

21. Musical Instruments

Classroom Activity: Explore the properties of sound by designing and building a musical instrument.

Grade: 4

Strand(s): Understanding Matter and Energy

This task addresses the following overall expectations:

- investigate the characteristics and properties of light and sound;
- demonstrate an understanding of light and sound as forms of energy that have specific characteristics and properties.

and the following specific expectations:

- investigate the basic properties of sound;
- use technological problem-solving skills to design, build, and test a device that makes use of the properties of light or sound;
- use scientific inquiry/research skills to investigate applications of the properties of light or sound;
- use appropriate science and technology vocabulary, including natural, artificial, beam of light, pitch, loudness, and vibration, in oral and written communication;
- describe properties of sound, including the following: sound travels; sound can be absorbed or reflected and can be modified;
- explain how vibrations cause sound;
- identify devices that make use of the properties of light and sound.

Assessment Categories:

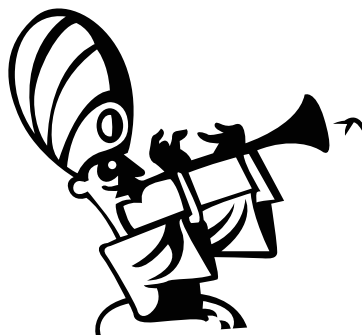
- Knowledge and Understanding
- Thinking and Investigation
- Communication

Cross-discipline connections: Social Science

Type of Activity: Classroom (individual project)

Preparation: (approx. 240 minutes. This time includes designing and researching the activity)

Obtain and prepare materials



Time needed to complete the task: 90 minutes

Materials/Resources for teachers:

How Stuff Works website: www.howstuffworks.com/guitar

Science Everywhere 4, Harcourt Brace, Canada, 1999

Rulers, chimachang, panpipes, straws, pop bottles, triangles, recorder, egg carton, elastics,

Cymbals, rice, tuning fork, water, drums, bowl, xylophone, guitar, plastic wrap

Materials/Resources for students:

same as for teachers

Activity Description:

Ask the class:

What is sound? (vibration)

Demonstrate by placing rice on a bowl covered with plastic wrap. Hit a tuning fork and allow the students to see it vibrate. Bring the tuning fork close to the bowl and show the class how the grains of rice also vibrate. Draw a sound wave on the blackboard.

Provide students with rulers and challenge them to produce vibrations (i.e. sounds). Prompt them to twang the ruler by holding it tight to the edge of the desk leaving a section to overhang. Hold the ruler near the edge of the desk not the end of the ruler.

Ask the class:

What is pitch? (frequency of vibration)

How can we change the pitch?

21. Musical Instruments(continued)

Ask the students to change the pitch of the ruler. (They can accomplish this by changing the amount of overhang before they twang.)

Students can feel the change in frequency when they change the pitch of their voices by placing their fingers on the front of their throats.

Ask the class:

What is volume? (height of the vibration)

How can we change the volume? (twang harder)

Have students snap their fingers and clap their hands, first softly, then loudly.

Demonstrate a sound board by stretching a piece of plastic wrap over a bowl. Tape a cut elastic band to the

plastic. Twang the elastic. Repeat without the sound-board.

Draw sound waves on the blackboard showing changing volume.

Outline the project: students are to make a musical instrument. They must be able to control the volume and the pitch. They must complete a plan sheet, listing the materials they use, write an instruction booklet on how to play the instrument, and play a simple tune on the instrument for the class.

Provide a variety of instruments and materials for inspiration and construction. Make a set of straw panpipes as a class. Cut straws according to the following chart:

Length (cm)	Proportion	Musical Notes
19.9	1	Do
17.7	8/9	Re
15.9	4/5	Mi
14.9	3/4	Fa
13.3	2/3	So
11.9	3/5	La
10.6	8/15	Ti
9.9	1/2	Do

Tips:

Mary Had a Little Lamb

mi	re	do	re	mi	mi	mi
re	re	re	mi	so	so	
mi	re	do	re	mi	mi	mi
mi	re	re	mi	re	do	