CLIL Module Plan

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School	Liceo Fabio Filzi				
School Grade	○ Primary		○ Middle		◉ High
School Year	○ 1	○ 2	◉ 3	○ 4	○ 5
Subject	Fisica	**Topic**	Vectors and forces as vectors		
CLIL Language	◉ English		○ Deutsch		

Personal and social-cultural preconditions of all people involved	The classes involved in this project include students coming from Rovereto or small villages located in the surrounding area. For all students, Italian is the mother tongue and no student had CLIL experience before starting this module, apart from two girls who had the chance to study geography using the CLIL methodology at middle school. The teacher of both classes is the only adult present during all the lessons. This is the teacher’s third experience in teaching applying CLIL methodology.

Students' prior knowledge, skills, competencies	**Subject**	**Language**
	Students start studying physics in the third year of this high school and so they are unfamiliar with the content of the module considered. They are able to write and read any mathematical expressions, they know physical quantities, units of measurement and their multiples and sub-multiples.	The average level of students is B1 (according to CEFR) and at the beginning of the course there was no student who had any linguistic certificate. Class 3 LUB Number of students 23 Special educational needs: 0 Migrant background: 2 from Pakistan 1 from Serbia. Class 3LUC Number of students 19 Special educational needs: 0 Migrant background: 2 from Pakistan 1 from Moldavia.

Timetable fit	◉ Module	Length 20 lessons each of them consists of 50 minutes apart from lesson 15

Description of teaching and learning strategies	Some topics are introduced by teacher with the support of power point and the use of the whiteboard , usually students are asked to recap or to solve some exercises to check their comprehension of the subject considered. Sometimes students introduce new content/information after analyzing the materials supplied by teacher in advance. Each lesson contains a glossary to help students to remember key words and to learn specific language.

Overall Module Plan

Unit: 1 Unit 1 - Vectors **Unit length:** 10 LESSONS (one hour per lesson) = 10 h	**Lesson 1** Vectors: introduction
	Lesson 2 Vectors: operations
	Lesson 3 Exercises to practice vector operations(sum and difference) related to lesson 1 and lesson 2
	Lesson 4 Exercises to practice vector operations (multiplication and division) related to lesson 1 and lesson
	Lesson 5 Components of a vector (task1+ task2)
	Lesson 6 Vectors and trigonometry
	Lesson 7 Exercises to practice the resultant vector through the use of components (task 3)
	Lesson 8 Revision for written test (exercises related to vectors, operations and components)
	Lesson 9 Written test
	Lesson 10 Check and correction of written test

Unit: 2 FORCES **Unit length:** 11 hours	**Lesson 1** Concept of force and spring force
	Lesson 2 Weight and mass
	Lesson 3 Exercises to consolidate understanding of force and spring force
	Lesson 4 Friction
	Lesson 5 Comprehension check of weight and mass, frictional force
	Lesson 6 Equilibrium of a particle: introduction
	Lesson 7 Body on an inclined plane
	Lesson 8 Inclined plane: exercises in groups
	Lesson 9 Recap: forces as vectors
	Lesson 10 Written test

CLIL Lesson Plan

Unit number	1	**Lesson number**	1	**Title**	Vectors: introduction

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	20 minutes	The definitions of scalar and vector quantities and the difference between them.	Teacher shows presentation 1 on scalar and vector quantities, introducing examples of the differences	**Skills** L S R W **Key vocabulary** Vector/vectorial Scalar Resultant Arrow Tail **Communicative structures** Today we are going to talk about... We can define/distinguish ... Examples of scalar and vector quantities are...	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	Presentation n°1	Formative assessment

2	25 minutes	Comprehension of geometrical representation of vectors	Students apply knowledge gained from presentation 1 by drawing pairs of vectors on the whiteboard with the same or different magnitude and direction	**Skills** L S R W **Key vocabulary** Vector/vectorial Scalar Resultant Arrow Tail **Communicative structures** Today we are going to talk about... We can define/distinguish ... Examples of scalar and vector quantities are...	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	Presentation n°1	Formative assessment
3	5 minutes	Recap of information	Students are invited to summarize the key words and the most important definitions from presentation.	**Skills** L S R W **Key vocabulary** Vector/vectorial Scalar Resultant Arrow Tail **Communicative structures** A vector can be defined as ... The geometrical representation of a vector is....	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	Presentation n°1	Formative assessment

CLIL Lesson Plan

Unit number	1	**Lesson number**	2	**Title**	Vectors: operations

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	10 minutes	Product of a vector by a scalar	Students are divided into groups of four or five. Using materials supplied by the teacher from presentation n° 2, each group introduces an area of vector operations. Some of them use the whiteboard to show materials adapted from the lesson assigned by the teacher First group: students explain the method and give examples , each student of the group speaks.	**Skills** L S R W **Key vocabulary** Product Scalar vector **Communicative structures** Use of the third person singular	☑ Whole class ☑ Group work ☐ Pair work ☐ Individual work	Presentation n° 2 (Vector addition)	Formative assessment, teacher observes students’presentations

2	10 minutes	Head to tail method	Second group :students explain the method and give examples , each student of the group speaks	**Skills** L S R W **Key vocabulary** Direction resultant Counterclockwise Protractor **Communicative structures** There are different ways to determine the vector sum, one of these is….	☒ Whole class ☒ Group work ☐ Pair work ☐ Individual work	Presentation n° 2 (Vector addition)	Formative assessment, teacher observes students’presentations
3	10 minutes	Parallelogram law	Third group :students explain the method and give examples , each student of the group speaks	**Skills** L S R W **Key vocabulary** Vector Tail Diagonal Parallelogram Vertex **Communicative structures** From this lesson I have understood….	☒ Whole class ☒ Group work ☐ Pair work ☐ Individual work	Presentation n° 2 (Vector addition)	Formative assessment, teacher observes students’presentations

4	10 minutes	Vector difference	Fourth group :students explain the method and give examples , each student of the group speaks	**Skills** L S R W **Key vocabulary** Minor diagonal Difference Resultant Opposite **Communicative structures** The difference of two vectors is obtained by….	☑ Whole class ☑ Group work ☐ Pair work ☐ Individual work	Presentation n° 2 (Vector addition)	Formative assessment, teacher observes students’presentations
5	10 minutes	Product of a vector by a scalar Head to tail method Parallelogram law Vector difference	Teacher’s recap	**Skills** L S R W **Key vocabulary** Revise a presentation To study in greater detail **Communicative structures** To summarize Today we have learnt	☑ Whole class ☐ Group work ☐ Pair work ☐ Individual work	Presentation n° 2 (Vector addition)	

CLIL Lesson Plan

Unit number	1	**Lesson number**	3	**Title**	Exercises to practice vector operations(sum and difference) related to lesson 1 and lesson 2

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	30 minutes	Familiarization with the sum and difference of two vectors. All the results are given geometrically (drawing the vectors) and algebraically.	Teacher divides the class into five groups. Each group consists of four or five students. One of the students has the role to check if his/her schoolmates speak English.	**Skills** L S R W **Key vocabulary** Application point Magnitude Resultant vector **Communicative structures** In my view, to calculate the magnitude is useful to remember...	☐ Whole class ▣ Group work ☐ Pair work ☐ Individual work	Worksheet n°1 (Sum and difference of vectors)	Formative assessment, teacher observes students' work Continuous assessment (teacher circulates around groups and gives further explanation of task if any student is not able to proceed)

2	20 minutes	Sum and difference of vectors	Under the supervision of the teacher, each group presents the solution of their allocated exercises and explains the procedure and the results. Group 1 is given exercises 1and 2. Group 2 is given exercises 3and 4. Group 3 is given exercises 5 and 6. Group 4 is given exercises 7	**Skills** L S R W **Key vocabulary** Application point Magnitude Resultant vector **Communicative structures** After sharing our ideas we have considered that …. After looking carefully at the picture of vectors we have realized that….	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	Worksheet n°1 (Sum and difference of vectors)	Formative assessment, teacher observes students' solutions

CLIL Lesson Plan

Unit number	1	**Lesson number**	4	**Title**	Exercises to practice vector operations (multiplication and division) related to lesson 1 and lesson

Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment
1	10 minutes	Sum and difference of vectors	Before assigning a new worksheet, teacher asks students some questions related to the exercises of the worksheet n°1	**Skills** L S R W **Key vocabulary** Application point Magnitude Resultant vector **Communicative structures** Use of the third person singular Passive form: parallelogram law is used to...	☑ Whole class ☐ Group work ☐ Pair work ☐ Individual work	Worksheet n°1 (Sum and difference of vectors)	Formative assessment, teacher listens to students' answers and corrects

2	20 minutes	Algebraic and geometrical product and division of a number and a vector	Teacher divides the class into five groups, each group consists of four or five students. The groups are changed from the previous lesson. One of the students has the role to check if his/her schoolmates speak English.	**Skills** L S R W **Key vocabulary** Application point Magnitude Resultant vector **Communicative structures** Opinion giving: In my opinion the correct method to calculate the product is...	☐ Whole class ☑ Group work ☐ Pair work ☐ Individual work	Worksheet n°2 (product and division of a number and a vector)	Formative assessment, teacher observes students'work - Continuous assessment(teacher circulates around groups and gives further explanation of task if any student is not able to proceed)
3	20 minutes	Product and division of a number and a vector	Under the supervision of the teacher, each group presents the solution of some exercises and explains the procedure and the results.	**Skills** L S R W **Key vocabulary** Product Division **Communicative structures** After sharing our ideas we have considered that …. After looking carefully at the pictures of vectors we have realized that….	☑ Whole class ☐ Group work ☐ Pair work ☐ Individual work	Worksheet n°2 (product and division of a number and a vector)	Formative assessment, teacher observes students' solutions

CLIL Lesson Plan

Unit number	1	**Lesson number**	5	**Title**	Components of a vector (task1+ task2)

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	10 minutes	Graphical magnitude of the components of a vector . Components of a vector and Pythagoras' theorem applied to components	Teacher uses whiteboard to introduce few slides of presentation n°3 in order to show the components of a vector and the right angled triangle to which Pythagoras' theorem can be applied	**Skills** L S R W **Key vocabulary** Components To drop a perpendicular Projection Intercept Decomposition of a vector **Communicative structures** A vector can be uniquely decomposed into a sum of two perpendiculars vectors. A vectors forms an angle with…. A component is preceded by a positive sign when….or a negative sign when….	☐ Whole class ☐ Group work ☐ Pair work ☐ Individual work	Presentation n° 3 (Components of a vector)	

2	15 minutes	Use of Pythagoras' theorem with vectors	Teacher divides the class into couples, in order to accelerate the organization of the work, each students completes task1 one with his/her neighbour	**Skills** L S R W **Key vocabulary** Components of a vector To break up a vector **Communicative structures** A vector can be broken up into its components, graphically we have to…. Pythsgoras'theorem can be applied whenever we deal with a right angled triangle	☐ Whole class ☐ Group work ▣ Pair work ☐ Individual work	Task 1 of presentation n°3 (Components of a vector)	Formative assessment, teacher observes students'work Continuous assessment(teacher circulates around couples of students and gives further explanation of task if any student is not able to proceed)

3	5 minutes	Addition and subtraction of vectors by two dimensional components	Teacher uses whiteboard to introduce the eighth and ninth slides of presentation n°3 in order to show the algebraic sum, difference of components and the multiplication of a number by a vector	**Skills** L S R W **Key vocabulary** Dimensions Components that lie along…. Algebraic sums and differences **Communicative structures**	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	Presentation n° 3 (Components of a vector)	
4	20 minutes	Practice of addition and subtraction of vectors by two dimensional components	Students complete task 2	**Skills** L S R W **Key vocabulary** Component notations **Communicative structures** It is important to consider components that lie in the same direction… It is very easy to add vectors in component notation….	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	Task 2 of presentation n°3	Formative assessment, teacher observes students'work Continuous assessment(teacher circulates around couples of students and gives further explanation of task if any student is not able to proceed)

CLIL Lesson Plan

Unit number	1	**Lesson number**	6	**Title**	Vectors and trigonometry

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	5 minutes	Trigonometry : equations used to determine the sides of a right angled triangle by means of cosine and sine functions	Teacher presents the first three slides of presentation n°3 and asks students to deduce the content. In a few minutes they realize that material suggests how to calculate the length of a side of a right angled triangle and which equations should be used	**Skills** L S R W **Key vocabulary** Trigonometry Adjacent to Opposite the Ratio of….to **Communicative structures** The sine/cosine function relates the measurement of an acute angle to….	☑ Whole class ☐ Group work ☐ Pair work ☐ Individual work	Presentation n°3 (trigonometry and direction of a vector , the first three slides)	Formative assessment (teacher listens to students' answers and their conclusion)

2	20 minutes	Calculation of the sides of a right angled triangle by means of cosine and sine functions	Students receive a photocopy containing task 3 of presentation n°3. They work in pairs to the complete exercises	**Skills** L S R W **Key vocabulary** Diagram To break up a vector Graphical magnitude of a vector Resultant vector **Communicative structures** The projection of vector v	☐ Whole class ☐ Group work ☑ Pair work ☐ Individual work	Task 3 (1,2) of presentation n°3 (Components of a vector)	Formative assessment, teacher observes students'work Continuous assessment(teacher circulates around couples of students and gives further explanation of task if any student is not able to proceed)
3	5 minutes	Magnitude of a vector whose components are defined through cosine and sine function	Teacher gives students the second part of the presentation n°3 and before assigning them task 3	**Skills** L S R W **Key vocabulary** To decompose a vector Vector addition **Communicative structures**	☐ Whole class ☐ Group work ☐ Pair work ☐ Individual work	Presentation n°3(trigonometry and direction of a vector , the last two slides before task 3)	

4	20 minutes	Calculation of the components of a vector using trigonometry	Students receive a photocopy containing task 3(n°3) of presentation n°3 . They work in pairs to complete exercises. Students find exercises quite demanding so they do not complete the last part of this task	**Skills** L S R W **Key vocabulary** To break up a vector **Communicative structures** The length of a segment in a right angled triangle can be calculated by knowing….	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	Task 3(n°3) of presentation n°3 (Components of a vector)	Formative assessment, teacher observes students'work Continuous assessment (teacher circulates around couples of students and gives further explanation of task if any student is not able to proceed)

CLIL Lesson Plan

Unit number	1	**Lesson number**	7	**Title**	Exercises to practice the resultant vector through the use of components (task 3)

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	5 minutes	Calculation of the sides of a right angled triangle by means of cosine and sine functions Graphical and algebraic magnitude of the components of a vector .	Teacher recaps following the slides of presentation n°3 given during the previous lesson and highlights the equations used to solve exercises in task 3	**Skills** L S R W **Key vocabulary** Segments Right angled triangle Hypotenuse **Communicative structures** If we know an acute angle of a right angled triangle and the length of a side , it is possible to calculate the length of hypotenuse... (zero conditional)	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	Presentation n°3 and task 3	

2	15 minutes	Practice of graphical and algebraic magnitude of the components of a vector	Teacher divides the class into five groups, each group consists of four or five students. The groups are different from previous lessons	**Skills** L S R W **Key vocabulary** Components of a vector **Communicative structures**	☐ Whole class ☒ Group work ☐ Pair work ☐ Individual work	Task 3	Formative assessment, teacher observes students'work

3	5 minutes	Sum of any two vectors using their components	Most of students are not able to complete the exercise 4 of task 3, so teacher gives further explanation	**Skills** L S R W **Key vocabulary** Sum Components **Communicative structures**	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	Task 3 (3 and 4)	

4	25 minutes	Practice of sum of any two vectors using their components	Students still in groups from before complete exercise 4 of tasks 3	**Skills** L S R W **Key vocabulary** Sum Components **Communicative structures** The sum of any two vectors can be determined by….	☐ Whole class ☒ Group work ☐ Pair work ☐ Individual work	Task 3 (3 and 4)	Formative Assessment (teacher circulates around couples of students and gives further explanation of task if any student is not able to proceed)

CLIL Lesson Plan

Unit number	1	**Lesson number**	8	**Title**	Revision for written test (exercises related to vectors, operations and components)

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	10 minutes	Scalar and vector quantities. Adding vectors (Parallelogram rule , head to tail rule). Subtracting vectors. Multiplying a vector by a scalar. Components of vectors	Students review the pages on vectors of the book Physics: Eleonora Anzola Silvia Anzola Ed Zanichelli then, in turn, teacher asks students to answer the questions related to the points of learning outcomes. Scalar and vector quantities. Adding vectors (Parallelogram rule , head to tail rule). Subtracting vectors. Multiplying a vector by a scalar. Components of vectors	**Skills** L S R W **Key vocabulary** Scalar Vector Parallelogram Head to tail Components **Communicative structures** Many quantities in physics are fully described by…. The head to tail rule is applied to… Some quantities in physics require a mechanism for describing both magnitude and direction…..	☐ Whole class ☐ Group work ☐ Pair work ☐ Individual work	From Physics: Eleonora Anzola Silvia Anzola Ed Zanichelli Pag 18, 19,Slides and note Pag 22 Concept map Pag 24 question and answer (4,5,6)	Formative Assessment

2	30 minutes	Practice of adding , subtracting vectors by means of head to tail rule; calculation of components using sine and cosine functions	Teacher divides the class into pairs (the reading comprehension was assigned for homework)	**Skills** L S R W **Key vocabulary** Scalar Vector Parallelogram Head to tail Components **Communicative structures**	☑ Whole class ☐ Group work ☐ Pair work ☐ Individual work	From Physics: Eleonora Anzola Silvia Anzola Ed Zanichelli Pag 26 Multiple choice Pag 27 Reading comprehension (ex n °1,2,3)	Formative Assessment
3	10 minutes	Strategies to be successful in solving the written test	Teacher hands out worksheet with advice on how to complete the written test and the marking criteria.	**Skills** L S R W **Key vocabulary** Look carefully at... **Communicative structures**	☑ Whole class ☐ Group work ☐ Pair work ☐ Individual work	Advice and marking criteria	

CLIL Lesson Plan

Unit number	1	**Lesson number**	9	**Title**	Written test

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	5 minutes	To understand the test requirements	Teacher gives instructions to complete the written test correctly	**Skills** L S R W **Key vocabulary** Magnitude Direction Components Resultant vector Scalar and vector quantities **Communicative structures** We can use two methods to obtain the resultant vector, they are…. To determine algebraically the magnitude of the components of a vector we can use trigonometry.	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	Test 1 supplied by teacher	Summative assessment

2	45 minutes	Difference between scalar and vector quantities. To draw vectors and their components To use parallelogram law to determine the resultant vector. Description of head to tail method Calculation of the components of a vector through the application of sine and cosine functions	Students complete their work answering the questions written on their worksheet, filling in the blanks and drawing the resultant vector, calculating algebraically the resultant vector	**Skills** L S **R** **W** **Key vocabulary** Magnitude Direction Components Resultant vector Scalar and vector quantities **Communicative structures**	☐ Whole class ☐ Group work ☐ Pair work ☒ Individual work	Test 1 supplied by teacher	

CLIL Lesson Plan

Unit number	1	**Lesson number**	10	**Title**	Check and correction of written test

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	15 minutes	Advice to facilitate understanding of main concept of the written test	Teacher assigns the written tests, underlining the most common mistakes made and the way to avoid them; then teacher chooses three pairs to correct any unclear mistakes	**Skills** L S R W **Key vocabulary** Look carefully Read the instructions twice or more **Communicative structures** After looking carefully at the picture of two vectors, we can calculate the resultant... Remembering the methods studied to calculate the resultant vector we can say that...	☑ Whole class ☐ Group work ☐ Pair work ☐ Individual work	Test 1 supplied by teacher	

2	10 minutes	To distinguish scalar and vector quantities	Students explain what scalar and vector quantities are, how to distinguish them and then they give examples. At the end they analyze the elements of the third exercise and tell classmates why some quantities are scalar and others vector	**Skills** L S R W **Key vocabulary** Velocity Displacement Volume Density Weight Mass **Communicative structures** Some quantities are said to be vector or scalar quantities if…	☑ Whole class ☐ Group work ☑ Pair work ☐ Individual work	Test 1 supplied by teacher	Formative assessment and teacher’s observation

3	10 minutes	To draw and to determine algebraically the resultant vector	Students in turn repeat the principles rules and laws studied to determine vector, then they give the solutions of the exercises related to the sum of two vectors	**Skills** L S R W **Key vocabulary** Opposite direction Application point Magnitude **Communicative structures** In physics we can find different strategies to determine the resultant vector… Parallelogram law consists of…. The head to tail method is so called because of the procedure we follow to establish the resultant vector of two or more vectors	☒ Whole class ☐ Group work ☒ Pair work ☐ Individual work	Test 1 supplied by teacher	Formative assessment and teacher’s observation

4	10 minutes	To determine the components of a vector. To determine the resultant vector	Students remind their classmates of when trigonometry is required to calculate the components of a vector and how to apply the sine and cosine functions	**Skills** L S R W **Key vocabulary** Components of a vector To point along To form an angle **Communicative structures** Trigonometry is a mathematical support used in several scientific subjects, one of them is physics…. The components of a vector can be calculated by means of….	☑ Whole class ☐ Group work ☑ Pair work ☐ Individual work	Test 1 supplied by teacher	Formative assessment and teacher's observation

CLIL Lesson Plan

Unit number	2	**Lesson number**	1	**Title**	Concept of force and spring force

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	20 minuts	The concept of force. Resultant forces Elastic and solid bodies Spring force	Teacher uses whiteboard to introduce slides of presentation n°4 in order to show the concept of force, the difference between elastic and solid bodies and Hooke’s law	**Skills** L S R W **Key vocabulary** To exceed To exert To tolerate To be subjected to To apply Restoring Stiffness **Communicative structures**	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Presentation n°4 forces and Hooke's law.pdf	

2	30 minutes	Practice of resultant force, spring force and Hooke’s law	Teacher divides the class into five groups, each group consists of four or five students. The groups are different from previous lessons	**Skills** L S R W **Key vocabulary** To exceed To exert To tolerate To be subjected to To apply Restoring Stiffness **Communicative structures** The resultant force is.. We can stretch or pull a spring and the force exerted can be calculated by…. The negative sign of Hooke’s law tells us…	☐ Whole class ☒ Group work ☐ Pair work ☐ Individual work	• Presentation n°4 forces and Hooke's law.pdf	Formative assessment, teacher observes students’work Continuous assessment (teacher circulates around groups of students and gives further explanation of task if any student is not able to proceed)

CLIL Lesson Plan

Unit number	2	**Lesson number**	2	**Title**	Weight and mass

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	20 minutes	The concepts of mass, of weight and the difference between them. Condition of equilibrium	Teacher uses whiteboard to introduce slides of presentation n°5 in order to show the concept of mass, of weight and the difference between them. Condition of equilibrium	**Skills** L S R W **Key vocabulary** Equilibrium Gravitational acceleration constant Point mass Resultant force **Communicative structures**	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Presentation n°5 weight.pdf	

2	15 minutes	Practice of condition of equilibrium, spring force , and weight	Teacher divides the class into pairs to solve the last exercise of presentation n°5	**Skills** L S R W **Key vocabulary** Equilibrium Gravitational acceleration constant Point mass Resultant force **Communicative structures** A point of mass is said to be in equilibrium if.... The resultant force is....	☐ Whole class ☐ Group work ☑ Pair work ☐ Individual work	• Presentation n°5 weight.pdf	Formative assessment, teacher observes students'work Continuous assessment (teacher circulates around groups of students and gives further explanation of task if any student is not able to proceed)
3	15 minutes	Steps to solve a problem related to condition of equilibrium, spring force , and weight	On confirming that students are able to solve the exercise partially, teacher gives them the solution explaining all the steps to follow and answers students' questions	**Skills** L S R W **Key vocabulary** Condition of quilibrium Resultant force **Communicative structures**	☑ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Worksheet n° 4 of presentation n°5.pdf	

CLIL Lesson Plan

Unit number	2	**Lesson number**	3	**Title**	Exercises to consolidate understanding of force and spring force

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	5 minutes	Comprehension of activity instructions	Teacher divides the class into five groups, each group consists of four or five students and then assigns the worksheet	**Skills** L S R W **Key vocabulary** See lesson 12 **Communicative structures**	☐ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Worksheet n° 5 Hooke's law practice.pdf Worksheet n° 5 Hooke’s law practice taken from link	

2	35 minutes	Spring force: Hooke’s law Direct proportionality of the extension of a spring and spring force	Students solve the exercises of the supplied worksheet from number 1 to number 13 (apart from exercises 3 and 5 that will be solved during the lesson 15)	**Skills** L S R W **Key vocabulary** Resting position Spring constant To stretch To deform **Communicative structures** TWe have to apply Hooke’s law equation to determine….	☐ Whole class ☑ Group work ☐ Pair work ☐ Individual work	• Worksheet n° 5 Hooke's law practice.pdf Worksheet n° 5 Hooke’s law practice taken from link	Formative assessment, teacher observes students’work Continuous assessment (teacher circulates around groups of students and gives further explanation of task if any student is not able to proceed)
3	10 minutes	Checking results	Two groups repeat the solutions of the exercises 1,2,4,7,13. on the whiteboard	**Skills** L S R W **Key vocabulary** Resting position Spring constant To stretch To deform **Communicative structures** To calculate the spring constant…. Hooke’s law equation permits us to determine…. Thanks to the graph extension/spring force we discovered that….	☑ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Worksheet n° 5 Hooke's law practice.pdf Worksheet n° 5 Hooke’s law practice taken from link	Formative assessment: teacher listens to students’explanation

CLIL Lesson Plan

Unit number	2	**Lesson number**	4	**Title**	Friction

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	15 minutes	The concepts of friction Differences between static, kinetic and rolling friction Equation to find the frictional force	Teacher uses whiteboard to introduce the slides of presentation n°6 in order to introduce when friction occurs and the different types of friction	**Skills** L S R W **Key vocabulary** Key vocabulary Static friction Kinetic friction Rolling friction The coefficient of static friction Smooth Rough **Communicative structures** Frictional force occurs whenever we try to slide one body over another body	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Presentation n°6 friction.pdf	

2	25 minutes	Practice of frictional force	With teacher assistance students look at an example of the first exercise on the worksheet and gives some instructions to solve in pair the following three exercises of the worksheet	**Skills** L S R W **Key vocabulary** Force diagram Coefficient of kinetic friction Normal force **Communicative structures**	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• Worksheet n°5 of presentation n°6 friction.pdf	Formative assessment, teacher observes students'work Continuous assessment (teacher circulates around groups of students and gives further explanation of task if any student is not able to proceed)

3	10 minutes	Check the solution of exercises	Using whiteboard, pairs of students present the solution of the exercises and give explanation to their classmates who check their own results.	**Skills** L S R W **Key vocabulary** Force diagram Coefficient of kinetic friction Normal force **Communicative structures** The force diagram consists of… The forces applied on a body depend on….	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Worksheet n°5 of presentation n°6 friction.pdf	Formative assessment, teacher observes students'explanation

CLIL Lesson Plan

Unit number	2	**Lesson number**	5	**Title**	Comprehension check of weight and mass, frictional force

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	5 minutes	Comprehension of activity instructions	Teacher divides the class into five groups, each group consists of four or five students and then assigns the worksheet n°6	**Skills** L S R W **Key vocabulary** Mass Weight Gravitational acceleration **Communicative structures**	☑ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Worksheet n° 6 mass and weight.pdf Worksheet n°6 Mass and weight adapted from link	

2	35 minutes	Mass as a constant Difference between mass and weight Different values of gravitational acceleration due to different planets	Students solves the exercises of the supplied worksheet n°6	**Skills** L S R W **Key vocabulary** Mass Weight Gravitational acceleration **Communicative structures** Mass never changes despite …. Weight changes depending on….	☐ Whole class ☒ Group work ☐ Pair work ☐ Individual work	• Worksheet n° 6 mass and weight.pdf Worksheet n°6 Mass and weight adapted from link	Formative assessment, teacher observes students'work Continuous assessment (teacher circulates around groups of students and gives further explanation of task if any student is not able to proceed)
3	10 minutes	Check the solution of exercises	Using whiteboard, pairs of students give answers with an explanation to their classmates who check their own results.	**Skills** L S R W **Key vocabulary** Mass Weight Gravitational acceleration **Communicative structures** To calculate weight we remember the different values of gravitational acceleration depend on….	☐ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Worksheet n° 6 mass and weight.pdf Worksheet n°6 Mass and weight adapted from link	Formative assessment, teacher listens to students'explanation

4	5 minutes	Comprehension of activity instructions	Teacher assigns the worksheet n°6 Students are still in groups as previous lesson	**Skills** L S R W **Key vocabulary** Coefficient of static/kinetic friction Force diagram To apply a force Rough Smooth **Communicative structures**	☐ Whole class ☒ Group work ☐ Pair work ☐ Individual work	• Worksheet n° 7 friction.pdf Worksheet n°7 friction taken from link + link	

5	35 minutes	To calculate the coefficient of static /kinetic friction To draw a force diagram Appreciation of different forces acting on two surfaces in contact (smooth or rough)	Students solve the exercises of the supplied worksheet n°7 (from number 1 to number 6)	**Skills** L S R W **Key vocabulary** Coefficient of static/kinetic friction Force diagram To apply a force Rough Smooth **Communicative structures** To draw a force diagram we have to consider all the forces acting on…. Drawing a diagram force helps to find correctly the data of a problem	☐ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Worksheet n° 7 friction.pdf Worksheet n°7 friction taken from link + link	Formative assessment, teacher observes students'work Continuous assessment (teacher circulates around groups of students and gives further explanation of task if any student is not able to proceed)
6	10 minutes	Check the solution of exercises	Using whiteboard, pairs of students give answers with an explanation to their classmates who check their own results.	**Skills** L S R W **Key vocabulary** Coefficient of static/kinetic friction Force diagram To apply a force Rough Smooth **Communicative structures**	☑ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Worksheet n° 7 friction.pdf Worksheet n°7 friction taken from link + link	Formative assessment, teacher listens to students' explanation

CLIL Lesson Plan

Unit number	2	**Lesson number**	6	**Title**	Equilibrium of a particle: introduction

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	15 minnutes	Definition of a particle. Equilibrium: conditions Equilibrium of a body on a horizontal plane.	Teacher uses whiteboard to introduce slides of presentation n°7 in order to show the concept of equilibrium	**Skills** L S R W **Key vocabulary** Particle Concurrent forces The resultant of all forces Horizontal plane **Communicative structures**	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Presentation n°7 equilibrium of a particle.pdf	

2	30 minutes	To draw a force diagram of a body on a horizontal plane The condition of equilibrium To find the magnitude of the frictional force between a horizontal plane and a body	Students solves exercises n 10,11 of worksheet n°7 and the first two exercises of worksheet n°8	**Skills** L S R W **Key vocabulary** Horizontal plane Rough plane To be on the point of slipping Coefficient of friction **Communicative structures** To solve a problem is useful to draw a system of concurrent forces acting on a body. We usually apply an ideal model to....	☐ Whole class ☒ Group work ☐ Pair work ☐ Individual work	• Worksheet n° 7 friction.pdf • Worksheet n° 8 equilibrium and body on an inclined plane.pdf • Presentation n°7 equilibrium of a particle.pdf	Formative assessment, teacher observes students'work Continuous assessment (teacher circulates around groups of students and gives further explanation of task if any student is not able to proceed)

3	10 minutes	Check the solution	Using whiteboard, pairs of students present the solution of the exercises 10 and 11 and give an explanation to their classmates who check their own results.	**Skills** L S R W **Key vocabulary** Horizontal plane Rough plane To be on the point of slipping Coefficient of friction **Communicative structures**	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Worksheet n° 7 friction.pdf • Presentation n°7 equilibrium of a particle.pdf	

CLIL Lesson Plan

Unit number	2	**Lesson number**	7	**Title**	Body on an inclined plane

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	15 minutes	Equilibrium of a body on an inclined plane	Teacher uses whiteboard to introduce the last six slides of presentation n°7 in order to show the concept of equilibrium a body on an inclined plane and to consider all the forces acting on it.	**Skills** L S R W **Key vocabulary** Inclined plane To break up forces Components of a force **Communicative structures** An inclined plane is....	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Presentation n°7 equilibrium of a particle.pdf	

2	10 minutes	To draw a force diagram of a body on an inclined plane	Teacher solves the first example of presentation n°7 in order to show how to draw a force diagram and how to apply the condition of equilibrium	**Skills** L S R W **Key vocabulary** Smooth Rough **Communicative structures**	▣ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Presentation n°7 equilibrium of a particle.pdf	
3	15 minutes	To draw a force diagram of a body on an inclined plane To find the magnitude of the frictional force between an inclined plane and a body	In pairs students solves the second example of presentation n°7	**Skills** L S R W **Key vocabulary** Block To weigh Plank Coefficient of static friction **Communicative structures** The forces acting on a body are…., we can break up them into parallel and perpendicular components…..	☐ Whole class ☐ Group work ▣ Pair work ☐ Individual work	• Presentation n°7 equilibrium of a particle.pdf	Formative assessment, teacher observes students'work Continuous assessment (teacher circulates around pairs of students and gives further explanation of task if any student is not able to proceed)

4	10 minutes	Check the solution	Using whiteboard, a pair of students answers the exercise and give explanation to their classmates who check their own results and check also the result of the first exercises of worksheet n°8	**Skills** L S R W **Key vocabulary** Block To weigh Plank Coefficient of static friction **Communicative structures** After considering all the forces acting on a body, we introduce a reference frame to consider the components of forces along the x and y axes	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Worksheet n° 8 equilibrium and body on an inclined plane.pdf • Presentation n°7 equilibrium of a particle.pdf	Formative assessment, teacher listens to students' explanation

CLIL Lesson Plan

Unit number	2	**Lesson number**	8	**Title**	Inclined plane: exercises in groups

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	5 minutes	Comprehension of activity instructions	Teacher divides the class into five groups, and assigns worksheet	**Skills** L S R W **Key vocabulary** nclined plane Equilibrium Normal force Weight Length Height **Communicative structures**	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Worksheet n° 8 equilibrium and body on an inclined plane.pdf Worksheet n° 8 inclined plane	

2	35 minutes	Practice of equilibrium of a body on an inclined plane	Students solve the exercises 3, 4, 5, 6 and 7 of the supplied worksheet n°8	**Skills** L S R W **Key vocabulary** Inclined plane Equilibrium Normal force Weight Length Height To spklit **Communicative structures** After introducing a frame reference, we have to split the forces along the perpendicular and parallel direction… The condition of equilibrium tells us that the resultant of the forces acting on….	☐ Whole class ☒ Group work ☐ Pair work ☐ Individual work	• Worksheet n° 8 equilibrium and body on an inclined plane.pdf Worksheet n° 8 inclined plane	Formative assessment, teacher observes students'work Continuous assessment (teacher circulates around groups of students and gives further explanation of task if any student is not able to proceed)

3	10 minutes	Revision of equilibrium of a body on an inclined plane	Using whiteboard, pairs of students present the solution of the first three exercises and give explanation to their classmates who check their own results.	**Skills** L S R W **Key vocabulary** Inclined plane Equilibrium Normal force Weight Length Height **Communicative structures**	☒ Whole class ☒ Group work ☐ Pair work ☐ Individual work	• Worksheet n° 8 equilibrium and body on an inclined plane.pdf Worksheet n° 8 inclined plane	Formative assessment, teacher listens to students' explanation

CLIL Lesson Plan

Unit number	2	**Lesson number**	9	**Title**	Recap: forces as vectors

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	10 minutes	Forces: Hooke’s law Normal force Weight Static friction force Kinetic friction force Equilibrium	Students review the pages on fo9rces of the book Physics: Eleonora Anzola Silvia Anzola Ed Zanichelli then, in turn, teacher asks students to answer the questions related to the points of learning outcomes	**Skills** L S R W **Key vocabulary** Interaction Components of a force Opposite To oppose Deformation Spring **Communicative structures** Elastic force is a force from the deformation of a body….its direction and magnitude are found by…. Friction is the force that opposes the motion of objects sliding…. Any object is in equilibrium when ….	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Zanichelli recap 2.pdf Recap 2 taken from Physics: Eleonora Anzola Silvia Anzola Ed Zanichelli Pag 68 Slides and notes (elastic force and Hooke’s law, equilibrium) Pag 70,71 Concept map	Formative assessment, teacher listens to students’ answers

2	30 minutes	Practice of Hooke’s law normal force weight static friction force kinetic friction force Equilibrium	Students use their text book to solve exercises on pag 74 . They work in pairs to complete exercises	**Skills** L S R W **Key vocabulary** Compression, extension, friction to exert At rest **Communicative structures** Hooke’ law states that an ideal spring exerts a force proportional to…. A friction force is created whenever two surfaces move or try to move across each other , it always acts….. The normal force is perpendicular to the surface…..	☐ Whole class ☐ Group work ☒ Pair work ☐ Individual work	• Zanichelli recap 2.pdf Recap 2 Taken from Physics: Eleonora Anzola Silvia Anzola Ed Zanichelli Pag 74 (multiple choice exercise 5and 6 are escluded) Pag 76 exercises (n°1)	Formative assessment, teacher observes students’work Continuous assessment (teacher circulates around pairs of students and gives further explanation of task if any student is not able to proceed

3	10 minutes	Check the answers of exercises	Using whiteboard, pairs of students present the solution of the exercises and give explanation to their classmates who check their own results.	**Skills** L S R W **Key vocabulary** Compression, extension, friction to exert At rest **Communicative structures**	☒ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Zanichelli recap 2.pdf Recap. 2 - Taken from Physics: Eleonora Anzola Silvia Anzola Ed Zanichelli Pag 74 (multiple choice exercise 5and 6 are escluded) Pag 76 exercises (n°1)	Formative assessment, teacher listens to students' explanation

CLIL Lesson Plan

Unit number	2	**Lesson number**	10	**Title**	Written test

Activity	**Timing**	**Learning Outcomes**	**Activity Procedure**	**Language**	**Interaction**	**Materials**	**Assessment**
1	5 minutes	To understand the test requirements	Teacher gives instructions to complete the written test correctly	**Skills** L S R W **Key vocabulary** To twist To compress Elasticity limit Force diagram **Communicative structures** A solid body is said to be in equilibrium if.... The main features of ....are....	☑ Whole class ☐ Group work ☐ Pair work ☐ Individual work	• Written test 2 forces.pdf Test supplied by teacher Written test 2 forces	

2	45 minutes	Differences between elastic and solid bodies. Forces as vectors. To draw a force diagram. Condition of equilibrium of a body. Differences between mass and weight. Spring force. Calculation of forces acting on a horizontal and on an inclined plane.	Students complete their work answering the questions written on their worksheet, filling in the blanks and solving the exercises.	**Skills** L S R W **Key vocabulary** **Communicative structures**	☐ Whole class ☐ Group work ☐ Pair work ☑ Individual work		Formative assessment