3rd Gymnasium of Heraklion Crete

CLIL Lesson Plan | **Teacher: Mizeraki Charikleia**

Subjects involved: **Physics: Mechanical Waves** | **Grade: 3rd grade**

Time: 3 lessons of 45 minutes

Unit or topic: **Excitation of Mechanical Waves and Types of Mechanical Waves**

Learning Outcomes
By the end of these lessons learners will be able to: • Understand what is necessary for the excitation of a mechanical wave • Describe what is a mechanical wave • Understand the factors that determine the speed (velocity) of the wave • Identify the three (basic) types of mechanical waves

Assessment	
Teacher, peer- and self -assessment processes will be used to access how well learners will: • participate in class • answer the questions of the worksheets • fill in an evaluation test to evaluate the procedure • volunteer for extra presentations/optional projects on related topics	
Content	**Cognition**
• Introducing the topic "Mechanical Wave" • Excitation of mechanical waves • Which physical quantity is transmitted	Provide learners with opportunities to use scientific procedure to study and describe simple physical phenomena.

through the mechanical waves (Energy and disturbance) • Types of Mechanical Waves (Basic types) • Implementation on known phenomena like the transmission of sound waves and seismic waves.	Provide learners with opportunities to understand the scientific approach of known quantities and phenomena. Provide learners with opportunities to understand the connection between known phenomena and physical quantities.
Culture	
• The students can realize that simple phenomena, like the transmission of the sound waves and the seismic waves are mechanical waves. • The sense of hearing depends on the propagation of the sound waves. • Earthquakes: seismic waves provide details and characteristics of the layered interior.	

Communications		
Language OF learning	**Language FOR learning**	**Language THROUGH learning**
Mechanical waves Propagation of a wave Energy transportation transmission excitation vibrating source flow continuous medium loose ≠ tight molecules particles	<u>Asking questions:</u> Can you tell us…? What is transmitted by the wavy motion? <u>Suggesting:</u> Can you draw a wave? <u>Ask for descriptions:</u> What did you see at this	Learn new words used for the description of the subject and the given vocabulary. Learn the use of known words for scientific expression. Learn expressions related with the certain chapter of the subject.

disturb demonstration longitudinal or compressional waves transverse or shear waves displacement parallel perpendicular solid liquid gas surface waves Earthquake	simulation? Comparing: What differences did you see…? Concluding Short phrases describing what we learn	

Procedures

[one week before the CLIL project realization]

The teacher gives a list of words (vocabulary) necessary for this CLIL lesson.

1st teaching hour

- The teacher orally mentions the subject of the lesson
- The teacher hands out the 1st worksheet and ask for the first activity (to draw a simple picture related with word “wave”)
- The students watch the simulation https://phet.colorado.edu/en/simulation/wave-on-a-string
- The simulation allows to change the critical parameters of the wave to understand their affection.
- Discussion about the questions of the worksheet
- The students watch again the simulation (if they ask for it) and fill in the work sheet.
- Homework: to study the concluding paragraph, so they could express the new meanings they’ve learnt.

2nd teaching hour

- watch the simulations

  http://photodentro.edu.gr/v/item/ds/8521/1666

  http://photodentro.edu.gr/v/item/ds/8521/1611

  or use of the "wave springs" (from the Science lab) to present shear waves and compressional waves.
- Discuss about the differences of those types of waves and description of them while they fill in the corresponding questions of the worksheet.
- Description of the surface waves and the reason they are complicated waves.
- A brief worksheet, with a few questions, could evaluate the procedure

3rd teaching hour

- Presentations about sound waves and earthquakes can take place, through projects done by the students.

Aids and materials

- Related vocabulary
- 2 Worksheets (1 for each teaching hour)
- Computer, projector, screen and internet connection.
- Equipment from the Science lab (like water tank or wave springs).
- Evaluation worksheet

Scaffolding Strategies

- Select a group of students with sufficient knowledge of the foreign language.
- Give the vocabulary to the students one week before the arranged class.

- Select words that are known to the students, not very scientific.
- Speak loud and clear.
- Ask short questions or questions like multiple choice or true/false.
- Use of simulations to give the pictures of the descriptions.
- Short conclusion at the end of each worksheet.

References

1. **"Physics -3rd grade of Gymnasium**" (Nikolaou A., Dimitriadis P., Kampouris K., Papamixalis K., Papatsima L.) [The formal book for Physics chosen by the Greek Education Ministry] and the corresponding "Guide for laboratory Experiments"

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2. **http://slideplayer.com/slide/4802395/**

3. **https://en.wikipedia.org**

4. **http://physics.tutorvista.com/waves**