



СУ "Летец Христо  
Топракчиев"



## PROJECT BASED LEARNING in STEM

Virtual Short-Term Exchange of the “STEM Education”  
11<sup>th</sup> May 2021

Online platform – Microsoft Teams

**STEM SUBJECT: Physics**

**TOPIC: Sound**

**TYPE OF THE ACTIVITY: Interactive Test based in Google form**

**TEAM: Bulgaria**

**TEACHERS: Tatyana Dimitrova, Teodora Taneva**

### WORKSHEET 1

[https://docs.google.com/forms/d/e/1FAIpQLSct5xV7Ut-tA-Q2Fuz70oU0U7ZowDT7\\_Z8Rn3J7-UY1jQqr5Q/viewform](https://docs.google.com/forms/d/e/1FAIpQLSct5xV7Ut-tA-Q2Fuz70oU0U7ZowDT7_Z8Rn3J7-UY1jQqr5Q/viewform)

#### PART 1 - AIMS of the ACTIVITY:

1. To analyze and assess the students` understanding of the lesson
2. To engage students` enrollment in educational process
3. To train skills for analysis, interpretation, researching and interaction
4. To deepen physics skills by watching videos and answering questions
5. To show the connection of Physics, and Sound in particular, with the situations in daily life.
6. To enrich the methods of thinking and concentration.
7. To form a positive attitude towards Physics, creating interest and motivation for students.



Erasmus+ Programme – Strategic Partnership Project - STEM Education - 2018-1-IT02-KA229-048507

## **PART 2 Description of the Activity**

The objectives of the physics lesson “Sound” were to deepen knowledge about physics and to learn, understand and relate the sound definitions and characteristics. To explore students’ understandings and answers, a google form test was administered online after the lesson. The Google form test, which includes a video and nine open-ended questions, created in Google form. Each student has to answer the Google form questions. Students have 15 minutes to do the task. Students have to write their names, emails and country in the beginning. Students have to watch the videos and answer the questions.

The google form test was scheduled for 11 May 2021, for an hour during the workshop in Physics “Sound” and the Bulgarian teachers provided the instruction.

42 participants from Bulgaria, Italy and Cyprus submitted the test.

18 Italians

14 Cypriots

10 Bulgarians

## **PART 3 Questions, Answers, Results, Tendencies**

### **TASK Watch the video “Science-Transmission of Sound” and answer the questions**

1. What does “vibration” mean?

**Answer -THE BACK AND FORTH MOVEMENT OF AN OBJECT**

Q1 – correct answers 37/42 – 88%

2. How do humans produce sound wave?

**Answer - VIBRATIONS ARE PRODUCED BY THE VOCAL CORDS IN YOUR THROAT.**

Q2 - correct answers 42/42 -100%

3. What are two types of waves?

**Answer - TRANSVERSE AND LONGITUDINAL WAVES**

Q3 - correct answers 42/42-100%

4. How do you create a transverse wave using a slinky? What does a transverse wave look like?

**Answer - BY AN UPWARD FLICK OF YOUR WRIST. THE WAVES MOVE UP AND DOWN. THEY LOOK LIKE AN “S**

Q4 - correct answers 27/42 -64%

5. What travels through the slinky when the Dr. Zook flicks his wrist?

**Answer –ENERGY**

Q5 - correct answers 14/42-33%

6. How do the particles vibrate in a transverse wave?

**Answer - THE PARTICLES VIBRATE AT A RIGHT ANGLE TO THE DIRECTION OF THE WAVE**

Q6 - correct answers 36/42- 86%

7. How do the particles vibrate in a longitudinal wave?



**Answer - THE PARTICLES MOVE PARALLEL TO THE DIRECTION OF THE WAVE**

Q7 - correct answers 37/42- 88 %

8. What is required to allow a sound wave to travel? What are the three types?

**Answer -A MEDIUM, A SOLID, LIQUID OR GAS**

Q8 - correct answers 37/42 -88%

9. What do we call a sound reflection?

**Answer -THEY TRAVEL IN ALL DIRECTIONS, ECHOES**

Q9 - correct answers 30/42 -71%

The analysis of the results of the Sound google test is a tool for evaluating the Physics lesson activities involved in the stage of the project. The activity is an instrument to present the effective and beneficial cooperation among students and teachers as long as the positive outcomes of the learning and teaching process implemented in the project schedule. The results of the test show the following most important tendencies:

1. Excellent results in answering most of the questions
2. The importance of project based lessons for teaching Physics
3. High percentage of students' involvement in the learning process
4. The necessity of including project based lessons in school curriculum
5. Lack of high concentration in online educational environment reflects the percentage of correct answers of Question 5
6. Teachers' inability to monitor, support and control the educational process in online educational environment leads to lower results.
7. Necessity for improving students' motivation for taking part in online learning process.
8. The importance of interactive tools to teach and learn STEM subjects, Physics in particular.