Ask® Teacher Guide: April 2021

Small but Mighty

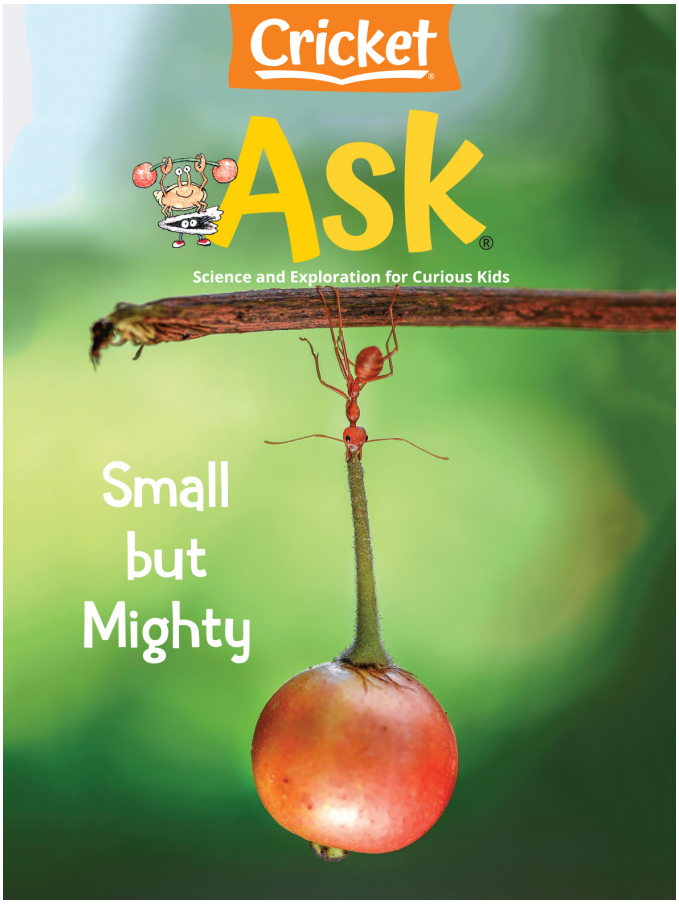
Do good things really come in small packages? This month's issue of ASK magazine explores tiny organisms and mechanisms that have greatly influenced the world around us. Students will truly learn the meaning of 'small, but mighty'.

CONVERSATION QUESTION

How can tiny things have a huge impact?

TEACHING OBJECTIVES

- **Students will learn about ant behaviors and how these tiny critters make the world a better place.**
- **Students will learn how Morse code was developed.**
- **Students will learn about the human body's microbiome.**
- **Students will collect evidence from a nonfiction text.**
- **Students will analyze and interpret a pattern.**
- **Students will examine the structure and function of the microorganisms that inhabit the body.**
- **Students will create an accurately labeled diagram depicting the anatomy of an ant.**
- **Students will research American inventions from the early 1800s.**
- **Students will demonstrate an understanding of the place value system (hundredths/thousandths).**



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

SELECTIONS

- **Ants All Around**

Nonfiction Narrative, ~500L

- **The Small Secret of Morse Code**

Nonfiction Narrative, ~500L

- **Meet Your Mighty Microbes**

Expository Nonfiction, ~900L

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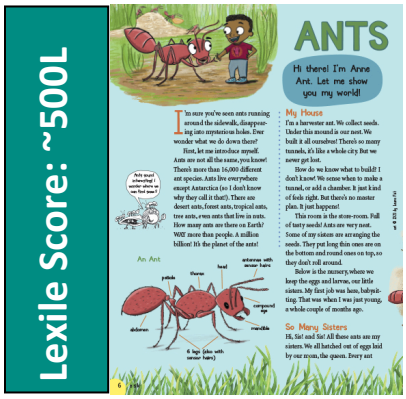
Ants All Around

pp. 6–10, Nonfiction Narrative

There is a quote that says, "All good work is done the way ants do things: Little by little." This article teaches readers how these tiny industrious insects create a highly organized society, complete with an underground palace.



RESOURCES

Collecting Evidence

OBJECTIVES

- Students will learn about ant behaviors and how these tiny critters make the world a better place.
- Students will collect evidence from a nonfiction text.
- Students will create an accurately labeled diagram depicting the anatomy of an ant.

KEY VOCABULARY

- ***mound* (p. 6)** a rounded pile of dirt; a raised area of earth
- ***tunnel* (p. 6)** an underground passage
- ***chamber*** (p. 6) an enclosed space or cavity

ENGAGE

Conversation Question: How can tiny things have a huge impact?

Show the students a movie clip from DreamWorks' "Ants". Although the movie is animated it accurately depicts life within an ant colony to a large degree. Have students work with a partner to complete a simple Venn diagram that compares/contrasts the habits of real ants with the habits of those in the film. Focus on the overlap in the diagram and discuss the real-life information about ant colonies that was portrayed through animation.

INTRODUCE VOCABULARY

Post and discuss the key terms and definitions. Display the title, "Ants All Around". Give students a few minutes to create a visual representation (picture dictionary) for the vocabulary words. They may add additional details to their drawings after they have read the article and gathered more information.

READ & DISCUSS

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

1. Where do ants live?
2. How do harvester ants build their nest? Explain the chambers and tunnels.
3. What are the differences between female and male ants in both appearance and roles?
4. Why and how do ants leave scent trails?
5. How do ants defend their food?
6. Why are ants beneficial to the Earth?

SKILL FOCUS: Collecting Evidence

INSTRUCT: This article presents the reader with detailed information regarding the important roles that different ants play within a colony. Present the graphic organizer, *F-ant-astic!*, and tell students that they will be collecting evidence from the text that shows the abilities needed by different members of the colony to perform different jobs. They will need to consult the article to gather information.

ASSESS: Review the organizers with the class. Have students choose one of the ants from the chart and write a 'Help Wanted' advertisement that would attract that particular ant. Show students the correct format of employment ads online or from the newspaper.

EXTEND

Science Instruct students to study the illustration of the ant on the bottom of page six. Have them recreate the diagram and label the following body parts: head, antennae, petiole, thorax, compound eye, mandible, legs, and abdomen. Below their labeled drawings, require the students to include a glossary defining each anatomical term.

F-*ant*-astic!

Collecting Evidence: Refer to the article to obtain the information needed to complete the chart. Use details to describe how each ant is essential to the functioning of the colony.

Ant	Job Description
Queen	
Male	
Harvester ant	
Guard ant	
Cleaner ant	

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The Small Secret of Morse Code

pp. 12-15, Nonfiction Narrative

Students will learn about the world's earliest 'instant messages.' This article teaches readers how Morse code was developed to be the most efficient communication system of its time.

RESOURCES

Analyze and Interpret a Pattern

OBJECTIVES

- Students will learn how Morse Code was developed.
- Students will analyze and interpret a pattern.
- Students will research American inventions from the early 1800s.

KEY VOCABULARY

- ***mechanism* (p. 13)** a system of parts working together in a machine
- ***deciphered* (p. 13)** translated from a code
- ***skimmed* (p. 14)** glanced over something quickly

ENGAGE

Conversation Question: How can tiny things have a huge impact?

Have students 'skim' a page of any text. Ask them what they observe to be the 5 most frequently used letters. Then, inform them that in the English alphabet, the 5 most commonly used letters are E, A, R, I, and O. How would knowing this fact change the way a secret writing code is developed? Display the text box on page 15 and have students draw conclusions. (Confirm/realign their thinking after reading the article.)

INTRODUCE VOCABULARY

Post and discuss the three vocabulary words and definitions. Have students Think-Pair-Share with a partner. Give them the following brainstorming directives, one at a time:

- Discuss what/how a **mechanism** on your bike helps you to stop.
- Discuss why you might **skim** a text rather than read thoroughly.
- Discuss how you would begin to **decipher** a code.

READ & DISCUSS

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

1. How does the Morse code machine function?
2. Why was Morse's first system of taps problematic?
3. What improvements were made to make the system more proficient?
4. How did More and Vail determine which letters of the alphabet were used the most often?
5. Explain how using the shortest codes for the most common letters was beneficial to telegraph operators.
6. How did Morse Code revolutionize communication?

SKILL FOCUS: Analyze & Interpret a Pattern

INSTRUCT: Direct students to return to page 15 to study the text box that deciphers each letter of the alphabet in Morse code. Emphasize the fact that the telegraph system replaced the primitive method of delivering messages by horseback. Distribute copies of the *Morse, of Course* graphic organizer and instruct the students to interpret the Morse code message. (Answer: original instant message)

ASSESS: Have students work quietly, so as not to give the answer to those who are still decoding. When everyone has deciphered the message, share the sentence aloud. Invite students to create a new message for a partner to solve.

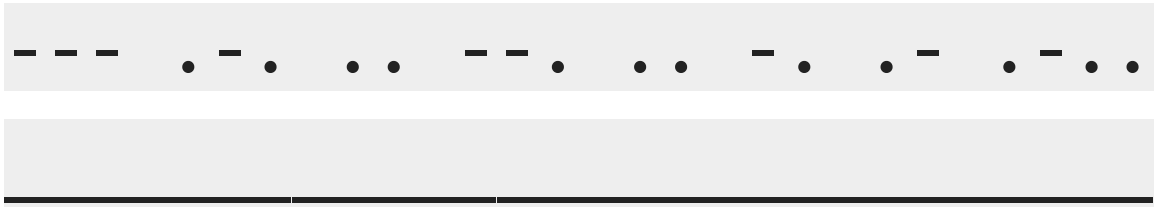
EXTEND

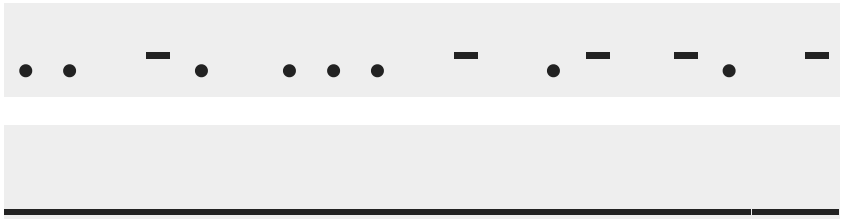
Social Studies Remind students that Morse code was developed by Samuel Morse and Alfred Vail in 1837. This very basic tapping mechanism that transported messages through electric wires that made dashes and dots created big change. Instruct students to research this time period (1800s in America) and present the class with information about another invention that had an impact on American life.

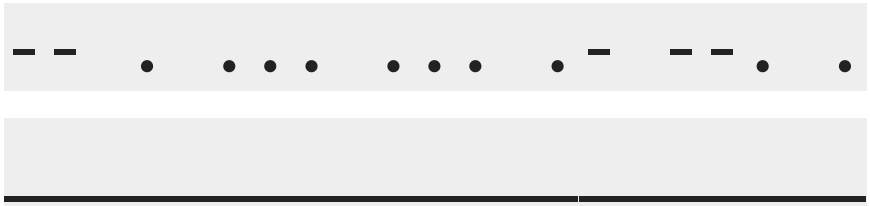
Morse, of Course

Analyze and Interpret: Translate the Morse code message into the correct words to complete the sentence.

Morse code is the







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Meet Your Mighty Microbes

pp. 16-21, Expository Nonfiction

This article may leave students feeling a little 'buggy', as it explains that humans are a habitat for microbes. These invisible critters are part of the body's microbiome, a complex web of life that lives in, on and with you.

RESOURCES

Structure and Function

OBJECTIVES

- Students will learn about the human body's microbiome.
- Students will examine the structure and function of the microorganisms that inhabit the body.
- Students will demonstrate an understanding of the place value system (hundredths/thousandths).

KEY VOCABULARY

- ***microbiome* (p. 17)** the collection of microorganisms that live in or on the human body
- ***epidermis* (p. 18)** the outermost layer of the skin

ENGAGE

Conversation Question: How can tiny things have a huge impact?

Display the title of the article, "Meet Your Mighty Microbes". Ask students which word refers to something strong (mighty) and which word refers to something tiny (microbes). Have students brainstorm with small groups to list things that are both strong and tiny. Create a class web and ask all groups to contribute a response.

INTRODUCE VOCABULARY

Post the key words and read aloud. Guide students to notice that both of the terms contain a prefix. Have students work in pairs to identify the root words and prefixes. Then, add the given definition for each word. Did students arrive at the correct definition when breaking up the words and defining each part? How can this be a useful skill, particularly when reading a science article?

READ & DISCUSS

Read the article aloud with the class. Have students reread the article in small groups to answer the questions below. Discuss responses.

1. What lives in your microbiome?
2. How does your microbiome work hard to keep you healthy?
3. Explain how different species adapt to live on different parts of your body.
4. How does your immune system work to protect you?
5. List 3 differences between bacteria and viruses. Use the graphics on page 20 to help you make a sketch of each.
6. What kind of health problems could possibly be attributed to an unbalanced microbiome?

SKILL FOCUS: Structure and Function

INSTRUCT: Elicit from students that the main idea of the article is to provide information that details the composition and function of the human body's microbiome. Present the graphic organizer, *Buggin' Out,* and tell students that they will be using information from the article to record the function of microbes on various parts of the body.

ASSESS: Circulate and discuss content with students. Collect graphic organizers to assess their ability to understand the structure and function relationship.

EXTEND

Mathematics The article states on page 16 that microbes that inhabit the body are too small to see. They are a hundredth or even a thousandth the size of this dot: . Use this opportunity to revisit place value and decimals by providing the students with a variety of problems to solve. See the examples below.

- How much is one hundredth of 10? (0.1)
- Which digit is in the thousandths place in 52.7894? (9)
- What is the value of the 3 in .23? (3 hundredths or 3/100)

Buggin' Out

Structure and Function: Use information from the article to define the role each structure plays in keeping a human body healthy.

Define 'microbiome': _____

_____

Structure	Examples of microbes that live there	Function it plays in immunity
skin		
mouth		
colon		