

The Rain Stick

Grade Level: 4

Science and Technology Topic:

Understanding Matter and Energy: Light and Sound

Introduction/Context:

This is an open-ended project where students use technological problem-solving skills to design, build, and test a creative form of artistic design - a rain stick that makes use of the properties of sound.

The activity begins with an investigation of the origins of the traditional rain stick, the natural plant materials from which they were made and the cultures that surround it.

After an audio introduction of a variety of sounds, students explore the variety of materials used in rain sticks and create experiments to demonstrate the basic properties of sound; (sound travels, sound can be absorbed or reflected, that sound can be modified [pitch, volume], that there is a relationship between vibrations)

Recommended reading: Seamus Heaney poem "The Rain Stick"

Added Information: The rain stick is a musical instrument from unknown origins.

Traditionally, rain sticks are made from the wood skeleton of a cactus. First, the thorns are pulled off and pushed back through the soft flesh of the cactus. Then the cactus is left in the sun to dry--with the thorns on the inside. Later, the hollow cactus is filled with small pebbles, and the ends are sealed with pieces of wood.

Prior Knowledge and Skills:

- Measuring and Layout
- Safe handling of hand tools and materials

Tools and Materials:

- Cardboard Tubes in a variety of sizes; paper towel rolls, gift wrapping, mailing or carpet tubes.
- Plastic Rolls in a variety of sizes
- Cardstock
- Dowel
- Fastening materials; tape (electric, or masking), hot glue or white glue
- Nails/Tacks/Toothpicks
- Objects to put inside the rain stick (rice, corn kernels, sunflower seeds beads, beans etc.)
- Hammer
- Scissors
- Acrylic paint or poster paint
- Paintbrushes

- Decorations to glue on the rain stick (fabric, feathers, leaves, jute, twine, shells, yarn, sand etc.)

Curriculum Expectations:

Big Ideas:

- Light and sound are forms of energy with specific properties.
- Sound is created by vibrations

Overall:

1. assess the impact on society and the environment of technological innovations related to light and sound;
2. investigate the characteristics and properties of light and sound;
3. demonstrate an understanding of light and sound as forms of energy that have specific characteristics and properties.

Specific:

- 2.1 follow established safety procedures for protecting eyes and ears (e.g., use proper eye and ear protection when working with tools)
- 2.3 investigate the basic properties of sound
- 2.4 use technological problem-solving skills to design, build, and test a device that makes use of the properties of light or sound
- 2.5 use scientific inquiry/research skills to investigate applications of the properties of light or sound
- 2.6 use appropriate science and technology vocabulary, including natural, artificial, beam of light, pitch, loudness, and vibration, in oral and written communication
- 2.7 use a variety of forms (e.g., oral, written, graphic, multimedia) to communicate with different audiences

Learning Goals (student-friendly language):

I experiment to can change the sound and I can make an instrument that makes the sound of rain.

Activity Description:

Rain sticks have become a very popular novelty musical instrument in the last 30 years. Stories concerning the origin of the rain stick are numerous. Some say that the Aztecs, other say China or West Africa, invented the instrument. There are even stories of its use among our own First nations people. Wherever they originated rains ticks have been used by many cultures around the globe for a variety of traditional reasons.

The Royal Ontario Museum is looking to build a display of rain sticks that will reflect the culture of the many people who have been known to use them. You are asked to create a prototype of a rain stick that will reflect one such culture of its origin. You will need to prepare a design portfolio that includes the information needed to complete the building project. Information to include would be: the plans/diagrams, instructions, materials list, problems that might be encountered and how to solve these and any other additional advice you might feel is necessary to know for making a rain stick.

Photograph:



Two Sample Rain Sticks

(In the clear sample "baffles" are clearly visible. These do the work of the nails in the cardboard sample)



A Decorated Rain Stick to Reflect A Culture of Origin

Assessment and Evaluation (including Criteria for Success):

Evidence of Student Learning: design notes and drawings, working prototype, understanding of properties of sound with explanations of how sound changes, appropriate choice of materials, demonstration of knowledge of design process with a particular emphasis on field testing (e.g., a design brief recording process of technological problem solving), presentation of design and final product with suggestions for improvement

Criteria: safe, appropriate, and effective use of materials and tools, design specification requirements are met, presentation shows understanding of key learnings, including consideration of economic and environmental factors that determine the suitability of materials for use in manufacturing a product

Completeness & Accuracy of Planning Sheets	/20 or level 1- 4
Constructive Use of Class Time	/20 or level 1- 4
Safe Use of Tools & Equipment	/20 or level 1- 4
Responsible Use of Materials	/10 or level 1- 4
Performance of the Model	/10 or level 1- 4
Technical Drawing	/20 or level 1- 4
Total	/100 or level 1- 4