

SCIENCE

Student Book

▶ **3rd Grade** | Unit 6

SCIENCE 306

SOUNDS AND YOU

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LIFEPAC Test |Pull-out

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**804 N. 2nd Ave. E.
Rock Rapids, IA 51246-1759**

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SOUNDS AND YOU

There are many different sounds around you each day. Some sounds are **LOUD!** Some sounds are *soft*. Some sounds are pretty. Some sounds are noisy. Some sounds you know. Some sounds are strange. God has given you ears to hear many different sounds each day.

In this LIFEPAC®, you will learn more about sound. You will learn the answers to questions like these:

What is sound?

What makes sounds different?

How are sounds made?

How do you hear sounds?

These and other questions about sound will be answered as you study this LIFEPAC.

Objectives

Read these objectives. The objectives tell you what you will be able to do when you have finished this LIFEPAC.

1. Tell what sound is.
2. Explain why sounds are different.
3. Tell how you hear sounds.
4. Describe how you make sounds.

1. SOUNDS ARE MADE

Many different kinds of sounds surround you during the day. Usually, you do not listen to every sound around you because you are doing something else. In this section of the LIFEPAC, you will take some time to listen to some of the different sounds around you. Every sound that you hear is made by something. People make sounds. Animals make sounds. Things make sounds. People, animals, and things make many different kinds of sounds. How do they do this? In this section of the LIFEPAC, you will learn what sounds are and how sounds are made.

Vocabulary

Study these new words. Learning the meanings of these words is a good study habit and will improve your understanding of this LIFEPAC.

acoustics (ə kōō' stiks). The science of sound and its effect on people.

categories (kăt' ə gor ēz). Classes, groups, or kinds.

cereal (sir' e el). Food made of grain.

frequency (frē' kwən sē). The vibrations per second of an object causing sound.

invent (ĭn vēnt'). To make, design, or produce something for the first time.

pitch (pĭch). The degree of highness or lowness of a sound.

tuning fork (tün' ing fôrk). A metal instrument that makes the sound of a musical note when tapped on a hard surface.

vibrate (vĭ' brāt). To move back and forth very fast.

vibration (vĭ brā' shən). When something is moved back and forth very fast.

Note: All vocabulary words in this LIFEPAC appear in **boldface** print the first time they are used. If you are unsure of the meaning when you are reading, study the definitions given.

Pronunciation Key: hat, āge, cāre, fār; let, ēqual, tērm; it, īce; hot, ōpen, ōrder; oil; out; cup, pūt, rüle; child; long; thin; /FH/ for then; /zh/ for measure; /u/ or /ə/ represents /a/ in about, /e/ in taken, /i/ in pencil, /o/ in lemon, and /u/ in circus.

Ask your teacher to say these words with you.



Teacher check:

Initials _____ Date _____

What Do You Hear?

As you read this, you are probably not aware that sounds are being made around you. This is because your attention is on reading and understanding this book. If you stop reading and take time to listen, you will probably hear some sounds around you. Do that right now.



Listen!

- 1.1** Listen for any sounds that are around you. Write the names of the sounds you hear on the lines below.

1.2 Ask your teacher to let you go outside. Take this LIFEPAK with you. Listen to the sounds outside. Close your eyes to listen more carefully. Open your eyes and write the sounds you hear on the lines below.

You have taken time to hear many of the sounds around you. The sounds were different. They were made by different kinds of things. Every sound you heard had to be made by something. Usually, the sounds are made by people, animals, or things. Take some time to place the sounds you heard in one of these three **categories**.





1.3

Think about the sounds you heard and put them in categories.

The sounds you heard were probably made by people, animals, or things. Write the name of the sound you heard in one of these three categories: people, animals, or things. For example, if you heard a car, write “car” under the category of things.

People	Animals	Things
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

What Is Sound?

Sound is something that we hear. Sounds are caused when something **vibrates**. This means that it moves back and forth very quickly. For example, if you pick a guitar string with your finger, the string will vibrate back and forth very quickly. The vibrating string makes a sound. You would probably recognize the sound as the string of a guitar.



| The strings on a guitar vibrate very quickly to make sounds.

Each of the sounds you heard earlier and wrote down was caused when something vibrated. All sounds are caused by **vibrations**. Something vibrated in the people, animals, or things that you heard. Later in this

LIFEPAC, you will learn more about the sounds people make when they speak. You will also learn how sound travels from a vibrating object to your ears.

Let us do a couple of experiments to show that vibrations cause sounds.

MAKE A DRUM

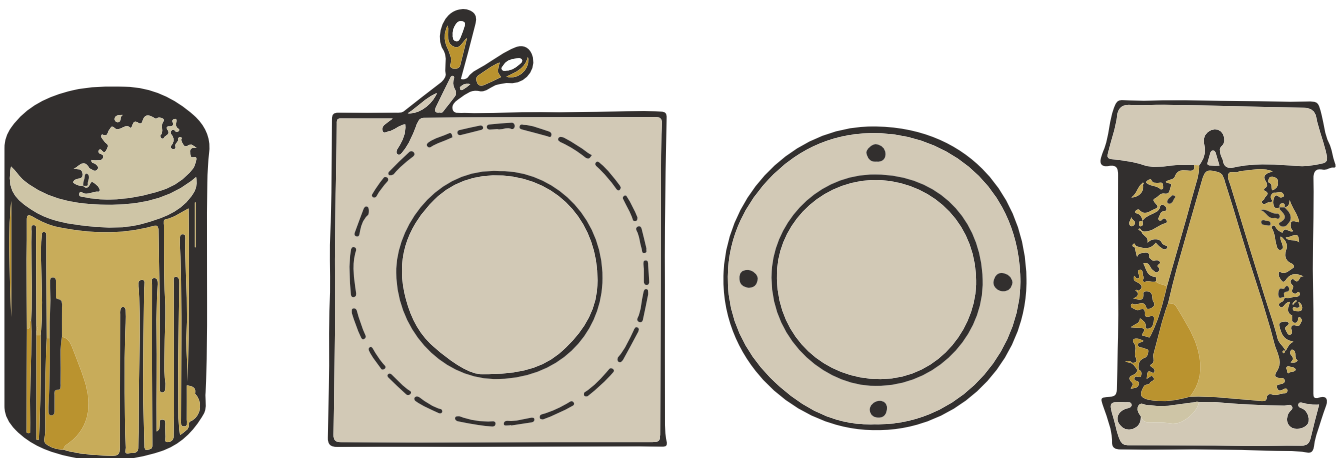


You will need these things:

- oatmeal box or section of a carpet tube
- 2 pieces of rubber or heavy plastic to fit over the ends
- small paper punch
- thick string
- scissors
- pencil

Note: If oatmeal boxes, rubber, or other materials are too hard to obtain, use a coffee can with a plastic lid and proceed to the next experiment.

(Continued on the next page)



Follow these directions. Check the boxes as you do each step.

- 1. Cut off the top and bottom of the oatmeal box.
- 2. Draw a circle on the rubber by outlining the box top.
- 3. Make a larger circle around the first circle by drawing a dotted line around the circle 2 inches outside the first line.
- 4. Cut out the larger circle along the dotted line.
- 5. Draw and cut out another circle on the other piece of rubber the same size as the circle you cut out. Use the cutout circle for a pattern.
- 6. Punch four holes in each circle as shown. Make the holes the same distance from each other.
- 7. Thread the string through one of the holes, and tie a knot to hold it in place. Put the rubber circles on the top and bottom of the box. Pull the string up and down between the circles. Pull tightly. Knot the end of the string.

USE YOUR DRUM



You will need these things:

drum
pencil
dry **cereal**

Follow these directions. Check the boxes as you do each step.

- 1. Put a spoonful of dry cereal on top of the drum.
- 2. Hit the drum with the pencil.



Answer the questions.

- 1.4 Did you hear anything when you hit the drum? _____
- 1.5 Before you hit the drum, did the cereal move? _____
- 1.6 When you hit the drum, did the cereal move? _____

1.7 What made the cereal move? _____

1.8 What makes the sound of the drum? _____

STUDY MORE ABOUT SOUND



You will need this thing:
tuning fork

Follow these directions. Check the boxes as you do each step.

NOTE: DO NOT TOUCH YOUR EAR OR HEAD WITH THE TUNING FORK.

- 1. Put the tuning fork near your ear. Listen for sounds from it.
- 2. Gently tap the tuning fork on the edge of a table. Listen for sounds again from the tuning fork.



Answer these questions.

1.9 Did the tuning fork make any sound when held still? _____

1.10 Did the tuning fork make any sound after it was tapped on the table?

1.11 Was the tuning fork vibrating or still when it made a sound?

_____ (vibrating / still)

Your experiments showed that sound is made when something vibrates. All sounds are caused by vibrations. When you hear the singing of a bird, the barking of a dog, the voice of a person, or the hum of your refrigerator, you can be sure that vibrations are causing the sounds.



| Dogs can hear sounds with greater vibrations than people can.

The number of vibrations that an object makes in one second is called **frequency**. Human beings can

usually hear sounds if the frequency is between 20 and 20,000 vibrations per second. Dogs and other kinds of animals can hear sounds with frequencies much greater than 20,000 vibrations per second.

The frequency affects the way we hear sounds. Objects that vibrate with a slower frequency sound like “low notes” to us. Faster frequencies sound like “high notes” to us. The human voice vibrates at frequencies between about 85 and 1,100 vibrations per second.



Think about sound. Choose the correct answer.

- 1.12** Usually, sounds are made by people, animals, or _____
 words. things.
- 1.13** When you hit the drum, it moved back and forth very _____
 quickly. slowly.
- 1.14** To move back and forth very fast means _____
 to be quiet. to vibrate.

- 1.15** Sounds are _____
 still. vibrations.
- 1.16** The number of vibrations per second of an object is called _____
 frequency. low note.

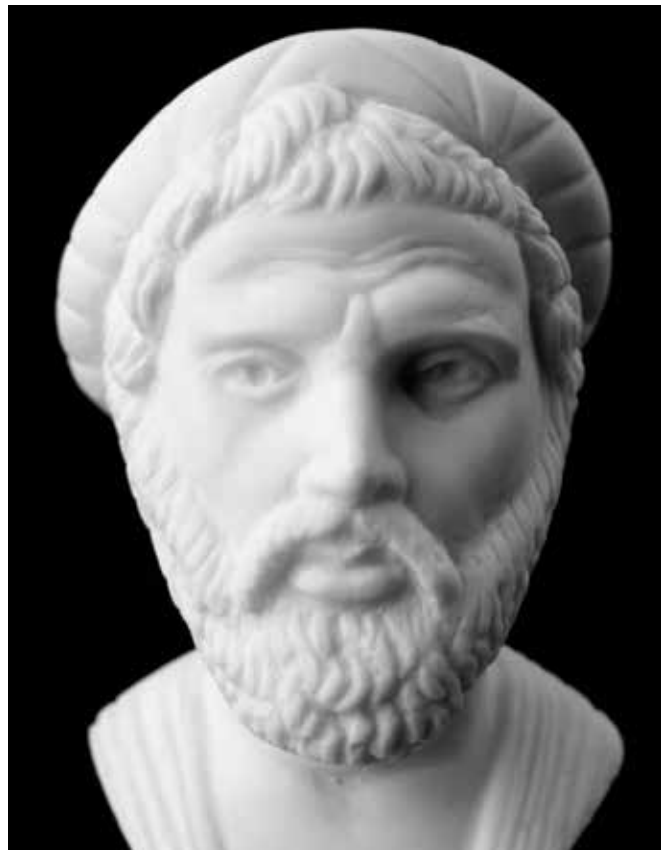
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The Study of Sound

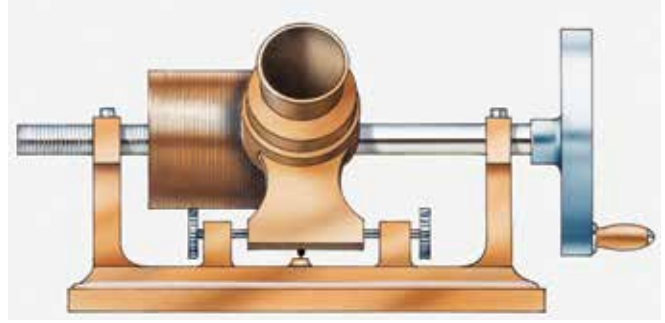
The study of sound began long ago. A Greek mathematician named Pythagoras (Pi thag' er us), who lived from around 569 B.C. to around 475 B.C., studied the sounds of vibrating strings. Other Greeks after him studied the way sounds change and how we hear sounds.

For many centuries before and after Christ, the study of sound was related to music. Around 400 years ago, beginning in the early 1600s, people such as the Italian scientist, Galileo (Gal i la' o), began to study more about the nature of sound itself. Galileo found that the frequency of a sound determined its **pitch**.



| Statue of Pythagoras

In 1877, an American scientist named Thomas A. Edison was the first person to **invent** a practical way to record sound and play it back. His device was called a phonograph (fo' no graf). It recorded sound on tinfoil wrapped around a small metal cylinder.



| Thomas Edison's phonograph

Today, many scientists and engineers continue to study sound. Their study of sound and its effects on people is called **acoustics**. These scientists and engineers help find new ways to control noise and sound, protect or improve hearing, and record and play back speech and music.



Match these items.

- 1.17 _____ Edison
 1.18 _____ Galileo
 1.19 _____ Pythagoras
 1.20 _____ acoustics
 1.21 _____ pitch

- a. a Greek who studied the sounds of strings
- b. the science of sound and its effects on people
- c. an American who invented the phonograph
- d. the high or low sound of an object
- e. an Italian who found that the frequency of a sound determined its pitch



For this Self Test, study what you have read and done. The Self Test will check what you remember.

SELF TEST 1

Each answer = 1 point

Choose the correct answer that correctly completes each sentence.

- 1.01** Sounds can be made by animals, _____, and things
 words people
- 1.02** You normally do not hear every sound around you because
 _____.
 something stops the sound you are doing something else
- 1.03** Sounds are caused when something _____.
 vibrates falls over
- 1.04** The cereal in your experiment moved because _____.
 it fell from the table the rubber on the drum vibrated
- 1.05** The number of vibrations that an object makes in one second is called _____.
 low note frequency

Answer *yes* or *no* for each sentence.

- 1.06** _____ A tuning fork makes sound when it is still.
- 1.07** _____ People can normally hear sounds from 20 to 20,000 vibrations per second.
- 1.08** _____ Animals cannot make sounds.
- 1.09** _____ Thomas A. Edison found a way to record and play back sound.
- 1.010** _____ Scientists today no longer study sound.

Match these items.

- 1.011** _____ sound
1.012 _____ Galileo
1.013 _____ Pythagorus
1.014 _____ acoustics
1.015 _____ pitch

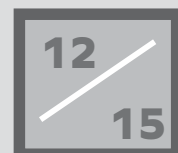
- a.** a Greek who studied the sounds of strings
- b.** the science of sound and its effects on people
- c.** caused by vibrations of an object
- d.** the high or low sound of an object
- e.** an Italian who found that the frequency of a sound determined its pitch

**Teacher check:**

Score _____

Initials _____

Date _____





SCI_Gr3-5



804 N. 2nd Ave. E.
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800-622-3070
www.aop.com

SCI0306 – Jan '16 Printing

ISBN 978-0-7403-1441-4



9 780740 314414