

Ask®

Make a Happy Sound

From sounds produced with wood and stone to digitally produced compositions, music plays a prominent role in cultures across the globe. While humans have been busy inventing and modifying instruments, insects have developed methods of creating sound that help them communicate, survive...and search for love.

CONVERSATION QUESTION

How are sounds produced?

TEACHING OBJECTIVES

- Students will learn how small insects can produce big sounds.
- Students will learn about the design and history of early musical instruments.
- Students will learn how electronic music is created and edited.
- Students will construct explanations from an expository text.
- Students will obtain information from a nonfiction article.
- Students will examine the structure and function of the components that produce electronic music.
- Students will create exponential expressions to represent numerical information.
- Students will plot geographical locations on a map of the world.
- Students will use a computer program to create a musical composition.



In addition to supplemental materials focused on core STEM skills, this flexible teaching tool offers vocabulary-building activities, questions for discussion, and cross-curricular activities.

SELECTIONS

- **Small Bugs, Big Sounds**
Expository Nonfiction, ~960L
- **Come In and Practice!**
Expository Nonfiction, ~880L
- **Band in a Box**
Expository Nonfiction, ~580L

Ask® Teacher Guide: November/December 2021

Small Bugs, Big Sounds

pp. 6–11, Expository Nonfiction

Buzz...Chirrp...Hummm. Warm summer nights are alive with the sounds of tiny insects calling out for love. Students will learn how these small critters produce such big sounds.



RESOURCES

Construct Explanations: The Ballad of the Bug

OBJECTIVES

- Students will learn how small insects can produce big sounds.
- Students will construct explanations from an expository text.
- Students will create exponential expressions to represent numerical information.

KEY VOCABULARY

- **vibrations (p. 6)** quick back-and-forth movements
- **sonar (p. 7)** a method for finding things by using sound waves
- **ripples (p. 7)** small waves on the surface of water

ENGAGE

Conversation Question: How are sounds produced?

Have students gently touch the top of their throat, a little below their chin. Inform them that the small bump they feel there is their voice box, or larynx. Tell them to keep their fingers resting on their throat while they sing and then hum. Ask students to describe what they feel as they sing and how the feeling changes when they go from singing to humming. Explain that they are feeling the small movements of their larynx, and that most sounds, including insect calls, are made up of many different sound waves traveling together.

INTRODUCE VOCABULARY

Post and discuss the three vocabulary words and their definitions. Arrange students into small groups and give each group a bowl of water and several small objects of different sizes. As they drop different objects into the water, have them discuss the change in the **ripples**. How can this be explained? Next, give the group rubber bands to stretch across their fingers and pluck. How does the stretching change the **vibrations** and create different sounds? Finally, have groups discuss uses of **sonar** by humans and animals.

READ & DISCUSS

Read the article aloud with the class. Have students reread the article with a partner to answer the questions below. Discuss responses.

1. Why do most insects produce sounds?
2. How do crickets avoid short-circuiting?
3. Explain how vibrations cause sound.
4. How are insects able to turn up the volume?
5. What are the females of each species especially listening for?
6. How does the spectrum of sound indicate the health of an ecosystem?

SKILL FOCUS: Construct Explanations

INSTRUCT: Have students review the article to note the variations of sounds that insects produce. Distribute the *Construct Explanations: The Ballad of the Bug* worksheet and tell the class that they will use information from the article to complete the chart. Students will need to provide clear explanations of how each sound is created. The final two questions will be answered using supporting details from the text.

ASSESS: Review responses with the class.

EXTEND

Mathematics Page 11 of the article states that “buzzing cicadas pop their tymbals in and out 100 times a second.” Review exponents with students and have them represent 100 in exponential form (10^2). Instruct students to practice using exponential expressions to represent variations of this fact. Example: How many times would a cicada pop its tymbals in 4 seconds? Answer: 4×10^2

The Ballad of the Bugs

In the chart below, write an explanation of how each sound is produced. Refer to the article to help you write your explanations. Then answer the questions.

Bug Sounds	Explanations
<p style="text-align: center;">Chirp (crickets/katydid)</p>	
<p style="text-align: center;">Pop/Buzz (cicadas)</p>	

1. How do insects make their sounds loud? _____

2. How do insects relay information with different sounds? _____

3. How do insects attract a mate with their calls but avoid a predator? _____

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Come In and Practice!

pp. 12–15, Expository Nonfiction

Beyoncé does it...the Rolling Stones do it...even Mozart did it: practice, practice, practice! Students will learn how and where a variety of instruments were created and why practice is the key to mastery.



RESOURCES

Obtaining Information: Musical Notes

OBJECTIVES

- Students will learn about the design and history of early musical instruments.
- Students will obtain information from a nonfiction article.
- Students will plot geographical locations on a map of the world.

KEY VOCABULARY

- **plectrum (p. 12)** a small, thin piece of metal, plastic, or ivory used to pluck the strings of a musical instrument
- **rhythm (p. 15)** a regular, repeated pattern of sounds
- **melody (p. 15)** a series of musical notes that form a song

ENGAGE

Conversation Question: How are sounds produced?

Write this familiar phrase on the board: *Practice makes perfect*. Tell students that studies indicate that deliberately practicing a new behavior has three effects: **1.** You get better at doing it. **2.** You start to replace old habits with new habits. **3.** You are able to execute a task while using less active brain processing (automaticity). Remind students that the emphasis should be on progress rather than perfection, and ask them to share their experiences with practicing a particular skill.

INTRODUCE VOCABULARY

Post the key terms and discuss the definitions. Then display the following questions and have students supply the correct answers:

1. Which word refers to being in sync? (*rhythm*)
Why is **rhythm** the most essential ingredient in music?
2. Which word refers to a guitar pick? (*plectrum*)
3. Today, most **plectrums** are made of plastic. What materials might have been used in the past?
4. Which word is a synonym for *tune*? (*melody*)
Organize a quick game of “Name That Tune” by humming a few notes of a **melody** while students try to guess the song.

READ & DISCUSS

Pose the following questions to the students to prompt meaningful discussion following the reading of the article.

1. Describe some different ways instruments have changed over time.
2. What did the lyre represent to the Greeks?
3. What were the earliest horns made out of?
4. Why were early musicians thrilled with the invention of the piano?
5. Explain why the embaire can be considered a group activity.

SKILL FOCUS: Obtain Information

INSTRUCT: Guide students to obtain information from the text, captions, and photos in the article. Remind them that the article was written to teach readers about the earliest instruments. Introduce the *Obtaining Information: Musical Notes* worksheet, and instruct students to correctly match the descriptions and instruments.

ASSESS: After reviewing the worksheet with students, have them classify the instruments into groups: strings/horns/keyboards/percussion.

EXTEND

Geography Instruct students to reread the article and to highlight all the geographical locations contained in the text. Provide pairs of students with a world map and have them plot and label each location and tag it with the name of the instrument created there.

Musical Notes

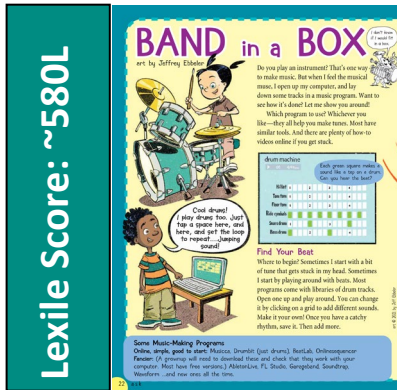
Obtaining Information Match each instrument on the left with its correct description on the right.

- | | |
|----------------------|---|
| 1. _____ ocarina | A. a popular folk instrument with only three strings |
| 2. _____ accordion | B. a small two-stringed fiddle with a drum-shaped body |
| 3. _____ balalaika | C. a long horn made of wood hollowed out by termites |
| 4. _____ guiro | D. a round pottery flute |
| 5. _____ erhu | E. a huge xylophone made of large wooden boards set above a pit in the ground |
| 6. _____ didgeridoo | F. a cousin of the Greek lyre |
| 7. _____ embaire | G. a squeeze-box with a keyboard |
| 8. _____ thumb piano | H. a hollow gourd with ridges |
| 9. _____ sackbut | I. small instrument played by twanging the metal tongues |
| 10. _____ beganna | J. an early version of the trombone |

Band in a Box

pp. 22–25, Expository Nonfiction

Electronic music is heard in dance clubs, in motion pictures, on the radio...and can now be created right in your own home. This article explores music technology and how even those who don't play an instrument can become legitimate musicians.



RESOURCES

Structure and Function: Tracks & Tunes

OBJECTIVES

- Students will learn how electronic music is created and edited.
- Students will examine the structure and function of the components that produce electronic music.
- Students will use a computer program to create a musical composition.

KEY VOCABULARY

- **DAW (p. 25)** digital audio workstation; a computer program that lets you compose and record music on a computer
- **BPM (p. 25)** beats per minute, or how fast a drum a plays
- **EDM (p. 25)** electronic dance music; dance music that is made with electronic equipment, such as computers and synthesizers

ENGAGE

Conversation Question: How are sounds produced?

Play some sound bites of synthetic music. Explain to students that digital music technology encompasses digital instruments, computers, electronic effects, software, and/or digital audio equipment. Discuss how these musical compositions and sounds differ from traditional instruments. Ask students to consider when one type of music may be preferred over the other.

INTRODUCE VOCABULARY

Post and discuss the key vocabulary. Point out that the words are actually abbreviations or words and phrases that are shortened to their initials. Brainstorm similar abbreviations, such as FBI, USA, TMI, and LOL. Remind students to look for the key vocabulary as they read.

READ & DISCUSS

Reinforce comprehension of the concepts and details presented in the article by using the following prompts to direct discussion.

1. List different ways that you can fill your world with music.
2. Why are drum tracks a good place to begin working on a tune?
3. How does a computer capture the sound of your instrument playing along to a computerized beat?
4. What can you do with a composition once the music has been turned into computer code?
5. Why do different instruments produce different sounds?
6. What happens when the computer changes the sound waves of an instrument?

SKILL FOCUS: Structure and Function

INSTRUCT: Elicit from students that the main idea of the article is to explain how music is electronically created and edited. Present the *Structure and Function: Tracks & Tunes* worksheet. Go over the directions and tell students they will be using information from the article to help them complete the chart.

ASSESS: Circulate and discuss content with students. Collect worksheets to assess students' ability to understand the structure and function relationship.

EXTEND

Music The text box on the bottom of page 22 lists some music-making programs. They range from simple beginner programs to more involved programs that require adult guidance. Visit one of the programs with your students and help them become familiar with it. Some students may already be proficient with this technology. Engage their expertise to help the class. Give small groups of students time during the week to use the program to create a musical composition. Then set aside time for groups to share their compositions with the class.

Tracks & Tunes

Structure and Function: Use information from the article to describe the function of each computer component listed in the first column below.

Structure	Function
microphone	
computer chip	
amplifier	
midi	
loop	