CLIL Module Plan

Author(s)	Annamaria Curzel				
School	ITT Buonarroti-Pozzo				
School Grade	○ Primary		○ Middle		◉ High
School Year	○ 1	○ 2	○ 3	○ 4	◉ 5
Subject	Altro - ANALISI CHIMICA E STRUMENTALE		**Topic**	Spectroscopy	
CLIL Language	◉ English		○ Deutsch		

Personal and social-cultural preconditions of all people involved	This module is carried out in a class of 17 students, 2 females and 15 males , who attend the last year in chemistry specialization. There aren't students with special needs They are Italian mother tongue and some of them are used to speak dialect too. Analytical chemistry is a core subject of the curriculum of this specialization and this is the reason why students are highly motivated to learn it in a deep way. This subject is taught for 8 hours/ week (divided in groups of 2 or 3 hours; every lesson time lasts 50 minutes) with 7hours of experimental activities in chemistry lab. At the end of their studies, not only will these students be able to describe how we can investigate the matter, but they will also have practiced with analytical instruments and they will be aware of the several applications linked to scientific field.They are interested in scientific subjects and their profile is rather good. Their level of English is much more heterogeneous as only some of them has B2 certification. Most of student have an English level between B1and B2 In the laboratory, with theoretical teacher also works a practical teacher but she doesn't know English language. For maintenance of instruments and their good working there is also a technician who helps students during instrumental practice

Students' prior knowledge, skills, competencies	Subject	Language
	Knowledge: scientific method, the structure of the atom, the nature of light, the electromagnetic spectrum, concepts of wavelength, frequency and quantization of Energy, light absorption and emission, chemical equipment, data acquisition processing and analysis. Students should be able to seek information from test, videos and diagrams, formulate hypothesis and solve, use of ICT ; They can manage laboratory activities with safety, take samples properly, carry out a quantitative analysis by using analytical method , write a report with the results of their analytical research using a language suitable for the working context.	Past simple, passive form, basic language to describe a process (first, then, next...) expressing agreement and disagreement, predicting and justifying predictions (about scientific experiment), giving instructions They should be able to listen to a lesson or watch a video in L2 and understand the general meaning, read material such as short text and understand the general meaning, speak with teacher or other students ,in pairs or in small groups, and ask for help and clarifications when it is necessary, write a short report about their laboratory activity using appropriate technical words Students can communicate in L2, interact with pairs, report their laboratory work both orally and in writing.

Timetable fit	◉ Module	Length 24 hours of 50 minutes

Description of teaching and learning strategies	After a short introduction where goals are explained, students are immediately asked to activate their prior knowledge in order to answer to the questions about the topic. They will be helped by a video and guided by the teacher; students should have acquired a short list of obligatory language vocabulary that makes them able to answer and discuss. However, students might not know some specific words and so the teacher will add these new words on the blackboard when students require them. Students are also invited to speak and brainstorm in pair or in a little group so that they can warm their speaking skills up and be prepared to use English language in the following part. Also in this specific module students are encouraged to discuss in pair and to make hypothesis on the base of what they have learnt in previous classes on just on the base of what they imagine .In these CLIL lesson students will be involved in cooperative learning using information exchange and information gap activities as well as inquiry-based learning and collaborative and task-based activities to get used both content, specific content glossary and to improve their English in communication Not less important is the laboratorial experience through which students develop communication and language skills but also other important competences such as team work, problem solving, decision making, working habits.Multimodality lesson involves visual, spoken, written and practical activities in order to improve understanding. Furthermore, multimodality lesson give students the opportunity to fit to different learning styles and learning strategies.

Overall Module Plan

Unit: 1 Uv-visible molecular spectroscopy **Unit length:** 11.30 hours of 50 minutes	**Lesson 1** Introduction to light
	Lesson 2 Absorption in the visible region
	Lesson 3 How a uv-visible spectrophotometer works and Lambert-Beer Law
	Lesson 4 Laboratory: Phosphates in the water/ in sport drinks
	Lesson 5 Presentation of experiment
	Lesson 6 Revision

Unit: 2 Atomic spectroscopy **Unit length:** 12.30 hours of 50 minutes	**Lesson 1** Introduction of Atomic absorption spectroscopy- How AAS works
	Lesson 2 Atomization using flame, furnace or plasma
	Lesson 3 Atomic emission spectroscopy-Inductively coupuled plasma
	Lesson 4 Lab activity: Calcium analysis in different samples of water
	Lesson 5 Presentation of experiment
	Lesson 6 Revision

CLIL Lesson Plan

Unit number	1	**Lesson number**	1	**Title**	Introduction to light

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	10min +20 min	Students are able to -understand and consolidate really nature of light, -refresh the nature of light while learning specific vocabulary, -take notes -learn specific words for the module - compare answers, recall	The students watch the video “introduction to light” twice, and they discuss in pair about nature of light. The teacher stops the video when there is a specific word and writes it on the board. Students are also allowed to ask for some clarifications	**Skills** L S R W **Key vocabulary** Specific vocabulary Electromagnetic spectrum, photons ,wavelength, frequency, energy, speed of light, intensity **Communicative structures** Question words, expressing opinions, sequencing words How would you explain.....? How would you summarise...? How would you rephrase.....? Could you repeat ...?	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• MAT_U1_L1_ALL 1.video.doc MAT_U1_L1_ALL 1. Video: Introduction to the light(Khan Accademy) link the video speaks about light and the electromagnetic radiation spectrum, wave and particle-like behavior, and how to calculate the wavelength or frequency of a light wave.	Partecipation and interest to the activity Knowledge of the argument and use of specific vocabulary

2	20 min	Students are able to identify the question words, match the correct answer to questions, compare answer with peers They recall previous learned information	The student read the sentences, answer the questions, identify and circle the correct word to make a questions on the worksheet .	**Skills** L S R W **Key vocabulary** Specific vocabulary Electromagnetic spectrum, Planck constant, wavelength, frequency, energy, speed of light, intensity **Communicative structures** -Question words why do… how is.. which is.. Adjectives (opposites, comparatives) ,expressing opinions,sequencing words	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• MAT_U1_L1_ALL 2.doc task1.docx MAT_U1_L1_ALL 2.doc Task 11. Students circle the correct word to make questions and match the correct answer to question Worksheet adapted from link	Teacher observes during class discussion Formative informal assessment of students' collaborative work

3	25 min	Students are able to elicit the information from the video, apply what is being learned	Using the information obtained from the video, the students discuss and then complete the sentences The teacher walks around the class making sure the students are able to understand and answer all of the questions	**Skills** L S R W **Key vocabulary** Specific vocabulary Electromagnetic spectrum, photons ,wavelength, frequency, energy, speed of light, intensity **Communicative structures** Agreement and disagreement Adjectives comparatives) Question words, expressing opinions, sequencing words	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• MAT_U1_L1_ALL 3.docTask 2 .doc MAT_U1_L1_ALL 3.doc Task 2 Using the information obtained from the video and task 1, students complete the sentences Worksheet adapted from link	Teacher observes during class discussion Formative informal assessment of students' collaborative work

CLIL Lesson Plan

Unit number	1	**Lesson number**	2	**Title**	Absorption in the visible region

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	10 min+20min	Students are able to understand the test and then explain the illustration above, to give predictions They are able to write some sentences to describe the fact using specific terms about the subject	The students watch the video - Absorption in the visible region- then read the text of the task 3 and at the end answer the questions	**Skills** L S R W **Key vocabulary** Specific vocabulary Prism, complementary colours **Communicative structures** Sequencing words Adjectives (opposites, comparatives) Question words, expressing opinions, sequencing words	☐ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• MAT_U1_L2_ALL 5.docTask 3.doc • MAT_U1_L2_ALL 4.video.doc MAT_U1_L2_ALL 4. Video “Absorption in the visible region “. The video explain the physical basis of our perception of color. link MAT_U1_L2_ALL 5.doc - task 3: text and questions (elaborated from link Students read the text then answer the task.Secondly using this knowledge they try to explain the simple experiment	Teacher observes during class discussion Formative informal assessment of students’ collaborative work

2	10 min	Students are able to repeat and summarize using key words, identify the correct words, solve the crossword	Teacher gives students crossword and the students complete it using specific vocabulary	**Skills** L S R W **Key vocabulary** Specific vocabulary Planck equation, absorption, emission, Electromagnetic spectrum, photons ,wavelength, frequency, energy, speed of light, intensity **Communicative structures** Question words, expressing opinions,	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• MAT_U1_L2_ALL 6.doc task 4 .doc MAT_U1_L2_ALL6.doc task 4:crossword.Students solve a crossword using technical words by link	Teacher observes during class discussion Formative informal assessment of students' collaborative work

3	10min	Communication in pairs, comprehending the meaning, and interpretation of the phrases .	The students read each other own cloze exercise and fill the gap 5A 5b (mutual dictation) Teacher shows the correct answer	**Skills** L S R W **Key vocabulary** Specific vocabulary Radio waves , infrared, visible light, ultra violet, x rays, gamma rays **Communicative structures** Adjectives (opposites, comparatives) Question words, expressing opinions, sequencing words	☐ Whole class ☐ Group work ☑ Pair work ☐ Individual work	• MAT_U1_L2_ALL 7.doc task 5 .doc MAT_U1_L2_ALL 7.doc - Task 5. Mutual dictation in pair: students read each other own cloze exercise and fill the gaps adapted from link	Teacher observes during class discussion Formative informal assessment of students' collaborative work

CLIL Lesson Plan

Unit number	1	**Lesson number**	3	**Title**	How a uv-visible spectrophotometer works and Lambert-Beer Law

Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment

1	25 min	Students understand how a spectrophotometer works, They are able to discuss in pair,, memorize technical words, identify correct position in a simple block system	The students watch the Video “How a Simple UV-visible Spectrophotometer Works “ where is described a simple example of a double-beam UV-visible spectrophotometer and how it is used to determine the % transmittance of a sample, which can be mathematically converted into absorbance for convenience. the students take notes. Than they complete the block diagram of double ray uv-vis spectrophotometer	**Skills** L S R W **Key vocabulary** Specific vocabulary Source, slit, spherical and plane mirror, monochromator prism, reference cell, bean splitter **Communicative structures** expressing opinions, sequencing words	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• MAT_U1_L3_ALL 8 Video.doc • MAT_U1_L3_ALL 9 task 6.docx MAT_U1_L3_ALL 8. Video “How a Simple UV-visible Spectrophotometer Works” link the video describes a simple example of a double-beam UV-visible spectrophotometer and how it is used to determine the absorbance in a sample MAT_U1_L3_ALL 9.doc Task6-adapted from link Students complete the block diagram of UV-visible spectrophotometer using the name of the components .	Teacher observes during class discussion . Formative informal assessment of students’ collaborative work

2	25min	The students should be able to confirm use of knowledge about optical system of a uv-vis spectrophotometer, identify the different parts of the instrument and match the name with the number	Teacher gives students picture of optical system and students identify and match the correct words	**Skills** L | S | R | W **Key vocabulary** Specific vocabulary Source, slit, monochromator, prism cell, bean splitter, ,detector, lens ,tungsten lamp, reflectance grating, adsorbance, trasmittance **Communicative structures** Explaining processes Can you explain how.? Would you mind rephrasing.? What can you say about? Do you agree with.? Represent Illustrate Report Can you list the part?	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• MAT_U1_L3_ALL 10 7A.pdf • MAT_U1_L3_ALL 10 task 7b.doc MAT_U1_L3_ALL 10.doc Task 7B- worksheet :students identify the different parts of the instrument and match the name with the number on the optical system (ALL10 pdf) scheme	Teacher observes during class discussion Formative informal assessment of students' collaborative work

3	20 min	Students are able to listen, complete the sentences, match words and phrases, identify,and recall	Using flashcards about UV-Visible molecular spectroscopy students can learn the correct pronunciation of technical words	**Skills** L S R W **Key vocabulary** Specific vocabulary Single beam double beam adsorbance, trasmittance, bond electrons,sigma bonds,molecular orbital,absobivity,quantum theory **Communicative structures** Question words, expressing opinions, sequencing words Can you explain how.? Rephrasing. What about? Do you agree with?	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• MAT_U1_L3_ALL 11 Flashcards UV Visible molecular spectroscopy Quizlet.doc MAT_U1_L3_ALL 11 Flashcards UV-Visible molecular spectroscopy Quizlet link	Teacher observes during class discussion Formative informal assessment of students' collaborative work

4	30 min	Students are able to understand the relationship between absorption and concentration, debate about Lambert beer Law, give prediction by guessing the answer Communication of knowledge recognizing correct answer	The students watch the video and take note , After that ,teacher gives them a list of question. Students can discuss and choose the right answer. At the end teachers shows the correct answers	**Skills** L S R W **Key vocabulary** Specific vocabulary Wavelength, source, slit, monochromator, prism cell, bean splitter, ,detector, lens ,tungsten lamp, reflectance grating, adsorbance, trasmittance **Communicative structures** Expressing opinions Passive form, Question words, sequencing words	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• MAT_U1_L3_ALL 13 Task 8.doc • MAT_U1_L3_ALL 12 video Lambert Beer Law.doc MAT_U1_L3_ALL 12. video Lambert Beer Law link This screencast lecture discusses Beer Lambert Law.(Royal Society Of Chemistry) MAT_U1_L3_ALL 13.doc Task 8 adapted from link Students choose the best option to answer the questions	Teacher observes during class discussion Formative informal assessment of students' collaborative work

CLIL Lesson Plan

Unit number	1	**Lesson number**	4	**Title**	Laboratory: Phosphates in the water/ in sport drinks

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	150 min	Students are able to identify the problem,apply analytical procedure in the chemistry lab, working with order and security. They are able to discuss the phases of experimental activity and perform experience using a double ray uv-vis spectrophotometer They are able to collect data processing with ICT	The students are asked to analyze phosphates in the water/ in the sport drinks using uv-vis spectrophotometer. They work in pairs. They read the analytical method, discuss, collect materials, carry out the determination and collect the data. The teacher explains ,suggests and discusses with students about experimental activity	**Skills** L S R W **Key vocabulary** Specific vocabulary Wavelength, source, slit, monochromator, prism cell, bean splitter, ,detector, lens ,tungsten lamp, reflectance grating, adsorbance, trasmittance, standard solution ,reagents, blank solution, detection limit	☐ Whole class ☐ Group work ☑ Pair work ☐ Individual work	• MAT_U1_L4_ALL 14.docTask9 Spectrophotometric Determination of Phosphoric Acid Content in.doc MAT_U1_L4_ALL 14.doc Task 9 Spectrophotometric Determination of Phosphoric Acid in Sports Drinks and Colas or in water	The teacher evaluates students by crossing data obtained from observing how they work during practical activity, and observing how they learn and write scientific report. Peer Assessment rubric in cooperative group work

				Communicative structures Question words, expressing opinions, sequencing words Imperative form, impersonal pronouns, comparing and contrasting sentences Could you plan ? Compare Can you propose a method How would you apply what you learned to plan/develop What changes would you make to solve? How would you adapt….to create a different How could you determine? Measure, rewrite			

CLIL Lesson Plan

Unit number	1	**Lesson number**	5	**Title**	Presentation of experiment

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	50 min	Students are able to collect data and to write lab report using specific vocabulary	The students in pairs write down the report. They use words and communicative structures in order to help presentation. The teachers observes how they write scientific assignment linking their hypotheses to the evidence collected during the experience ,helping them when they need	**Skills** L S R W **Key vocabulary** Specific vocabulary all key words previously listed **Communicative structures** Sequencing words, impersonal pronouns, comparing and contrasting sentences, Suggestions Expressing opinions and explaining processes	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• MAT_U1_L5_ALL 15.doc words and communicative structures copia.doc MAT_U1_L5_ALL 15.doc Words and communicative structures in order to help presentation	The teacher observes how students write scientific report linking their hypothesis to the evidence collected during the laboratorial activity

2	100 min	The students are able to explain lab experiment in front of peers They discuss about the procedure and compare and evaluate different results	The students are asked to explain the experiment that they had been carried out (analysis of water or drink) in front of peers. The teacher helps them to discuss about different results. Different data are signed on the board and statistically elaborated Students are given the same grid used by the teachers to evaluate the presentations of their classmates	**Skills** L S R W **Key vocabulary** Technical specialist vocabulary, all key words previously listed **Communicative structures** Sequencing words, impersonal pronouns, comparing and contrasting sentences, Suggestions, agreeing and disagreeing Can you assess the importance of? How would you justify? What data was used to make the conclusion? What can you conclude about.? Can you graph…? How would you evaluate?	☒ Whole class ☐ Group work ☐ Pair work ☒ Individual work	• MAT_U2_L5_ALL14 doc-evaluation grid fo.doc • MAT_U2_L5_ALL13.doc words and communicative structures.doc MAT_U2_L5_ALL13 doc Words and communicative structures MAT_U2_L5_ALL14 doc-Evaluation grid for students presentation	The teacher evaluates how students report scientific experience linking their hypothesis to the evidence collected during the laboratorial activity Summative assessment regarding practical activity Focus on communication skills: students answer the questions of the teacher and students and practice the vocabulary

CLIL Lesson Plan

Unit number	1	**Lesson number**	6	**Title**	Revision

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	100minutes	Students are able to comprehend the meaning of the question, retrieve previous learned information, apply what was learned during the module, compare different ideas and discuss with classmates .	The teachers gives students a final test, and students individually, answer the questions. In the second hour students discuss in pairs and at the end teacher explains the correct answers	**Skills** L S R W **Key vocabulary** Specific vocabulary All key word previously used **Communicative structures** Question words, all communicative structures previously used	☒ Whole class ☐ Group work ☐ Pair work ☒ Individual work	• MAT_U1_L6_ALL 17.doc task 10 review.doc • MAT_U1_L6_ALL 18.doc evaluation criteria final test.doc MAT_U1_L6_ALL17.doc Task 10 review MAT_U1_L6_ALL 18.doc Evaluation criteria final assessment	The teacher evaluates students by crossing data obtained from the results of final test

CLIL Lesson Plan

Unit number	2	**Lesson number**	1	**Title**	Introduction of Atomic absorption spectroscopy- How AAS works

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

1	20 min	Students are able to identify and comprehend three types of atomic spectroscopy: atomic absorption, atomic emission, and atomic fluorescence.	The students watch the video and brainstorm on the theme of this module,discussing about the topic in pair The teacher guides them in the discussion. The students take notes and discuss in pair and memorize technical words,	**Skills** L S R W **Key vocabulary** Specific vocabulary Atomic absorption spectrometry, wavelengths-beam-electromagnetic – vaporised-ground-vapour-light source-ionisation-sputtering-excitation-emission-sample cell-monochromator-detector-background absorption-inteferences-matrix **Communicative structures** Question words, e xpressing opinions, sequencing words How would you explain? How would you summarise...? How would you rephrase.....? Could you repeat ...?	☒ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• MAT_U2_L1_ALL 1.video.doc MAT_U2_L1_ALL 1.video Video link A brief overview of the three types of atomic spectroscopy: atomic absorption, atomic emission, and atomic fluorescence.	Teacher observes during class discussion. Formative informal assessment of students' collaborative work

2	40 min	Students understand, know the basics of Atomic Adsorption Spectroscopy They know technical words related to the topic and remember	The teacher gives the article “Atomic absorption spectrometry and explains that students have to read and underline the specific words related to the absorption Students build a dictionary with the new words that they have highlighted	**Skills** L S R W **Key vocabulary** Specific vocabulary Atomic absorption spectrometry- billion-clinical-environmental-pharmaceuticals-industry-mining-atomised-wavelengths-beam-electromagnetic – vaporised-ground-vapour-light source-ionisation-sputtering-excitation-emission-sample cell-monochromator-detector-background absorption-inteferences-matrix **Communicative structures** Passive voices How would you explain? How would you summarise? How would you rephrase? Could you repeat ? Can you read? Do you mind highlighting? Can you look them up..	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• MAT_U2_L1_ALL 2.doc task 1.pdf MAT_U2_L1_ALL 2.pdf Task1: articlelink	Teacher observes during class discussion Formative informal assessment of students collaborative work

3	40 min	The students are able to understand, to reason, to evaluate and remember	Students read again the article Teacher asks students to read the worksheet and match the words with their definition to consolidate the knowledge about AAS instrument. Teacher shows the correct answer	**Skills** L S R W **Key vocabulary** Specific vocabulary Source-chopper-sample cell-monochromator-detector-electronics-readout-reference beam-sample beam-atomisation system-modulate-pulsed-lamp-flame-hallow cathode - lens –monochromator- **Communicative structures** Can you read? Do you agree with?	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• MAT_U2_L1_ALL 3.doc task 2 .doc MAT_U2_L1_ALL 3.doc Task 2 The students match the words in A with their definition in B. May be more definitions for one word	Partecipation and interest to the activity Knowledge of the argument and use of specific vocabulary

CLIL Lesson Plan

Unit number	2	**Lesson number**	2	**Title**	Atomization using flame, furnace or plasma

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

1	30min	The students are able to reason,analyze, understand, evaluate	The students fill the gaps in the extract of the article previously read and then compare with other students. They discuss in pairs and answer the questions Teacher encourages learners to discuss how they work out the correct missing words and discuss the correct answers	**Skills** L S **R** W **Key vocabulary** Specific vocabulary Source-chopper-sample cell-monochromator-detector-electronics-readout-reference beam-sample beam-atomisation system-modulate-pulsed-lamp-flame-hallow cathode -lens –monochromator **Communicative structures** Can you explain how…..? Would you mind rephrasing..? What can you say about……?Do you agree with…….? Represent, Compare,axplain Can you list the part…..? Advantages and disadvantages	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• MAT_U2_L2_ALL 4.doc Task 3.doc • MAT_U2_L2_ALL 5.doc Task 4 AAS.docx MAT_U2_L2_ALL 4.doc Task 3 Extract of the article-The students fill the blanks MAT_U2_L2_ALL 5.doc Task 4 The students discuss in pair and answer the questions	Partecipation and interest to the activity Knowledge of the argument and use of specific vocabulary

2	25min	The students are able to compare different typology of atomization, understand, order, and remember the different typology of process	The students watch the video about different typology of atomization: flame, furnace. They take note and at the end they have to write down 3 phrases to describe the differences	**Skills** L S R W **Key vocabulary** Specific vocabulary Physical, chemical,spectral,ionisation interferences, Graphite furnace-electrothermal atomizer- viscous-surface tension - matrix- heat stable compound-releasing agents- volatile-ionisation suppressoratomisation system-modulate-pulsed-lamp-flame-hallow cathode -lens –monochromator- **Communicative structures** Sequencing words, explaining process Can you explain how? Would you mind rephrasing..? What can you say about? Do you agree with? Represent Illustrate Report ..Can you list ?	☒ Whole class ☐ Group work ☐ Pair work ☒ Individual work	• MAT_U2_L2_ALL 6.video.doc MAT_U2_L2_ALL 6.video link An introduction to how analyte is atomized in atomic spectroscopy using a flame, furnace, or plasma. The students discuss and then write 3 phrases to describe the differences	Teacher observes students during discussion Formative informal assessment of students collaborative work

3	45min	Students are able to reason ,analyze, compare, and guess different answers	The students are given worksheet and teacher asks to answer the question about atomic absorption spectroscopy, choosing between different answers	**Skills** L S R W **Key vocabulary** Specific vocabulary Source-chopper-sample cell-monochromator-detector-electronics-readout-reference beam-sample beam-atomisation system-modulate-pulsed-lamp-flame-hallow cathode -lens –monochromator- **Communicative structures** Question words What about……? Do you agree with…….? Students watchCan you list the steps….?	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• MAT_U2_L2_ALL7.doc task 5.doc MAT_U2_L2_ALL7.doc Task 5 questions about atomic absorption spectroscopy.Students answer the questions choosing between different answers. Adapted from link	Partecipation and interest to the activity Knowledge of the argument and use of specific vocabulary

CLIL Lesson Plan

Unit number	2	**Lesson number**	3	**Title**	Atomic emission spectroscopy-Inductively coupuled plasma

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	30 min + 30 min	The student are able to understand, remember ,evaluate ,reason Students know technical words related to transition and emission Students are able to discuss about the topic and to rephrase	Firstly students watch the Video about atomic emission spectroscopy and discuss about the topic;secondly teacher introduces an activity with Quizlet about atomic spectroscopy :matching questions and multiple choice questions	**Skills** L S R W **Key vocabulary** Specific vocabulary Atomic emission, transition .AES, plasma, argon,I nductively coupled plasma,electrotermal vaporisation **Communicative structures** Can you explain how? Would you mind rephrasing.? What can you say about? Do you agree with? How would you avoid?	☑ Whole class ☐ Group work ☑ Pair work ☐ Individual work	• MAT_U2_L3_ALL9 .doc task 6.doc • MAT_U2_L3_ALL8.video.doc MAT_U2_L3_ALL8.video link. video about atomic emission spettroscopy MAT_U2_L3_ALL9 task 6 link matching questions and multiple choice questions	Partecipation and interest to the activity Knowledge of the argument and use of specific vocabulary

2	40 min	The student are able to understand, remember ,evaluate ,reason	The teacher gives students a part of the article about inductively coupled plasma in which some important specific words are deleted. Students work in pairs and write down the words they expect to read in the text, then compare their answers with the complete original text.	**Skills** L S R W **Key vocabulary** Specific vocabulary Inductively coupled plasma,torch,copper coil Bandwidth-peak-hollow cathode lamp-cathode-anode-glass/quartz window-sputtering-excitation – emission-electrodeless discharge lamp-radiofrequency coil-ceramic holder-radiofrequency generator or driver **Communicative structures** Can you explain how? Would you mind rephrasing..? What can you say about? Do you agree with? Represent, Illustrate, Report…… Can you list ?	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• MAT_U2_L3_ALL10 doc task 7.doc MAT_U2_L3_ALL10 doc Task 7 Article from link The students fill the blanks, using the words below	Teacher observes during class discussion Formative informal assessment of students collaborative work

CLIL Lesson Plan

Unit number	2	**Lesson number**	4	**Title**	Lab activity: Calcium analysis in different samples of water

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	150min	The students are able to apply analytical procedure in the chemistry lab, working with order and security. They discuss the phases of experimental activity They are able to perform experience using a AA spectrophotometer,to understand how the instrument works. Data processing and use of ICT	The students are asked to analyze Ca (or different metals) in the water using AAS spectrophotometerThey work in pairs. They read the analytical method, discuss ,collect materials, carry out the determination and collect the data. The teacher explains ,suggests and discusses with students about experimental activity	**Skills** L S R W	☒ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• MAT_U2_L4_ALL11 doc task 8.doc MAT_U2_L4_ALL11 doc Task 8 Calcium analysis in different samples of water	The teacher evaluates students by crossing data obtained from observing how they work during practical activity.,and observing how they learn and understand scientific explanation.

				Key vocabulary Specific vocabulary Hollow cathode lamp- t- springs –push- insert- - knobs- current- milliamps- gain – valve –helium- oxidant- fuel – ignite-suck up- nebulisator- .impact bead – flow spoiler- turn on- turn off – absorbance procedure- results- conclusion- reference-stock standard- volumetric flask- pipette and all key words previously listed		

				Communicative structures Imperative form, impersonal pronouns, comparing and contrasting sentences Could you plan? Compare. Can you propose a method How would you apply what you learned to plan/develop? What changes would you make to solve…? How would you adapt….to create a different… How could you determine…? Measure,			

CLIL Lesson Plan

Unit number	2	**Lesson number**	5	**Title**	Presentation of experiment

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	50 min	Students are able to collect data ,organize, synthetize, and order	The students in pairs write down the report collecting data and using specific vocabulary, The teachers observes how they write scientific report linking their hypotheses to the evidence collected during the experience	**Skills** L S R **W** **Key vocabulary** Specific vocabulary all key words previously listed **Communicative structures** Sequencing words, impersonal pronouns, comparing and contrasting sentences, Suggestions Expressing opinions and explaining processes	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• MAT_U2_L5_ALL12 docTask 9.doc MAT_U2_L5_ALL12 doc Task 9 Lab report	The teacher evaluates how they write scientific report linking their hypothesis to the evidence collected during the laboratorial activity

2	50 min	Students are able to explain lab experiment in front of peers discuss about the procedureand compare and evaluate different results	A group of students explains the experiment that had been carried out in front of the class and all together discuss the results, Different data are signed on the board and statistically elaborated	**Skills** L S R W **Key vocabulary** Specific vocabulary all key words previously listed **Communicative structures** Sequencing words, impersonal pronouns, comparing and contrasting sentences, Suggestions, agreeing and disagreeing	☐ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• MAT_U2_L5_ALL14 doc-evaluation grid fo.doc • MAT_U2_L5_ALL13.doc words and communicative structures.doc MAT_U2_L5_ALL13 doc Words and communicative structures MAT_U2_L5_ALL14 doc-Evaluation grid for students presentation	The teacher evaluates how students report scientific experience linking their hypothesis to the evidence collected during the laboratorial activity

CLIL Lesson Plan

Unit number	2	**Lesson number**	6	**Title**	Revision

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	100 min	Students are able to comprehend the meaning of the question, retrieve previous learned information, apply what was learned during the module ,compare different ideas and discuss with classmates They are able to remember ,evaluate, and reason	The teachers gives students a final test, and students individually, answer the questions, choosing between different options. At the end teacher explains the correct answers	**Skills** L S R W **Key vocabulary** Specific vocabulary All key words previously used **Communicative structures** Question words All communicative structures previously used	☑ Whole class ☐ Group work ☐ Pair work ☑ Individual work	• MAT_U2_L6_ALL15 doc task 10 revision.doc • MAT_U2_L6_ALL16 doc evaluation criteria final test .doc MAT_U2_L6_ALL15 doc Revision adapted from (task10)Multiple Choice Questions adapted from link MAT_U2_L6_ALL17 doc Evaluation criteria	The teacher evaluates students by crossing data obtained from the results of final test