CLIL Module Plan

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School	ITT M. Buonarroti - A. Pozzo - curriculum "Medical Biotechnology"				
School Grade	○ Primary		○ Middle		◉ High
School Year	○ 1	○ 2	○ 3	○ 4	◉ 5
Subject	Biologia	**Topic**	Techniques and applications of innovative biotechnology		
CLIL Language	◉ English		○ Deutsch		

Personal and social-cultural preconditions of all people involved	This module is designed for a 5th year class of a technical institute with a curriculum in “Medical Biotechnology”. The core subjects of this curriculum are Anatomy, Biology and Chemistry. The class consists of 23 students, 13 males and 10 females. Their average English level is B1, with uneven competences in the four abilities, which is their speaking abilities are generally less developed than their reading and writing ones. The class has not been previously exposed to long CLIL experience, they have just attended a group of lessons of 5 hours, not organized as a module, such as in this case. Many students of the class are quite wary about CLIL and do not seem to enjoy the perspective of a 20-hour-module. Nevertheless, the “innovative” topic of the module, which deals with new discoveries in the field of Science, should involve students and motivate them. On average, the class has quite good results in Biology and sufficient results in English. A CLIL Science teacher (English level C1) will run the module with the help of the class teacher of Biology (English level B2). Both teachers are required because the former has better methodology competencies while the latter has known the class for the past 2 years and has a better idea of the module target. The two teachers cooperate in the planning of the module, but each lesson will be taught by the CLIL Science teacher. The class teacher of Biology will be present in class throughout the module lessons and support class activities especially during the monitoring of group works.

Students' prior knowledge, skills, competencies	

	Subject	Language
	KNOWLEDGE Students know: the basis of biology and genetics (3rd and 4th year of Biology); the definition of biotechnology, the process of cloning; how some tools of biotechnology work (restriction enzymes, PCR, vectors); SKILLS Students can: understand a scientific text or video and answer some questions about it; analyse a biological production process; COMPETENCIES Students can: give meaningful scientific presentation in L1; give opinions about the use and the ethics of some scientific techniques	BICS: Students know: general classroom language, how to communicate with teachers and classmates. Students can: ask for help or for clarifications, express their opinions and ideas, make comparisons and contrasts, organise their job. CALP: students will encounter technical vocabulary throughout the module, however since English scientific language is Latin-based, and therefore very similar to Italian one, students are expected to understand it without difficulties. Grammar: passive forms, past tenses and basic conditional forms, comparative forms, time connectives. Skills and competencies: Students should be able to: read and comprehend a short scientific text, discuss ideas with classmates using a list of communicative structures, write an essay, ask for clarification, listen and understand to teacher’s instructions and explanations or to a short video with subtitles understanding the general meaning.

Timetable fit	◉ Module	Length 20 academic hours

Description of teaching and learning strategies	Considering the lack of students’exposure to meaningful CLIL experience, different types of scaffolding will be used in this module in order to facilitate both input and output in L2. Moreover, this lesson plan is to be considered flexible since students’ preferences will be considered as the module will be delivered. Structure of the lessons: classes will be mainly organized following 4 stages: activation, presentation of content, practice and summary. Some classes will be organized differently depending on the chosen teaching strategy (e.g. jigsaw, presentations...) Adaptation of language input: teacher will adapt language input to students level, trying to avoid difficult grammar forms. Interesting videos can be slowed down, subtitles can be shown and authentic scientific texts can be either shorten or simplified. Code switching (CS): CS will be allowed in order to avoid the loss of fluency or to double-check student’s comprehension of a word. When CS occurs, teacher will rephrase the sentence with the correct English words, so that students can repeat and learn new vocabulary. Teacher and student talking time: Since one of the goals of CLIL is to enhance the communication in L2 and especially to improve speaking skills, TTT will be severely reduced in order to increase STT. Teacher will speak to the whole class not more than 10-15 minutes per lesson. Language output: students will always be encouraged to speak in English even if mistakes occur. Correction will not be made while students are speaking but at the end, since interruption could demotivate them. In speaking and writing tasks, students will be first given conversation samples, groups of collocations or useful sentences grouped by theme or communicative functions to facilitate and scaffold the output of students. (see the rest in file "Description of teaching and learning strategies.docx" in Materials)

Overall Module Plan

Unit: 1 introduction about biotechnology **Unit length:** 3 lessons of 1 hour	**Lesson 1** Introduction and vocabulary of biotechnology
	Lesson 2 A short history of biotechnology
	Lesson 3 Advantages and disadvantages of biotechnology

Unit: 2 Monoclonal antibodies **Unit length:** 4 lessons of 1 hour	**Lesson 1** What a monoclonal antibody is
	Lesson 2 Monoclonal antibodies production and difference between polyclonal and monoclonal antibodies
	Lesson 3 Applications of monoclonal antibodies- phase 1
	Lesson 4 Applications of monoclonal antibodies- phase 2

Unit: 3 Biotechnological Vaccines **Unit length:** 4 lessons of 1 hour	**Lesson 1** How a vaccine works and types of vaccines
	Lesson 2 New generation vaccines production
	Lesson 3 Edible vaccines production
	Lesson 4 Vaccines roundup

Unit: 4 Stem cells and gene therapy **Unit length:** 5 lessons of 1 hour	**Lesson 1** What is a stem cell?
	Lesson 2 Types of stem cells
	Lesson 3 What is gene therapy?
	Lesson 4 Vectors for gene therapy
	Lesson 5 ADA-SCID: an example of gene therapy

Unit: 5 Examples of innovative biotechnology applications and final assessment **Unit length:** 2 lessons of 1 hour and 1 one lesson of 2 hours	**Lesson 1** Journal Club 1
	Lesson 2 Journal Club 2-3
	Lesson 3 Final assessment

CLIL Lesson Plan

Unit number	1	**Lesson number**	1	**Title**	Introduction and vocabulary of biotechnology

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	10'	Students know: how a CLIL class works (LOTS); Students increase their motivation and learn what is the topic of the module (LOTS); Students can: give an opinion about the reality of the video (HOTS).	Activation: The teacher welcomes students and explains what a CLIL class needs to be effective. Students watch a video from Jurassic Park and they have to guess the topic of the module (TASK 1-Worksheet 1). During the video students can take notes and read the video script if they need it. Brief guided discussion on the video and stating of the title of the module. Students can use a phrasary to speak their mind (scaffolding)	**Skills** L S R W **Key vocabulary** biotechnology, DNA, cloning, copy, modify, GMO, genetic engineering, technique **Communicative structures** What do you think about..? Do you agree..? What happened….? In my opinion…	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• 1-Videoscript from Jurassic Park (cloning scene).docx • Worksheet n.1.docx • 1- innovative biotechnology_.pptx Video: link ; 1-Video script from Jurassic Park (cloning scene); Worksheet n. 1 Task 1; 1-Phrasary; PPT 1-Innovative biotechnology slides 1-2;	/

2	15'	Students can: classify different types of biotechnology (LOTS); give titles to paragraph in a text (LOTS).	Presentation of content: the teacher introduces the 4 different types of biotechnology through a diagram (ppt slide 3) with a brief explanation. Students then have 10 minutes to read a text about the same topic, put paragraphs in the correct order and give titles to the text and to each paragraph. The teacher shows the possible keys of the task on the LIM and students can give their answers and check while evaluating themselves.	**Skills** L S R W **Key vocabulary** ancient, classical, modern, innovative biotechnology, recombinant DNA, fermentation, yeast, cell **Communicative structures** to lay the foundations for..., what is the difference between...? Does .... deal with.....? Simple past forms	☒ Whole class ☐ Group work ☐ Pair work ☒ Individual work	• Worksheet n.1.docx • 1- innovative biotechnology_.pptx Worksheet n. 1 Task 2; PPT 1-innovative biotechnology slides 3-4-5	self-assessment (students check their answers)

3	20'	Students can: write answers to questions about a text (LOTS); explain the meaning of a new word in L2 (LOTS); describe the steps of gene transfer and put them in the correct chronological order (LOTS).	Practice: students answer questions about the text (TASK 2 bis) and then they swap worksheet with a deskmate that gives an evaluation about the answers. Then, the teacher shows the correct answers. After this, students read a text (TASK 3) and have to highlight technical words that will be useful throughout the module and complete TASK 4 (description of gene transfer steps)	**Skills** L S **R** **W** **Key vocabulary** recombinant DNA, PCR, vector, protein, selective breeding , gene transfer, gene expression **Communicative structures** passive forms	☒ Whole class ☐ Group work ☒ Pair work ☒ Individual work	• Worksheet n.1.docx • 1- innovative biotechnology_.pptx Worksheet n.1 - Tasks 2bis-3-4; PPT 1-innovative biotechnology slides 6-7-8	peer-assessment

4	5'	Students can: remember what has been done during the class (LOTS); (at home) build a dictionary about technical words (HOTS).	Summary: the teacher asks students which words they have learned today and writes them on the blackboard. The teacher also asks which are the 4 types of biotechnology and students answer. Homework: students will build a dictionary with the words they highlighted in TASK 3	**Skills** L S R W **Key vocabulary** the same as previous activities **Communicative structures** Which words have you highlighted? Can you tell me the meaning of….? What's the Italian for…?	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• 1- innovative biotechnology_.pptx Blackboard; PPT1- innovative biotechnology slide 9	formative assessment: the teacher understands through roundup if students have achieved the outcomes of the class

CLIL Lesson Plan

Unit number	1	**Lesson number**	2	**Title**	A short history of biotechnology

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	10'	Students can explain the meaning of a word in L2 (LOTS).	Activation: Each student chooses a word from their home-made dictionary and explains the meaning to their mate (TASK 5). The teacher walks around the class and listens to the students giving help when needed.	**Skills** L S R W **Key vocabulary** see lesson n.1 **Communicative structures** What is the meaning of..? Can you tell me what...means?	☐ Whole class ☐ Group work ▣ Pair work ☐ Individual work	• Worksheet n.1.docx • 1- innovative biotechnology_.pptx Worksheet n.1-Task 5; PPT 1-innovative biotechnology Slide 11	Formative assessment: the teacher receives a feedback about students comprehension

2	30'	Students can: organize the group work; scan a text to look for specific information; discuss with mates; deduce implicit information from a text (HOTS) .	Content and Practice: the teacher divides students in groups of 3-4 people and gives to each group a timeline and a set of cards with events and discoveries in the field of biotechnology. Students have to put the cards in the correct position on the timeline through a discussion. They can resume information on the timing of each discovery from their previous studies or through the scanning of a text (file "1-lesson 2 task 6 biotech in the realm of history"). The text is quite long, which is the reason why they have to scan it for information. Students can look for time transition words and words to give an opinion in their phrasary.	**Skills** L S R W **Key vocabulary** discovery, to develop, to demonstrate, experiment, production, sequencing **Communicative structures** When did this happen? Did this happen before/ after this? Then, Later, Meanwhile, as a result of...	☐ Whole class ☒ Group work ☐ Pair work ☐ Individual work	• 1-flashcards.docx • 1-lesson 2 task 6 biotech in the realm of history.docx • 1-phrasary.docx • 1-timeline.pdf • Worksheet n.1.docx • 1- innovative biotechnology_.pptx PPT 1-innovative biotechnology slide 12; worksheet n.1-TASK 6; Extract from link (named: 1- lesson 2 task 6 biotech in the realm of history); 1-Timeline + 1-flashcards;	/

3	10'	Students can: compare different timelines with the original one and evaluate it (LOTS and HOTS)	Summary: The teacher asks students to leave their timelines on the desk and to stand up and go to look at other groups timeline. Then, the teacher shows the correct timeline and students decide which is the best timeline.	**Skills** L S R W **Key vocabulary** / **Communicative structures** Which is the best…	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• 1- innovative biotechnology_.pptx Timelines completed by students; PPT 1- innovative biotechnology slides 13-14	Formative assessment: the teacher checks the number of mistakes in each timeline Peer assessment

CLIL Lesson Plan

Unit number	1	**Lesson number**	3	**Title**	Advantages and disadvantages of biotechnology

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	10'	Students activate their prior knowledge about advantages and disadvantages of biotechnology. (LOTS)	Activation: The teacher asks students to think about something good and something bad that biotechnology could do and to write it on a post it and put it on the blacboard. The teacher reads aloud the post-its and asks students to divide bad and good aspects depending on the theme (health, economy, ethics, law…).	**Skills** L S R W **Key vocabulary** advantages, disadvantages, useful, dangerous, harmful, harmless, ethics, health, economy **Communicative structures** Is this a good or a bad aspect? In which category would you put this…?	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Worksheet n.1.docx • 1- innovative biotechnology_.pptx Worksheet n.1-TASK 8; PPT 1-innovative biotechnology slide 16; Post-its.	/

2	10'	Student can understand an authentic text of a GCSE level book and distinguish advantages and disadvantages of biotechnology (LOTS)	Presentation of content: Students read the extract from GCSE AQA Science - J.Breithaupt et al. -Oxford University Press pages 116-117 (TASK 8) and highlight advantages and disadvantages of biotechnology. The teacher is always available to explain meanings of unknown words and walks around the class.	**Skills** L S R W **Key vocabulary** manipulation, human health, growth rates, world hunger, pesticide, infertile, crops, bacteria + the ones in activity 1 **Communicative structures** may+be	☐ Whole class ☐ Group work ☐ Pair work ☒ Individual work	• Worksheet n.1.docx • 1- innovative biotechnology_.pptx Worksheet 1 - TASK 8 (extract from GCSE AQA Science - J.Breithaupt et al. -Oxford University Press pag. 116-117); PPT 1-innovative biotechnology slide 16.	/

3	20'	Student can: think critically about a trend topic in Science; express their ideas justifying them ; assess their classmates; (HOTS)	Practice: Students do TASK 9 and make a list of at least 4 advantages and disadvantages of biotechnology and rank them. Then, they compare their lists in pairs and discuss with their mate in order to agree on the same ranking. Following this, each student gives a mark to their classmate depending on their ability in discussion. The teacher is always available to give suggestions and especially he/she helps students with difficulties in speaking by forming a group of 3 with them, encouraging the starting of discussion. Phrasary can be used if needed but the teacher encourages good students to remove this scaffolding.	**Skills** L S R W **Key vocabulary** agree/disagree + key vocabulary of activity n.2 **Communicative structures** Do you think...? Do you agree with me? I strongly disagree. I couldn't agree more. What is your opinion? I think that...because of.... As a result of....	☐ Whole class ☑ Group work ☑ Pair work ☐ Individual work	• Worksheet n.1.docx • 1- innovative biotechnology_.pptx Worksheet n.1-TASK 9; PPT 1-innovative biotechnology slide 17.	Formative assessment: the teacher listens to students while speaking and can give tips. Peer assessment: students assess their classmate interaction with an emoticon

4	10'	Students can express their ideas about the topic they have studied; (at home) Students can write meaningful essay about a topic they have studied (HOTS).	Summary - The game line: The teacher asks students to stand up and shows the line and explains that when he/she asks a question they have to take position on the line depending if they agree or disagree and about different levels of agreement/disagreement. Homework: students will write an essay about “Advantages and disadvantages of biotechnology”	**Skills** L S R W **Key vocabulary** see activities 1,2,3 **Communicative structures** Do you agree on…? Do you think that…?	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• 1- innovative biotechnology_.pptx a long line made of paper with YES and NO written at the opposite ends; PPT 1-innovative biotechnology Slide 18; Essay evaluation rubrics link .	Formative assessment: the teacher checks if students understand and explains again if needed. Summative assessment: part of the mark of the module (10%) will be determined by the evaluation of essays. An evaluation rubrics will be used (see Materials)

CLIL Lesson Plan

Unit number	2	**Lesson number**	1	**Title**	What a monoclonal antibody is

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	15'	Students revise their previous knowledge about antibodies (LOTS).	Warm up: the teacher welcomes students and shows them questions that will be useful for the discussion about the video. When students have read the questions, they watch the video with subtitles. The video can be shown twice if students need it. Students answer the questions and then the teacher asks some students to read their answers and shows the correct ones. Students can correct their answers.	**Skills** L S R W **Key vocabulary** monoclonal antibodies, B- cells, CTLs, immune system, target, disease, mass production, to bind **Communicative structures** Why are mAb called “weapons”? What is the difference…? Do you remember…?	☑ Whole class ☐ Group work ☐ Pair work ☑ Individual work	• Worksheet n. 2_.docx • 2-mAb.pptx Video: link from 0.00 to 1.05; Worksheet n. 2-Task1; PPT 2-mAb slides 1-2-3.	Self-assessment: students check their answers and correct them

2	10'	Students can: describe the structure of an antibody ; explain the function of each structure; explain the differences between natural antibodies and monoclonal ones (LOTS).	Presentation of content: The teacher shows a picture of an antibody without labels and explains the structure and the function of an antibody. After the explanation, students label the picture. Then, the teacher explains the difference between antigen and epitope.	**Skills** L S R W **Key vocabulary** Antigen, epitope, light chain, heavy chain, constant region, variable region **Communicative structures** An Ab is made of…….. This part is called……. The function of …… is….	☒ Whole class ☐ Group work ☐ Pair work ☒ Individual work	• Worksheet n. 2_.docx • 2-mAb.pptx Worksheet n. 2 -Task 2; PPT 2-mAb slides 4-5;	/

3	15'	Student can describe the steps of the immune response (LOTS).	Practice: the teacher shows pictures about different steps of the immune response and natural antibodies production to the class and asks students to write a proper description for each step in pairs. Then, the teacher shows the correct answers.	**Skills** L **S** R **W** **Key vocabulary** Key vocabulary B-cells, antibody, antigen, to enter something, polyclonal, monoclonal **Communicative structures** What is a possible description for this picture?	☒ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• Worksheet n. 2_.docx • 2-mAb.pptx Worksheet n.2 Task 3; PPT-2 mAb from slide 6 to slide 12;	Formative assessment: the teacher checks if students understand and explains again if needed
4	10'	Students can remember what they have learned throughout the lesson (LOTS).	Summary: The teacher asks to students to say one thing that they remember about the lesson. The teacher especially encourages the students that have not spoken in plenary during the class.	**Skills** **L** **S** R W **Key vocabulary** see previous activities **Communicative structures** Can you say something about...? Can you repeat..?	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Worksheet n. 2_.docx • 2-mAb.pptx Worksheet n.2 Task 4; PPT-2 mAb slide 13	Formative assessment: the teacher checks if students understand and explains again if needed

CLIL Lesson Plan

Unit number	2	**Lesson number**	2	**Title**	Monoclonal antibodies production and difference between polyclonal and monoclonal antibodies

Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment
1	10'	Student can make a guess about a process when knowing its biological components (HOTS)	Activation: The teacher welcomes students and introduces the topic of the lesson. Then, the teacher guides students to brainstorm on the production of monoclonal antibodies with proper questions, such as “How can we produce mAb in a lab?”, “Which type of cell do we need to grow?”, “Which type of environment do you need to grow these cells?”	**Skills** L S R W **Key vocabulary** cells, grow, guess **Communicative structures** How can we produce mAb in a lab?”, “Which type of cell do we need to grow?”, “Which type of environment do you need to grow these cells?”	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	Blackboard	/

2	15'	Student can: write pieces of listening (LOTS) ; explain how production of mAb occurs and justify each step (HOTS).	Content: The teacher shows a video and students listen to it and fill the gaps in the video script on their worksheet (TASK 5) . The video can be watched twice or thrice but without subtitles. Then, students swap worksheet, the teacher shows the correct answers and students correct their classmate's answers.	**Skills** L S R W **Key vocabulary** hybridoma, B-cell, selection, HAT medium, lymphoma cells, metabolism, wells **Communicative structures**	☐ Whole class ☐ Group work ☑ Pair work ☑ Individual work	• Worksheet n. 2_.docx • 2-mAb.pptx PPT-2 mAb slides14-15-16; Worksheet n.2 - Task 5; Video: link	Peer assessment
3	15'	Students know the differences between monoclonal and polyclonal antibodies and can list them (LOTS) ; Students can choose the right antibodies for a specific application (HOTS).	Practice: Students read a text about polyclonal and monoclonal antibodies (TASK 6) and then in pairs associate the correct type of antibody for sample applications. (TASK 7). Then, the teacher shows the correct answers.	**Skills** L S R W **Key vocabulary** polyclonal, monoclonal,expensive, cheap, variability, diagnostics, labelling, sensitivity **Communicative structures** Which antibody would you choose if.....?	☐ Whole class ☐ Group work ☑ Pair work ☑ Individual work	• Worksheet n. 2_.docx • 2-mAb.pptx Worksheet 2 - Task 6-7; PPT-2 mAb slides 17-18.	/

4	10'	Student can answer orally to questions about the topic they have studied (LOTS)	Summary: The teacher shows summary questions and students answer orally in pairs (TASK 8). The teacher walks around the class and takes notes if students have difficulties. At the end, the teacher can decide if extra-explanation has to be given.	**Skills** L S R W **Key vocabulary** the same used in previous activities **Communicative structures** the same used in previous activities	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• Worksheet n. 2_.docx • 2-mAb.pptx Worksheet 2 - Task 8 PPT-2 mAb slides 19-20	Formative assessment: the teacher checks if students understand and explains again if needed

CLIL Lesson Plan

Unit number	2	**Lesson number**	3	**Title**	Applications of monoclonal antibodies- phase 1

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**

1	10'	Students know how a jigsaw class works (LOTS)	Activation: The teacher welcomes the class and introduces the topic of monoclonal antibodies applications. The teacher explains how the lesson will be organized, telling students that they will first listen to an example of application through a video. Then, they will be divided in 5 groups of 5 people (since the class is made of 23 students, the 2 teachers will take part to the activity, because square numbers of people are needed for this activity) and they will study and learn one type of application. In the following lesson, groups will be mixed so that in each new group there are 5 people coming from the 5 original groups. In the new groups each student will tell to the others which type of applications he/she has studied and how it works.	**Skills** L S R W **Key vocabulary** Jigsaw, groups, to learn, application **Communicative structures** These two classes are going to be….. I suggest that you form one group. Is it clear?	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• 2-mAb.pptx PPT-2 mAb slides 21-22	

2	10'	Students can describe how a mAb can be effective against cancer and why (LOTS)	Content: The teacher shows a video about an application of mAb against cancer. The video can be watched twice with subtitles if needed. After watching the video, students answer to questions (TASK 9) and the teacher checks them walking through the class and looking at each worksheet.	**Skills** L S R W **Key vocabulary** To secrete, self-destruction, CTLs, to be reined in, collateral damage, PD-1, PD-L1, receptor **Communicative structures** Passive forms What is your answer?	☒ Whole class ☐ Group work ☐ Pair work ☒ Individual work	• Worksheet n. 2_.docx Video: link ; Worksheet n.2 TASK 9; PPT-2mAb slides 23-24:	Formative assessment: The teacher checks if students answered correctly to the questions after the video.

3	25'	Students can: understand a written text about an application of mAb; select important information from the text (LOTS)	Practice: The teacher forms 5 groups, as written in activity 1, and gives text about mAb applications to each group. Simpler texts will be given to groups which have less L2 abilities. Students read the text, find out the most important information and then try to memorize. If parts of the text are not clear for someone, firstly the other students of the same group try to explain to them, secondly the teacher can be called. The teacher is always available for any question and walks through the class listening to each group and assessing students for the group work with an evaluation rubric.	**Skills** L S R W **Key vocabulary** Target, secondary antibody, enzyme, fluorescence **Communicative structures** I don't understand this part, could you explain it? The target of this mAb is a protein called….and its function ….. When a mAb binds it…..	☐ Whole class ☑ Group work ☐ Pair work ☐ Individual work	• 2-application of mAB jigsaw.docx File: "2-Application of mAb jigsaw" (one text per group); PPT-2mAb slide 25; Evaluation grid: link	Summative assessment: part of the mark (10%) of the module will be determined by the assessment of moments of group work. An evaluation rubric will be used (see Materials).
4	5'	Students can sum up their group work (LOTS)	Summary:The teacher asks students to sum up the activity inside each group and keeps evaluating students like in activity 3. The teacher suggests to revise the content of the group work at home because each students should be able to explain it to other students in lesson n.4 - unit 2	**Skills** L S R W **Key vocabulary** see activity 3 **Communicative structures** Can you draw a conclusion of your work of today? What do you remember about…?	☐ Whole class ☑ Group work ☐ Pair work ☐ Individual work	• 2-application of mAB jigsaw.docx • 2-mAb.pptx see activity 3	/

CLIL Lesson Plan

Unit number	2	**Lesson number**	4	**Title**	Applications of monoclonal antibodies- phase 2

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	5'	Students remember how a jigsaw class works (LOTS)	Activation: The teacher welcomes and asks students how they will form new groups for the second phase of a jigsaw activity.When students answer correctly, the teacher gives the names of the components of each group (2 teachers included). While forming the groups, the teacher pays attention to include not more than 1 weak in English student per group.	**Skills** L S R W **Key vocabulary** Jigsaw, groups, explain, application **Communicative structures** Could you tell me...?	☑ Whole class ☐ Group work ☐ Pair work ☐ Individual work		

2	30'	Students can: make themselves understood when talking about a topic they have previously studied (LOTS); answer to questions about the topic (LOTS); assess classmate using a grid (HOTS).	Content + Practice: Inside each group every student describes to the others the application that he/she studied and explains how it works (TASK 11). Students assess each other by using an evaluation grid which is on their worksheet (TASK 12). At the end, each group builds a diagram on an A3 paper containing the most important information about each application (TASK 13). Then, students hand in the diagram to the teacher. While group work goes on, the teacher walks around groups and supports the speakers when giving their speech to the group and the listeners in order to check their comprehension (rephrasing, ask them to rephrase, adding examples...)	**Skills** L S R W **Key vocabulary** the same as activity 3 lesson 3 **Communicative structures** the same as activity 3 lesson 3	☐ Whole class ☒ Group work ☐ Pair work ☐ Individual work	• Worksheet n. 2_.docx Worksheet n.2 Tasks 11-12-13; A3 papers.	Peer assessment: Students will give a mark to each classmate using a grid included in the worksheet Formative assessment: The teacher collects groups diagrams and checks if the main information has been included

3	15'	Students can: answer to multiple choice questions about mAb (LOTS); justify their answers (HOTS).	Summary: Students play a Kahoot about monoclonal antibodies that summarizes the whole unit (TASK 14). The Kahoot is prepared by the teacher. After discovering the answer to each question, the teacher asks a student why the answer is correct. Then, the teacher decides if a short extra-explanation is needed, especially if many students did not answer correctly to a particular question.	**Skills** L S R W **Key vocabulary** the ones used throughout the unit **Communicative structures** Why is this the correct answer? Could you tell me….? What is not clear about…? Do you want me to explain again…?	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Worksheet n. 2_.docx Kahoot “CLIL Monoclonal Antibodies” by NazarenaR (search it on link) ; Worksheet n.2 Task 14.	Formative + Summative assessment: using Kahoot students have continuously feedback about their answers and about their ranking in the class. Moreover, the teacher can decide to save results from Kahoot and analyze them in order to give positive or negative annotations to students

CLIL Lesson Plan

Unit number	3	**Lesson number**	1	**Title**	How a vaccine works and types of vaccines

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	10'	Students know English vocabulary about vaccines (LOTS)	Activation: Students already have general knowledge about vaccines, even if not specifically about the biotechnology behind them. In this activity, students recall to their mind technical vocabulary in L1 or L2 about vaccines with a brainstorming. When students give a word in L1, the teacher translates it in L2 and asks students to repeat it. The teacher writes all the words on the blackboard and students write them in their worksheet (TASK 1). Then, the teacher gives the correct definition of vaccine.	**Skills** L **S** R W **Key vocabulary** Vaccine, disease, to prevent from, alert, immune system, pathogen **Communicative structures** What is a vaccine? What's the English for….? Why are vaccine useful?	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Worksheet n. 3.docx • 3-Vax.pptx Blackboard; Worksheet n. 3 Task 1; PPT 3-Vax slides 1-2-3.	Formative assessment: the teacher checks if students know the core vocabulary needed for this unit.

2	15'	Students can: distinguish different types of vaccines; Students know: which types of vaccines are produced with innovative biotechnology (LOTS).	Content: Students listen to the teacher for 5 minutes and write notes about vaccine on the diagram on their worksheet (TASK 2). The same diagram is shown on the LIM screen and it is explained by the teacher. After listening to the teacher, students answer the questions orally in pairs (TASK 3) and then, the teacher gives the correct answers.	**Skills** L S R W **Key vocabulary** whole agent vaccine, subunit, recombinant, inactivated, attenuated, production **Communicative structures** This...is different from... because....	☒ Whole class ☐ Group work ☐ Pair work ☒ Individual work	• Worksheet n. 3.docx Worksheet n.3 Tasks 2-3; PPT 3-Vax slides 4-5-6-7.	/
3	15'	Student can: describe advantages and disadvantages of different types of vaccines (LOTS);	Practice: Students watch a video and answer questions about it (TASK 4). Subtitles can be shown and the video can be watched twice if students need it. While students watch the video, the teacher writes on the blackboard key vocabulary that can be found in the video	**Skills** L S R W **Key vocabulary** injection, cowpox virus, outbreaks, smallpox, inoculation, to trigger, to recruit, risk, downside, threats, to harm **Communicative structures** This becomes handy when.... First...next...	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Worksheet n. 3.docx • 3-Vax.pptx Worksheet n.3 Task 4; PPT 3-Vax slides 8-9; Blackboard; Video:link ; Questions:link ;	/

4	10'	Students can: list important characteristics for each type of vaccine (LOTS)	Summary: Students list two characteristics for each type of vaccine that they have learned (TASK 5). The teacher asks students to read them and checks if students have understood the lesson and if extra-explanation is needed.	**Skills** L **S** R **W** **Key vocabulary** The ones used during previous activities **Communicative structures** The ones used during previous activities	☒ Whole class ☐ Group work ☐ Pair work ☒ Individual work	• Worksheet n. 3.docx • 3-Vax.pptx Worksheet n.3 Task 5; PPT 3-Vax slide 10.	Formative assessment: the teacher checks if students can sum up the important points of the lesson

CLIL Lesson Plan

Unit number	3	**Lesson number**	2	**Title**	New generation vaccines production

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	5'	Students know that yeast can be involved in vaccine production (LOTS)	Activation: The teacher shows pictures of bread, beer and a vaccine and asks students to find out what those pictures have in common (TASK 6). With their previous knowledge, students should be able to state that yeast can be exploited to produce all those items.	**Skills** L S R W **Key vocabulary** beer, bread, vaccine, yeast **Communicative structures** What do these pictures have in common?	☑ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• 2-mAb.pptx PPT 3-Vax slides 11-12	/

2	20'	Students can: write proper descriptions for a process while looking at a picture (LOTS); apply the cloning process (that they already know) to vaccine production (HOTS).	Content + practice: Students look at a picture describing recombinant HBV vaccine production. Since they already know the process of cloning, they should be able to write a proper description for each step of the production, which is one type of cloning process. Students work in pairs. The teacher is always available especially for helping students in finding English words that they do not know. When a student asks the English for one word while working, the teacher writes it on the blackboard. When students have finished, the teacher shows the correct answers.	**Skills** L S R **W** **Key vocabulary** recombinant, HBV, restriction enzymes, bacterium, transfer method, insertion, plasmid, adjuvants. **Communicative structures** First...then....next...later... Lastly..	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• Worksheet n. 3.docx • 3-Vax.pptx Worksheet n. 3 -Task 7; PPT 3-Vax slides 13-14; Picture:link ; Blackboard.	Formative assessment: the teacher checks if student understand the process; Self assessment: students check their answers

3	15'	Students can: understand and find meaningful information in an authentic text about DNA vaccines; list advantages and disadvantages about DNA vaccines (LOTS).	Content+Practice: The teacher gives a short explanation about DNA vaccines using slides from 15 to 18. Then, students read individually a text from WHO about DNA vaccines and they fill the table in their worksheet about advantages and disadvantages. Lastly, the teacher listens to students answers and shows the correct ones.	**Skills** L S **R** **W** **Key vocabulary** approach, adjuncts, DNA vaccines **Communicative structures** I think that this is an/a advantage/disadvantage because....	☐ Whole class ☐ Group work ☒ Pair work ☒ Individual work	• Worksheet n. 3.docx Worksheet n.3 - Task 8; PPT 3-Vax slides 15-16-17-18-19.	/
4	10'	Students can list differences between recombinant and DNA vaccines (LOTS)	Summary: Students discuss in groups about the differences between recombinant and DNA vaccines and the teacher sums up their thoughts on the blackboard.	**Skills** L **S** R W **Key vocabulary** the ones used in previous activities **Communicative structures** A difference between.... and.....is that.....	☐ Whole class ☒ Group work ☐ Pair work ☐ Individual work	• Worksheet n. 3.docx • 3-Vax.pptx Worksheet n.3 - Task 9; Blackboard	Formative assessment: the teacher checks if students achieved the goal of the lesson.

CLIL Lesson Plan

Unit number	3	**Lesson number**	3	**Title**	Edible vaccines production

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	10'	Student are aware that vaccines can be produced also in plants (LOTS).	Activation: The teacher welcomes the class and introduces the topic of the lesson by presenting slide n. 22 and describing advantages of producing vaccines inside plants. Then, students read the abstract of the article “Recent Development and Future Prospects of Plant-Based Vaccines”	**Skills** L S R W **Key vocabulary** edible, plant-based technology, pharmaceutical compounds, genetic modification **Communicative structures** Producing vaccines is extremely advantageous because....	☒ Whole class ☐ Group work ☐ Pair work ☒ Individual work	• Worksheet n. 3.docx • 3-Vax.pptx Worksheet n.3 Task 10; PPT 3-Vax slides 21-22-23	/

2	15'	Students know how a transformation with A. tumefaciens works and the steps to produce an edible vaccine	Content: Students watch a video about the transformation of plants with A. tumefaciens and then they read a text describing steps of edible vaccine production. The video can be watched twice. Students can ask questions to the teacher and the teacher can give extra-explanations about the process if they are needed.	**Skills** L S R W **Key vocabulary** tumor-inducing, plasmid, soil, wound, chemical signal, crown gall tumor, amino acids, opines, cytokinin **Communicative structures**	☒ Whole class ☐ Group work ☐ Pair work ☒ Individual work	• Worksheet n. 3.docx • 3-Vax.pptx Worksheet n. 3 Task 11; PPT 3-Vax slides 24-25; Video: link	/
3	20'	Students can produce a diagram with captions and picture describing a topic they have studied (HOTS)	Practice: Students work in groups of 4 or 5 people and have to produce a diagram with pictures and captions that describes edible vaccines production. The task will be completed in lesson n. 4 of the same unit. The teacher walks around the class and is always available to help and give clarifications.	**Skills** L S R W **Key vocabulary** see the previous activity **Communicative structures** What could you say about this picture/step? We could write……. This part is important, I suggest you to put it in the diagram because...	☐ Whole class ☒ Group work ☐ Pair work ☐ Individual work	• Worksheet n. 3.docx • 3-Vax.pptx Worksheet n.3 Task 11; PPT 3-Vax slide 25; A3 papers; Evaluation grid: link	Summative assessment: part of the mark of the module (10%) will be determined by the assessment of moments of group work using an evaluation grid

4	5'	Students can list advantages of edible vaccines (LOTS).	Summary: Students work in pairs and, after reading a short summary, they list at least 3 advantages of edible vaccines. The teacher walks around the class, listening to each pair and then writes the most important advantages on the blackboard	**Skills** L S R W **Key vocabulary** See previous activities **Communicative structures** One of the advantage of edible vaccine is...	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• Worksheet n. 3.docx • 3-Vax.pptx Worksheet n.3 Task 12; PPT 3-Vax slide 26; Blackboard;	Formative assessment: the teacher checks if students understand the class

CLIL Lesson Plan

Unit number	3	**Lesson number**	4	**Title**	Vaccines roundup

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**

1	10'	Students revise what they know about types of vaccines (LOTS) and get motivated by the competition.	Activation: Students play a Kahoot prepared by the teacher about types of vaccine (TASK 13). After discovering the answer to each question, the teacher asks a student why the answer is correct. Then, the teacher decides if a short extra-explanation is needed, especially if many students do not answer correctly to a particular question.	**Skills** L **S** **R** W **Key vocabulary** the ones used throughout the unit **Communicative structures** Why is this the correct answer? Can you tell me….? What is not clear about…? Do you want me to explain again…?	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• 3-Vax.pptx Kahoot “CLIL Vaccines” by NazarenaR (search it on link) ; PPT 3-Vax slide 28	Formative + Summative assessment: using Kahoot students have continuously feedback about their answers and about their ranking in the class. Moreover, the teacher can decide to save results from Kahoot and analyze them in order to give positive or negative annotations to students

2	15'	Students can produce a diagram with descriptions and pictures describing a topic they have studied (HOTS)	Practice: Students work in groups of 4 or 5 people and complete the diagram started in lesson n.3 (same unit). The teacher walks around the class and is always available to help and give clarifications.	**Skills** L S R W **Key vocabulary** see the previous activity **Communicative structures** What could you say about this picture/step? We could write……. This part is important, I suggest you to put it in the diagram because...	☐ Whole class ☒ Group work ☐ Pair work ☐ Individual work	• Worksheet n. 3.docx • 3-Vax.pptx Worksheet n.3 Task 11 ; PPT 3-Vax slide 25; A3 papers; Evaluation grid: link	Summative assessment: part of the mark (10%) of the module will be determined by the assessment of moments of group work using an evaluation grid

3	15'	Students revise what they know about types of vaccines (LOTS)	Practice: Students play a Kahoot prepared by the teacher about Transformation of plants with A. tumefaciens. After discovering the answer to each question, the teacher asks a student why the answer is correct. Then, the teacher decides if a short extra-explanation is needed, especially if many students do not answer correctly to a particular question.	**Skills** L S R W **Key vocabulary** the ones used throughout the unit **Communicative structures** Why is this the correct answer? Can you tell me….? What is not clear about…? Do you want me to explain again…?	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• 3-Vax.pptx Kahoot “Transformation of plants with Agrobacterium tumefaciens”by NazarenaR (search it on link) ; PPT 3-Vax slide 29.	Formative + Summative assessment: using Kahoot students have continuously feedback about their answers and about their ranking in the class. Moreover, the teacher can decide to save results from Kahoot and analyze them in order to give positive or negative annotations to students

4	10'	Student can assess other works (HOTS) after choosing a criterium	The teacher collects diagrams from students and attaches them on the blackboard and gives one post-it to each student. Students have to choose the best diagram and to express the criterium they followed in order to make their decision. Students write the criterium on a post-it and put it close to the chosen diagram.	**Skills** L **S** R **W** **Key vocabulary** content, precise, originality, clearness, criterium **Communicative structures** I think this is the best diagram because....	☒ Whole class ☐ Group work ☐ Pair work ☒ Individual work	• 3-Vax.pptx PPT 3-Vax slide 29; Post-its; Diagrams made by students in activity 2 lesson 4 and lesson 3.	Peer assessment

CLIL Lesson Plan

Unit number	4	**Lesson number**	1	**Title**	What is a stem cell?

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	10'	Students are able to connect cell differentiation and stem cells (LOTS)	Activation: The teacher shows two pictures in order to activate students prior knowledge and guide them to the topic of stem cells	**Skills** L S R W **Key vocabulary** stem cells, differentiation, to become, to turn into **Communicative structures** What do you think about the picture? /What can you see?/What does this mean?	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• 4-stem_gene.pptx PPT 4-stem&gene slides 1-2-3	/

2	15'	Students can identify the topic of each paragraph of a scientific text and give it a title (LOTS)	Content: Students read an introductory text about stem cells and give a title to each paragraph. The teacher walks around the class and is always available to help students.	**Skills** L S **R** W **Key vocabulary** Key vocabulary adult/embryonic stem cells,tissue, to repair, to replenish, regenerative medicine **Communicative structures** Passive forms	☐ Whole class ☐ Group work ☐ Pair work ☒ Individual work	• Worksheet n. 4.docx • 4-stem_gene.pptx PPT 4-stem&gene slide 4; Worksheet n. 4 Task 1	/
3	15'	Students can: answer to multiple choice questions about a topic they have studied (LOTS); give their opinion about an ethical problem (HOTS)	Practice: Students work in pairs, one read a question and the possible answers and the other answers the question. If the two students do not agree on an answer they discuss together. Then, the teacher gives the correct answers and leads a discussion about ethical problems on stem cells use.	**Skills** L **S** **R** W **Key vocabulary** features, specialized, therapies, bone marrow, powerful **Communicative structures** Which is the answer? I think that the answer is….because...	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• Worksheet n. 4.docx • 4-stem_gene.pptx PPT 4-stem&gene slides 5-6; Worksheet n.4 Task 2.	/

4	10'	Students can ask and answer questions about a topic they have studied (LOTS)	Summary: Each student writes a question about the lesson on their worksheet. Then, each student asks their question to the classmate at their right and answers to the question of the student at their left. This activity starts from the student sitting closest to the teacher and goes on sequentially so that all the students can hear all the questions/answers.	**Skills** L S R W **Key vocabulary** the ones used throughout the lesson **Communicative structures** What…?Which…? Why…? What is the difference…?	☒ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• Worksheet n. 4.docx • 4-stem_gene.pptx PPT 4-stem&gene slide 7; Worksheet n. 4 Task 3.	Formative assessment: the teacher checks if students have achieved the goal of the lesson

CLIL Lesson Plan

Unit number	4	**Lesson number**	2	**Title**	Types of stem cells

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	10'	Students can state the meaning of the word “potency” (LOTS)	Activation: The teacher asks students to think about the word “potency” and describe its meaning. After students have expressed their ideas, the teacher gives a short explanation about the meaning of “potency” as regard to stem cells.	**Skills** L S R W **Key vocabulary** potency, ability **Communicative structures** What is the meaning of…? Why is it related to stem cells?	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Worksheet n. 4.docx • 4-stem_gene.pptx PPT 4-stem&gene slides 9-10	/

2	15'	Students can match each type of potency with their definition (LOTS)	Content + Practice: Students have a set of flashcards with types of potency and definitions. They have to match each type of potency with its correct definition. When they have finished the teacher checks if the matchings are right and then students can copy the correct definitions on their worksheet (TASK 4)	**Skills** L S R W **Key vocabulary** to differentiate, egg, sperm, zygote, morula, blastocyst, totipotent, multipotent, oligopotent, unipotent **Communicative structures** I think this match with this. Do you agree? Yes, I couldn't agree more/No, I don't agree because...	☐ Whole class ☐ Group work ▣ Pair work ☐ Individual work	• 4-potency flashcard - keys.docx • 4-potency flashcard-STUDENTS.docx • Worksheet n. 4.docx • 4-stem_gene.pptx PPT 4-stem&gene slides 11-12 ; Worksheet n.4 task 4; Flashcards (see file "4-potency flashcard-STUDENTS); Keys (see file "4-potency flashcard keys);	Formative assessment: The teacher checks if students match type of potency and definition correctly.
3	15'	Students know what an IPS cell is and which are its features. (LOTS)	Content + Practice: Students watch a video and having the script on their worksheet they fill the gaps (TASK 5). The video can be shown twice but without subtitles. Then, the teacher shows the correct answers	**Skills** L S R W **Key vocabulary** method, technique, IPS cells **Communicative structures**	▣ Whole class ☐ Group work ☐ Pair work ▣ Individual work	• Worksheet n. 4.docx • 4-stem_gene.pptx PPT 4-stem&gene slides 13-14 ; Worksheet n. 4 task 5; video link	/

4	10'	Students can: think critically and express their opinion about a topic they have studied and (at home) write a meaningful essay about it (HOTS)	Summary: The teacher guides a brief discussion about the use of stem cells in research and in therapies using questions written both on the presentation and on the student worksheet. The teacher encourages students to speak and to give opinions. Homework: students will write an essay about “Uses of stem cells in Science”	**Skills** L | **S** | R | W **Key vocabulary** the ones used throughout the lessons 1 and 2 of unit 4 **Communicative structures** Why…? What do you think about..? Can you motivate your assertion?	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Worksheet n. 4.docx • 4-stem_gene.pptx PPT 4-stem&gene slide 15; Worksheet n.4 task 6 ; Essay evaluation rubric: link	Summative assessment: part of the mark of the module will be determined by the evaluation of essays too. An evaluation rubric will be used (see Materials).

CLIL Lesson Plan

Unit number	4	**Lesson number**	3	**Title**	What is gene therapy?

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	10'	Students know the goal of gene therapy (LOTS)	Activation: Students watch an introductory video about gene therapy and fill the gaps in the text on their worksheet (TASK 1 Worksheet n.5). The video can be shown twice but without subtitles. Then, the teacher shows the correct answers and asks students to think about what it would be possible to do with gene therapy.	**Skills** L S R W **Key vocabulary** Gene therapy, viral vector, treatment, genetic disease, functional copy **Communicative structures** What could we do with gene therapy in the future?	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Worksheet n.5.docx • 4-stem_gene.pptx Worksheet n. 5 Task 1; PPT 4-stem&gene slides 16-17-18-19 ; Video:link	/

2	15'	Students can: put the steps of a gene therapy in the correct chronological order; list the different components needed in a gene therapy (LOTS)	Content +Practice:The teacher shows a picture describing the process of gene therapy and gives a short explanation to students. Then, students work in pairs and match each gap in the picture with the correct caption. The teacher shows the correct answers and adds some information about each step.	**Skills** L S R W **Key vocabulary** viral vector, nuclear pore, nuclear membrane, integration, to be packaged **Communicative structures** I think this caption goes in this part of the picture because...	☐ Whole class ☐ Group work ☑ Pair work ☐ Individual work	• Worksheet n.5.docx • 4-stem_gene.pptx Worksheet n. 5 Task 2; PPT 4-stem&gene slides20-21-22 .	Formative assessment: The teacher checks if students have achieved the goal of the activity
3	15'	Students know the differences between in- and ex-vivo gene therapy and know strengths and weaknesses of both (LOTS). Students can associate gene therapy and stem cells in certain applications (LOTS)	Content+Practice: The teacher introduces in-vivo and ex-vivo gene therapy with a short explanation. Students read a text that explains the differences between in-vivo and ex-vivo gene therapy. Then, students answer questions about the text. The teacher is always available to give meanings of new words and to check that students understand. The teacher shows the correct answers.	**Skills** L S R W **Key vocabulary** in-vivo, ex-vivo, to transplant, uptake **Communicative structures** What...?Why...? Passive forms	☐ Whole class ☐ Group work ☐ Pair work ☑ Individual work	• Worksheet n.5.docx • 4-stem_gene.pptx Worksheet n. 5 Task 3; PPT 4.stem&gene slides 23-24-25	Formative assessment: The teacher checks if students have achieved the goal of the activity

4	10'	Students can give opinions and discuss about a topic they have studied (HOTS)	Summary: Students work in pairs and have to find an agreement on the best choice between in-vivo and ex-vivo gene therapy. After 5 minutes, the teacher stops the conversations and asks each pair about their choice.	**Skills** L | S | R | W **Key vocabulary** the ones used throughout the lesson **Communicative structures** I think..../ I agree/disagree because.../ to sum up...	☒ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• Worksheet n.5.docx • 4-stem_gene.pptx Worksheet n. 5 Task 4; PPT 4-stem&gene slide 26	Formative assessment: The teacher checks if students can make a choice justifying it

CLIL Lesson Plan

Unit number	4	**Lesson number**	4	**Title**	Vectors for gene therapy

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	10'	Students can make hypothesis about gene transfer, after knowing the general process of gene therapy (HOTS)	Activation: The teacher asks to students how they could actually transfer a functioning gene inside a cell. Students brainstorm on the question and the teacher writes on the blackboard students' ideas. Then, the teacher explains what a vector is.	**Skills** L S R W **Key vocabulary** delivery, transfer, uptake **Communicative structures** How would you do…..? How is it possible?	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• 4-stem_gene.pptx PPT 4-stem&gene slides 27-28-29 Blackboard	/

2	15'	Students know strengths and weaknesses of different types of vectors for gene therapy (LOTS)	Content: The teacher presents virus as possible vectors for gene therapy and shows a video that explains that in the '90s there was concern about using virus in certain applications so that other possibilities were explored. The teacher shows a table with different types of vectors and explains features, advantages and disadvantages for each method.	**Skills** L S R W **Key vocabulary** retrovirus, lentivirus, adenovirus, efficiency, capacity, target **Communicative structures** comparative forms	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Worksheet n.5.docx • 4-stem_gene.pptx PPT 4-stem&gene slides 30-31; Worksheet n. 5 task 5; Video: link	/
3	15'	Students can answer to questions and discuss about types of vector for gene therapy (LOTS). Students can make hypothesis about possible solutions of vectors problems (HOTS).	-Practice: Students work in pairs and answers to questions about what they heard in the previous activity and discuss about issues regarding viral vectors. The teacher walks around the class and listens to different conversation, supports and encourages students that have difficulties in speaking tasks.	**Skills** L S R W **Key vocabulary** the same as activity n.2 **Communicative structures** In my opinion/I think…… The problem could be solved if…..	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• Worksheet n.5.docx • 4-stem_gene.pptx PPT 4-stem&gene slide 32; Worksheet n. 5 task 6; Blackboard	/

4	10'	Students can check if their hypothesis are correct; Students know about the existence of CRISPR and its functioning principle (LOTS)	Summary: The teacher shows the correct answers and guides a discussion about how issues with vectors could be solved and gives a short explanation about the innovative technology of CRISPR/Cas 9. Then, the teacher suggests to students to watch some videos about it for homework.	**Skills** L S R W **Key vocabulary** the ones used throughout lesson n.3 and 4 of unit 4 **Communicative structures** This brand new discovery can...	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• 4-stem_gene.pptx PPT 4-stem&gene slides 33-34	Formative assessment the teacher checks if students have achieved the goal of the lesson

CLIL Lesson Plan

Unit number	4	**Lesson number**	5	**Title**	ADA-SCID: an example of gene therapy

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	5'	Students know that the first marketing approval of an ex-vivo gene therapy in Europe has recently been released (LOTS).	Activation: The teacher welcomes students and shows the abstract of a recent article that deals with the commercialization of a new ex-vivo gene therapy that aims to treat ADA-SCID. The teacher underlines that this product is made and released in Italy.	**Skills** L S R W **Key vocabulary** product, commercialization, treatment, ADA-SCID **Communicative structures** This product has been recently approved…..	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• 4-stem_gene.pptx PPT 4-stem&gene slides 35-36	/

2	20'	Students know what ADA-SCID is, which symptoms has and why it is life-threatening (LOTS); Students can: sympathize with people suffering from ADA-SCID ; understand the importance of research in the field of genetic diseases treatment; (HOTS)	Content: Students read a text that explains what ADA-SCID is and answer the questions. Then, they watch a video that shows how life with ADA-SCID is. Then, the teacher guides discussion with the whole class about it.	**Skills** L S R W **Key vocabulary** Adenosine Deaminase, Severe Combined ImmunoDeficiency, enzyme replacement, opportunistic infection **Communicative structures** She suffers from….; In your opinion what is the hardest part of life with ADA-SCID?	☒ Whole class ☐ Group work ☐ Pair work ☒ Individual work	• Worksheet n.5.docx • 4-stem_gene.pptx Worksheet n. 5 TASKS 7-8; PPT 4-stem&gene slides 37-38-39	/

3		Students can take notes in L2 and they can write a summary about what they heard (HOTS)	Practice: The teacher explains how ADA-SCID gene therapy works using a picture and students take notes. Then, students write a summary about the topic. The teacher walks around the class and is always available to suggest words or to give help. The teacher also checks especially the content of students' summaries.	**Skills** L S R W **Key vocabulary** Bone marrow harvest,patient, extraction, iliac crest,blood, flow cytometer, CD34, transduction, to engraft, infusion. **Communicative structures** First.... then ....later ... consequently ....lastly	☒ Whole class ☐ Group work ☐ Pair work ☒ Individual work	• Worksheet n.5.docx • 4-stem_gene.pptx Worksheet n. 5 TASK 9; PPT 4-stem&gene slides 40-41-42-43	Formative assessment: The teacher checks the content of the summaries written by students
4	10'	Students can give advice about their classmate’s summary (HOTS)	Summary: Students swap summary with a classmate and they read it and then give advice about how to improve it	**Skills** L S R W **Key vocabulary** the same as previous activity **Communicative structures** I think that your summary is.... /If I were you I would add/remove.....	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• Worksheet n.5.docx • 4-stem_gene.pptx Worksheet n. 5 TASK10; PPT 4-stem&gene slide 44	Peer-assessment Students give advice on their classmate’s summary

CLIL Lesson Plan

Unit number	5	**Lesson number**	1	**Title**	Journal Club 1

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	15'	Students know how the Journal Club works	Activation: the teacher explains how the Journal club works and forms groups of maximum 3 people, taking in account English and Biology level of each student. Then, the teacher gives copies of a scientific article about innovative biotechnology to each group. Students will have to prepare and give a presentation of their article using any kind of visual support.	**Skills** L S R W **Key vocabulary** Scientific articles, abstract, author, presentation, visual support **Communicative structures** What you have to do is… I expect from you…	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Scientific articles list.docx Scientific article list	/

2	35'	Students can read a scientific article about a topic they have studied and extract meaningful information from it (HOTS)	Content+Practice: Students work in groups and read the article. The teacher is always available to give support and help in understanding the texts. Students will prepare the presentation for homework. If more CLIL hours for the class were available it would be useful and productive to let students work in class on their presentation, so that the teacher could guide and help especially weak students. This is not the case, so the level of the scientific papers has been carefully checked and sometimes articles have been shortened.	**Skills** L S R W **Key vocabulary** it depends on the article **Communicative structures** In the light of... We concluded.... .... is believed to... ...evidence of...	☐ Whole class ☑ Group work ☐ Pair work ☐ Individual work	• Scientific articles list.docx Scientific articles (see list in "Scientific articles list")	

CLIL Lesson Plan

Unit number	5	**Lesson number**	2	**Title**	Journal Club 2-3

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	10'	Students know how to use an evaluation rubric (LOTS)	Activation: The teacher explains that the presentations will be assessed by students and teachers both using an oral presentation rubric.	**Skills** L S R W **Key vocabulary** the ones used throughout the module **Communicative structures** I expect from you... Remember to give value to...	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	Oral presentation rubric link	/

2	80'	Students can listen to presentations given from other students and can give an evaluation using a rubric (HOTS); Students can answer questions about their work that come from other students (LOTS)	Content+Practice: Each group gives its presentation using the chosen visual support. After each presentation students and teachers can ask questions and then, they use the rubric and give an evaluation to the group.	**Skills** L S R W **Key vocabulary** the ones used throughout the whole module **Communicative structures** the ones used throughout the whole module	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	Oral presentation rubric link	Summative assessment and peer assessment: The mark of the presentation will count for a 30% of the final mark of the module
3	10'	Students receive a feedback from the teacher about their presentation; Students know how the final test will be structured (LOTS)	Summary: The teacher gives a final comment on students' works and gives marks. Then, he/she gives instructions about the final test (types of questions, length….)	**Skills** L S R W **Key vocabulary** Key vocabulary open ended questions, closed ended question, to focus on **Communicative structures** While studying remember to focus on…	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	/	The teacher makes the marks of the presentations explicits

CLIL Lesson Plan

Unit number	5	**Lesson number**	3	**Title**	Final assessment

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	50'	Students can show what they have learned through a written test with both open and closed ended questions, justifying answers and choices (LOTS and HOTS)	The teacher gives the tests to students. Help for the language can be given to students with severe difficulties in L2 but not for the content.	**Skills** L S **R** **W** **Key vocabulary** the ones used throughout the whole module **Communicative structures** the ones used throughout the whole module	☐ Whole class ☐ Group work ☐ Pair work ☒ Individual work	• Final test innovative biotechnology.docx Final test Innovative biotechnology	Summative assessment: the final assessment will be composed of different evaluations such as essays (10%), group works (10%), oral presentation (30%) and final test (50%)