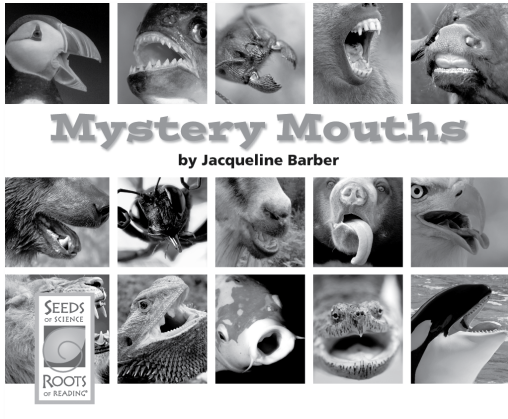


Using Visual Evidence to Make Inferences

with *Mystery Mouths*
from *Seeds of Science/Roots of Reading*®



Introduction

This strategy guide introduces an approach for using visual evidence in science texts to make inferences. The ability to interpret visual evidence is central to scientific observation. Scientific illustrations, photographs, diagrams, and models convey important evidence that is not easily observable firsthand. This guide includes an introductory section about visual evidence, a general overview of how to use this strategy with many science texts, and a plan for teaching how to use visual evidence to make inferences with the *Seeds of Science/Roots of Reading*® book, *Mystery Mouths*.

Book Summary

Mystery Mouths introduces readers to the concept of adaptations by providing opportunities to examine the characteristics of various animal mouths. First, readers are shown a photograph of a mouth and asked to examine it. Then, they turn the page and learn to what species of animal the mouth belongs and how mouth adaptations allow the animal to survive in its habitat. Mouths from other animals with similar adaptations are also presented for comparison. The structure of this book makes it an ideal text for students to practice using visual evidence and making inferences based on this evidence.

Science Background

The concept of adaptation is central to understanding why organisms have the characteristics they do. An adaptation is an inherited characteristic that helps a species do something important for its survival. An adaptation can be a physical structure, a behavior, or an internal physiological process. Among scientists, the word *adaptation* more often refers to the process by which a species develops new characteristics that provide a survival advantage. Adaptations are the result of genetic changes in a species, not in a single individual. The everyday usage of the word *adapt* can contribute to misconceptions about adaptation. We often say that a person has adapted to a situation, like a new classroom or a new job; however, species do not develop adaptations because they want or need them. Instead, species develop new adaptations as a result of changes in habitat. Changes in habitat affect the survival of individual organisms and, therefore, affect which characteristics are present in the species as a whole. When these new characteristics are passed on to future generations over a long period of time, they may become new adaptations of the species.

About This Book

Reading Level

Guided Reading Level*: N

Key Vocabulary

adaptation, characteristic, evidence, related

Text Features

bold print, captions, glossary, labels, photographs, text boxes

*Guided Reading Levels based on the text characteristics from Fountas and Pinnell, *Matching Books to Readers*.

About Visual Evidence

Although scientists gather evidence using observation, many things in the natural world are not readily observable. For example, scientists cannot always observe animals in their natural habitats because the animals are distantly located or because of safety concerns. Similarly, weather patterns are quite complex and cannot be observed in nature as a changing system. In these instances, scientists often rely on various sources of visual evidence, such as scientific illustrations, photographs, models, or diagrams. These sources are critical means for observing and learning about the world indirectly. In the classroom, students cannot always observe things that scientists are able to observe. Science texts offer a unique opportunity for students to learn about topics of interest when firsthand observation is not possible. Science texts often contain engaging sources of visual evidence that enhance students' understanding of a topic. Students can learn how to make inferences from visual evidence through guided interpretation and discussion.

Teaching How to Use Visual Evidence to Make Inferences

The following guidelines can be used to teach how to use visual evidence found in many science texts to make inferences.

- Select an appropriate text. Choose a book or article with one of the following types of visual evidence: realistic illustrations, striking photographs, images of models, or detailed diagrams. The visual evidence in the text should be central to the understanding of the content of the book. (See the box on this page.)
- Focus students' attention on one source of visual evidence in the text that is particularly important for understanding the content. For instance, if photographs provide key visual evidence, tell students to pay close attention to the photographs while they read.
- Tell students that scientists learn about the world by observing but that they can't always observe everything firsthand. Explain that scientists often use visual evidence to make inferences about something they are studying.

Visual Evidence in Science Texts

- **Scientific illustration:** a realistic, detailed drawing that depicts accurate features and characteristics (e.g., an illustration of an insect's body parts)
- **Photograph:** an image of a real object (e.g., a close-up picture of an animal mouth)
- **Model:** a simple representation of something that makes it easier to see or understand (e.g., a model of a DNA molecule)
- **Diagram:** images and labels that work together to show how something happens (e.g., a diagram of a food chain)

Explain that an inference is like a good guess based on evidence.

- Ask students to preview the sources of visual evidence in the text, focusing on the most important one. Discuss what students can infer based on their initial observations.
- Have students read the text and pay careful attention to the parts that contain visual evidence. You may wish to have students use the Using Visual Evidence to Make Inferences copymaster included with this guide to focus their reading.
- Discuss the source(s) of visual evidence with students. Discuss what inferences students were able to make from the visual evidence. You can encourage students to use sentences such as, "I think _____ because _____" to explain their inferences and the reasoning behind them.
- Continue the class discussion about the various sources of visual evidence and how students used the evidence to make inferences. Guide students in listing some information they learned primarily from the visual sources.
- Continue using the strategy. As students read other science texts, remind them to look closely at evidence presented visually. Discuss what inferences students made from the visual evidence. Remind students that using the visual evidence is often as important as reading the written text. You might also ask students to comment on how the written text and the visual evidence support and enhance each other and help convey ideas.

Teaching How to Use Visual Evidence to Make Inferences with *Mystery Mouths*

Mystery Mouths invites readers to closely observe different animals' mouths to discover the mouth adaptations that help the animals survive in their habitats.

Getting Ready

Make a copy of the Using Visual Evidence to Make Inferences copymaster for each student.

Before Reading

1. Focus students' attention on the cover of *Mystery Mouths* and ask what they notice about the photographs. Ask students to identify some of the animals, stating reasons for their answers. Model this for students by saying, "I think this is the mouth of a _____ (animal name) because _____ (name mouth characteristics)." (Note: Animal names are listed inside the back cover of the book.) Explain that students are inferring which animal they see based on the evidence in the photograph.
2. Explain that scientists often rely on photographs and other sources of visual evidence to make inferences about something they can't observe directly. Explain to students that they will learn about animal adaptations by observing the visual evidence because they aren't able to observe these animals directly.

During Reading

1. Ask students to open their books to page 3 and observe the photograph of the skull. Read the text aloud to students and briefly discuss their answers to the questions "What could a mouth like this eat?" "What is this mouth like?" "What kinds of teeth does it have?"
2. Tell students that an inference is something a scientist thinks is true based on evidence. Explain to students that they made inferences to answer the questions using clues or evidence they gathered from the photographs as well as from what they already knew about animals. Then, have students turn the page to read the information about the skull on page 4.
3. Ask students to turn to page 7 of their books and observe the photograph of the mouth.

Distribute the Using Visual Evidence to Make Inferences student sheets. Prompt students to record the page number and their observations about the characteristics of this mouth in the appropriate boxes. [Page 7. It is long and pointy.]

4. Next, ask students to make inferences about what that mouth eats. Have students record their inferences in the appropriate box on their student sheets.
5. Invite students to continue reading the book in a way that is consistent with your classroom routines, giving students as much independence as possible. Ask them to record their observations and inferences for two or three more mouths in the book in order to practice using visual evidence to make inferences.

After Reading

1. When students have finished reading, ask them to share a few of their observations and inferences from their student sheets with the class. Reinforce the idea that each animal has different adaptations that help it survive in its habitat.
2. Ask students to reflect on what they have learned about animal adaptations using visual evidence. For example, ask, "Why do different animals have different mouths?"
3. Explain that each time students make an observation and an inference, they are using visual evidence to learn about animal adaptations that they couldn't observe directly.
4. Ask students to reflect on this strategy and how it might be useful when reading other science texts.

Independent Extension

Have students examine and discuss with a partner the photographs of different mouths on page 23 of *Mystery Mouths*. Ask them to use visual evidence to identify to what animal the mouth might belong. Then have them use the following sentence frames to discuss the photographs: *The characteristics of this mouth are _____ . I think the animal eats _____ because _____ .*

Name _____ Date _____

Using Visual Evidence to Make Inferences

Title of book: _____

Page number	Observations	Inferences

About Strategy Guides

A six-page strategy guide is available for each *Seeds of Science/Roots of Reading*® student book. These strategies support students in becoming better readers and writers. They help students read science texts with greater understanding, learn and use new vocabulary, and discuss important ideas about the natural world and the nature of science. Many of these strategies can be used with multiple titles in the *Seeds/Roots* series. For more information, as well as for additional instructional resources, visit the *Seeds/Roots* Web site (www.seedsofscience.org/strategyguides.html).

Available Student Books for Grades 3–4

Nine engaging student books are now available from *Digestion and Body Systems* and *Variation and Adaptation*, each with a corresponding strategy guide. The books are part of the *Seeds of Science/Roots of Reading*® curriculum program described on page 6. Eighteen student books from the remaining grade 3–4 units (*Weather and Water* and *Light Energy*) are currently in development and will be available in late 2009.

<i>Digestion and Body Systems</i>	
Strategy	Student Book
Analyzing Part-to-Whole Relationships	<i>Systems</i>
Teaching About the Nature and Practices of Science	<i>Secrets of the Stomach</i>
Teaching Process Description Writing	<i>Voyage of a Cracker</i>
Searching for Information in Science Texts	<i>Handbook of Body Systems</i>
Making Sense of Data in Science Texts	<i>What's the Diagnosis?</i>
<i>Variation and Adaptation</i>	
Strategy	Student Book
Teaching Scientific Comparison Writing	<i>Blue Whales and Buttercups</i>
Using Discourse Circles	<i>The Code</i>
Using Visual Evidence to Make Inferences	<i>Mystery Mouths</i>
Teaching About the Nature and Practices of Science	<i>Evidence from the Past</i>

Extend Learning with *Seeds of Science/Roots of Reading*®

The strategy featured in this guide is drawn from the *Seeds of Science/Roots of Reading*® curriculum program. *Seeds/Roots* is an innovative, fully integrated science and literacy program.

The program employs a multimodal instructional model called “Do-it, Talk-it, Read-it, Write-it.” This approach provides rich and varied opportunities for students to learn science as they **investigate** through firsthand inquiry, **talk** with others about their investigations, **read** content-rich books, and **write** to record and reflect on their learning.

Take advantage of the natural synergies between science and literacy instruction.

- Improve students’ abilities to read and write in the context of science.
- Excite students with active hands-on investigation.
- Optimize instructional time by addressing goals in two subject areas at the same time.

To learn more about *Seeds of Science/Roots of Reading*® products, pricing, and purchasing information, visit www.seedsofscience.org



Variation and Adaptation Science and Literacy Kit



Developed at Lawrence Hall of Science and the Graduate School of Education at the University of California at Berkeley.

Seeds of Science/Roots of Reading® is a collaboration of a science team led by Jacqueline Barber and a literacy team led by P. David Pearson and Gina Cervetti.

© 2012 The Regents of the University of California All rights reserved.

Mystery Mouths Strategy Guide

Published and Distributed by  **wireless generation**®