



СЦ "Летец Христо
Топракчиев"



PROJECT BASED LEARNING in STEM

**Virtual Short-Term Exchange of the “STEM Education”
11th 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

<https://docs.google.com/forms/d/11B2fOkzPWyJejuIwSdV8tIh80vzTzQAIt5AcdR2i3m8/edit>

STEM Education project "What is sound" and “Can you shatter glass with your voice?”

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.



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 online lesson. The Google form test which includes 2 videos and 6-six open-ended questions was created in Google form. Each student has to answer the Google form test. Students have 15 minutes to do the task. The task of the students is to watch the videos and answer the questions.

Two videos "What is sound" and “Can you shatter glass with your voice?”

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

Until the end of the set time, 16 participants from Bulgaria and Italy submitted the test. Due to technical issues, the participants from Cyprus didn't manage to solve and submit their tasks on time. The other participants in the project submitted their tests until the last day of the project activities on 15 May 2021. 32 participants did the test.

PART 3 Questions, Answers, Results, Tendencies

TASK 1 Watch “*What is sound*” and answer the following questions

1. How are sounds made?

Answer _THROUGH VIBRATIONS

Q1 - correct answers 32/32 - 100 %

2. What does a sound wave do when it reaches our ears?

Answer - IT VIBRATES THE EAR DRUM, WHICH PASSES THE VIBRATION TO THE INNER PARTS OF OUR EARS AND THEN ON TO OUR BRAIN, WHERE THE VIBRATIONS ARE INTERPRETED AS SOUND.

Q2 - correct answers 31/32 - 97 %

3. How can you make a sound in a similar way as with a rubber band and a tin can?

Answer - WITH A GUITAR, A BANJO OR ANY INSTRUMENT WITH STRINGS

Q3 –correct answers 7/32 -21%

TASK 2 Watch “Can you shatter glass with your voice?” and answer the questions

1. What do decibels measure? –

Answer -DECIBELS MEASURE THE LOUDNESS OF SOUND

Q1 - correct answers 28/32 - 88 %

2. What is affected by frequency?

Answer - FREQUENCY WILL AFFECT THE PITCH OF THE SOUND. THE HIGHER THE FREQUENCY



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Q2 - correct answers 7/32 - 21 %

3. What conditions must be fulfilled in order to break a glass with a human voice?

Answer - FREQUENCY AND AMPLIFICATION. THE SOUND FROM HIS VOICE CAUSES THE GLASS TO VIBRATE. THE LOUDER THE SOUND THE MORE INTENSE THE VIBRATION UNTIL THE GLASS FINALLY BREAKS. (ALL OBJECTS HAVE THEIR OWN RESONANT FREQUENCY. JAIME MATCHES THAT FREQUENCY OR NOTE AND THAT CAUSES THE GLASS TO BEGIN VIBRATING.)

Q3 –correct answers 27 /32 -84 %

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 questions, which concern common and experienced physics problems.
2. Lack of high concentration in online educational environment reflects the percentage of correct answers of the Task 1, Question 3 and the Task 2, Question 2
3. Difficulties when students deal with more scientific or theoretical questions
4. Necessity of time for remembering the sound terms and definitions
5. Teachers' inability to monitor, support and control the educational process in online educational environment leads to lower results.
6. Necessity for improving students' motivation for taking part in online learning process.
7. The importance of interactive tools to teach and learn STEM subjects, Physics in particular.