



MINIATURE WORLDS

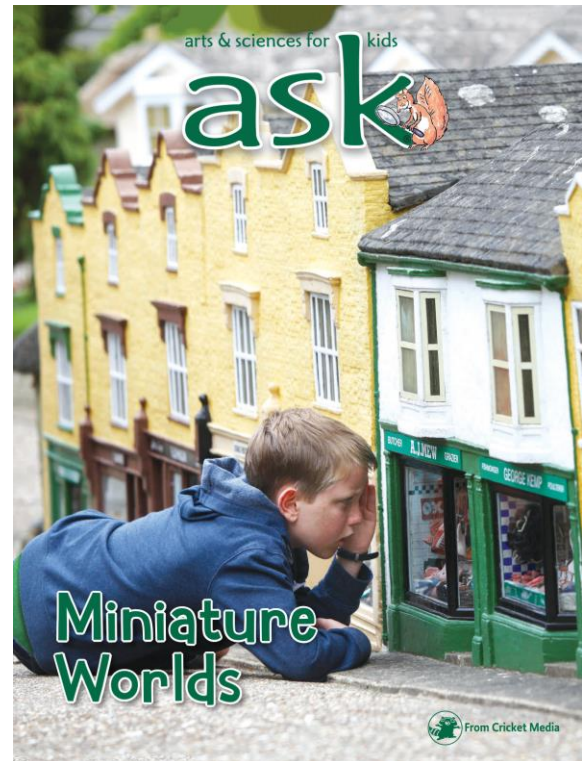
This issue of *Ask* explores the world of tiny creatures and miniature models. Students will learn how scaled-down versions of things are created by humans, as well as produced naturally in the wild. Good things *do* come in small packages!

CONVERSATION QUESTION

What can tiny creations teach us about our big world?

TEACHING OBJECTIVES

- Students will learn how miniature models are created.
- Students will learn about the tiny trees called bonsai.
- Students will learn about some of the world's tiniest creatures.
- Students will study the structure and function relationship.
- Students will demonstrate the ability to properly sequence a studied process.
- Students will obtain information from a nonfiction text.
- Students will explore the mathematical concept of scaling.
- Students will write a persuasive essay.
- Students will explore metric measurements and conversions.



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.

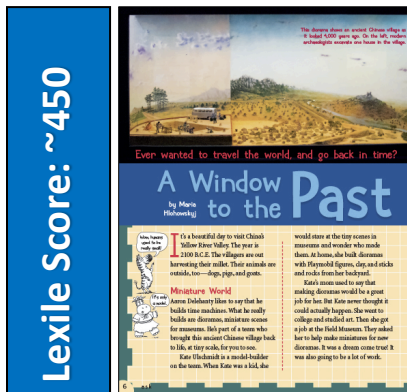
SELECTIONS

- **A Window to the Past**
Expository Nonfiction, ~450L
- **Tiny Trees**
Expository Nonfiction, ~750L
- **The Tiny Wild**
Expository Nonfiction, ~750L

A Window to the Past

pp. 6–10, Expository Nonfiction

Students will be fascinated to learn how miniature worlds are created for exhibits in museums. This article examines the people, materials, and processes responsible for constructing a detailed diorama of an ancient Chinese village.



RESOURCES

- Itty Bitty City

OBJECTIVES

- Students will learn how miniature models are created.
- Students will study the structure and function relationship.
- Students will explore the mathematical concept of scaling.

KEY VOCABULARY

- **exhibit (p. 7)** a public display in an art gallery or museum
- **figures (p. 6)** representations of human or animal forms
- **scale (p. 6)** the relative size of something; ratio

ENGAGE

Conversation Question: What can tiny creations teach us about our big world?

Use books, the internet, or actual objects (standard stapler/mini-stapler, toothpaste tube/travel toothpaste, etc.) to generate a discussion about size. Focus on how smaller versions of things can be useful, and have the students consider the process involved in creating such mini-models.

INTRODUCE VOCABULARY

Have students use resources to find the meanings of the three key vocabulary terms. Allow time for them to discover that each word has several meanings. List the various meanings on the board. As you read the article, draw attention to these words and ask students to conclude which definition is intended for each word.

READ & DISCUSS

Reinforce comprehension of the material presented in this article by leading a class discussion based on the following questions:

- What is the purpose of building a diorama or a miniature scene?
- What do archeologists study in order to learn more about a past civilization?
- Why is “scaling” important when building a model?
- Describe some of the features included in the diorama of ancient China.

CONCEPT/SKILL FOCUS: Structure and Function

INSTRUCT: Distribute the graphic organizer, *Itty Bitty City*, and tell the students that they are going to create a detailed record of the process and materials used to create the miniature model studied in the article (structure). They will then use information from the text, as well as their own thoughts to examine the purpose (function) of creating miniature models such as this one.

ASSESS: Circulate and have mini-conversations with students as they work on the graphic organizer. Remind them to include details. Collect and review their work to further assess understanding.

EXTEND

Mathematics Review the sections of the article that contain numbers and mathematical concepts. Focus on the ratio/scaling information provided on page 10. Assign students the task of scaling a particular object and then creating a representation. Be sure to tailor this project to the mathematical abilities of your students. (Ex: Simplify the ratios, use fractions such as $\frac{1}{4}$ the size of, or use basic wording such as “half the size of”)

Itty Bitty City

Use information from the article, "A Window to the Past," to study how a tiny Chinese village was constructed for the Tang Hall of China. Record your findings.

STRUCTURE: Mini-model/Diorama	FUNCTION: Purpose
<i>Description of process & materials</i>	<i>Why is it useful?</i>

Would you like to be part of a team that builds dioramas for museum exhibits? Explain.

Tiny Trees

pp. 11–13, Expository Nonfiction

Students will learn that a bonsai is more than just a potted plant. Climb into this article and discover how bonsai artists create these amazing living sculptures and how these tiny trees can tell a story.



RESOURCES

- Beautiful Bonsai

OBJECTIVES

- Students will learn about the tiny trees called bonsai.
- Students will demonstrate the ability to properly sequence a studied process.
- Students will write a persuasive essay.

KEY VOCABULARY

- **clamps** (p. 12) devices designed to press two or more parts together so as to hold them firmly
- **harsh** (p. 12) having an unpleasant or harmful effect
- **species** (p. 11) a kind or sort; a group of similar living organisms

ENGAGE

Conversation Question: What can tiny creations teach us about our big world?

If possible, display a bonsai in class. (If not, use books or the internet.) Create a Know-Want to Know-Learned (KWL) chart on the board and list student responses. Return to the chart after reading “Tiny Trees” in order to complete the “learned” column.

INTRODUCE VOCABULARY

Post the key vocabulary terms on the board without the meanings and have students work with a partner to procure definitions. Instruct each partner to create sentences that demonstrate meaning. Challenge them to omit the key word and have their partner fill in the missing word with the correct term.

READ & DISCUSS

Children may rejoin with their partner from the vocabulary activity to answer the questions below. Have the pairs of students discuss and record written responses to the following questions.

- Define the words *bonsai* and *penjing*.
- What is the job of a bonsai artist and what tools does he/she use?
- How do you care for a bonsai?
- Describe some of the popular styles for bonsai.

CONCEPT/SKILL FOCUS: Sequence

INSTRUCT: Review the information on pages 12 and 13. Discuss the fact that bonsai are more than just tiny trees. Elicit from the students that bonsai artists must follow a procedure to produce such creations. Distribute the *Beautiful Bonsai* graphic organizer and instruct the class to refer back to the article and to properly sequence the statements. Their finished work will tell the story of bonsai creation.

ASSESS: Circulate as students are working on the graphic organizer and discuss the information in the article. Direct students having difficulty with the sequencing to reread the text. Collect the organizer when completed to further evaluate understanding of this skill.

EXTEND

Language Arts Guide students to notice that there is a question under the title of the article. (Would you like a pet tree?) Give the class the opportunity to answer this question. Review the criteria for writing a persuasive essay. Advise students that they will be writing a short essay that will attempt to convince people why they would or would not like to have a pet tree. This can be a humorous or serious piece, but stress proper writing techniques. Encourage them to use at least two facts from the article in conjunction with their own expressive ideas.

Beautiful Bonsai

Describe the process of creating a bonsai by rewriting the statements below in the proper order.

- Bonsai need daily care, but if well tended can live for hundreds of years.
- Bonsai artists use scissors, clamps, and other small tools to shape the branches.
- Once the tree is shaped, the bonsai artist carefully chooses a pot.
- To create a bonsai, wires are wrapped around living branches to train them how to grow.
- Large roots are removed.
- The pot is filled with special soil.
- Wires stay on the branches for a few months until the shape holds.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

The Tiny Wild

pp. 24–25, Expository Nonfiction

We all know “where the wild things are,” but where are the *tiny* wild things? This article explores some of nature’s tiniest creatures and discusses their appearance, habitats, and locations.



RESOURCES

- **A Little Bit of Nature**

OBJECTIVES

- Students will learn about some of the world’s tiniest wild creatures.
- Students will obtain information from a nonfiction text.
- Students will explore metric measurements and conversions.

KEY VOCABULARY

- **impressive (p. 24)** magnificent, awesome
- **mammals (p. 25)** warm-blooded animals that birth live young and produce milk
- **scrawny (p. 24)** skinny, thin

ENGAGE

Conversation Question: What can tiny creatures teach us about our big world?

Allow the students to meet in small groups to brainstorm about nature’s tiniest wild creatures. Have them record and share their thoughts. Assure them that they will learn about some creatures that are even smaller than those they listed. Distribute “The Tiny Wild” and instruct the students to read the article with their group.

INTRODUCE VOCABULARY

Review the key terms and definitions with the class. Guide students to notice that each word belongs in a different part of the alphabet. (Beginning: A–I, Middle: J–R, End: S–Z) Have them write these headings at the top of their paper and put each word in the correct category. As a post-reading activity, have students add other words from the article to their list in the correct columns.

READ & DISCUSS

Lead a class discussion based on the following prompts.

- How can tiny creatures be just as impressive as the giants in our animal kingdom?
- What is the largest of tiny creatures mentioned in this article? What is the smallest?
- How can being tiny be an advantage in nature?

CONCEPT/SKILL FOCUS: Obtaining Information

INSTRUCT: This article contains an abundance of information on some of the world’s “teeny tiniest” creatures. Distribute the graphic organizer, *A Little Bit of Nature*, and allow the students to work with a partner to collect relevant facts about any four of these animals. Advise the class to refer back to the text and to record the data accurately.

ASSESS: Be available to help remedial students reread and complete their charts. Collect *A Little Bit of Nature* from all students when completed to further evaluate their understanding.

EXTEND

Mathematics “The Tiny Wild” provides an excellent opportunity for students to more closely examine the metric system. Have the class use metric rulers to draw and label a line that represents each of the creatures discussed. Depending on the abilities of your students, have them convert the lengths into other metric units. (Ex: mm to cm, cm to meters, etc.)

A Little Bit of Nature

Use information from the article, "The Tiny Wild," to study the appearance, habitat, and location of various tiny creatures. Record your findings.

Animal	Appearance	Habitat	Location