



LESSON PLAN

Beat the Parents

GRADE LEVEL: ELEMENTARY

brainchild.com | grades 3, 4, 5



Beat the Parents

Elementary Lesson Plan

OVERVIEW OF ACTIVITY

Students will use their creativity and common materials to engineer the loudest instrument, making the connection between volume, amplitude and sound waves.

DURATION

Approximately 1 class period.

STANDARDS ADDRESSED

Next Generation Science Standards

- **4-PS4-1** - Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.
- **PS4.A** -Wave Properties. Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks).
- **3-5-ETS1-2** - Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

OUTLINE OF LESSON

- Introduction to sound waves.
- View the Brainchild “Beat the Parents” episode.
- Students engineer instruments, determine which is loudest.
- Draw a diagram and reflect on process.

ACTIVITY PROCEDURE

- Teacher will explain that class will be viewing a Brainchild episode that touches on many fun topics, including sound waves. Class can chart what they think they know about sound waves.
- Class will view the “Beat the Parents” episode and pay special attention to the clip on hearing.
- Teacher will introduce the concepts of sound traveling as waves, amplitude, and volume:
In the Brainchild episode, “Beat the Parents,” we learned a bit about hearing and sound frequency. We are going to think about how sound gets into our ears. Anyone have an idea of how sounds gets to our ears? Students can share out ideas. It travels in waves, like the waves in the ocean. Only sound waves go through air and we

cannot see them. When the sound waves make it to our ears, they vibrate the air around them and the anatomy inside them, creating a sound. When we hear a very loud sound, it has a large **amplitude**. The top of the wave is far from the bottom of the wave. Teacher should draw a sound wave. A soft sound has less distance between the top and bottom.



Today, you are going to have a chance to make instruments using some everyday objects and see who can create an instrument to produce the loudest sound. That means it is a contest to see who can make the biggest sound waves, or the sound waves with the greatest amplitude.

- Teacher will send students off in small groups to engineer an instrument. Upon completing one instrument, the teacher should instruct students to try and change a component of their piece to make it louder. This may or may not be successful, however the prompted changes will encourage students to expand upon their engineering skills.
- Each small group should have a chance to share out their design, first explaining the process of creating the instrument (did they try different designs first before determining the best design?).
- Class can then determine which instrument was the loudest, with the highest amplitude, making the connection to different wave diagrams to represent each. This will give them a chance to prepare for the homework or follow-up.

FOLLOW-UP

Students will make final touches on their instrument diagram and complete the follow-up drawing of the possible sound waves made from the loudest and softest instruments.

MATERIALS LIST

- Student Activity Resource
- Household materials for each group to make instruments: paper towel rolls, cardboard boxes, rubber bands, tape, paper or plastic cups, beads, beans, popsicle sticks, bottle tops, wax paper, cans (without any sharp edges)