

Sound



Music Makers and Shakers

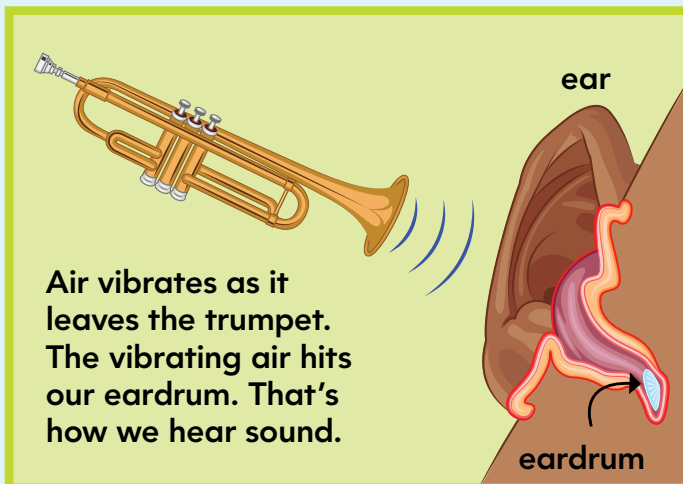


Drums and harps don't look or sound alike. But they both make music by making vibrations.

When something **vibrates**, it moves back and forth very quickly. Try this: Put your fingers on your throat and say, "vibrations." Can you feel your throat vibrate when you talk? Everything that makes a sound is vibrating, even if you can't see it moving.

How do musicians make their instruments vibrate? A drum is one of the simplest instruments. When you tap the skin of a drum, it vibrates. A harp is played by plucking metal strings. The strings are different lengths. Short strings vibrate quickly. They make high, squeaky sounds. Long strings vibrate slowly. They make low, deep sounds.

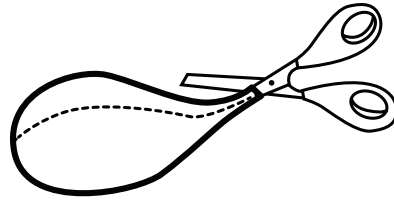
When an instrument vibrates, the air around it vibrates too.



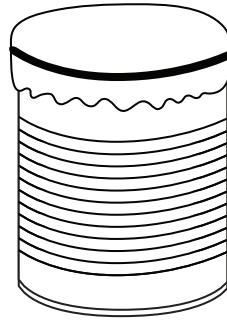
The vibrations travel through the air like waves in water. If the sound is loud enough to reach your ears, it vibrates your eardrums. Your ears send signals to your brain. You hear music!

Get Shaking!

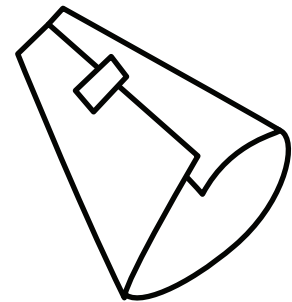
How can you see what sound looks like? Try this!



1. Cut one side of a balloon from neck to bottom, as shown. Stretch the balloon tight over the top of a can. Have a partner use a rubber band to hold the balloon in place.



2. Sprinkle a little puffed rice cereal on top of the balloon.
3. Roll the paper or file folder into a megaphone shape, as shown. Make sure there is an opening to speak into. Tape in place.



4. Point your megaphone at the balloon and shout. (Don't blow!) Record what happens on your data sheet.
5. **Think:** What made the cereal do what it did? How do you know? (Use the word **vibrate** in your answer.)
6. Try a shout that's high and squeaky. Then try one that's low and deep. Make loud sounds. Make soft sounds. Do different sounds make the cereal move differently? Record what you notice.

Materials

- ★ balloon
- ★ scissors
- ★ large empty tin can
- ★ rubber band
- ★ puffed rice cereal
- ★ stiff paper or file folder
- ★ tape
- ★ "Get Shaking!" data sheet

Name: _____

Get Shaking!



1. Do Steps 1–4 of the Task Card.
Record what happened.

2. **Think:** What made the cereal do what it did? How do you know?
(Use the word *vibrate* in your answer.)

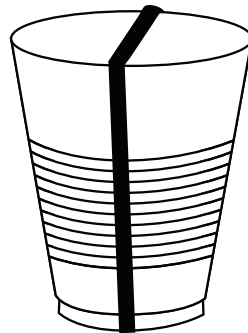
3. Do Step 6 of the Task Card. Record what you notice below.

Type of sound	What happens to the cereal?
High and squeaky	
Low and deep	
Loud	
Soft	

Music Maker

Play with sound, then make a musical instrument!

1. Stretch a rubber band between your thumb and a finger. Pluck it. What do you observe?
2. Stretch the band around a cup, as shown. Pluck it. Does the cup change the sound's **volume**—how loud or quiet it is?



3. Pluck the rubber band again. Then touch the middle of the rubber band with one finger. This splits the rubber band in half. Pluck one of the halves. Compare the two sounds. Which has a higher sound—the longer (whole) rubber band or the shorter (half) rubber band? Can you play different notes by changing where you touch the rubber band?
4. Stretch the rubber band so it is tighter across the top of the cup. Does this change the sound? How?
5. Use what you have learned to make an instrument. Look at your inventor's materials. **Think:** How will you make your instrument loud enough to hear? How will you make different notes?
6. How does your instrument work? Explain on your data sheet.

Materials

- ★ rubber band
- ★ plastic cup or other container
- ★ inventor's materials: cardboard boxes, more rubber bands, cardboard tubes, yogurt containers, tape, scissors, string, what else?
- ★ "Music Maker" data sheet

Name: _____

Music Maker



1. Do Step 1 of the Task Card.
What did you observe?

2. Do Step 2 of the Task Card. Is the sound louder or quieter?

3. Do Step 3 of the Task Card. Which makes a higher sound—the longer (whole) rubber band or the shorter (half) rubber band?

4. Do Step 4 of the Task Card. Does stretching the rubber band tight across the cup change the sound? How?

5. Make an instrument. Explain how it works on the back of this sheet.

Next Generation Science Standards
PS4.A Wave Properties
ETS1 Engineering Design

Background

Sound is a form of energy, just like light, heat, and electricity. Sound is produced when things move back and forth, or *vibrate*, creating sound waves. Sound waves can travel through different kinds of materials, such as metal, water, and air. When sound waves travel through air and reach our ears, we can hear the sound.

Hands-On Hints

Task Card 1: Get Shaking!

Make sure there aren't jagged or sharp edges where the lid was removed from the can. If there are, cover the edges with tape. Since cans, cups, and rubber bands come in different sizes, check ahead of time to make sure your materials are compatible sizes and strengths. Larger balloons

are easier to stretch across the cans. The tighter the balloon "drumhead," the more easily children will see cereal movement.

A loud shout will vibrate the balloon skin, causing the cereal to "jump" (Step 4). High sounds come from faster vibrations, and low sounds come from slower vibrations. Loud sounds come from bigger vibrations, and soft sounds come from smaller vibrations. Children may see these differences reflected in how the cereal moves (Step 6).

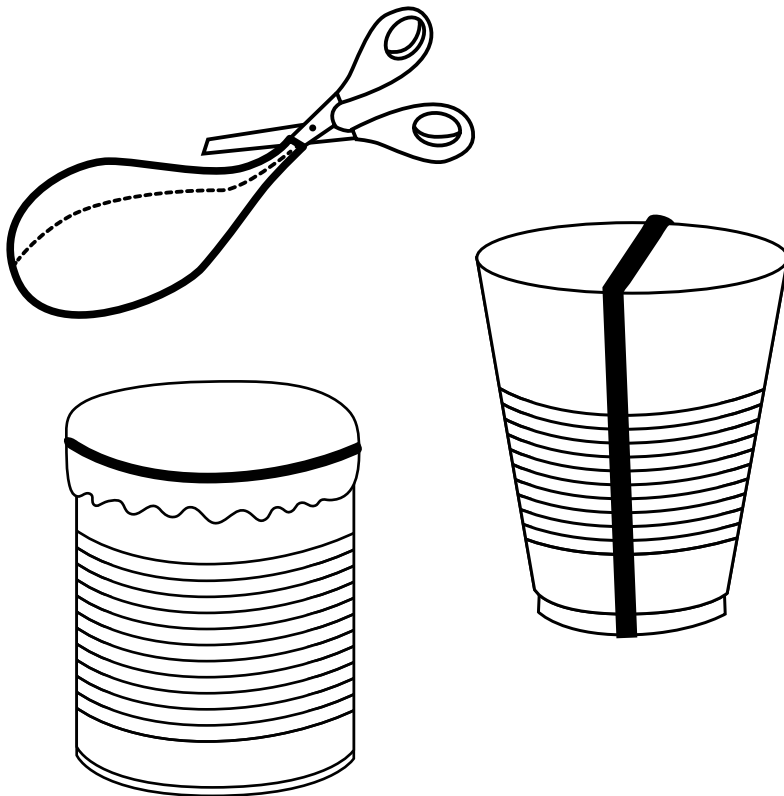
Bonus: Challenge children to design and test an experiment to make sure that it's the sound making the cereal "jump," not their breath. (Children could find a different way to make noise, such as by playing music through a speaker or clapping two wooden blocks together.)

Task Card 2: Music Maker

Children will probably see the rubber band vibrating and may hear a quiet sound (Step 1). Putting the rubber band around a cup and plucking it will make a much louder sound (Step 2). Placing a finger in the middle of the rubber band and plucking half of it will make a higher sound (Step 3). Moving one finger around while plucking with the other or stretching the rubber band (Step 4) will both change the pitch.

Depending on materials you have available, children could make percussion instruments (using cans or plastic containers), stringed instruments (using rubber bands or string and boxes), and more.

After children complete their instruments, you can conduct the class in an improvised song. First, ask everyone to play three high-pitched notes in a row, using a pencil as a conductor's baton to give them a beat. Next, ask everyone to play three low notes in a row, holding your pencil lower to emphasize the change in pitch. Give everyone a solo—go around the room and have each child play three notes in a row. Finally, using your pencil baton, lead the class in a simple musical sequence like high-high-low-low-high-low-high-low. End by having everyone stand and take a bow.



For optimal results, we suggest following these steps:

1. Introduce the topic by reading aloud the nonfiction article. The article helps build background knowledge and provides context for the hands-on activities. You can project it onto your interactive whiteboard as you read it aloud. There is also a printable version that you can distribute to students so they can read along.
2. Divide the class into small groups. Hand each group a Task Card, and give each student a Data Sheet. (We recommend starting with Task Card 1.) Together with the class, read aloud the steps of the activity to ensure everyone understands what to do. You may also want to have each group conduct an inventory of their materials to make sure they have everything they need.
3. Have students do the activity and record on their Data Sheets.
4. Make sure to leave enough time before the end of the period so you can have a class discussion about the activity. Invite groups to share their findings and results, including any challenges they may have faced.
5. Gather students' data sheets to assess for understanding.

If you plan to continue the unit in your next lesson with the second Task Card, you might want to review the article with the class. In some cases, Task Card 2 builds upon Task Card 1, so you may want to quickly go over the first activity as well.

At the end of a unit, consider asking students to evaluate the topic and activities. This can be as simple as a thumbs-up or thumbs-down. Engage them in a discussion about what they liked or did not like and why. You might find this feedback useful for future lessons.

The two Task Cards feature hands-on activities that incorporate the following eight science and engineering practices—identified by the NGSS as essential for all students to learn:

1. Asking questions and defining problems
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations and designing solutions
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Subscribe to **SuperScience** magazine for more engaging science articles, standards-aligned skills sheets, and fun hands-on experiments and design challenges. Visit scholastic.com/buy-supersci.

Scholastic Inc. grants teachers permission to photocopy the data sheets from this set for classroom use. Purchase of this set entitles use by one teacher for one classroom only. No other part of this publication may be reproduced in whole or in part, or stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without written permission of the publisher. For information regarding permission, write to Scholastic Inc., 557 Broadway, New York, NY 10012.

Written by Katherine Burkett and *SuperScience* staff
Editor: Maria L. Chang
Art Director: Tannaz Fassihi
Design by Michelle H. Kim, Nilou Safavieh
Illustrations by Marybeth Rivera

ISBN: 978-1-338-09900-3
Copyright © 2017 by Scholastic Inc.
All rights reserved.

Music Makers and Shakers



Drums and harps don't look or sound alike. But they both make music by making vibrations.

When something **vibrates**, it moves back and forth very quickly. Try this: Put your fingers on your throat and say, "vibrations." Can you feel your throat vibrate when you talk? Everything that makes a sound is vibrating, even if you can't see it moving.

How do musicians make their instruments vibrate? A drum is one of the simplest instruments. When you tap the skin of a drum, it vibrates. A harp is played by plucking metal strings. The strings are different lengths. Short strings vibrate quickly. They make high, squeaky sounds. Long strings vibrate slowly. They make low, deep sounds.

When an instrument vibrates, the air around it vibrates too.

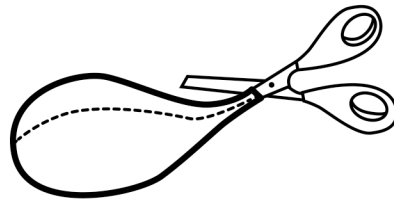


Air vibrates as it leaves the trumpet. The vibrating air hits our eardrum. That's how we hear sound.

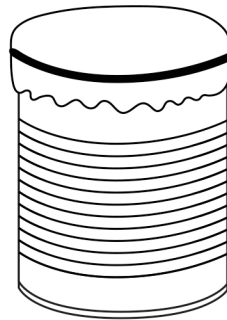
The vibrations travel through the air like waves in water. If the sound is loud enough to reach your ears, it vibrates your eardrums. Your ears send signals to your brain. You hear music!

Get Shaking!

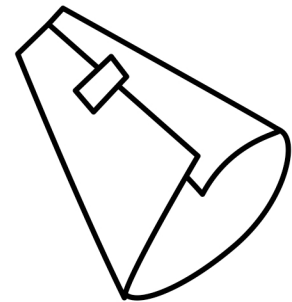
How can you see what sound looks like? Try this!



1. Cut one side of a balloon from neck to bottom, as shown. Stretch the balloon tight over the top of a can. Have a partner use a rubber band to hold the balloon in place.



2. Sprinkle a little puffed rice cereal on top of the balloon.
3. Roll the paper or file folder into a megaphone shape, as shown. Make sure there is an opening to speak into. Tape in place.



4. Point your megaphone at the balloon and shout. (Don't blow!) Record what happens on your data sheet.
5. **Think:** What made the cereal do what it did? How do you know? (Use the word **vibrate** in your answer.)
6. Try a shout that's high and squeaky. Then try one that's low and deep. Make loud sounds. Make soft sounds. Do different sounds make the cereal move differently? Record what you notice.

Materials

- ★ balloon
- ★ scissors
- ★ large empty tin can
- ★ rubber band
- ★ puffed rice cereal
- ★ stiff paper or file folder
- ★ tape
- ★ "Get Shaking!" data sheet

Name: _____

Get Shaking!



1. Do Steps 1–4 of the Task Card.
Record what happened.
-

2. **Think:** What made the cereal do what it did? How do you know?
(Use the word *vibrate* in your answer.)
-
-

3. Do Step 6 of the Task Card. Record what you notice below.

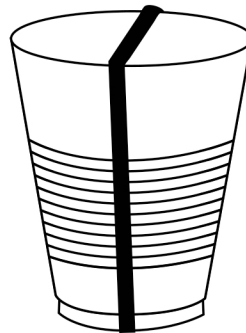
Type of sound	What happens to the cereal?
High and squeaky	
Low and deep	
Loud	
Soft	

Music Maker

Play with sound, then make a musical instrument!

1. Stretch a rubber band between your thumb and a finger. Pluck it. What do you observe?

2. Stretch the band around a cup, as shown. Pluck it. Does the cup change the sound's **volume**—how loud or quiet it is?



3. Pluck the rubber band again. Then touch the middle of the rubber band with one finger. This splits the rubber band in half. Pluck one of the halves. Compare the two sounds. Which has a higher sound—the longer (whole) rubber band or the shorter (half) rubber band? Can you play different notes by changing where you touch the rubber band?

4. Stretch the rubber band so it is tighter across the top of the cup. Does this change the sound? How?

5. Use what you have learned to make an instrument. Look at your inventor's materials. **Think:** How will you make your instrument loud enough to hear? How will you make different notes?

6. How does your instrument work? Explain on your data sheet.

Materials

- ★ rubber band
- ★ plastic cup or other container
- ★ inventor's materials: cardboard boxes, more rubber bands, cardboard tubes, yogurt containers, tape, scissors, string, what else?
- ★ "Music Maker" data sheet

Name: _____

Music Maker

- 1.** Do Step 1 of the Task Card.
What did you observe?



- 2.** Do Step 2 of the Task Card. Is the sound louder or quieter?

- 3.** Do Step 3 of the Task Card. Which makes a higher sound—the longer (whole) rubber band or the shorter (half) rubber band?

- 4.** Do Step 4 of the Task Card. Does stretching the rubber band tight across the cup change the sound? How?

- 5.** Make an instrument. Explain how it works on the back of this sheet.