

## 4.6 Sound Waves

**Lesson Concept** Sound waves travel and cause vibrations of molecules which causes sound.

**Link** In the previous lesson, students analyzed and interpreted data to learn that energy can be transferred and were introduced into energy transformation. In this lesson, students continue to learn about how mechanical energy is transformed into sound energy. In the next lesson, students learn about pitch and volume related to frequency and amplitude.

**Time** 60 minutes

**Materials** Whole Class

\_\_\_\_\_ Bill Nye video <http://nicertube.com/5d2kjscx>

Per groups of 4

1 Slinky

1 iPad

Per individual

Science Notebook

Pencil

### Advance

### Preparation

1. Find space in the room to set up the slinkys
2. Play the video to make sure it works.

### Procedure

#### **Engage (5 minutes) Obtaining information**

1. Ask students to go review their notebook drawings from when they made a model of a wave (jump rope and slinky).
2. Ask them to recall with a partner what their model described.
3. Point them to the side to side movement of the slinky and explain that today they will put energy into the slinky in a different way to see what happens.

#### **Explore (10 minutes) Conduct an investigation to see how sound waves are made.**

4. Ask students to get in groups of 4 and decide who will be the holder (2 students will do this); the recorder, and the ipad videographer.

5. Assign groups to their location. Have the holders spread the slinky on the floor, holding firm at one end and leaving a little slack at the other end. Then ask one student to gather up a few coils toward them on the slack end, and let go.
6. Have students practice and when they are ready, ask students to set up the investigation: holders in place, recorder ready to observe and iPad ready to video. Have them make 3 trial runs.
7. Ask students to sit back at their table and review what the recorder noted and what the iPad video shows.
8. Ask students to draw what they observed in their notebook.  
**Explain (10 minutes) Obtain information to see how sound waves are made.**
9. Show the video: <http://nicertube.com/5d2kjscx> and ask students to take notes on what they see.
10. Conduct a discussion of what the students noted in the video. Have them compare their observations of their slinky with what they noted in the video. How did the vibrations occur?
11. Ask students to draw a “compression” wave in their notebook. Label what moves and what stays in place.
12. Ask students to discuss how this wave relates to the jump rope or other slinky-- what represents the tape in the compression wave and is “bobbing?” (air molecules) what is moving (the energy)

**Evaluate (5 minutes) Sound waves cause vibrations.**

13. Have students write an exit slip to answer this prompt: How did the bouncing balls from the previous lesson make sound?