ss on-the-spot correction regarding				

	pronunciation, vocabulary use, grammar, and spelling. Common errors will also be discussed once back in the main session. **Materials** Research starting point: https://microbiologyinfo.com/flagella-introduction-types-examples-parts-functions-and-flagella-staining-principal-procedure-and-interpretation/ Additional links: Helicobacter pylori: https://www.msdsonline.com/resources/sds-resources/free-safety-data-sheet-index/helicobacter-pylori/ Vibrio cholerae: https://www.medscape.com/answers/962643-54703/what-are-characteristics-of-vibrio-v-cholerae Alcaligenes faecalis:				

	https://catalog.hardydiagnostics.com/cp_prod/Content/hugo/Alcaligenes.htm Salmonella typhi: https://www.msdsonline.com/resources/sds-resources/free-safety-data-sheet-index/salmonella-typhi/ Handout 2: Research and Speech Outline Steps (PPT)				
4	**Post Task** After listening to their classmates' outline presentation for the upcoming speeches, Ss will be sent back to the BRs. Using Handout 3, T will explain that each group will write 3 tips regarding public speaking and giving speeches. T will encourage Ss to write pieces of advice they would like to share with their classmates when presenting their speech. Once back in the main session, T will ask Ss to send their tips to the chat box so that everybody has access to them. Ss are asked to share some tips with their	**Useful Language** We can write about… I would like to tell them… I think a good piece of advice would be… **When writing**: Can you spell that word for me? How can I say…?	Writing specific information Giving concise information	W R S	10'

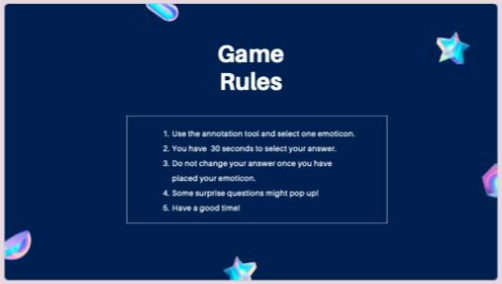
	classmates. T and TA will provide support in BR as needed. *Note*: UL for the discussion is provided in the Zoom chat box. **Feedback** Ss will receive feedback on their use of vocabulary, pronunciation, and grammar based on the notes taken by T and AT. **Materials** Handout 3**:** Tips to give speeches	What is another word for/ a synonym of…			

Abbreviations: BR= breakout rooms, T= teacher, AT= assistant teacher(s), Ss=students, L= listening, S= speaking,

W= writing, R= reading, UL= useful language, PPT= PowerPoint Presentation, HW=homework

Warm up

1



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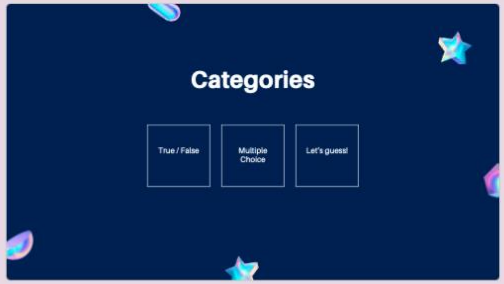

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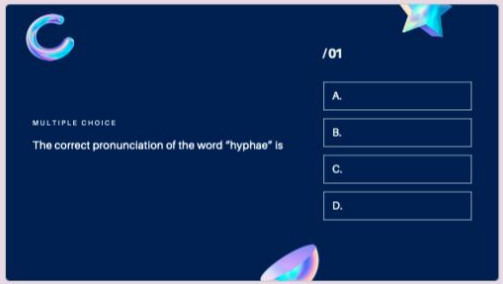

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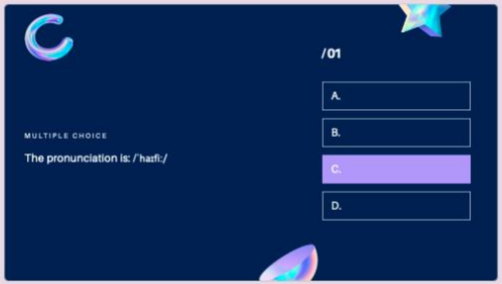

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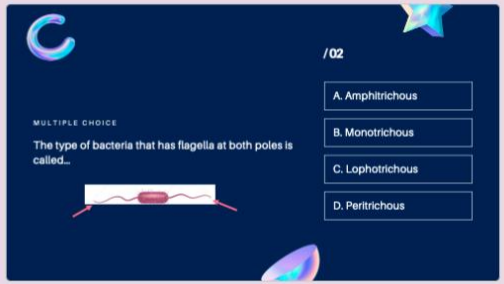

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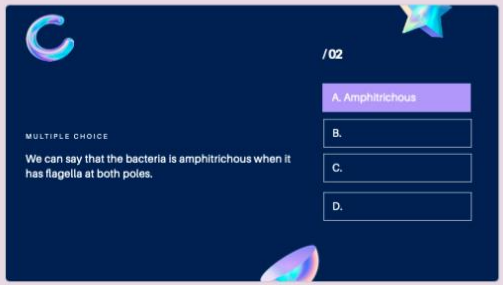

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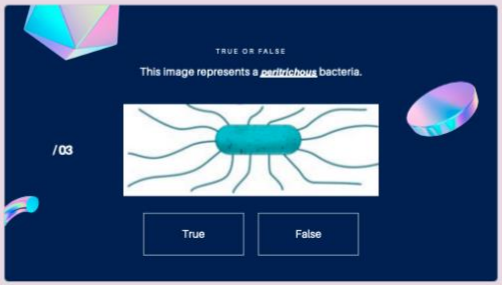

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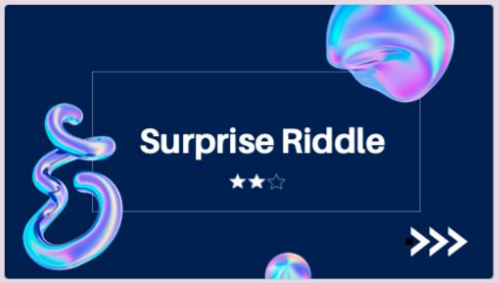

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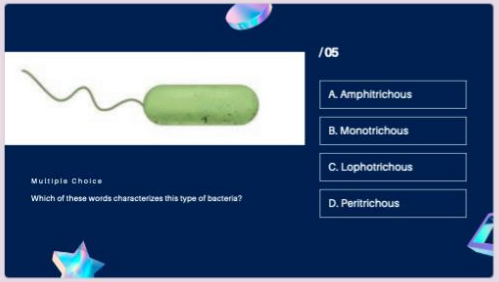

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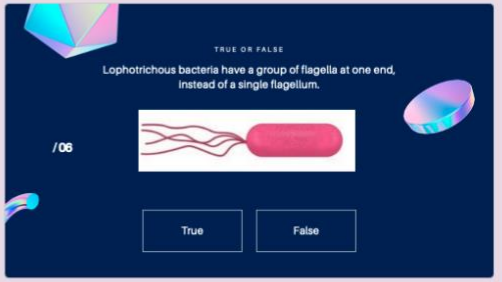

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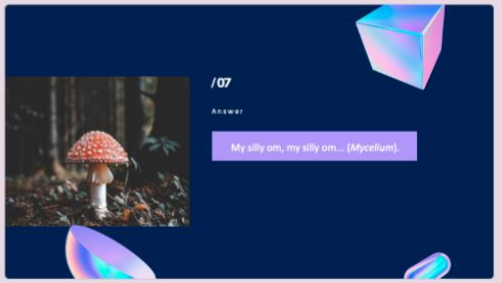

18

Pre-task

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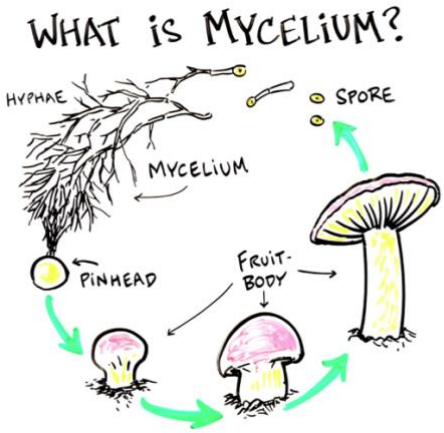
Instructors: Chinambu, Tenorio, Whitaker
Handout 1

Instructions

Listen to the video about the mushroom mycelium one more time and fill out the **speech parts** below. Be ready to extract **useful language** or **expressions** you can use during an **informative speech**.

Video: What is Mushroom Mycelium?



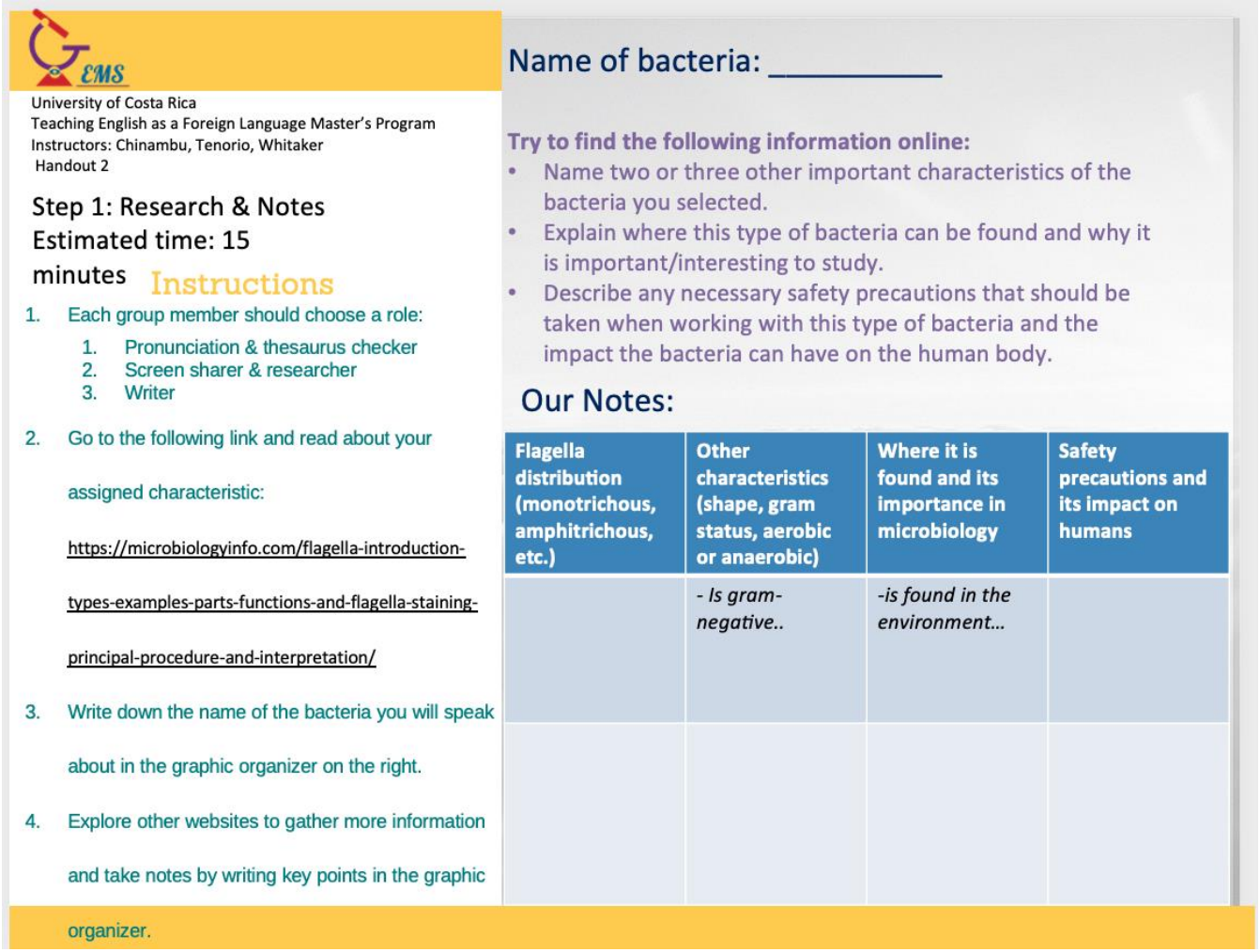
Useful Language
Can you pause the video right there?
Could you rewind the video?
Can you go back please?
Can you stop the video please?
I think the introduction can have these expressions: _____.
We can include these expressions: _____ as part of the body.

Introduction	What discourse markers / expressions can you find at the beginning of the video?	What useful language can you use for your own speech?

	What phrases / expressions can you find in this section?	What useful language can you use for your own speech?
Body		

	What phrases to conclude this video can you identify?	What <u>useful language</u> can you use for your own speech?
Conclusion		

Main task



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Handout 2

Step 1: Research & Notes
Estimated time: 15 minutes

Instructions

1. Each group member should choose a role:
    1. Pronunciation & thesaurus checker
    2. Screen sharer & researcher
    3. Writer
2. Go to the following link and read about your assigned characteristic:
   https://microbiologyinfo.com/flagella-introduction-types-examples-parts-functions-and-flagella-staining-principal-procedure-and-interpretation/
3. Write down the name of the bacteria you will speak about in the graphic organizer on the right.
4. Explore other websites to gather more information and take notes by writing key points in the graphic organizer.

Name of bacteria: _____

Try to find the following information online:

- Name two or three other important characteristics of the bacteria you selected.
- Explain where this type of bacteria can be found and why it is important/interesting to study.
- Describe any necessary safety precautions that should be taken when working with this type of bacteria and the impact the bacteria can have on the human body.

Our Notes:

Flagella distribution (monotrichous, amphitrichous, etc.)	Other characteristics (shape, gram status, aerobic or anaerobic)	Where it is found and its importance in microbiology	Safety precautions and its impact on humans
	- Is gram-negative..	*-is found in the environment…*	

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Instructors: Chinambu, Tenorio, Whitaker
Handout 2

Step 2: Speech Outline
Estimated time: 15 minutes

Instructions

1. Use the information you gathered in Step 1 to write an informative speech outline. An outlilne graphic organizer is provided on the next slide.
    1. You should write bullet points including the main points you want to share with the class.
    2. You should use discourse markers to help the flow of your speech.
    3. Use the thesaurus to find synonyms and remember to paraphrase.

Discourse Markers

Cause and effect:
Therefore,
Consequently,
Thus,

Adding information:
Moreover,
Furthermore,
Additionally,

Comparing:
Similarly,
Likewise,

Contrast:
However,
Nevertheless,
On the contrary,

Useful language for discussion:
We should mention that _____
We could write _____
How can we paraphrase this idea? How can we restructure or rephrase _____?
Do you think we should include_____?
Which discourse marker would be best to _____?

Introduction	Outline *-use bullet points* *-paraphrase* *-use discourse markers*
- **What is your speech about?** - **What information will you be sharing with the class?**	***-Hello class and instructors! Today we would like to share some information about…..*** ***-This bacteria is considered…..***

Body	**Outline** *-use bullet points* *-paraphrase* *-use discourse markers*
- **What are the characteristics of this bacteria that you would like to mention?** - **Where is this bacteria found?** - **Why do microbiologists study this bacteria?**	
	-Furthermore, this bacteria is classified as…..

Conclusion	Outline *-use bullet points* *-paraphrase* *-use discourse markers*
- **What are the safety precautions that are needed when working with this bacteria?** - **What can this bacteria do to humans?**	
	-However, humans should be cautious because….

Post-task

University of Costa Rica
Teaching English as a Foreign Language Master's Program
Instructors: Chinambu, Tenorio, Whitaker
Handout 3

3 TIPS FOR GIVING

Speeches

1. Write here

2. Write here...

3. Write here...

University of Costa Rica
Master's Program in TEFL
English for Microbiology Students
Chinambu, Tenorio, Whitaker
Lesson Plan # 10

Date: 10/21/2020
Student teacher: Diego Tenorio
Assistant: Mauli Chinambu & Jessica Whitaker

Lesson Plan 10 and Materials

ESP Course: EMS

Unit # 2: Tests do not lie **Approximate time for task cycle:** 120 minutes

Unit goal: By the end of the course, the students will be able to orally deliver information about microbiology to an audience of microbiologists, stakeholders, and other members of the scientific community by communicating in a clear and concise manner.

General objective: By the end of the unit, students will be able to effectively express ideas related to the characteristics of bacteria when interacting with members of the scientific community by stating facts.

Specific objectives: By the end of the lesson, students will be able to

1. Accurately recognize vocabulary regarding bacteria-related topics by matching terms and definitions in a memory
   game;
2. effectively write a set of tips regarding proper speech delivery by brainstorming ideas after watching a short video;
3. carefully review an informative speech about types of bacteria and presentation tips by rehearsing and discussing in groups;
4. thoughtfully analyze level of preparation to present an informative speech about types of bacteria by completing a checklist before the live presentation;
5. properly analyze lessons learned about presenting an informative speech by completing a self-assessment checklist.

Objectives	Procedures	Language	Strategies	Macro Skills	Time allotted
1	**Warm-up** T greets Ss and explains that the warm up will deal with the vocabulary covered in the previous lesson as well as additional vocabulary related to effects of bacteria when in human contact and possible measurements to prevent virus spreading. T explains that ss will work individually in a Memory Card Game to recall bacteria-related vocabulary and to practice terms related to the effects of bacteria and viruses spreading.	**Vocabulary** amphitrichous, lophotrichous, mycelium, temperature, thermometer, asymptomatic, contagious, ibuprofen, prophylactic… **Useful Language** I want card #_ and	Schema activation	S L R W	15’

	T will share the screen with the game. The game includes cards with images and/or fill-in-the-blanks sentences. Ss will try to match images with the corresponding term for each one of them. They will also try to select the card with the word that best completes a given sentence. T reviews the correct answer with Ss emphasizing the pronunciation of new words. **Feedback** T and AT will take notes on Ss oral production. Ss will receive feedback on their use of vocabulary and pronunciation. Ss will also receive feedback and corrections on the spot as necessary during the main	the one next to it… Maybe cards #__ and #__ go together… Can you read the sentence again? Can you pronounce that word again? I don't remember in what card that word was!			

	session. **Materials:** PowerPoint: Memory Cards Game				
2	**Pre-task** In the main session, T will ask the Ss the following question ¨What is a bad speech?¨ Ss will be encouraged to share ideas about what can make a speech poor or ineffective. After eliciting 3 or 4 ideas, T will tell Ss that they will be sent to BR in groups of 2 or 3 to watch a video where a young man is getting a poor speech. One Ss should share their screen to play the video. Ss will receive Handout 1 in the Zoom chat box where they can access the video	**Vocabulary** **Useful Language** I think the content was rich/ limited in detail because… The speaker's level of preparation was… which resulted in …. I noticed that the	Listening for specific details Expressing and sharing ideas	L S W	30'

	link (on slide 1). Ss should watch the video and pay attention to the following aspects: ● The content of the speech (topic, supporting details, examples) ● The level of preparation ● Body language ● Eye contact ● Overall quality of the speech Ss will then discuss what they observed regarding each of the aforementioned aspects. Taking into consideration the aspects that make a speech poor/ineffective, Ss will work together to write a list of three tips for effective speech deliverance using Handout 1(slide 2).	speaker was/ wasn't using body language. For example… What did you think about his performance? How effective do you think the speech was? What do you think was the main problem?			

	Once complete, Ss will return to the main session and share their tips with their classmates in order to help them prepare to deliver their speeches. Note: The video link, instructions, and UL are provided on Handout 1. Handout 1 will be sent to Ss using the Zoom chat box. **Feedback** T and AT will take notes on Ss oral production. Ss will receive feedback on their use of vocabulary and pronunciation. Ss will also receive feedback and corrections on the spot as necessary during the main session. **Materials**				

	A Bad Speech- Online video link: https://www.youtube.com/watch?v=bTKuyk5A7wQ Handout 1: Video activity and Speech Tips (PPT slide)				
Break from 5:50 p.m. to 6:00 p.m.					
3, 4	**Main Task** T will ask the Ss to start getting ready for the informative speech they have to present. *Note*: During the previous lesson, Ss prepared an outline of an informative speech about a specific bacterium. For homework, Ss finished their speech. Ss had gone online to find the	**Vocabulary** monotrichous, amphitrichous, lophotrichous, peritrichous, flagellum, flagella, spirilla, spirillum, salmonella typhi, vibrio cholerae, Alcaligenes	Skimming and scanning Paraphrasing Giving specific information	R W L S	45’

	following information: 1. Name 1 type of bacteria that has your assigned characteristic. 2. Name two or three other important characteristics of the bacteria you selected. 3. Explain where this type of bacteria can be found and why it is important/interesting to study. 4. Describe any necessary safety precautions that should be taken when working with this type of bacteria and the impact the bacteria can have on the human body. T will explain to Ss that they have to rehearse before presenting the	faecalis, Helicobacter pylori, anaerobic, aerobic, gram-negative/positive **Discourse Markers for:** **Adding information:** *moreover, furthermore, additionally*			

	speech using a self-assessment checklist (Handout 2). Ss will use the checklist to verify and confirm they are fully ready to present the topic they were assigned. Ss will check with their peers regarding any difficult words to pronounce by confirming with them and/or using the dictionary whenever needed. Ss will make sure they are including the tips they discussed during pre-task. T will explain the task and model with TA. Ss will be sent to the BR where each group will prepare to present an informative speech about one of the characteristics of the below bacteria: Group 1: monotrichous	**Cause and effect:** *therefore, consequently, thus* **Comparing:** *similarly, likewise* **Contrast:** *however, nevertheless, on the contrary* **Research related verbs:** *this causes, this results in, this affects*			

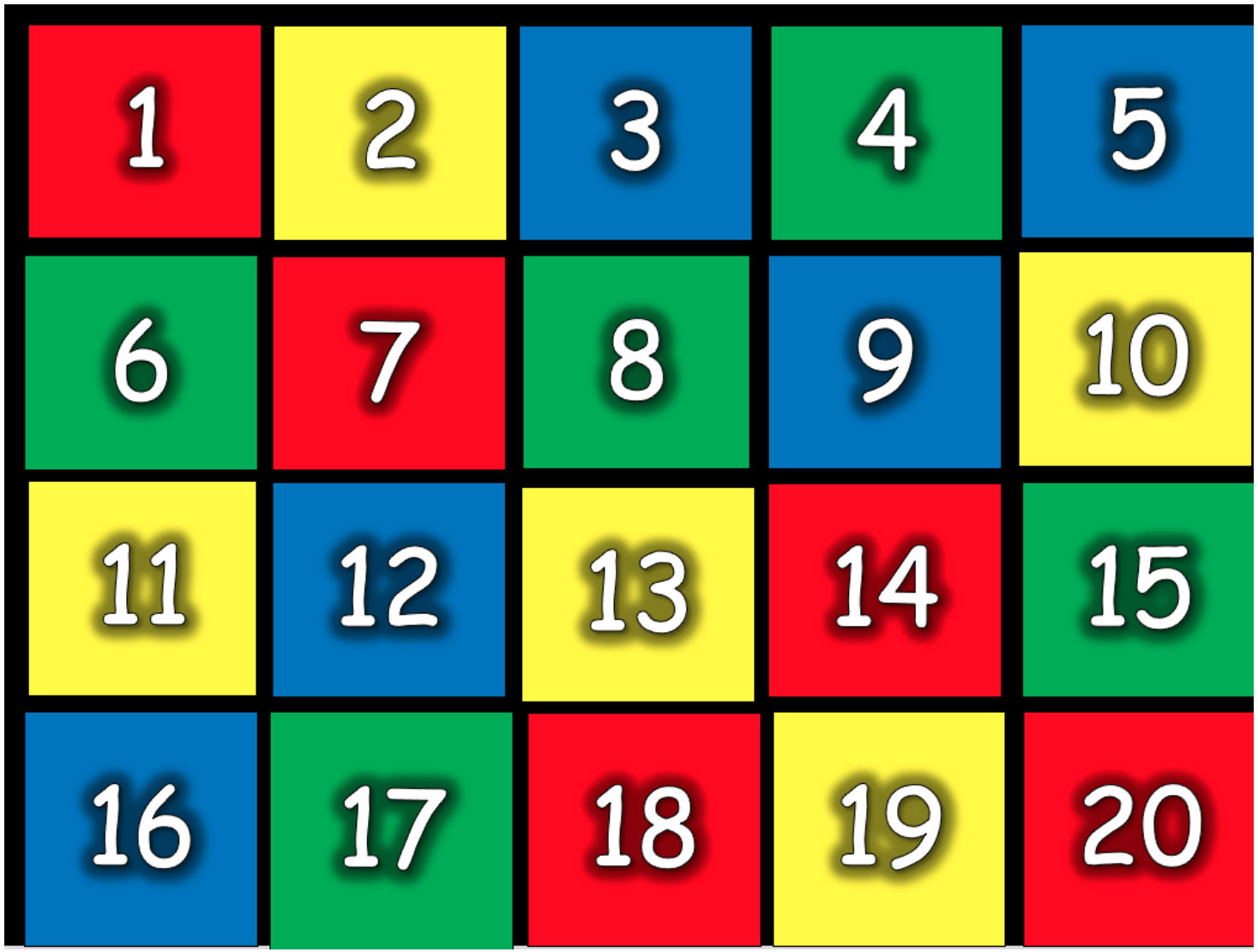
	Group 2: amphitrichous Group 3: lophotrichous Group 4: peritrichous Ss return to the main session and after the speeches are done, Ss will quiz their classmates by asking 3-4 questions about their presentation. **Feedback** T and TA will visit each BR and give Ss on-the-spot correction regarding pronunciation, vocabulary use, grammar, and spelling. Common errors will also be discussed once back in the main session. **Materials** Handout 2: My speech checklist / Self	**Useful Language (for discussing content)** We need to check the pronunciation of…. We could write some research verbs: this causes, this results in, this affects… What do you think about saying…? How can we restructure or rephrase …?			

	Assess	Which discourse marker can we use for….?			
5	**Post Task** After listening to their classmates' informative speech, Ss will be sent back to the BRs to complete Handout 3. Ss will reflect on their presentation and they will discuss what they have learned during their speech. T will encourage Ss to analyze what they have to work on to improve their speech and write some observation comments about their own performance. Once back in the main session, T will ask some volunteers to share their	**Useful Language** I feel I still need to work on… This word is difficult for me. How do you say _____ one more time? Can you repeat that word please?	Reflecting	W S	10'

	thoughts and let the rest of the class know what they learned and realized they have to work on. *Note*: UL for the discussion is provided in the Zoom chat box. **Feedback** Ss will receive feedback on their use of vocabulary, pronunciation, and grammar based on the notes taken by T and AT. **Materials** Handout 3**:** Self-assessment / Reflection	**When writing**: How do you spell_____? How can I say…? What is another word for/ a synonym of…			

Abbreviations: BR= breakout rooms, T= teacher, AT= assistant teacher(s), Ss=students, L= listening, S= speaking, W= writing, R= reading, UL= useful language, PPT= PowerPoint Presentation, HW=homework

Warm up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Warm up Answer Key

Matching Pairs	
THERMOMETER	
LOPHOTRICHOUS	
AMPHITRICHOUS	
CONTAGIOUS	
IBUPROFEN	
MYCELIUM	
MITOSIS	

THEY NEED TO CHECK EACH PERSON'S _____ TO MAKE SURE THEY DON'T HAVE A FEVER.	TEMPERATURE
MANY PEOPLE DON'T KNOW THEY ARE SICK BECAUSE THEY ARE _____.	ASYMPTOMATIC
MANY CITIES ARE ON LOCKDOWN AS PART OF THE _____ MEASURES IN PLACE TO PREVENT THE TRANSMISSION OF COVID-19.	PROPHYLACTIC

Pre-task

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Handout 1

A Bad Speech

Instructions: Go to the following link and watch the video:
https://www.youtube.com/watch?v=bTKuyk5A7wQ
While you watch, pay attention to the following aspects of this speech and the speaker:

- The content of the speech (topic, details, examples)
- The speaker's level of preparation
- The speaker's body language
- The speaker's eye contact with the audience
- The overal quality of the speech

After you watch the video, have a discussion as a group about what you observed. Discuss each of the aspects mentioned above.

Useful language for discussion

I think the content was rich/ limited in detail because…
The speaker's level of preparation was… which resulted in ……..
I noticed that the speaker was/ wasn't using body language. For example..
What did you think about his performance?
How effective do you think the speech was?
What do you think was the main problem?

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Handout 1

3 TIPS FOR GIVING

Speeches

Instructions: As a group, create a list of 3 tips for giving an effective speech. Use the imperative form (for example: Be sure to always…..). You will present your speeches to the class in the main session.

1. Write here

2. Write here…

3. Write here…

Main task

Drag an **X** into the corresponding box when applicable!

✖

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Handout 2

MY SPEECH CHECKLIST

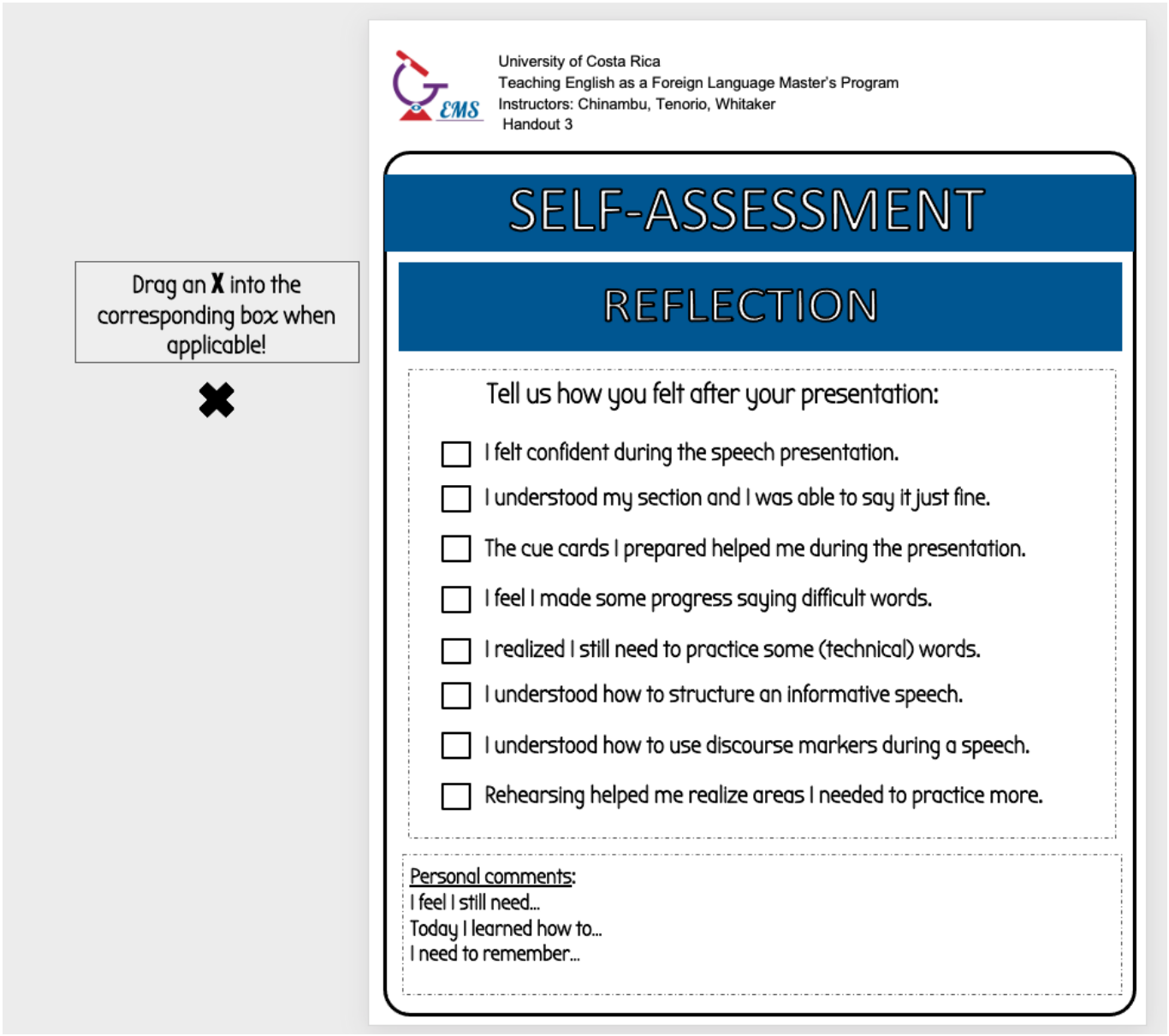
SELF-ASSESS

Rate your preparedness for your presentation:

- ☐ I included the tips suggested for our presentation.
- ☐ I memorized my section.
- ☐ I prepared cue cards.
- ☐ I need help with some of the words I have to say.
- ☐ I might need a little more practice before presenting.
- ☐ I paraphrased some of my section parts for the speech.
- ☐ I used the dictionary/thesaurus to confirm pronunciation of words.
- ☐ I rehearsed and I feel ready!

Notes:
I need to remember...
I have to practice...
I have to pronounce...

Post-task


Drag an X into the corresponding box when applicable!
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Handout 3
SELF-ASSESSMENT
REFLECTION
Tell us how you felt after your presentation:
I felt confident during the speech presentation.
I understood my section and I was able to say it just fine.
The cue cards I prepared helped me during the presentation.
I feel I made some progress saying difficult words.
I realized I still need to practice some (technical) words.
I understood how to structure an informative speech.
I understood how to use discourse markers during a speech.
Rehearsing helped me realize areas I needed to practice more.
Personal comments:
I feel I still need...
Today I learned how to...
I need to remember...

University of Costa Rica
Master's Program in TEFL
English for Microbiology Students
Chinambu, Tenorio, Whitaker
Lesson Plan # 11

Date: 10/28/2020
Student teacher: Jessica Whitaker
Assistant: Diego Tenorio & Mauli Chinambu

Lesson Plan 11 and Materials

ESP Course: EMS

Unit # 2: Tests do not lie **Approximate time for task cycle:** 120 minutes

Unit goal: By the end of the course, the students will be able to orally deliver information about microbiology to an audience of microbiologists, stakeholders, and other members of the scientific community by communicating in a clear and concise manner.

General objective: By the end of the unit, the students will be able to accurately present microbiology related processes to members of the scientific community by stating facts in a structured manner about a microbiology related topic.

Specific objectives: By the end of the lesson, students will be able to

1. appropriately demonstrate use of microbiology-related terms by giving an impromptu speech;
2. effectively identify main ideas presented in a video about antibiotics by discussing a series of questions in groups;
3. correctly determine the sequence of a speech after watching a short video presentation by filling out a graphic organizer in groups; and
4. successfully analyze speech areas of improvement by answering questions and sharing ideas with the group.

Objectives	Procedures	Language	Strategies	Macro Skills	Time allotted
1	**Warm-up** T will greet Ss as they arrive. T will explain that for the warm up activity they will do impromptu speeches using the key microbiology terms that we have been focusing on. T will model the activity with AT. One Ss will be randomly selected to start the activity. Ss will spin the wheel and then give a 1-minute impromptu speech about the word that the arrow points to. The key words can be nouns, verbs, or adjectives. Ss will have 30 seconds to think about what they would like to talk about. If Ss are not comfortable talking about that particular word, they will have an opportunity to spin one more time for a new word.	**Vocabulary** Mycelium, apex, monotrichous, prophylactic, lophotrichous, anaerobic, amphitrichous, hyphae, contagious, ibuprofen, spirilla, prions, inhibitory, diaphragm, thermometer, temperature, inoculate, peritrichous, carbohydrate	Schema activation	S L	15 mins

	Note: Ss were told in advance that they would be doing impromptu speeches and were asked to review the key terms for homework. Note: UL will be provided in the Zoom chat box, **Materials** https://wordwall.net/resource/5938620 (wheel for warm up)	**Useful Language** I would like to talk to you about _____. This word is important in the field of microbiology because _____. This characteristic/item/fact or is relevant because _____. I would like to begin/conclude by saying that _____.			

		An important example of this is _____. This characteristic causes the bacteria to _____. This item enables laboratory technicians to _____.			
2	**Pre-task 1** **1.** Ss will be divided into groups of three on the Zoom platform based on the first letter of their name. They will be assigned a BR.	**Useful Language** • In this video I heard…	Listening for global meaning, main ideas,	L S W	25 mins

	2. Ss will watch a short video presentation on antibiotics and how they are introduced into society. As they watch, they must take notes on the key words that they hear. T and AT will provide support in breakout rooms. **3.** Ss will then work together to discuss four comprehension questions about the information presented in the video. **4.** A whole class discussion will then take place to discuss the answers. T will elicit responses. **Materials** Video: https://www.youtube.com/watch?v=ttwPjUEennU	• I believe that… • I think the speaker said that…. • The main idea is… • Some important details that were mentioned are… • In my opinion this topic is… • What do you think about…? **Useful Language for Discussion** • In this video I the speaker was…	and key words Using context clues to understand vocabulary and main ideas English stress patterns and intonation		

	Handout # 2 – Comprehension questions (individual in Word)	• I believe that the speaker showed… • I think the speaker said that…. • The body tone of voice was… • I consider the pacing was… • In my opinion this volume of the speaker was… • I think the speech in general was… **Grammatical Features** Simple present tense used to discuss the			

		topic. For example: *What do you think about…?* Simple past used to refer to the information presented in the video. For example: *The speaker said that….* Sequence adverbs used to describe a process. For example: *First, research must be conducted in a laboratory.*			

		Reported speech used to discuss information gathered from the video. For example: *He said that approving antibiotics is a long process because…*			
Break from 5:50 p.m. to 6:00 p.m.					
3	**Main Task** Using the same video from the Pre-task, Ss will go back to their BRs and watch the video presentation a second time. As they watch, they will fill out the graphic organizer on Handout 3 in which they must identify the process presented in the speech, thinking about how they would like to present the	**Useful Language** ● I believe that…. ● In my opinion this topic is…… ● What do you think about….? ● We should consider that…	Recognize parts of speech and word order Outlining an impromptu speech	S L R W	35 mins

	information if they were to give an impromptu speech. Ss will be encouraged to take notes individually and then compare what they wrote to fill out the graphic organizer that highlights the structure of the speech and its important components. T and AT will provide support in breakout rooms. Once back in the main session, T will lead a discussion to elicit responses from Ss. T will ask Ss how they were able to identify the steps in the process and the language that helped them. They will share opinions on whether or not the speech was easy to follow. **Feedback** T and AT will visit each BR and give Ss on-the-spot correction regarding pronunciation, vocabulary use, grammar, and spelling.	● For example, ● This process involves……. ● The first/second/third step is……. Sequence adverbs used to describe a process. For example: *First, research must be conducted in a laboratory.* (First, second, third, next, then, last, finally)			

	Common errors will also be discussed once back in the main session. **Materials** Video https://www.youtube.com/watch?v=ttwPjUEennU Handout # 3 – Graphic organizer	**Research related verbs:** *this causes, this results in, this affects, the research shows, the researches explain that…*			
4	**Post-task** 1. Ss will respond to prompts by completing the sentences in order to reflect on what they learned during the speech analysis previously performed. 2. Ss will be given 10 minutes to meet with their groups in the BR to share their thoughts and feedback about their analysis. T and AT will provide support in BR.	**Useful Language** I believe that….. Next time we should…. What do you think about….? What do we need to improve?	Self-reflection, expressing feelings, analyzing performance, and setting goals	W S L	15 mins

	Materials Handout # 4 – Reflection Prompts (individual in Word)	**Grammatical Features** The simple past will be used to reflect on performance. For example: *I really enjoyed….. I thought it was difficult to…… During this presentation, I felt ……*	Expressing and sharing ideas		

Abbreviations: BR= breakout rooms, T= teacher, AT= assistant teacher(s), Ss=students, L= listening, S= speaking, W= writing, R= reading, UL= useful language, PPT= PowerPoint Presentation, HW=homework

Warm up


Spin the wheel and give an impromptu speech using the key microbiology terms!
Anaerobic
Amphitrichous
Hyphae
Contagious
Ibuprofen
Spirilla
Prions
Inhibitory
Diaphragm
Thermometer
Temperature
Inoculate
Peritrichous
Carbohydrate
Mycelium
Apex
Monotrichous
Prophylactic
Lophotrichous
Spin It

Pre-task

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Handout 2

Instructions: Watch the video prepared by the Microbiology Society called Antibiotics - from bench to bedside:
https://www.youtube.com/watch?v=ttwPjUEennU

Step 1: While you watch the video, use the box below to write down all the key words that you hear.

-*Antimicrobial resistance*

Step 2: Discuss the following comprehension questions with your group members. Use the useful language below to help you discuss the answers.

a. What was the purpose of this speech? Was it to inform, to entertain, to persuade, or to inspire the audience? Explain your answer.

b. What was the main idea of this speech?

c. What examples were used to support the main idea?

d. What is your opinion of antibiotics?

Useful Language for Discussion

- In this video I heard…
- I believe that…
- I think the speaker said that….
- The main idea is…
- Some important details that were mentioned are…
- In my opinion this topic is…
- What do you think about…?

Step 3: How would you evaluate the speaker's

- tone of voice?
- pacing?
- volume?
- speech in general?

Step 4: Share your answers with the whole class.

Useful Language for Discussion

- In this video I the speaker was…
- I believe that the speaker showed…
- I think the speaker said that….
- The body tone of voice was…
- I consider the pacing was…
- In my opinion this volume of the speaker was…
- I think the speech in general was…

Main task

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Handout 3

Instructions: Watch the video a second time. With your group, organize the information presented about antibiotics into the graphic organizer below by identifying the steps in the process and how you will present them during an impromptu speech.

Explaining the Process
(steps to follow)

Step 1
First, researchers must find out how a compound could affect a patient…

Step 2

Step 3

Step 4

Step 5

Useful language for activity:
Adverbs of sequence
-First
-Second
-Third
-Next
-Then
-Lastly

Research related verbs:
the research shows…
the researchers explain that…
this causes…,
this results in…,
this affects…,

Post-task

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Instructors: Chinambu, Tenorio, Whitaker
Handout 4

Instructions

Step 1: **Reflect** on your performance during today's speech analysis by completing the sentences below. Think about the feedback you received from your classmates.

1. During the speech analysis, I learned how to ……..

_____
_____

2. I really enjoyed …… because……

_____
_____

3. I believe that I still need to work on …… because……

_____
_____

4. My classmates and teacher gave me good feedback about …….

_____
_____

5. Next time, I would like to……

_____
_____

6. It was difficult for me to……

_____
_____

Step 2: **Share** your reflection with your group members. Discuss what you would like to improve for the next oral presentation.

Useful Language for Discussion
- I believe that….
- In my opinion, I/we….
- Next time I think we should….
- What do you think about….?
- Do you think that we….?
- What did we do a great job with?
- What do we need to improve?

University of Costa Rica
Master's Program in TEFL
English for Microbiology Students
Chinambu, Tenorio, Whitaker
Lesson Plan # 12

Date: 11/04/2020
Student teacher: Mauli Chinambu
Assistant: Diego Tenorio & Jessica Whitaker

Lesson Plan 12 and Materials

ESP Course: EMS

Unit # 2: Tests do not lie **Approximate time for task cycle:** 120 minutes

Unit goal: By the end of the course, the students will be able to orally deliver information about microbiology to an audience of microbiologists, stakeholders, and other members of the scientific community by communicating in a clear and concise manner.

General objective: By the end of the unit, students will be able to accurately present microbiology related processes to members of the scientific community by stating facts in a structured manner about a microbiology related topic.

Specific objectives: By the end of the lesson, students will be able to

1. effectively identify characteristics and vocal elements of speech by engaging in a matching exercise connecting terms to their definition;
2. successfully identify different types of tone of voice, volume, and pace used in an antimicrobial resistance speech by participating in a Mentimeter voting activity.
3. demonstrate appropriate use of spoken language elements such as tone, volume, and pace by giving a short impromptu speech about the development of antibiotics;
4. properly provide feedback to peers regarding the elements of spoken language during an impromptu speech by completing a peer evaluation tool;
5. properly analyze lessons learned about elements of spoken language by completing a self-assessment checklist.

Objectives	Procedures	Language	Strategies	Macro Skills	Time allotted
1	**Warm-up** T greets Ss and explains that the warm up will deal with some of the terms presented in the last class related to speech production and vocal elements involved when giving a speech. T will explain that ss will work in groups in their BRs in a Matching Columns exercise to identify speech characteristics and their definitions. Ss will receive a link to the online matching exercise. One Ss will share the screen with the game. The game includes cards with images and/or fill-in-the-blanks sentences. Ss will try to match images with the corresponding term for each one of them. They will also try to select	**Vocabulary** Tone of voice, pacing, volume, impromptu speech, body language, outline, self-monitoring **Useful Language** I think the card that says ____ and the one that says ___ go together… The term _____ matches with the card	Schema activation	S L R	15’

	the card with the word that best completes a given sentence. T will encourage Ss to read the complete sentence to enhance the speaking skill during class. Once back in the main session, T will review the correct answer with Ss emphasizing the importance of these characteristics when giving a speech. **Feedback** T and AT will take notes on Ss oral production. Ss will receive feedback on their use of vocabulary and pronunciation. Ss will also receive feedback and corrections on the spot as necessary during the main session. **Materials:** EducaPlay: Matching Columns exercise	that says… Can you read the sentence again? What do you think that word means? I don't remember what word means! Do you think this image represents ____?			

	https://www.educaplay.com/learning-resources/7480629-ems_speaking_elements.html				
2	**Pre-task 1** In the main session, T will select in private 3 Ss to read 2 sentences extracted from a TedTalk transcript. When reading the text Ss have to use the tone of voice, volume, and pace the T indicated to use. For instance: ● One Ss will read the sentences with an angry tone of voice, regular pace, and regular volume ● The next Ss will read using a bored tone of voice, slow pace, and low volume	**Useful Language** • I think the volume/tone/pace used was… • I believe that the tone was… • I think the speaker's volume was… • I believe the volume/tone/pace was appropriate for the type of…	Identifying tone of voice, volume and pace Speech strategies	S L	30'

	• The last Ss will read using an excited tone of voice, fast pace, and high pitch volume Once the Ss have finished reading, the T will display a slide in Mentimeter asking the Ss to vote on what type of tone the speaker used when reading the sentences. All Ss, except the ones who were asked to participate, will vote by choosing the answer they think is appropriate. T will ask the Ss what they think the best tone of voice for the type of text it is. When everyone has voted, T will play the original video and all Ss will once again vote and decide if the type of tone, volume, and pace from the speaker was appropriate based on the topic presented. T will elicit responses from the Ss to have them analyze the importance of tone, volume, and pace when presenting a speech and why				

	a variation of any of these will affect your message delivery. **Feedback** T and AT will take notes on Ss oral production. Ss will receive feedback on their use of vocabulary and pronunciation. Ss will also receive feedback and corrections on the spot as necessary during the main session. **Materials** Mentimeter https://www.menti.com/kfd3tmapay				
Break from 5:50 p.m. to 6:00 p.m.					
3 & 4	**Main Task** T will tell the Ss that they will have 15 minutes to review their notes and rewatch the video from the previous class in order to prepare for an impromptu speech. They will be sent to the	**Discourse Markers for:** Adding information:	Listening for main ideas and	L S	40’

	BR with Handout 1 which will provide some preparation tips. The groups will be the same as the week before: Group 1: Daniela, Ana, Grettel Group 2: Daniel, Johanna, Danae Group 3: Gabriel, Jennifer, Veronica Group 4: Andrea, Fabian *Note*: During the previous lesson, Ss completed a graphic organizer that highlighted the main steps involved in the process of approving antibiotics. Ss extracted the information from an online YouTube video. During this 15-minute preparation time, Ss will be encouraged to practice their tone, volume, and pace, and check any difficult words to pronounce by using the online dictionary. Ss should make sure they are including the points	*moreover, furthermore, additionally* Cause and effect: *therefore, consequently, thus* Comparing: *similarly, likewise* Contrast: *however, nevertheless, on the contrary* Research related verbs: *this causes, this results in, this affects* **Useful Language**	specific details Sequencing events/steps to follow Selecting, connecting, and explaining information. Paraphrasing Giving specific information		

	about spoken language that they discussed during the pre-task. Ss will also be reminded to use the target discourse markers we have been practicing in class, along with research related verbs. Ss will also be sent the Peer Evaluation Tool (Handout 2) to review so that they know what areas of their speech will be evaluated by their peers. *Note*: the UL for discussion and video link will be provided in a Zoom chatbox. Ss return to the main session to present their impromptu speech. **Feedback** One Ss from the audience will be randomly selected and asked to complete a peer evaluation tool and provide verbal feedback to the group (Handout 2). First, upon finishing	**(for discussing content)** We need to check the pronunciation of…. We could write some research verbs: this causes, this results in, this affects… What do you think about saying…? How can we restructure or rephrase …? Which discourse marker can we use for….?	Negotiating meaning		

	the speech, T will provide feedback to the group pertaining to grammar, pronunciation, and vocabulary. Second, the selected Ss will share their screen and present their feedback to the group regarding their use of spoken language such as tone, volume, and pace. **Materials** Video https://www.youtube.com/watch?v=ttwPjUEennU Handout 1: Preparation tips Handout 2: Peer evaluation tool (Word Doc)	**Useful Language for providing feedback:** I think the group did a great job with _____. I noticed that_____ was/wasn't reading. Some group members' tone/volume/pace was not appropriate because it was too ____.			

		Overall, I believe that the speech was delivered effectively/appropriately because ____. Overall, I believe that the following areas need to be improved: _____.			
5	**Post-task** After all impromptu speeches and feedback are finished, Ss will reflect on their presentation and spoken language and they will discuss what they have learned during their impromptu speech. This reflection will happen in the BR and one Ss will share the	**Vocabulary** Tone of voice, pacing, volume, impromptu speech, body language, outline, self-monitoring	Reflecting	S	15’

	screen to display the reflection tool to facilitate a discussion (Handout 3). T will encourage Ss to analyze what they have to work on to improve their spoken language and speaking skills and consider how they would like to improve for the upcoming final oral presentations. Once back in the main session, T will ask some volunteers to share their ideas and let the rest of the class know what they learned and realized they have to work on. *Note*: UL for the discussion is provided in the Zoom chatbox. **Feedback** Ss will receive feedback on their use of vocabulary, pronunciation, and grammar based on the notes taken by T and AT.	**Useful Language** I feel I still need to work on…. The word _____ is difficult for me. I think that I need to work on my tone/volume/pace because _____. I felt confident in my ability to _____. When writing:			

	Materials Handout 3 **:** Self-assessment / Reflection (PPT)	How do you spell_____? How can I say…? What is another word for/ a synonym of…			

Abbreviations: BR= breakout rooms, T= teacher, AT= assistant teacher(s), Ss=students, L= listening, S= speaking, W= writing, R= reading, UL= useful language, PPT= PowerPoint Presentation, HW=homework

Warm up

_____ refers to how fast or how slow you speak.

I couldn't hear anything you said. Your voice _____ was too low.

It helps you to organize the information for your speech.

Self-monitoring

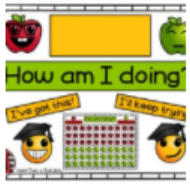
_____ is about the way you say something, and the impression it makes on everyone in your audience.

Body Language

Speech Pacing

Outline

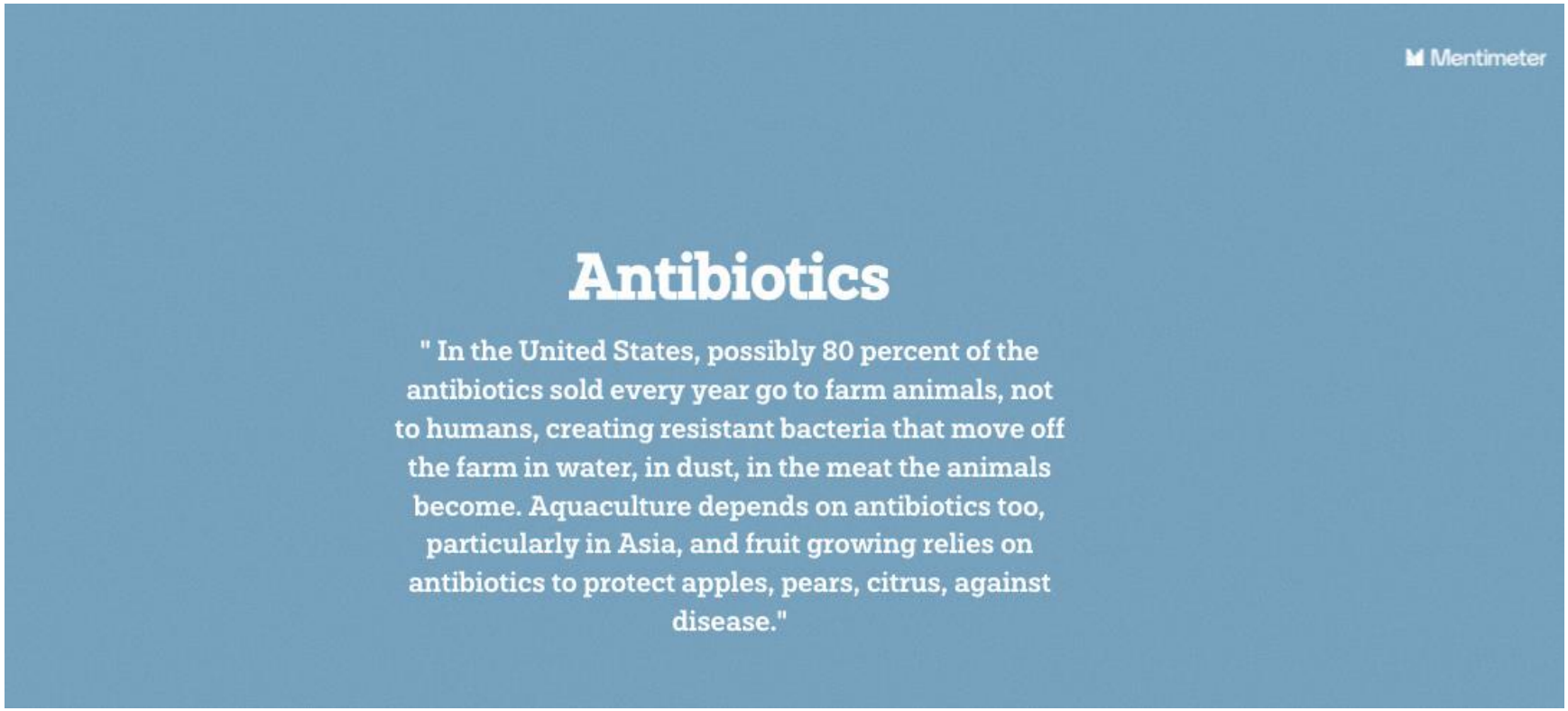
Tone of Voice

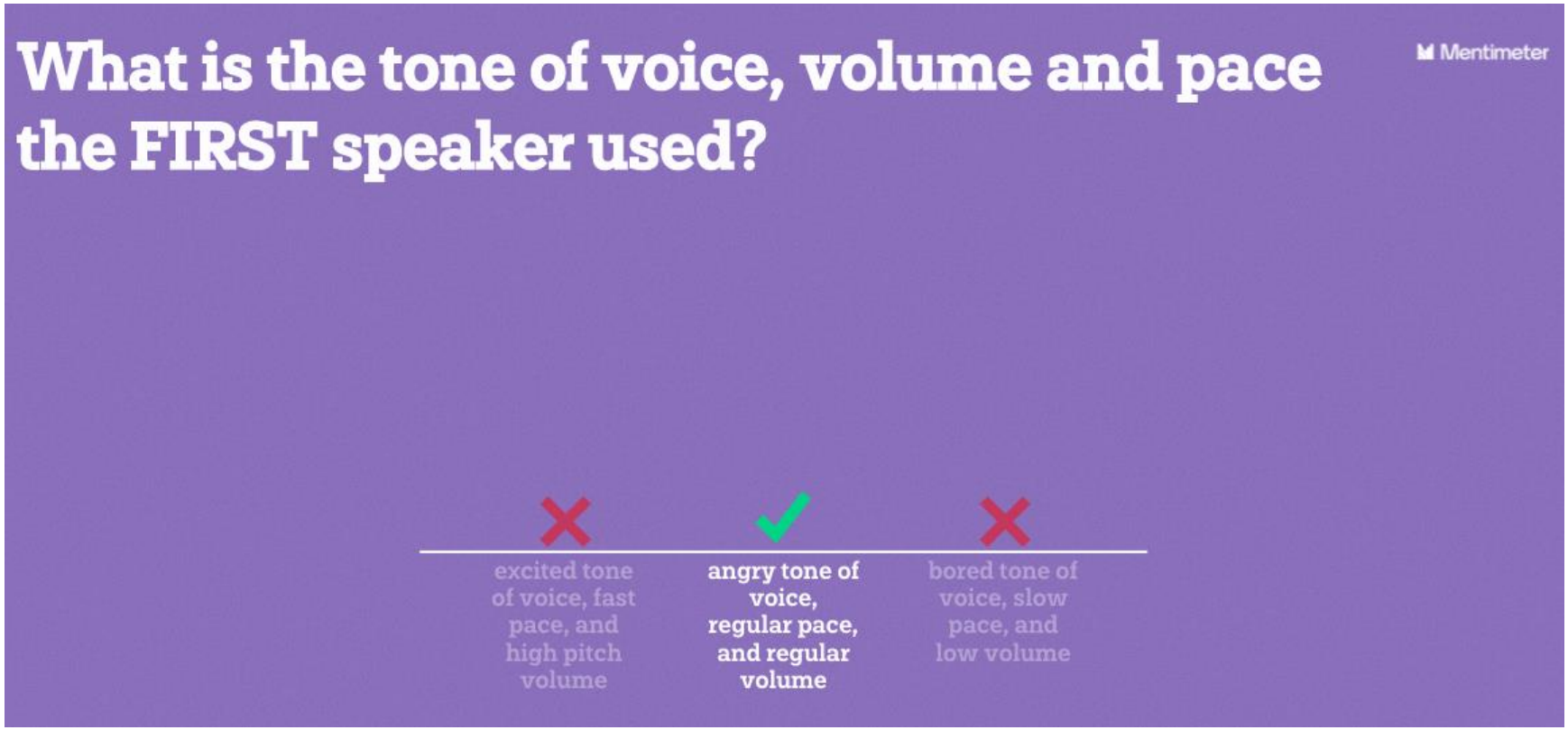


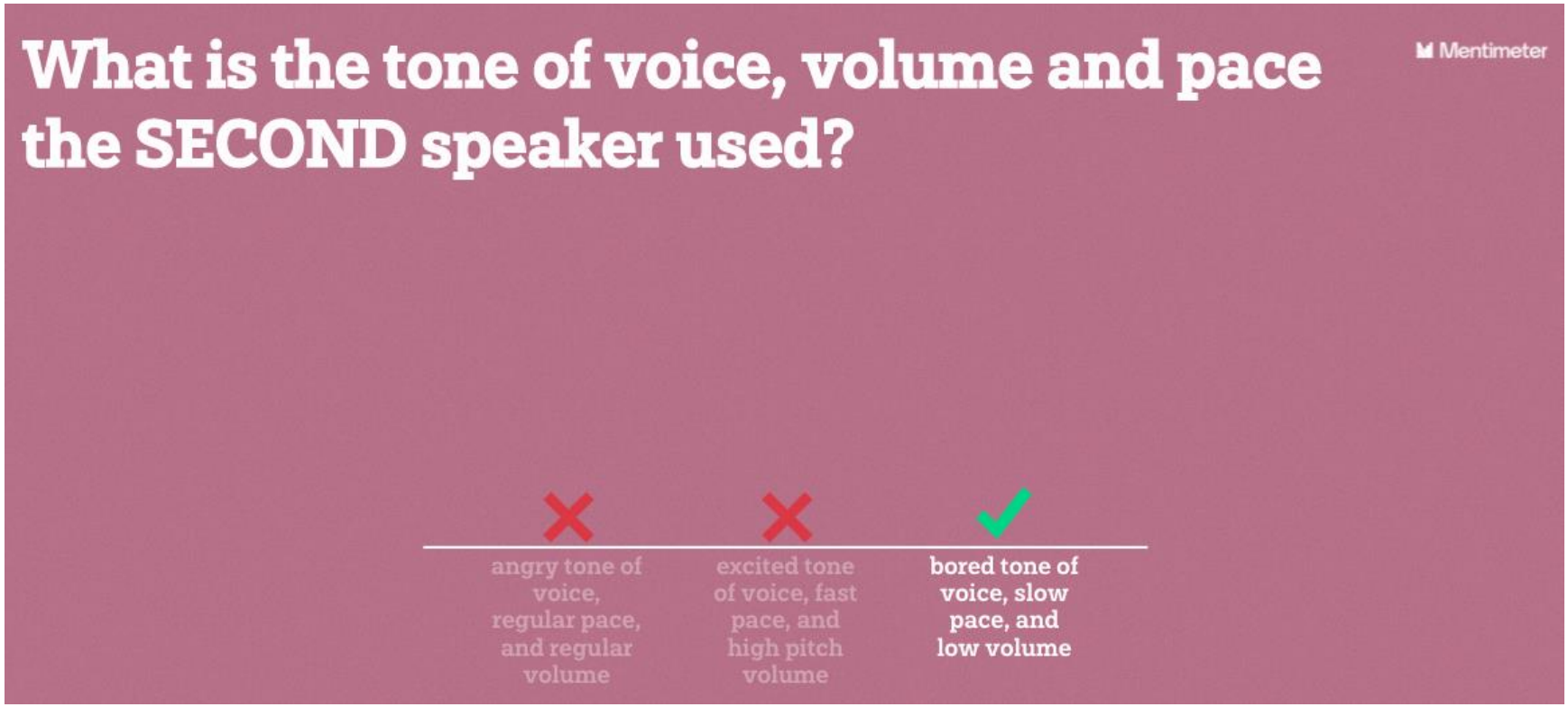
Volume

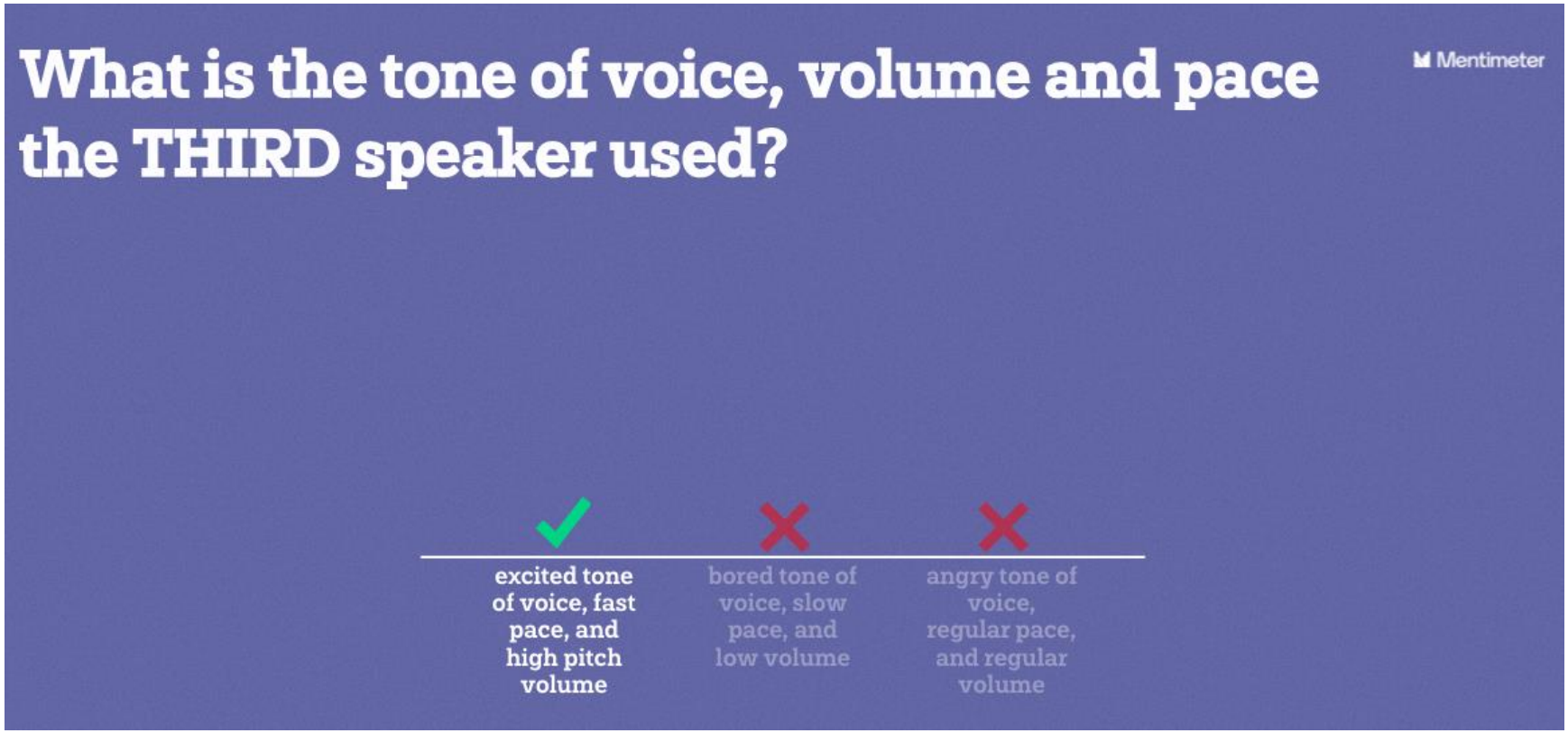
Impromptu Speech

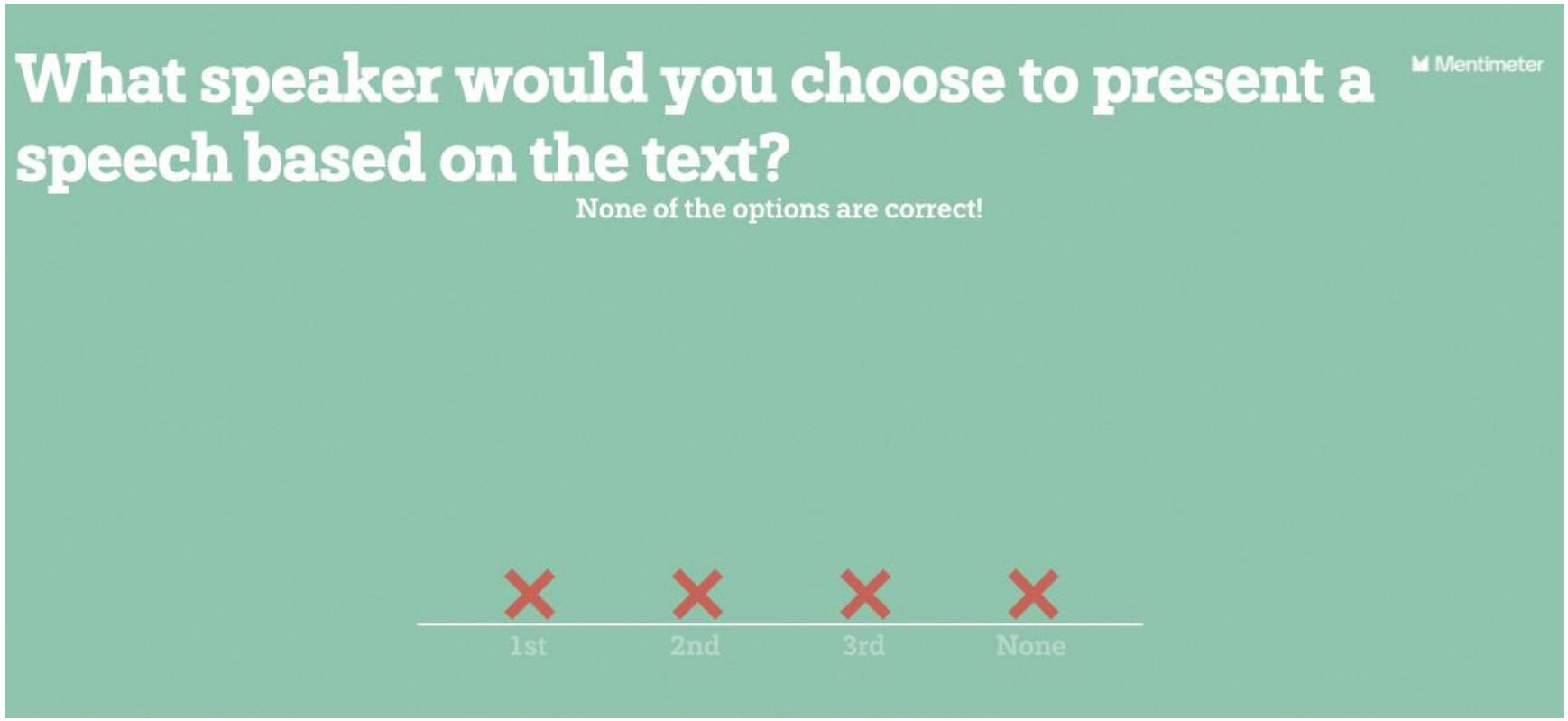
Pre-task

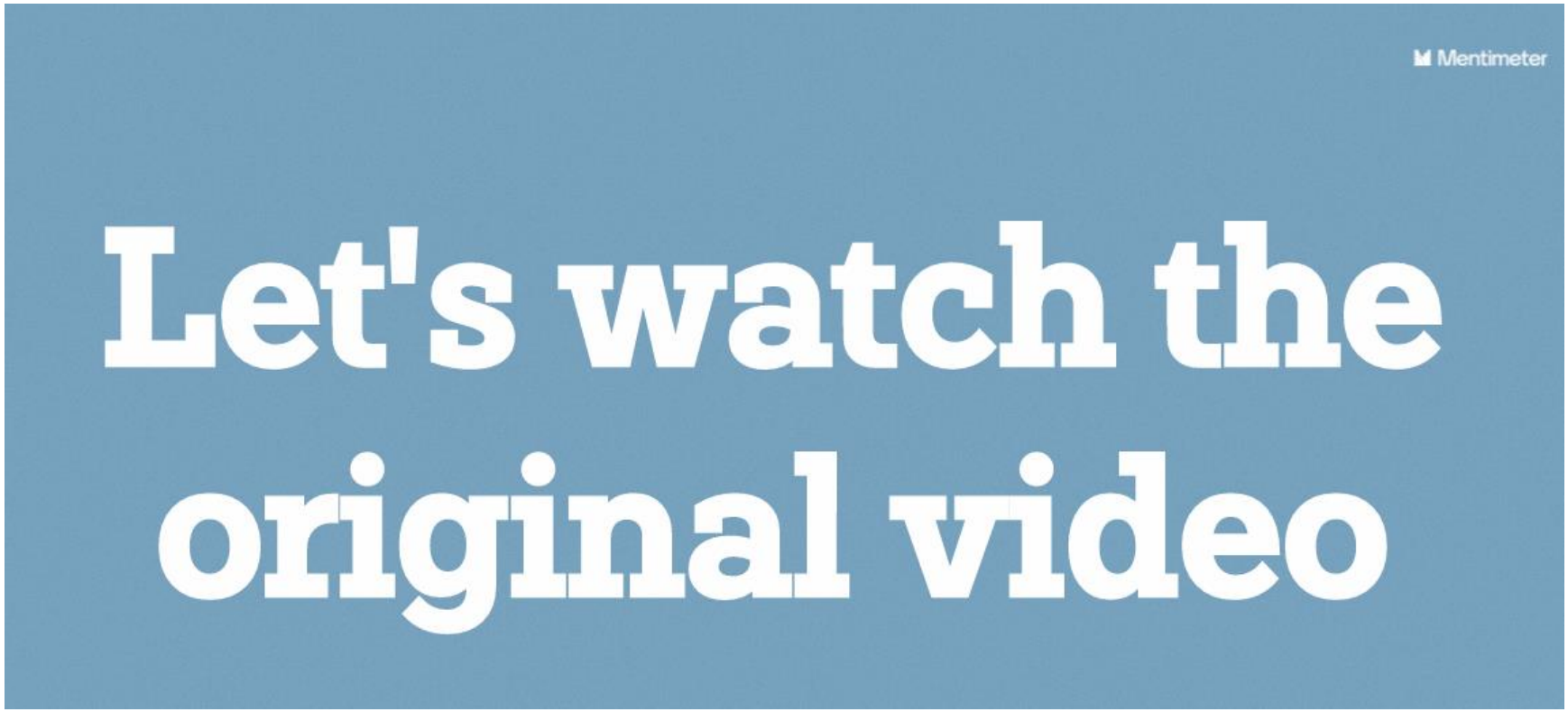

Mentimeter
Antibiotics
" In the United States, possibly 80 percent of the antibiotics sold every year go to farm animals, not to humans, creating resistant bacteria that move off the farm in water, in dust, in the meat the animals become. Aquaculture depends on antibiotics too, particularly in Asia, and fruit growing relies on antibiotics to protect apples, pears, citrus, against disease."


What is the tone of voice, volume and pace the FIRST speaker used?
Mentimeter
excited tone of voice, fast pace, and high pitch volume
angry tone of voice, regular pace, and regular volume
bored tone of voice, slow pace, and low volume


What is the tone of voice, volume and pace the SECOND speaker used?
Mentimeter
angry tone of voice, regular pace, and regular volume
excited tone of voice, fast pace, and high pitch volume
bored tone of voice, slow pace, and low volume

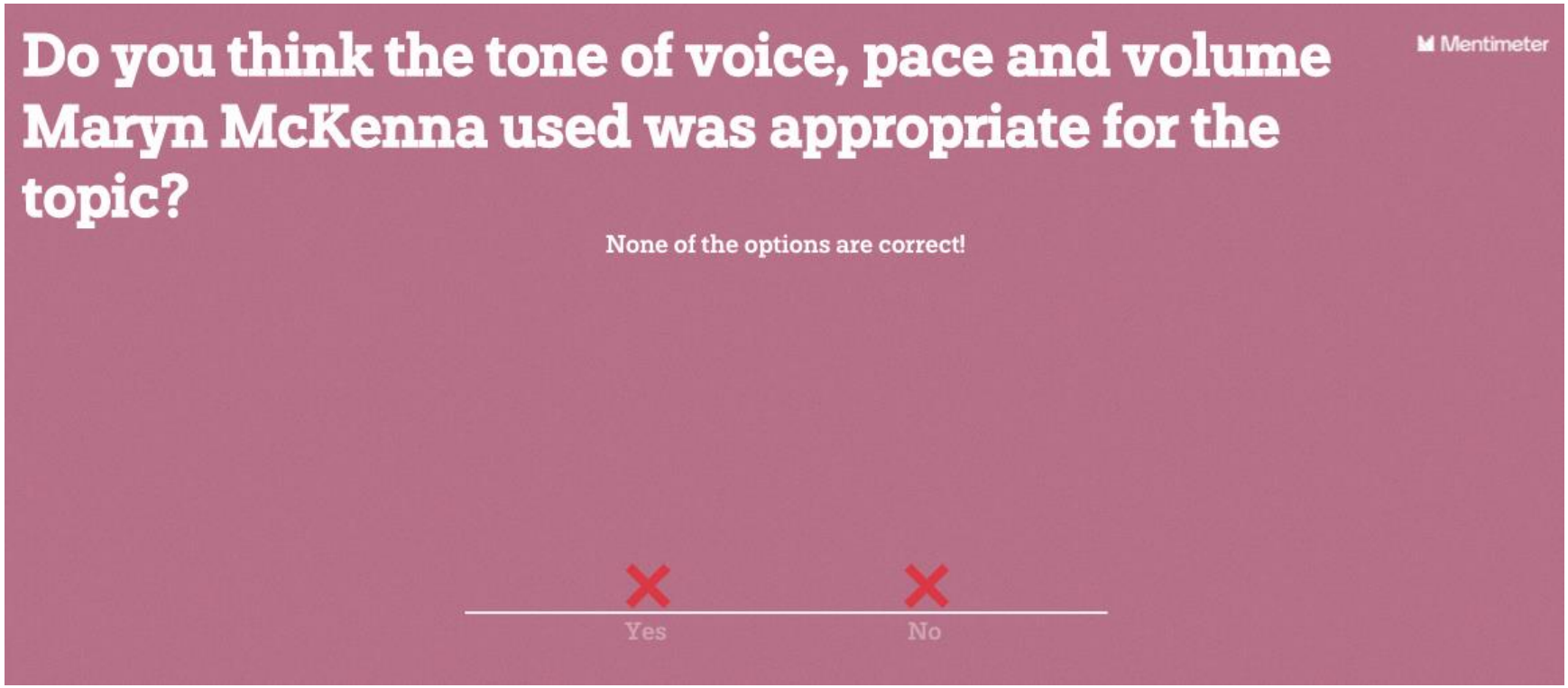

What is the tone of voice, volume and pace the THIRD speaker used?
Mentimeter
excited tone of voice, fast pace, and high pitch volume
bored tone of voice, slow pace, and low volume
angry tone of voice, regular pace, and regular volume


What speaker would you choose to present a speech based on the text?
Mentimeter
None of the options are correct!
1st
2nd
3rd
None


Mentimeter
Let's watch the original video

Mentimeter

What do we do when antibiotics don't work anymore?


Do you think the tone of voice, pace and volume Maryn McKenna used was appropriate for the topic?
Mentimeter
None of the options are correct!
Yes
No

Main task

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Handout 1

Preparation Tips

Use discourse markers!

Adding information:

moreover, furthermore, additionally

Cause and effect: *therefore, consequently, thus*

Comparing: *similarly, likewise*

Contrast: *however, nevertheless, on the contrary*

Use research-related verbs:

this causes…..
this results in…..
this affects…..
this relates to……
this supports…..

- Don't read off the paper
- Make eye contact with the audience
- Be mindful of your tone, volume and pace
- Use the online dictionary for pronunciation
- Paraphrase

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Handout 2

Impromptu Speech Peer Evaluation Tool

Group # _____ **Total Points: _____**

Instructions: Using the scale below, give the assigned group a grade based on their performance during the impromptu speech. Then share your screen and provide verbal feedback. Remember to add up the points to give them a grade out of 40 points.

(1) Strongly agree (2) Agree (3) Disagree (4) Strongly disagree

	Criteria	1	2	3	4	5
A.	The group made eye contact with the class.					
B.	The group presented their speech without reading from their notes.					
C.	The group members' volume was appropriate.					
D.	The group members' pace was appropriate.					
E.	The group members' tone was appropriate.					
F.	The group members' pronunciation of microbiology-related terms was correct.					
G.	The group demonstrated a good understanding of the topic.					
H.	The group delivered the speech with confidence.					

Additional Comments:

Useful Language for providing feedback:

- I think the group did a great job with _____.
- I noticed that _____ was/wasn't reading.
- Some group members' tone/volume/pace was not appropriate because it was too ____.
- Overall, I believe that the speech was delivered effectively/appropriately because ____.
- Overall, I believe that the following areas need to be improved: _____.

Post-task

Drag an **X** into the corresponding box when applicable!

✖

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Handout 3

SELF-ASSESSMENT

REFLECTION

Tell us how you felt after your presentation:

- ☐ I felt confident during the impromptu speech.
- ☐ I understood my section and I felt comfortable using the key microbiology-related words.
- ☐ The cue cards I prepared helped me during the presentation.
- ☐ I believe that my pronunciation of microbiology-related words has improved.
- ☐ I think that my tone/volume/pace was appropriate.
- ☐ I made eye contact with the audience during the speech.
- ☐ I used discourse markers effectively during the speech.
- ☐ I was able to communicate my ideas in a natural way.

Personal comments:
I feel I still need...
Today I learned how to...
I need to remember...

University of Costa Rica
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English for Microbiology Students
Chinambu, Tenorio, Whitaker
Lesson Plan # 13

Date: 11/10/2020
Student teachers: Mauli Chinambu, Diego Tenorio, and Jessica Whitaker

Lesson Plan 13 and Materials

ESP Course: EMS

Unit # 2: Tests do not lie **Approximate time for task cycle:** 120 minutes

Unit goal: By the end of the course, the students will be able to orally deliver information about microbiology to an audience of microbiologists, stakeholders, and other members of the scientific community by communicating in a clear and concise manner.

General objective: By the end of the unit, students will be able to accurately present microbiology related processes to members of the scientific community by stating facts in a structured manner about a microbiology related topic.

Specific objectives: By the end of the lesson, students will be able to

1. adequately demonstrate the ability to describe key microbiology-related terms by engaging in a game of Taboo in small groups;
2. appropriately solve a fill in blank activity with microbiology-related terms from a word bank by listening to a dialogue;
3. accurately prepare to present microbiology-related processes to peers by delivering a well-structured oral presentation about a microbiology-related topic;
4. properly evaluate presentations and provide feedback to peers regarding the elements of spoken language during an oral presentation by completing a peer evaluation tool;
5. effectively analyze lessons learned about elements of spoken language by completing a self-assessment checklist.

Objectives	Procedures	Language	Strategies	Macro Skills	Time allotted
1	**Warm-up** T will greet Ss and explain the warm-up game called Taboo. Ss will be organized into groups of 3 or 4 and sent to BR. Each Ss will receive 2 secret words that T will send to them in advance via the app Remind. The game rules will be provided on Handout 1 which will be sent to the Ss in the Zoom chat box along with UL for the activity. One Ss should share the screen to display Handout 1. T will explain the following rules and model the activity with AT. Each Ss will receive 2 secret words that they cannot show to their group members. Ss will choose one of their 2 words and describe it to their group members without saying the word(s). The group must guess	**Vocabulary** Bunsen burner, hot plate, safety measures, auditor, audit mycelium, apex, monotrichous, prophylactic, lophotrichous, anaerobic, amphitrichous, hyphae, contagious, ibuprofen, spirilla, prions,	Schema activation	S L	15’

	what the word is. For example, if the secret word is *spirilla* the Ss might say something like ¨ *This word is used to describe bacteria that have a twisted shape/structure*¨. Ss will take turns describing each of their secret words. Once finished, T will bring Ss back to the main session and ask Ss to describe 2 or 3 of the target words. *Note:* The observer will be made co-hosts in order to move from one BR to another as necessary. **Feedback** A PPT will be filled out with the information obtained from the BR discussions. Ss will receive feedback on their use of vocabulary and pronunciation. Ss will also receive feedback and corrections on the spot as necessary during the main session. **Materials**	inhibitory, diaphragm, thermometer, temperature, inoculate, peritrichous, carbohydrate **Useful Language** This is an item that we use in a laboratory to _____. This word is a characteristic of			

	Handout 1: Game Instructions	_____. This word defines a type of bacteria that _____. This word is an example of _____. This word is commonly used when talking about _____.			
2	**Pre-task** T will tell Ss that they will listen to a dialogue presented by Ms. Chinambu and the AT regarding a	**Vocabulary** Mycelium, apex, monotrichous,	Listening for specific details	L S	30’

	visit to a microbiology laboratory. Ss will be sent a link to Google Forms where they will see a word bank full of microbiology related terms. While they listen to the dialogue which is composed of a series of questions and answers, Ss must fill in the blank spaces with the words they heard in each response. Each response with the target word will be repeated twice for the Ss. This listening task will be done in the main session and once complete, Ss will submit their Google Form for assessment. T will ask Ss how they felt during the listening task now that they have been exposed to those words more frequently and UL for responding will be provided in the Zoom chatbox. *Note*: This task will help to gain further insight into our Ss vocabulary acquisition process as it serves as	prophylactic, lophotrichous, anaerobic, amphitrichous, hyphae, contagious, ibuprofen, spirilla, prions, inhibitory, thermometer, temperature, inoculate, peritrichous, carbohydrate **Useful Language** During the task,	Guessing meaning from context Expressing and sharing ideas	W	

	the listening section of the post-test for the research project. *Note*: Ss were provided with a document for HW which provided instructions for the speaking portion of the post-test. They were asked to pronounce the 20 target words and then use each one in a sentence, if possible. Audio recordings were uploaded to the EMS Classroom to use as the speaking part of the post-test for the research project. **Feedback** T will ask Ss how they felt about the task and will provide on-the-spot error correction on pronunciation, grammar, and vocabulary use. **Materials** Vocabulary Speaking Test (EMS Classroom for HW) Vocabulary Listening Test (Google Forms Link)	I felt…… This time I felt… It is still challenging to ….. Many of the words were ….. Overall, I think I did …….			

Break from 5:50 p.m. to 6:00 p.m.					
3, 4	**Main Task** Ss will prepare to present their speaking presentation project which is 35% of their final grade. Ss had received guidelines and the rubric two weeks ago to give them enough time to prepare. Ss had the option to freely select the microbiology topic of their choice and to work in pairs or individually. Based on the previous information, T will provide Handouts 2-4 in one PDF document and Handout 5 which will be used to do peer evaluation. T will project Handout 2 to remind Ss about some tips regarding discourse markers and research-related verbs. T will also show the Ss a summary of the guidelines sent to remind them what they have to focus on during the speech or role play. Also, Handout 4 includes the rubric that Ss received along	**Discourse Markers for:** Adding information: *moreover, furthermore, additionally* Cause and effect: *therefore, consequently, thus* Comparing: *similarly, likewise*	Listening for main ideas and specific details Sequencing events/steps to follow Selecting, connecting, and explaining information Paraphrasing Giving	L S	45’

	with the guidelines. After completing the previous steps, Ss will be sent to BR to start preparing for their project presentation. Once Ss return, they will start presenting. All of the Ss will be told to evaluate the group presenting using Handout 5 as once the group finishes, one S will be randomly selected to provide feedback. Ts will work on Handout 4 offline to evaluate each of the groups' presentations to grade them. **Feedback** One S from the audience will be randomly selected to provide their peer evaluation feedback to the group that presented their project (Handout 5). First, upon finishing the speech, T will provide feedback to the group pertaining to grammar, pronunciation, and vocabulary. Second, the selected S will share their screen and present their feedback to the group	Contrast: *however, nevertheless, on the contrary* Research related verbs: *this causes, this results in, this affects* **Useful Language** **(for discussing content)** We need to check the	specific information Negotiating meaning		

	regarding their use of spoken language such as tone, volume, and pace. **Materials** Handout 2: Preparation tips Handout 3: Instructions for speaking presentation Handout 4: Evaluation of oral presentation Handout 5: Peer evaluation	pronunciation of…. We could write some research verbs: this causes, this results in, this affects… What do you think about saying…? How can we restructure or rephrase …?			

		Which discourse marker can we use for….? **Useful Language for providing feedback:** I think the group did a great job with _____. I noticed that_____			

		was/wasn't reading. Some group members' tone/volume/pace was not appropriate because it was too ____. Overall, I believe that the speech was delivered effectively/appro			

		priately because ____. Overall, I believe that the following areas need to be improved: _____.			
5	**Post Task** After all presentations and feedback are finished, Ss will reflect on their presentation and spoken language and they will discuss what they have learned during their final project presentation. This reflection will happen in the BR and one Ss will share the screen to display the reflection tool to facilitate a discussion (Handout 6).	**Vocabulary** Tone of voice, pacing, volume, impromptu speech, body language, outline, self-monitoring	Reflecting		10’

	T will encourage Ss to analyze what they have to work on to improve their spoken language and speaking skills and consider how the areas they still need to work on and improve. Once back in the main session, T will ask some volunteers to share their ideas and let the rest of the class know what they learned. *Note*: UL for the discussion is provided in the Zoom chatbox. **Feedback** Ss will receive feedback on their use of vocabulary, pronunciation, and grammar based on the notes taken by T and AT. **Materials** Handout 6: Project presentation self-assessment	**Useful Language** I feel I still need to work on…. The word _____ is difficult for me. I think that I need to work on my tone/volume/pace because _____. I felt confident in			

		my ability to _____. When writing: How do you spell_____? How can I say…? What is another word for/ a synonym of…			

Abbreviations: BR= breakout rooms, T= teacher, AT= assistant teacher(s), Ss=students, L= listening, S= speaking, W= writing, R= reading, UL= useful language, PPT= PowerPoint Presentation, HW=homework

Warm up

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Chinambu, Tenorio, Whitaker
Handout 1

Taboo Game Instructions

Purpose: The purpose of this game is to practice speaking and describing the key microbiology words we have been practicing.

Rules: Each group member will have 2 secret words. You must describe your secret word **without saying it**. Your group members must guess what the word is. The group can guess words, but they cannot ask questions. The group member who correctly guesses the most words wins the game.

For example, if your secret word is spirilla, you could describe it like this:

"This word is used to describe bacteria that have a twisted shape/structure. An example of bacteria with this shape is Campylobacter jejuni."

Useful Language for Game:

- **This is an item that we use in a laboratory to …….**
- **This word is a characteristic of ……..**
- **This word defines a type of bacteria that ……..**
- **This word is an example of ……..**
- **This word is commonly used when talking about …….**

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Vocabulary Preparation for Taboo Game

Students will receive these words in the app **Remind** prior to the class in order to prepare for the activity. Students should keep these words a secret.

Daniela	carbohydrate, peritrichous bacteria
Ana	inoculate, temperature
Grettel	thermometer, ibuprofen
Wendy	contagious, Bunsen burner
Daniel	hyphae, hot plate
Johanna	auditor, mycelium
Danae	safety measures, amphitrichous bacteria
Gabriel	anaerobic, lophotrichous bacteria
Jennifer	prophylactic, aerobic
Veronica	monotrichous bacteria, apex
Andrea	prions, flagella
Fabian	microscope, audit

Appendix O: Test 2

Pre-task

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Vocabulary Listening Post-test

Instructions

You will hear two people talking. One person will ask questions (J. W) and the other will answer the questions (M. C). Listen to the answers given by M. C and fill in the blank space by writing the word you heard. Select one of the words from the word bank below. M. C will repeat the response twice.

Word Bank

Mycelium	Apex	Bacterium	Thyroid	Monotrichous
Cilia	Dendrite	Aerobic	Prophylactic	Respiration
Asymptomatic	Flagella	Lophotrichous	Locate	Oxygen
Anaerobic	Amphitrichous	Hyphae	Contagious	Ibuprofen
Spirilla	Temptation	Spiral	Prions	Diagram
Inhibitory	Diaphragm	Thermometer	Symptoms	Temperature
Inoculate	Peritrichous	Anaphylactic	Carbohydrate	

J. W	Hi Ms. Chinambu! I'm here to conduct a regulatory inspection today. Is it ok if I ask you some questions?
M.C	Hi Mr/Ms __ ! Yes, of course! Ask as many questions as you'd like.
J. W	Great! Due to the pandemic, what is your safety protocol when entering the building? I noticed some screeners in the entryway. Do they use any equipment to test for COVID-19?
M.C	Well, right now we have some screeners in the entryway asking employees questions and taking their _____ to make sure they don't have a fever.
J. W	Are they using any equipment to take their temperature?
M.C	Yes, of course. They use a _____ to do this.
J. W	I understand. In case one of your employees hesitates or doubts about his medical condition, what do you do?
M.C	As a _____ measure, they are sent home for 15 days until we can confirm that they are or not sick.
J. W	That makes sense.
M.C	Yes, especially because many people are _____ and don't know they are sick, so to prevent the virus from spreading they are sent home.
J. W	Is it bad for COVID-19 patients to take Advil?
M.C	At the moment there is no scientific evidence that _____ worsens COVID-19 symptoms.
J. W	How do you think scientists are going to find a cure for COVID-19?
M.C	One testing method they are trying is to _____mice with the virus and then test different medicines to see what works.
J. W	Thanks. Are you required to wear your protective gear at all times?
M.C	Well, inside the lab it is always a requirement. I am wearing gloves and a mask because this virus that I'm inspecting is very _____.

J. W	I understand, thanks! I have another question. Can you tell me what causes diseases like the mad-cow disease?
M.C	Diseases like mad-cow disease can be triggered by the interaction of _____and healthy proteins in the brain. Would you like to see some samples of different specimens through the microscope? Let's start with this one…
J. W	Ok, this is really interesting! What kind of bacteria is this?
M.C	This kind of bacterium is _____. It's called Clostridium botulinum. It's extremely dangerous if ingested. It's a bacillus, so it looks like a cylinder under the microscope. Here is another sample for you to look at.
J. W	What do you call bacteria that have a spiral shape?
M.C	We can refer to this type of bacteria as _____ and another characteristic is that it has flagella at both poles.
J. W	Is there a name for that second characteristic?
M.C	Yes, we can say that the bacteria is _____.
J. W	What if there is only one flagellum at one pole?
M.C	Then we can say that the bacteria is _____.
J. W	Oh, I see.
M.C	But we say that the bacteria is _____ if there is a group of flagella at one end, instead of a single flagellum.
J. W	Are there any other distribution types?
M.C	Yes, _____ bacteria have flagella all over. Let's look at another sample. This one here is a sample of nectar.
J. W	What is the difference between pollen and nectar?
M.C	Well, pollen is a protein and nectar is a type of _____. Ok, now look at this other sample.
J. W	When I look into the microscope, I see little threads. What are they called?
M.C	Those threads are called _____.

J. W	What do all those threads together create?
M.C	All together they form _____which are an important part of a mushroom's life cycle. Let's look at one more specimen.
J. W	Interesting! How can I describe this specimen?
M.C	You can say that it is about half an inch long and swollen from the _____ downward.
J. W	Ok perfect. Thanks for all your help today! Everything seems to be working just fine around here! Before I go… what does MIC stand for?
M.C	It refers to the minimum _____concentration of a drug. It was great meeting you! Take care!

Main task

University of Costa Rica
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Handout 2

Preparation Tips

Use discourse markers!

Adding information:

moreover, furthermore, additionally

Cause and effect: *therefore, consequently, thus*

Comparing: *similarly, likewise*

Contrast: *however, nevertheless, on the contrary*

Use research-related verbs:

this causes…..
this results in…..
this affects…..
this relates to……
this supports…..

- Don't read off the paper
- Make eye contact with the audience
- Be mindful of your tone, volume and pace
- Use the online dictionary for pronunciation
- Paraphrase

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Project: Speaking Presentation
Handout 3

Instructions for Speaking Presentation (35%)

Remember this project is to be done in pairs or individually.

The purpose of this project is to put into practice the oral skills learned throughout Unit 2, including the techniques and strategies taught during class to give a good speech, formal presentation or perform a role play.

Organizing your presentation. In breakout rooms, you will:

1. Prepare to present your already chosen microbiology-related topic.
2. Return to the main session and tell us what you will present. Remember to mention your topic and the type of presentation you will do:
   a. Role Play
   b. Informative Speech

   **During your presentation, feel free to reuse and share the handouts we have used in class.
3. You can use any visual aid you desire: PowerPoint presentation, videos, audios…
4. Presentation time: **6 to 8 minutes**.

   If you are working in pairs, the presentation should be long enough to have equal participation from both students.

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Project: Speaking Presentation
Handout 4

Evaluation of Oral Presentation

Instructions: The student teachers will use this rubric to provide feedback to the students when doing their oral presentations. This evaluation sheet intends to gather information on how the students performed during their project presentation.

Part A: Indicate the degree of student performance in the oral presentation by checking the corresponding box for each statement.

1 – below average **2 – average** **3 – very good** **4 – excellent**

Total points obtained: Grade:
Percentage:

Student's name:		**Assigned rate**			
		1	**2**	**3**	**4**
1.	Student's preparation to present the topic was				
2.	The organization of student's ideas was				
3.	Student's message delivery during the presentation was				
4.	Student's oral abilities were				
5.	The student's tone of voice was				
6.	Student's pronunciation was				
7.	Student's use of vocabulary was				
8.	Student's use of grammar was				
9.	The way the student handled all the questions asked was				
10.	Student's overall performance during the whole presentation was				

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Handout 5

Speaking Presentation Project

Peer Evaluation Tool

Group # _____ **Total Points:** _____

Instructions: Using the scale below, give the assigned group a grade based on their performance during the speaking presentation project. Then share your screen and provide verbal feedback. Remember to add up the points to give them a grade out of 40 points. Remember to use the expressions from the useful language section located in page 2.

(1) Strongly agree (2) Agree (3) Disagree (4) Strongly disagree

	Criteria	**1**	**2**	**3**	**4**	**5**
1.	The group made eye contact with the class.					
2.	The group presented their speech without reading from their notes.					

3.	The group members' volume was appropriate.					
4.	The group members' pace was appropriate.					
5.	The group members' tone was appropriate.					
6.	The group members' pronunciation of microbiology-related terms was correct.					
7.	The group demonstrated a good understanding of the topic.					
8.	The group delivered the speech with confidence.					

Additional Comments:

_____

_____

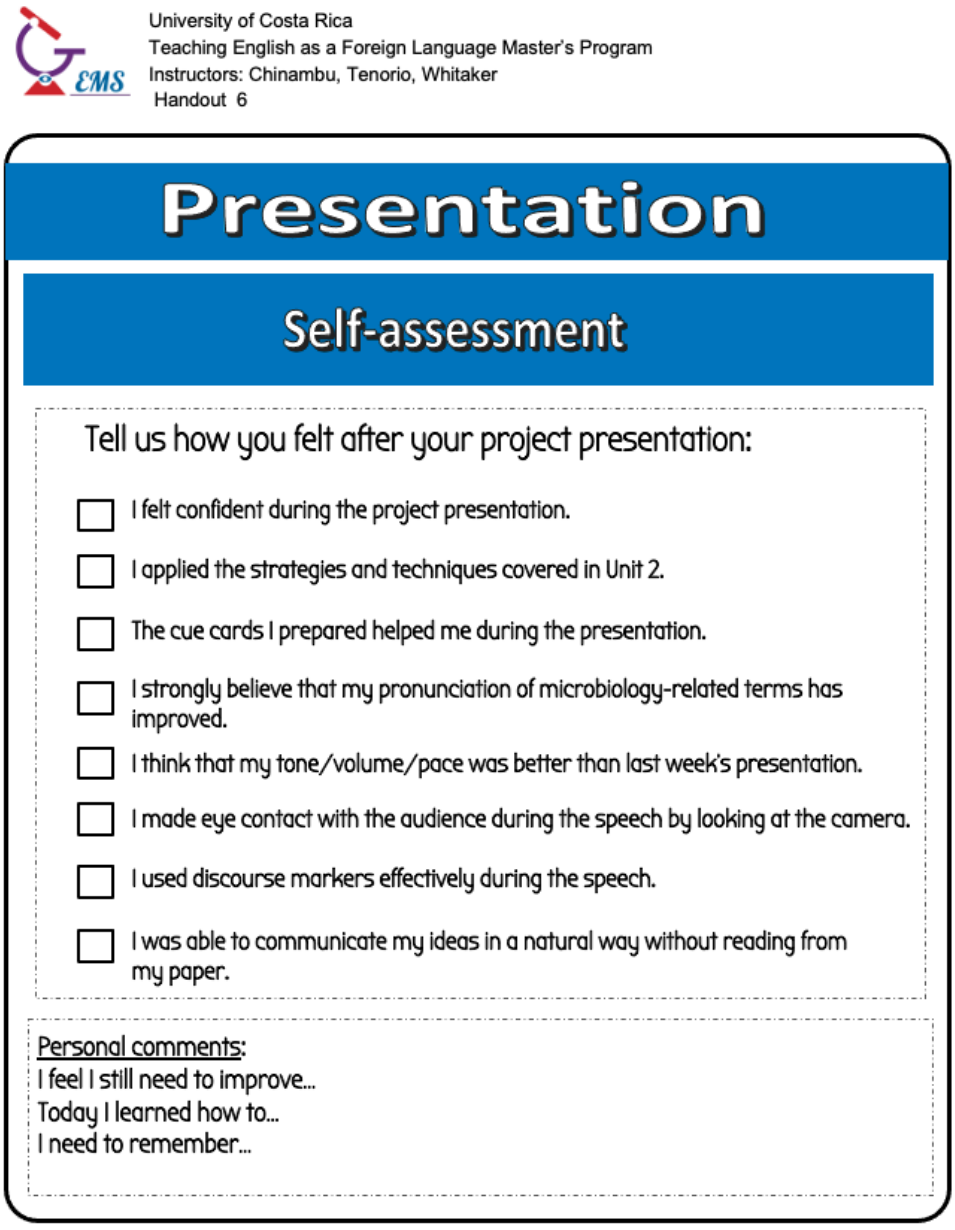
Useful Language for providing feedback:

- I think the group did a great job with _____.
- I noticed that _____ was/wasn't reading.
- Some group members' tone/volume/pace was not appropriate because it was too ____.
- Overall, I believe that the speech was delivered effectively/appropriately because ____.
- Overall, I believe that the following areas need to be improved: _____.

Post-task

Drag an **X** into the corresponding box when applicable!

✖



University of Costa Rica
Teaching English as a Foreign Language Master's Program
Instructors: Chinambu, Tenorio, Whitaker
Handout 6

Presentation

Self-assessment

Tell us how you felt after your project presentation:

- ☐ I felt confident during the project presentation.
- ☐ I applied the strategies and techniques covered in Unit 2.
- ☐ The cue cards I prepared helped me during the presentation.
- ☐ I strongly believe that my pronunciation of microbiology-related terms has improved.
- ☐ I think that my tone/volume/pace was better than last week's presentation.
- ☐ I made eye contact with the audience during the speech by looking at the camera.
- ☐ I used discourse markers effectively during the speech.
- ☐ I was able to communicate my ideas in a natural way without reading from my paper.

Personal comments:
I feel I still need to improve...
Today I learned how to...
I need to remember...