



Title of the STEAM Unit: Show the Sound

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RELATED SUBJECTS	GRADE RECOMMENDATIONS	TOTAL ACTIVITY TIME	LEARNING OBJECTIVES DURING THE LESSON SUBJECT-SPECIFIC COMPETENCIES	LEARNING OBJECTIVES AFTER THE LESSON
Music, Science, Sustainability, Arts, Mathematics, Engineering, Technology, Biology	12-13	One month	Experimenting Science concepts (Sound is a wave, Frequency and Amplitude) Conversion of something invisible to visible Sensory Experience Programming skills Computational Thinking Knowledge of robotics. (Sensor, Actuator)	Curiosity about sound as a phenomenon. Detecting using Sound Sound and Nature (Bats). Making sound as a hobby.



OVERVIEW: TOPIC & PURPOSE

Short introduction to the content, learning goals, structure, and purpose of the unit's design. Insert a motivational picture too, to raise attention to the unit.



https://youtu.be/LdgzsF_O7ol?si=CFa-i8zNgx1ytw6H (Star Wars theme on floppy drives)

<https://www.youtube.com/watch?v=slopZnMLeQo> (Rubens Tube)

<https://www.youtube.com/watch?v=wwJAgRUBF4w> (sand on a plate, Sound made visible)

<https://www.youtube.com/watch?v=4gibcRfp4zA> (Oscilloscope)

ACTIVITY PREREQUISITES

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STEAM ELEMENTS

ELEMENT 1: context presentation	Real-world / scientific / artistic context of the unit
ELEMENT 2: creative design	Summary of creative activities in the unit
ELEMENT 3: emotional and social learning	Summary of emotional and social skills development in the unit

STEAM SUBJECT ELEMENTS

STEAM SUBJECTS	SCIENCE	TECHNOLOGY	ENGINEERING	ARTS	MATHEMATICS
SHORT INTRODUCTION TO RELATED SUBJECT ELEMENTS	Learning about the physics of the sound	Students will understand how different electrical components can be used to produce sound. They will also gain hands-on experience in creating circuits.	Learning about engineering and the way stuff works	Making connections between the sounds they created and their visual representations.	Calculations, coding&programming

SYLLABUS

LESSONS (90 min)	SUBJECTS	TOPIC OF THE UNIT	LEARNING OBJECTIVES DURING THE LESSON: SUBJECT SPECIFIC COMPETENCIES	LEARNING OBJECTIVES AFTER THE LESSON: STEAM COMPETENCIES





<p>1</p>	<p>Introduction, What is the sound? (Science) Making the sound. (playfulness)</p>	<ul style="list-style-type: none"> • Discuss what sound is and how it's produced. • Discuss acoustic sound and digital sounds. • Conduct experiments to visualize sound using tuning forks and water. • Discuss the properties of sound waves. (Pitch and amplitude.) 	<p>Students will understand what sound is, how it's produced, and the properties of sound waves.</p>	<p>Students will understand what sound is, how it's produced, and the properties of sound waves.</p>
<p>2</p>	<p>Dismantling (Engineering) Upcycling (Sustainability)</p>	<ul style="list-style-type: none"> • Students bring old equipment to dismantle. • Discuss how to dismantle this equipment in a safe and organized way. 	<p>Students will learn about engineering and the way stuff works.</p>	<p>Students will learn about engineering and the way stuff works.</p>
<p>3</p>	<p>Circuit making (Electrical Engineering)</p>	<ul style="list-style-type: none"> • Show various upcycled student-brought uncommon electrical components that can produce sound and motion (e.g., pumps, motors, servos, floppy disc drives.). • Discover how these components work. • Allow students to create simple circuits to produce visible effects. 	<p>Students will understand how different electrical components can be used to produce sound. They will also gain hands-on experience in creating circuits.</p>	<p>Students will understand how different electrical components can be used to produce sound. They will also gain hands-on experience in creating circuits.</p>





<p>4</p>	<p>Coding, Robotics (Technology, Mathematics)</p>	<ul style="list-style-type: none"> • Introduce students to a simple coding platform that can be used to produce and record sounds (e.g., Scratch). • Guide students to record their own sound and “read” them. • Guide students to use Microbit and sensors to detect sound and translate it to actuators which can make sound visible. 	<p>Students will learn basic coding skills and understand how sounds can be detected, manipulated digitally, processed into commands.</p>	<p>Students will learn basic coding skills and understand how sounds can be detected, manipulated digitally, Processed into commands.</p>
<p>5</p>	<p>Assembling and showing the sound (Art, Engineering)</p>	<ul style="list-style-type: none"> • Student assemble their project which can translate sound to motion, so they can SHOW THE SOUND. • Extra: Discuss how to make an amplifier for your sound. • Discuss the projects made. (Designer Circle) • Record evidence of the project. 	<p>Students will understand how sound can be visualized. They will also be able to make connections between the sounds they created and their visual representations.</p>	<p>Students will understand how sound can be visualized. They will also be able to make connections between the sounds they created and their visual representations.</p>





EVALUATION PLAN BY LESSON

LESSON	EVALUATION CRITERIA	EVALUATION METHOD
1	Does the student understand how sound is produced? Does they know the basics about the properties of the sound?	Practical skills demonstration and peer interview
2	Does the student understand the structure of the equipment brought to the lesson?	Observation of class activities, discussion
3	Is the student able to create simple circuits to produce visible effects?	Observation of class activities, practical skills demonstration
4	Has the student acquired basic coding?	Practical skills demonstration
5	Does the student understand how sound can be visualized?	Observation of class activities, self-evaluation of groups / students.

NOTES

Optional

ACTIVITY SHEETS TO BE LINKED

Optional

EVALUATION MATERIALS TO BE LINKED

Optional

REFERENCES / SUPPORTING MATERIALS TO BE LINKED

See handout below.



STEAM

SHOW THE SOUND

Class: 12-14 year olds

Lesson 1
Introduction to sound. (Physics)

Lesson 2
Dismantling (Engineering)

Lesson 3
Making the sounds (Sustainability, Technology)

Lesson 4
Coding and Programming (Mathematics)

Lesson 5
Assembling the sound (Arts and Engineering)