The human body - Immune system – VEGA Teaching Scenario

Topic: Natural Science (anatomy, viruses and bacteria) – Understanding how the human Immune system works.

Subject(s): Biology/health education/English

Age / Grade: 15+ / grade 8-9+

Short description of the AR/VR game in this scenario:

VIRUS POPPER (VR) Greetings Space Traveler, we need you to save the universe again! New virus variants threaten our galaxy. Level up with a new arsenal of weapons to combat these variants. We are equipping you with funky fun weapons like the Vaxcaliber, Vac Bat, and Jazzeroid Rocket Launcher. Explore new worlds and enjoy some newly mastered bangers by DJ Inkers while battling for the survival of the universe. For your protection, we are also giving you the option to vaccinate and wear a mask, but both are your choice! It is up to you to save the party people! Virus Popper Reopened is FREE and Includes: ● 4 New Maps! ● Over 15 funky weapons! ● 8 Types of Viruses! ● Progression Unlocks ● Original Virus Popper game mode

SHARECARE (VR) YOU is a real-time simulation of the human body that allows anyone to freely navigate and explore an anatomically accurate, 3D model of the human body, its organs, and their natural function. Customise physiology and simulate disease. Personalise the human body to represent YOU. The unprecedented power of Sharecare YOU allows customization to display disease in varying states of severity.

Sharecare Reality Lab's award-winning content delivers medically-accurate anatomy, physiology, disease and treatment simulations in stunning, 3D detail. Designed for interactivity and immersive environments, our content offers unrivalled flexibility to create or enhance a wide variety of products

MOZAIK 3D (AR/VR) The mozaik3D mobile application is a tool to explore more than 1200 educational 3D scenes and videos, interactive activities, games… with the help of a smartphone or tablet.

Interactive educational scenes that are related to history, technology, physics, mathematics, biology, chemistry, geography and visual arts make the learning experience an adventure. Most of our 3D scenes contain narration, built-in animations, as well as labels, fun animated activities, and other visual elements. Create a free user account and open 5 educational 3D scenes for free every week.

Introduction to the scenario

In this case, students will learn about virus, how they are, how they act, how they participate. Students also understand how the immune system works. Students learn to identify the systems, devices, and organs involved in relational and coordinative functions, and to interpret their mechanisms of action, relational and coordinative functions, and their mechanisms of action as processes by which stimuli receive, coordinate information, and execute responses. Organs and systems have appropriate preventive processes, and each system is associated with appropriate processes to prevent sensory changes, hormonal imbalances, or hormonal or neurological imbalances.

Learning outcomes:

The students are able to:
- Reflect on what they already know about their immune system and set up goals for what they will know when the assignment is finished
- Understand how the respiratory system and the lungs work together
- See the connection between cause and effect, to see the connection between a healthy lifestyle and a good lung capacity
- Know: Knowing better the different human organs, their functioning, and their importance. Differentiate between viruses and bacteria, knowing their types.
- Know the types of bacteria and viruses. Identify the function of human organs and their functioning.

Cross-cutting theme: the importance of organ transplants. Discuss in groups the importance of organ donation and transplantation.

A selection of learning outcomes from the Spanish Curriculum

In Compulsory Secondary Education, the subject of biology is based on six blocks.

Curriculum development is based on the need for didactic programming by the teacher. For this reason, the contents and their corresponding assessment criteria and indicators of achievement are included. It should be noted that the indicators of attainment are the competency results visible to the students.This scenario is interdisciplinary as it is approached from two subjects, biology and technology. We will now proceed to the curricular development of both.

The biology contents worked on in this scenario belong to block 2, PEOPLE AND HEALTH that focuses on the study of the human body and health promotion, its determinants and the importance of acquiring healthy lifestyles. It also deals with the origin of the most common infectious diseases, their transmission and prevention mechanisms, the process of immunity and its applications, and an assessment of the contributions of the biomedical sciences. It deals with the study of the human body, the structure of the organs, apparatuses and systems involved in the functions of the human body, the structure of the organs, apparatus and systems involved in the functions of nutrition, relationships and reproduction, relating them to their functioning and to the causes, symptoms and consequences of the most common diseases in order to prevent them.

The first block of topics covers the contents:

- Relationship functions.
- The nervous system.
- The endocrine system.
- The sense organs and sensory receptors.
- Neuroendocrine interaction.
- Common diseases and disorders, causes, risk factors and preventive measures.prevention measures.

The assessment criterion corresponding to this content is: Recognise the systems, apparatus and organs involved in the functions of relationship and coordination, and interpret their mechanisms of action, functions of relationship and coordination, and interpret their mechanisms of action as a process of reception of stimuli, coordination of information and execution of responses, associating each organ and system with the corresponding process to prevent and system with the corresponding process to prevent alterations of the sensory organs, hormonal imbalances or hormonal or nervous imbalances..

The achievement criteria related to this block of contents are as follows.

- Identifies and describes the organs, apparatuses and systems related to the functions of relationship and coordination using anatomical models, diagrams and graphs.

- Identifies the basic mechanisms of action of the functions of relationship and coordination and associates each of them with the organs involved and coordination functions and associates each of them with the organs involved.

- Illustrate with examples an event in everyday life that is the integration of the nervous and endocrine systems.

- Identifies the causes, symptoms and effects of some of the most common diseases related to diseases related to the sense organs, nervous and endocrine systems and suggests preventive nervous and endocrine systems and suggests preventive habits.

The second block of topics covers the contents:

- Types of diseases. Causes, prevention and treatment.

The assessment criterion that corresponds to this content is as follows. Differentiate the origin of the most common diseases, explain the mechanisms of transmission of infectious diseases in order to the mechanisms of transmission of infectious diseases in order to justify the preventive methods of contagion and propagation.

The indicators of achievement related to these contents are as follows:

- Classifies, according to their origin, the most relevant illnesses in today's society, based on case studies or information from society, based on case studies or information from the media or scientific documents the media or scientific documents.

- Recognises the mechanisms of transmission of infectious diseases, relating them to the diseases in relation to the means of prevention of contagion and spread.

The contents of the technology subject belonging to block 1: SOLVING TECHNOLOGICAL PROBLEMS AND TECHNICAL COMMUNICATION, the backbone of the area as it describes the set of phases that make up the resolution of a problem by obtaining a final product that satisfies our initial need problem solving thanks to the obtaining of a final product that satisfies our initial need. Therefore, it shows what to do and how to do a complete technological project. To this block, all the aspects related to the technical communication of the project are added: from the first sketches to the standardised plans, including the different views that can be used in the project through to the different views of the final design.

- Design of a prototype that provides a solution to a technical problem.

- Knowledge of cooperative learning structures and techniques cooperative learning.

The corresponding assessment criterion is: To perform tasks effectively, to have initiative to undertake and propose actions while being aware of strengths and weaknesses, to show curiosity and interest during their development and to act flexibly in seeking alternative solutions.

The achievement criteria relate to the competences of sense of initiative and entrepreneurship, and learning to learn.

- Has the initiative to undertake and propose actions when carrying out technological tasks or projects at the level of education and acts with flexibility in seeking alternative solutions to the difficulties encountered during their development.

- Has the initiative to undertake and propose actions when carrying out technological tasks or projects at the educational level and acts flexibly looking for alternative solutions to the difficulties encountered during their development.

Students self-assessment rubric

This rubric is made to help understand what's important with games or any new media in general. An experienced teacher can run without, but this is to help new teachers to assess what's valuable.

The idea is that every ROW is just ONE variable (ex. recall, transfer. problem-solving etc.). You read the first column and give a 'grade'. The descriptions are just there to give a 'quality' if you need that.

<table>
<tr><th colspan="5">Student evaluation rubric</th></tr>
<tr><td>Knowledge content</td><td>1</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td>Information recall</td><td>Student can't recall information covered in game</td><td>Student can recall some information covered in game</td><td>Student can recall most information covered in game</td><td>Student can recall all the information from the game well</td></tr>
<tr><td>Transfer</td><td>Student can't connect the information in game to information on books or in other medias</td><td>Student can transfer some information from the game to other medias</td><td>Student can transfer majority of information from the game to other medias</td><td>Student can connect the information in game very well to contents in other medias</td></tr>
<tr><td>Skills</td><td>1</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td>Problem-solving</td><td>Student did not try to solve problems in game / during activity</td><td>Student was somewhat active in solving problems during the activity</td><td>Student worked rather actively on solving problems during class.</td><td>Student worked very actively on solving problems during class</td></tr>
<tr><td>Collaboration</td><td>Student was not able / willing to collaborate with others.</td><td>Student participated, but was not particularly active in collaboration.</td><td>Student was actively collaborating while working.</td><td>Student was very actively collaborating while working.</td></tr>
<tr><td>Creativity</td><td>Student did not actively consider / provide creative solutions to tasks or challenges</td><td>Student provided some creative ideas and solutions during the activity</td><td>Student actively considered / provided creative solutions to tasks or challenges</td><td>Student very actively considered/provided creative solutions to tasks or challenges</td></tr>
</table>

	1	2	3	4
Exercise completion	Student was not able to complete the tasks in the game	Student was able to complete some of the tasks in the game	Student was able to complete most of the tasks in the game	Student was able to complete all (or nearly all) tasks in the game
Engagement	Student was not engaged during the class	Student was slightly engaged during the class	Student was engaged during the class	Student was very engaged during the class

Formative assessment

The main part of the scenario (number of lessons):

Part one (1 lessons x 45 min/day)

Lesson 1

Number of students: Duration (estimated time/number of lessons):

- From 20 to 30 students (2 students/group)
- 1 lessons 45 min

Prerequisites (necessary materials and online resources):

- Oculus Quest
- HTC VIVE
- Other VR Glasses
- STEAM account
- Virus Popper VR is free, just downloaded into computers.

Before the program begins (preparatory work for teacher):

- Teacher will Introduce immune system. Dedicate a class to the introduction of the contents with audiovisual materials such as animation videos, documentaries, interactive games, etc.

VIRUS POPPER TRAILER: https://www.youtube.com/watch?v=qGk6apu3BfA

VIRUS POPPER APP LABS: https://www.youtube.com/watch?v=4IPFG7pWG4g

   All material the students need is included in the assignment

- Divide students into groups of maximum two student / computer

Description

- In class the students visualise the content of the following video:

   HOW A VIRUS INVADE YOUR BODY
   https://www.youtube.com/watch?v=Rpj0emEGShQ

   A VIRUS ATTACK A CELL
   https://www.youtube.com/watch?v=jkNxmTrrZSk

   HOW DO VIRUS REPRODUCE
   https://www.youtube.com/watch?v=QHHrph7zDLw

   HOW IS A VACCINE
   https://www.youtube.com/watch?v=P8wCk8FU7_o

Promote an internal competition playing VIRUS POPPER VR to see who will kill more viruses and goes for Better Scoring. During the game students must use cleaning devices, wash hands,...

Students must prepare an Infographic content explaining: HOW VIRUS COME, HOW VIRUS REPRODUCE, HOW VIRUS CAN BE ELIMINATED.

Final discussion between students about best solutions.

Part two (1 lesson x 45 min)
Lesson 1 – Mozaik3D

Number of students: Duration (estimated time/number of lessons):

- 24 students (2 students/group)
- One lesson: 1 lesson day x 45 min

Prerequisites (necessary materials and online resources):

At least 15 mobile or tablets (depending the number of students or groups

Install and download MOZAIK3D

Create free accounts for MOZAIK3D

- APP TRAILER: https://www.youtube.com/watch?v=VoaWX6-WFcU

- HOW TO USE AND INSTALL MOZAIK3D: https://www.youtube.com/watch?v=U93cA9V10kg

Before the program begins (preparatory work for teacher):

- Teacher will Introduce virus in class. Dedicate a class to the introduction of the contents with audiovisual materials such as animation videos, documentaries, interactive games, etc.

  Sample:

  COVID19

  https://www.youtube.com/watch?v=i0ZabxXmH4Y

- Learn how basic functions work and how you use the controllers (make a manual for the controllers if the students haven't used them before)

- Create an assignment in Google classroom with project description and goals (the same task for three lessons)

  All material the students need is included in the assignment

- Divide students into groups of maximum two student / computer

Description:

In class the students visualise the content of the following videos:

Using mobile and tablets with Cardboard, downloading MOZAIK3D, students are divided in teams to cover all topics. One device by each team:

MOZAIK30 group guide (AR and VR) on this topics:

VIRUS: https://www.mozaweb.com/en/Extra-3D_scenes-Viruses-12048

BACTERIA

Bacteria (spheres, rods, spirals)

Bacteria occur in a wide range of shapes, including spheres, rods and spirals.

THE BLACK DEATH

The Black Death (Europe, 1347–1353)

The bacterial disease known as the bubonic plague is one of the deadliest infectious diseases in the history of mankind.
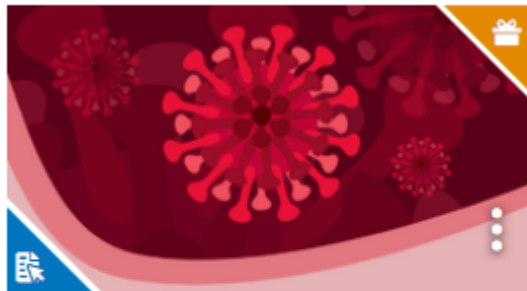
DIGITAL LESSONS FROM MOZAIK3D

HOW THE VACCINES WORKS

How do vaccines work?

This lesson explains the various types of vaccines.

THINGS YOU SHOULD KNOW ABOUT CORONAVIRUSES AND COVID-19

Things you should know about coronaviruses and COVID-19

Simple, straightforward information about the coronavirus epidemic.

Debrief with students in the end of the first lesson

- What did you learn that you didn't know before?
- Select a topic to develop in deep with your team
- Search and collect information and material about the topic
- Prepare 1 infographic about a topic developed.
- How does the cooperation in your group work?

Part three (1 lesson x 45 min)

Lesson 1 – Sharecare YOU

Number of students: Duration (estimated time/number of lessons):
- 24 students (4 students/group)
- One lesson: 1 lesson day x 45 min

Prerequisites (necessary materials and online resources):

- HTC glasses or oculus Quest

- STEAM ACCOUNT or OCULUS LINK

- Game SHARECARE YOU

- GAMEPLAY

   https://www.youtube.com/watch?v=UwqIzzXo5YA

   https://www.youtube.com/watch?v=ImSWVRr2-cA

Before the program begins (preparatory work for teacher):

- Teacher will Introduce virus in class. Dedicate a class to the introduction of the contents with audiovisual materials such as animation videos, documentaries, interactive games, etc.

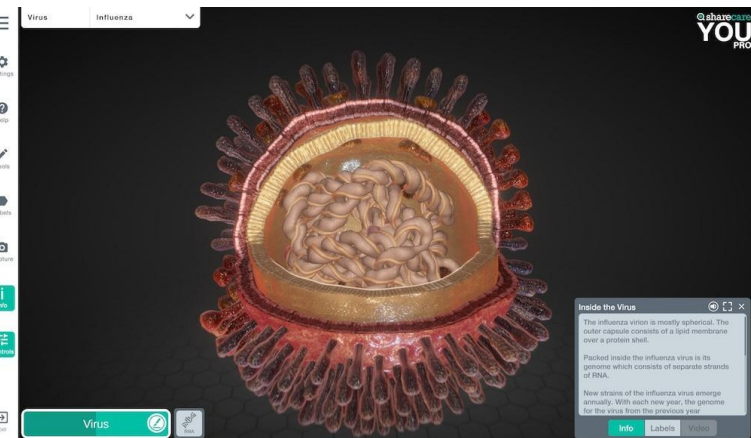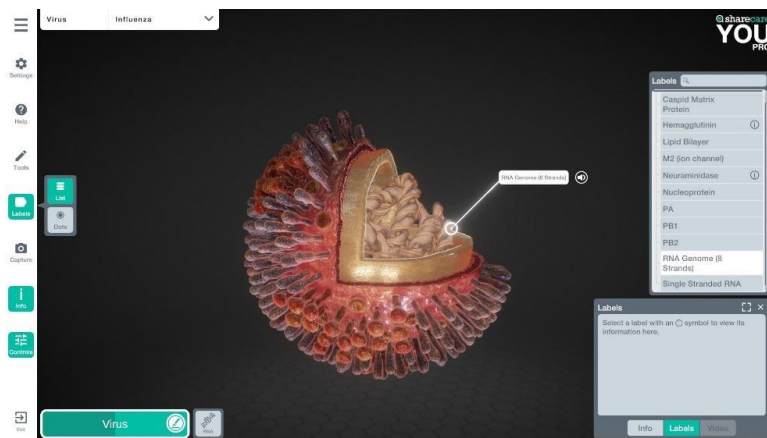 Sample: COVID19: https://www.youtube.com/watch?v=i0ZabxXmH4Y

- Learn how basic functions work and how you use the controllers (make a manual for the controllers if the students haven't used them before)
- Create an assignment in Google classroom with project description and goals (the same task for three lessons)

  All material the students need is included in the assignment

- Divide students into groups of maximum two student / computer

Description:

Students will find what is a Virus (virus Influenza), component and structure using Sharecare You, later they need to draw their own Inside Virus.
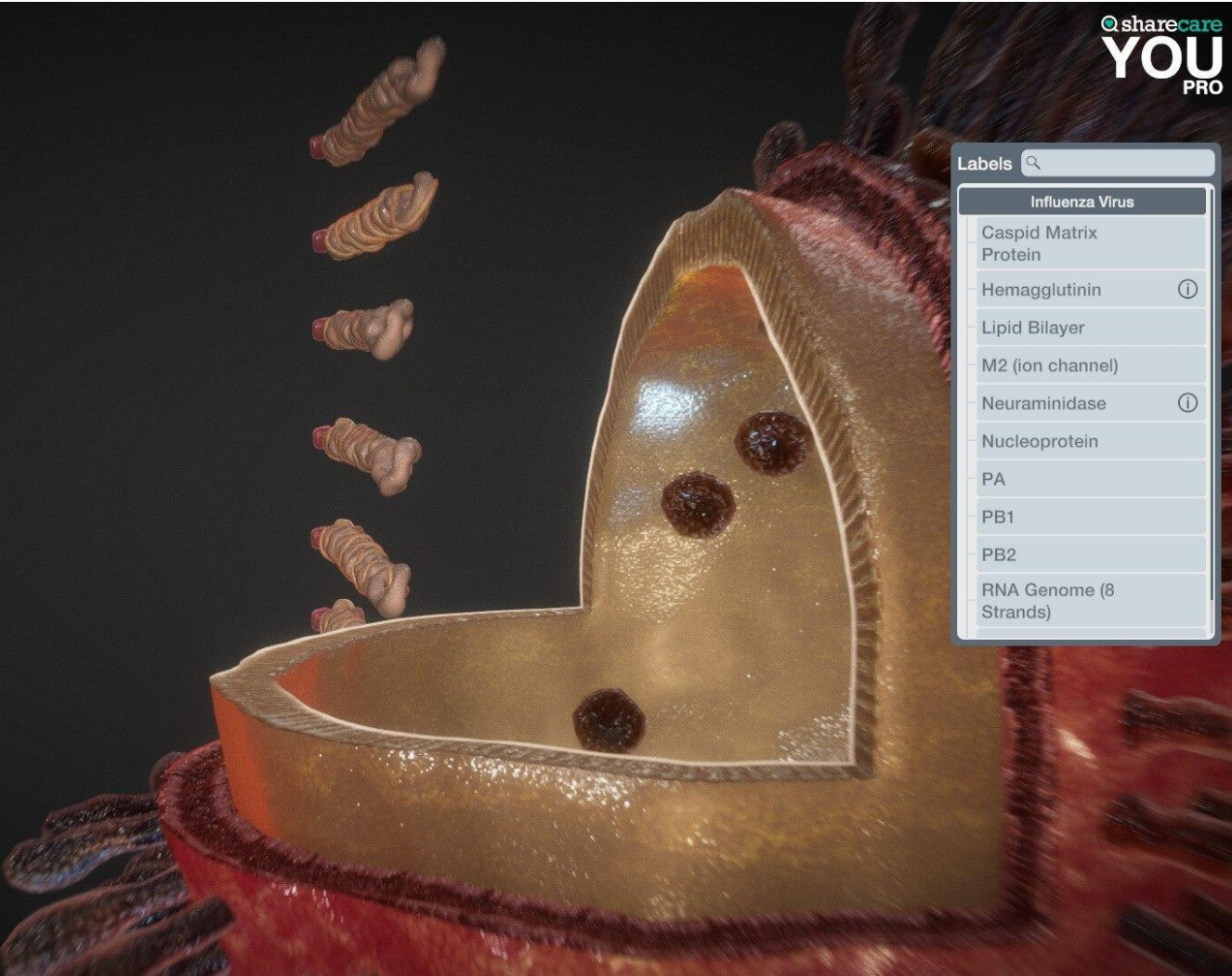
Summative assessment:

Grades 5-10	5	6	7	8	9	10
Content application	They do not show any interest in the applications. They misuse them. Without understanding their functions. They make a synthesis that does not reflect the proposed contents.	They show a few interest in how the applications work. They discover the basic functions of the applications They make an extensive synthesis of the ideas obtained in the exploration.	Show interest in how apps work. They discover some relevant functions of the applications. They elaborate a somewhat extensive synthesis.	Show interest in how apps work. They investigate the main possibilities of the applications. They elaborate a synthesis with the main ones of the exploration.	They show interest in how the applications work. They investigate the possibilities of the applications. Produce a concise and creative synthesis of the exploration.	They show interest in how the applications work. They investigate the possibilities of the applications. Produce a concise and creative synthesis of the exploration.
Exercise resolutions	They make a presentation with a fuzzy structure. Their learning conclusions do	They make a presentation with a fairly clear structure. The conclusions of their learning	They deliver a presentation with a creative and clear structure.	They deliver a clearly structured and quite creative presentation.	They deliver a clearly structured presentation in a creative way.	They deliver a clearly structured presentation in a creative way.

	not adhere to the content. They briefly explain some of the ideas they have extracted.	are quite extensive. . They explain the main ideas.	Its learning conclusions are quite concise, and a bit lengthy. They explain the main ideas and some secondary aspects.	The conclusions of their learning are brief and fairly concise. They explain the main ideas and share at least one aspect or curiosity they have discovered.	Their learning conclusions are short and concise. They explain the main ideas and share the aspects or curiosities they have discovered.	Their learning conclusions are short and concise. They explain the main ideas and share the aspects or curiosities they have discovered.
Skills	Does not show motivation for the activity. Is able to summarise the information needed to make the prototype. Develops cooperation and teamwork skills with notable difficulty.	Shows little motivation for the activity. Is able to synthesise the information needed to make the prototype. Develops cooperation and teamwork skills with notable difficulty.	Shows enough motivation for the activity. Is able to synthesise the information needed to make the prototype. Develops cooperation and teamwork skills with little difficulty.	Shows motivation for the activity. Can search for and synthesise the information needed to make the prototype. Develops cooperation and teamwork	Shows a lot of interest and motivation for the activity. Can search for and synthesise the information needed to make the prototype. Develops their cooperation	Shows a lot of interest and motivation for the activity. Can search for and synthesise the information needed to make the prototype. Develops their cooperation and teamwork skills.

				skills with little difficulty.	and teamwork skills.	
Activity and engagement	The student has had challenges to get the task finished. The student hasn't shown signs of engagement neither at school nor at home.	The student has only occasionally shown interest in the work and has had difficulty finding motivation.	The student has mostly shown interest in the work both at home and at school.	The student has shown interest and commitment to the work both at home and at school.	The student has shown great interest and commitment both in lessons and at home.	The student has shown great interest, responsibility and commitment both in lessons and at home.
The overall picture of the work when completed.	The student misses several parts of his work and several points are not checked in the list.	The student lacks several parts of the checklist in his work.	The student lacks certain parts of the checklist, but it is largely complete.	The student has done all the parts on the checklist.	The student has done all the parts on the checklist and you can see that the student has made an effort to include all the parts.	The student has done every single part on the checklist and it can be seen that the student has processed the content.
Images and captions	The student lacks pictures.	The student has few pictures and no captions.	The student has pictures but no captions.	The student has pictures with accompanying text.	The student has several pictures and descriptive captions.	The student has versatile pictures and descriptive and explanatory text.

Showing responsibility for the completion of the work. Cooperation and peer response	The student had difficulty cooperating with his group and did not listen to his classmates.The student did not give a peer response and did not take into account what the group gave in response.	The student had some difficulties in cooperating with his group and listening to his classmates. The student gave peer feedback without following the instructions. The student did not take into account the response given by the group.	The student mostly cooperated well with his group.The student received and gave feedback from his group almost always according to the instructions. The response was mostly constructive.	The student showed responsibility and mostly a good ability for cooperation.The student received and gave feedback from his group. The response was constructive.	The student showed evidence of good responsibility and a good ability for cooperation. The student gave a versatile response and took the response he / she received from his / her group into account.	The student showed evidence of excellent responsibility and an excellent ability for cooperation.The student made an effort to formulate himself in a constructive and valuable way for the task in order to help his group further in his work. The student received a response from his group and took it into account in his own work.
Language learning/English	The student has big difficulties in learning the English words.	The student struggles with and has some challenges with the English words.	The student knows the most important concepts and words in English.	The student shows evidence of understanding most parts In English.	The student has a good understanding and has learned most of the concepts and knows all the words in English.	The student masters all concepts and words in English.