THE PAPER GIRLS SHOW EDUCATIONAL GUIDE

EPISODE 7: DEV-ASTATED BY FAME TOPICS: SOUND WAVES AND MUSIC

EPISODE SYNOPSIS

Reese and Caily travel to Confetti to cheer Dev up after his talent show audition goes sour when he gets stage fright.

FEATURED STEAM TOPICS

BIG IDEA – Sound is caused by vibrations. Different vibrating materials make unique sounds that our brains recognize. We can make instruments that vibrate and carry sound to our ears.

EXPLANATION FOR CHILDREN:

When objects or materials vibrate, they can make a sound. We can hear sounds because sound waves travel through air, water, and solid objects as vibrations. When these vibrations reach our ears, our eardrums vibrate, and our brains recognize that the vibrations are sounds made by different objects or materials.

RELATED CONTENT STANDARDS (CORE CURRICULAR AIMS) IN THIS EPISODE

The standards and curricular aims listed below are linked to this episode's extension activities. Each activity is designed to promote children's thinking and action in physical science and engineering design arts as they explore sound.

Physical Science: Waves and Their Applications in Technologies for Information Transfer

Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.

Engineering: Design

Ask questions, make observations, and gather information about a situation people want to

change to define a simple problem that can be solved through the development of a new or improved object or tool.

Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Source: NGSS Lead States. 2013. Next Generation Science Standards: For States, By States. Washington, DC: The National Academies Press.



ACTIVITY EXTENSIONS FOR EPISODE TOPICS

n this episode, children are introduced to the idea that vibrations create sound, and we can make musical instruments, such as drums, that create vibrations. Below is a brief listing of activities that invite children to create their own instruments, all from various types of paper. In each activity the emphasis is on the process of thinking, design, and making rather than a perfect end product as children take the lead in their own investigations. Parents and teachers can support children in their work by asking prompting questions such as: What kind of sound will your instrument make?; Will the sound be easy or hard to hear? How can you play your instrument louder? Or softer? How would you describe the sound your instrument is making?

1. Paper cup drums

In this extension activity children will be able to independently create their own paper cup drum using various sizes of paper cups, rubber bands, and small squares of wax paper. Invite your students to think about how the size of a cup may impact the sound their paper drum makes. Each student can choose a cup, place a square of wax paper (large enough to fully cover the opening of the cup) and place a rubber band or two around the top of the cup to hold the wax paper in place. Encourage the children to gently test out different finger taps to see if the sounds they create can change with the amount of force they apply.

PROMPTING QUESTIONS

- What happens when you tap softly?
- Does the sound change if you tap fast or slow?
- If you wanted to make a louder sound, what do you need to do?

Extension Website:

TEDX Greenville: West African Drummers: Spirit Beat Drummers

https://www.youtube.com/watch?v=6V3kI3QB WK8 (Opens in YouTube)

2. Cardboard Didgeridoo

In this extension activity, your students can create their own version of one of the world's oldest instruments using only cardboard tubes, wax paper, rubber bands, and arts media (paint, markers, crayons). These instruments can be made by using stronger paper tubes such as those used for mailing or thinner paper tubes such as those found in rolls of gift wrap or paper towels. If using shorter tubes, student can tape two tubes together to create a longer instrument. Once their tube is at the desired length, cut a small square of wax paper and place over one end of the tube and secure with a rubber band. Cut an open slit into the wax paper for children to blow into. The wax paper will help to protect the tube while a child blows into it. Children can use a variety of arts media to personalize their didgeridoo. Once dry, each child will need to sit down and place the didgeridoo between their legs as they sit. They will blow into the end with the wax paper. Encourage them to experiment with

the ways they can alter the sounds their instrument makes.

PROMPTING QUESTIONS

- Tell me about the design you created?
- How do you make a long sound?; How do you make a short sound?
- What other instruments are similar to a didgeridoo?; How do those instruments create sound?

Extension Website:

Didge Project: Traditional Didgeridoo Rhythms by Lewis Burns, Aboriginal Australian Artist.

https://www.youtube.com/watch?v=yG9ZX1FS2 0A (Opens in YouTube)

3. Cardboard Guitars

In this extension activity, students will create their own cardboard guitars using everyday materials. The body of the guitar can be made by using boxes such as cereal boxes, shoe boxes, of small packing boxes. You will also need a cardboard tube (paper towel tubes are a good size) for the neck of each guitar, scissors, large rubber bands, and strong packing tape.

To create the guitar, cut a 2-3 inch hole in the front of the cardboard box and make a second hole on the top of the box for the cardboard tube to fit snuggly inside. At the top of the tube, make a series of small cuts to hold the rubber bands which will act as guitar strings. Tape the bottom of the tube into the hole you made at the top of the cardboard box (the side of the tube with slits will be at the top).Wrap rubber bands over the slits at the top of the tube and pull them down around the bottom of the box. Tape the rubber bands securely on the back side of the box. Children can personalize their guitar with arts media. Once dry, the guitar can be played by plucking the strings.



PROMPTING QUESTIONS

- Can you describe the sound your guitar makes?
- How can you make sounds that are different?; What happens when you pluck the strings or strum them?
- Where does the sound begin on your guitar?; How do you know that?

Children's Book Extension:

Zin! Zin! Zin! A violin

Written by Lloyd Moss Illustrated by Marjorie Priceman

Publisher: Aladdin Picture Books

This Caldecott Award-winning book introduce children to 10 different musical instruments and how they form different musical groupings.





ABOUT Angela Eckhoff, PhD

Angela Eckhoff, is an Associate Professor of Teaching and Learning and the Director of the Virginia Early Childhood Policy Center at Old Dominion University. Dr. Eckhoff studies the role of creativity in child development and learning, arts-based research and pedagogical practices, and early STEAM learning in both classroom and museum settings. She is a co-editor of the Full STEAM Ahead column for Teaching Young Children from NAEYC as well as the author of 'Provoking Curiosity" and the four-book "Creative Investigations" series from Gryphon House Inc. Dr. Eckhoff holds a dual PhD from the University of Colorado–Boulder in educational psychology and cognitive science.