



In This Guide

In this guide, you will find language arts and science lessons for the stories in the May issue of EXPLORER TRAILBLAZER.

Explorer Magazine

EXPLORER magazine is a classroom magazine specifically written for each grade, 2-5. Each grade's magazine contains a grade-appropriate reading experience, develops literacy skills and teaches standards-based science content. Great storytelling and stunning photographs teach your students about our planet and the people, plants, and animals that live on it. Use EXPLORER in your classroom to encourage students to explore our world and make it a better place.

EXPLORER is part of NATIONAL GEOGRAPHIC EXPLORER's Education program. Visit the "For Teachers" tab on EXPLORER's website, ngexplorer.cengage.com, to find additional resources for extending your students' learning.

Your Subscription Includes:

- Magazines
- Classroom Posters
- Projectable Magazine
- Interactive Whiteboard Lesson
- Teacher's Guide
- App (additional subscription required)

Into the Hive

LANGUAGE ARTS

Objectives

- Students will identify and explain connections between vocabulary words.
- Students will interpret and explain information visually, orally, and quantitatively to quickly answer questions about the text.

Resources

- Vocabulary Assessment Master (page 6)
- Language Arts Assessment Master (page 7)

Summary

- The article “Into the Hive” introduces students to the three types of honeybees that live in a hive, examines the role of each, and identifies parts of honeybees and flowers that help them survive.

BUILD VOCABULARY AND CONCEPTS

- **beeswax**
- **hive**
- **nectar**
- **pollen**
- **pollinate**

Display the Wordwise section on page 9 of the projectable magazine. Invite volunteers to read aloud the words and their definitions. Encourage students to share what they know about each word.

Give each student a copy of the **Vocabulary Assessment Master**. Divide the class into pairs. Instruct partners to record each word and its definition. Then have them think about how the vocabulary words are related. Tell them to write three sentences telling how two or more words are connected. For example: Honeybees carry pollen back to the hive.

READ

Inform students that the purpose of this article is to introduce them to the different types of honeybees in a hive and to explore what each type of bee does.

Display pages 2-3 of the projectable magazine. Tell students to look at the photo. Remind the class that there are three types of bees in a hive. **Ask:** *How many kinds of bees do you think are shown here?* **Say:** *That seems like an impossible question to answer. But it's not if you know a little bit about honeybees.*

Display the diagram on page 7 of the projectable magazine. **Say:** *The illustrations in this diagram show you what each type of bee looks like. The labels tell you what they're called. And the captions tell you what the bees do. Based on the information in the captions, I'm pretty sure I can figure out how many kinds of bees are shown in the photo. Invite volunteers to read the captions aloud. **Say:** *These bees are busy. They aren't mating or laying eggs. They're working outside the hive. My guess is only one type of bee is shown in the photo. I think all of these bees are worker bees.**

Point out the class that you could have answered that question after reading the entire article, but often that's not necessary. Many times, readers can get information from photos, captions, diagrams, and other text elements in an article. That information can quickly answer some of the questions they have.

Give each student a copy of the **Language Arts Assessment Master**. Review the questions on the worksheet with the class. Then have students read the article on their own. As they do, instruct them to write four questions they have about key concepts in the text. Tell them to record the answer and tell where they found it in the article.

Into the Hive

LANGUAGE ARTS

TURN AND TALK

Have students turn and talk to discuss what they learned about honeybees. **Ask:** *Where do honeybees live?* (in hives) *What are the three kinds of honeybees?* (drones, queen, workers) *What does each type of bee do?* (Drones mate with the queen. The queen lays eggs. Workers do everything to take care of the hive and the other bees.) Invite students to share what else they learned about the three types of bees.

- **Finding Connections** Explain to students that reading definitions tells people what words mean. But readers can learn even more if they see how important words are connected. Point out that this is exactly what they did when they wrote sentences about the vocabulary words in the article. Instruct students to turn and share the sentences they wrote on their **Vocabulary Assessment Masters** with a partner. Encourage them to discuss similarities and differences in their sentences to get an even deeper understanding of the vocabulary words.

- **Interpreting Information** After reading the article, remind students that article contain much more than text. They often contain photos, diagrams, captions, and other text elements, too. These text elements usually highlight important points in the text. Because of that, readers can often find answers to questions more quickly if they study the text elements on the page. Have students share their **Language Arts Assessment Masters** in small groups. Did students record the same questions? If so, did they get the same answers? If not, instruct students to use their source information to revisit the information in the text. Encourage them to rewrite their answers as needed.

WRITE AND ASSESS

You may want students to write about what they learned to assess understanding. Encourage students to reflect upon what they read and how it affected their ideas about the topic.

- *What does a queen bee do?*
- *What do worker bees do?*
- *What surprised you about what you read?*

Into the Hive

SCIENCE

Objectives

- Students will understand why honeybees and plants need each other to survive.
- Students will understand that honeybees have body parts that help them survive.
- Students will recognize characteristics that distinguish honeybees from wasps and other types of bees.

Resources

- Content Assessment Master (page 8)
- "The Buzz on Bees" poster (Teacher's Edition)
- Comprehension Check (page 9)
- "Into the Hive" Interactive Whiteboard (optional)

Science Background

Honeybees are small insects (5-15 mm) that live in very large colonies or swarms. There may be more than 60,000 honeybees in one hive.

There are three types of bees: the queen, drones, and workers. Each hive has one queen. The queen is the largest bee in the hive. She can live up to five years. Her one job is to lay eggs. A queen bee can lay up to 2,500 eggs a day.

There are several hundred drones, or male bees, in a hive. The sole purpose of the drone bee is to mate with the queen.

The vast majority of bees in a hive are workers. These are female bees that do all of the work to keep the hive going. Worker bees clean the hive, take care of the young, build wax combs, guard the entrance, and find the food that feeds all of the other bees. They also make honey.

Honeybees get their food from flowers. They eat pollen and drink nectar. To guide other bees to flower, a honeybee dances. The worker bee lands on a vertical surface. If she runs straight up, she's telling the other bees to fly toward the sun. If she runs down, the food is in the opposite direction. She wiggles her abdomen to communicate distance. The more she wiggles, the further away the food is.

ENGAGE

Tap Prior Knowledge

Ask students to think of a time when they saw a bee landing on a flower. Have them describe what the bee did when it got to the flower. As a class, discuss what the bee was doing and why it might have landed on the flower.

EXPLORE

Preview the Lesson

Display pages 2-3 of the projectable magazine. Read aloud the headline. Have students examine the photo. **Ask:** *What type of insect does this photo show? (honeybees) Where are they going? (into the hive) Why? (It is their home.)* Draw students' attention to the honeybee above the word "Into" in the headline. Point to its hind leg. **Say:** *This bee has a very fat hind leg. The leg looks yellow.* **Ask:** *Do you think that's just the way the leg looks in the photo or is there something on the honeybee's leg? If so, what could it be?* Encourage students to share their ideas. Tell them they'll know the answer after they read the article.

Set a Purpose and Read

Have students read the article in order to understand why honeybees and plants need each other and to understand that honeybees have body parts that help them survive. They will also recognize characteristics that distinguish honeybees from wasps and other types of bees.

EXPLAIN

Honeybees and Plants

Display pages 8-9 of the projectable magazine. Point out to students that the honeybees in both of these photos are visiting flowers. **Ask:** *Which subhead on this page tells you why the honeybees are visiting the flowers? (Finding Food)* Read that section aloud.

Ask: *What do bees get when they visit flowers? (pollen and nectar) What do they do with the pollen and nectar? (They eat the pollen and drink the nectar. They also use the nectar to make honey.)* Discuss how their visit also helps flowers survive. (Bees

Into the Hive

SCIENCE

pollinate flowers so they can make seeds.)

EXPLAIN

(continued)

Understanding Bee Body Parts

Display pages 8-9 of the projectable magazine. Ask students what the honeybees are doing in each photo. (Page 8: drinking nectar; page 9: collecting pollen) **Say:** *Honeybees eat some of the pollen and nectar they get when they visit flowers. But not all honeybees leave the hive. So bees that do fly out into the field need to collect pollen and nectar and bring it back to the hive so all of the other bees have food, too.* Discuss how the honeybees do this. (The bee drinks nectar with its mouth and stores it in its two stomachs. The bee collects pollen on its legs and on tiny hairs on its body.) Give each student a copy of the **Content Assessment Master**. Then divide the class into small groups. Have groups discuss the different ways honeybees use their legs, wings, mouth, and stomachs. Then have each student draw a picture and write a sentence telling one way a honeybee uses each body part.

Honeybees vs. Wasps and Other Bees

Display "**The Buzz on Bees**" poster. Invite a volunteer to read aloud the headline and subhead. Then examine the four bees on the poster. Discuss how the bees are different. Then zoom in on the section "Wasp vs. Bee." Review the traits of wasps and bees. As a class, discuss how wasps and bees are different.

ELABORATE

Find Out More

Point out to students that the article explained in detail how bees use their body parts to get food from flowers. But all it said about flowers is that bees pollinate flowers when they visit. Divide the class into small groups. Instruct groups to conduct research to identify the parts of a flower needed for pollination to occur.

Extend Your Thinking About Insects

Inform students that honeybees are the only insects in the world that make a food people eat. But in some parts of the world, people eat insects for food. Divide the class into small groups. Instruct groups to conduct research to find one insect people eat for food. Challenge them to write a recipe that would entice their friends to eat that insect for lunch!

EVALUATE

Have students record their answers to the assessment questions in their science notebooks or on a separate sheet of paper.

- *Why do bees need beeswax?* (to create the wax cells inside their hives)
- *Why do bees visit flowers?* (to get pollen and nectar)
- *How does a bee help a flower when it visits?* (Bees transfer pollen from one flower to another.)

If you wish, have students complete the **Comprehension Check** to assess their knowledge of concepts mentioned in the article. You may also wish to examine the optional **Interactive Whiteboard** lesson that accompanies this article.

VOCABULARY ASSESSMENT: Into the Hive

Record each vocabulary word and its definition.

Word	Definition

Write three sentences to tell how different words are connected.

1. _____

2. _____

3. _____

Name _____

Date _____

LANGUAGE ARTS ASSESSMENT: Into the Hive

Write four questions you have about the article. Record the answer. Tell where you found the answer in the article.

Question	Answer	Source

CONTENT ASSESSMENT: Into the Hive

Draw a picture to show how honeybees use each body part. Tell what they are doing.

Legs	Wings
<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
Mouth	Stomachs
<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>

COMPREHENSION CHECK: Into the Hive

Read each question. Fill in the circle next to the correct answer or write your response on the lines.

- 1. How are all worker bees the same?
A They lay eggs.
B They fly to flowers.
C They are female.

- 2. What do honeybees collect on their legs?
A nectar
B pollen
C fruit

- 3. What do honeybees make out of nectar?
A honey
B pollen
C beeswax

- 4. What do honeybees make to build a hive?
A bee stings
B bee barf
C beeswax

5. Tell how honeybees make beeswax.

Magnificent Magnets

LANGUAGE ARTS

Objectives

- Students will create sketches to understand the meaning of unfamiliar words.
- Students will ask and answer questions about magnets.
- Students will explain concepts based on information in the text.

Resources

- Vocabulary Assessment Master (page 14)
- Language Arts Assessment Master (page 15)

Summary

- The article “Magnificent Magnets” invites students to discover how magnets work and how they are used in the world.

BUILD VOCABULARY AND CONCEPTS

- **attract**
- **electromagnet**
- **magnet**
- **magnetic field**
- **magnetic pole**
- **repel**

Display the vocabulary words on a word wall or on the whiteboard. Point out to students that when they read they will encounter words they don't know. Remind them that using context clues such as the sentences before and after an unknown word and photographs on the page can help them figure out what the unfamiliar word means.

Invite a volunteer to read the definition of *attract* in the Wordwise feature on page 15 of the article. Examine this word in context. Then give each student a copy of the **Vocabulary Assessment Master**. Instruct students to write the word's definition and create a detailed sketch showing what it means. Inform students that their drawings won't all be the same. The point is for students to draw the word in a way that helps them remember what it means. Examine the other words in this same way.

READ

Let students know that the purpose of this article is to discover how magnets work and how they are used in the world.

Explain to students that good readers ask questions before, during, and after they read. They ask questions, in particular, when they encounter something they don't understand or something they want to learn more about. Usually, they can find the answer in the text.

Display pages 10-11 of the projectable magazine. Model how to ask and answer questions. **Say:** *When I look at these pages, I see two big red and silver objects in the photo. But something strange is going on. All of the silver objects seem to be pulled toward the larger objects. Why?* Point out the headline and read it aloud. **Say:** *This explains a lot. The two larger objects must be magnets. I know that different types of metal are attracted to magnets. The silver pieces must all be metal.* Point out the subhead and read it aloud. **Say:** *I've used magnets before, but I don't know how they made my life better. And how could a magnet make an animal's life better? To find answers to those questions, I'll have to read the article.*

Give each student a copy of the **Language Arts Assessment Master**. Explain to student how they can use the worksheet to record questions and answers before, during, and after they read the article.

As a class, brainstorm a list of questions about magnets. Instruct students to record the questions in the appropriate section of their worksheets. Then have students read the article on their own. As they do, instruct them to record additional questions and any answers they find in the text. If students still have questions about magnets after reading the article, instruct them to record those questions, too.

Magnificent Magnets

LANGUAGE ARTS

TURN AND TALK

Have students turn and talk to discuss what they learned about how magnets work. **Ask:** *What is a magnet?* (a material that has a magnetic force) *What does that mean?* (A magnet can attract or repel objects.) *What is the biggest magnet shown in the photos in this article?* (Earth)

- **Ask and Answer Questions** Remind students that asking and answering questions is a strategy to help them understand what they read. **Say:** *Even the best readers come across words or ideas they don't understand. Asking questions is the first step toward figuring those things out. If you ask questions, you know which answers to search for as you read and re-read the text.* Have students share and compare their **Language Arts Assessment Masters** with a partner. Do they have the same questions? Did they find the same answers? If not, encourage them to identify where in the text they found the answer and make any corrections necessary.

- **Explain Concepts** After reading the article, **say:** *One way to see if you understand information is to try to tell someone else about the topic. If you can't explain the concept, you might need to read the article again.* Have students turn and talk to explain to a partner how magnets work. Prompt discussion with questions such as: *What is a magnetic pole?* (the area of a magnet where the force is strongest) *What do two opposite poles do?* (attract one another) *What do two of the same poles do?* (repel one another)

WRITE AND ASSESS

You may want students to write about what they learned to assess understanding. Encourage students to reflect upon what they read and how it affected their ideas about the topic.

- *What is a magnetic field?*
- *Why are some magnets stronger than others?*
- *What surprised you about what you read?*

Magnificent Magnets

SCIENCE

Objectives

- Students will understand how magnets work.
- Students will recognize how magnets are used in everyday objects.

Resources

- Content Assessment Master (page 16)
- "Earth's Magnetic Field" poster (Teacher's Edition)
- Comprehension Check (page 17)

Science Background

A magnet is a material that has a magnetic force. Although that force is invisible, it is powerful. It allows magnets to pull other objects toward them or to push the objects away.

Magnets get this power from the spinning motion of electrons. Electrons circle the nucleus, or core, of the atoms that make up matter. When electrons spin, they create electricity. This occurs in all types of matter. But in most materials, equal numbers of electrons spin in opposite directions, canceling out the magnetism.

In some materials—like iron, cobalt, and nickel—most of the electrons spin in the same direction. If a material like this enters the magnetic field of another object, such as Earth, that object obtains its own magnetic force.

Every magnet has two poles, north and south. Opposite poles are attracted to each other. They are pulled together. The same poles repel, or push apart.

An electromagnet is a type of magnet created when a material becomes magnetic after an electric current is passed through a wire coiled around it. Magnets like these need electricity to create a magnetic field. When the electric current is turned off, they can no longer attract or repel other objects.

ENGAGE

Tap Prior Knowledge

Display a mixture of plastic and metal paper clips on a desk. Invite a student to hold a magnet over the objects. Give students a moment to observe as the metal the paper clips move toward the magnet but the plastic ones don't. Challenge students to explain what just happened.

EXPLORE

Preview the Lesson

Display pages 10-11 of the projectable edition. Read aloud the headline and subhead. **Ask:** *What is this article about?* (magnets) *What does the subhead claim?* (that magnets make life better for people and animals) Brainstorm ideas about how this might be possible.

Set a Purpose and Read

Have students read the article in order to understand how magnets work and recognize how magnets are used in everyday objects.

EXPLAIN

Understanding How Magnets Work

Display page 12 of the projectable magazine. Zoom in on the small photo of the magnet. Point out the letters "N" and "S" on the magnet's two ends. Inform the class that these letters identify magnetic poles. **Say:** *All magnets have magnetic poles. The objects in this photo are attracted to the poles because that's where the magnet's force is strongest.* Remind students that the north and south poles of two magnets attract. But two of the same poles will repel. Point out that Earth is a giant magnet. Like smaller magnets, it has two magnetic poles. **Say:** *Earth also has a giant magnetic field, or area of magnetic force. It is so strong that it extends into space.* Display the **"Earth's Magnetic Field" poster**. Discuss how Earth's magnetic field is formed. Then display the photo of *Aurora Australis* on pages 12-13 of the projectable magazine. Discuss how Earth's magnetic field causes this to happen.

Magnificent Magnets

SCIENCE

EXPLAIN

(continued)

Recognizing Magnets in Everyday Objects

Remind students that magnets use an invisible force to push and pull some objects without even touching them. **Say:** *Often when people think of magnets they picture something like the magnet shown on pages 10-11 of this article. They see a bar or a horseshoe-shaped object that picks up metal objects. But not all magnets are like this.* Display page 13 of the projectable magazine. Discuss how the loggerhead sea turtle uses the magnet in its head to navigate. **Say:** *Many objects they use every day have magnets in them. The magnets make them work.* Give each student a copy of the **Content Assessment Master**. Then divide the class into small groups. Challenge students to find and record information to explain how magnets make each object work.

ELABORATE

Find Out More

Display pages 14-15 of the projectable magazine. Inform students that the article explained how people use magnets to operate doorbells, dishwashers, and trains. But it only showed a picture of an electronic device. As a class, to conduct research to learn how electronic devices use magnets. Invite them to share what they learned with the class.

Extend Your Thinking About Magnets

Remind students that in some parts of the world people use magnets to move trains. These trains can travel at speeds of up to 500 kilometers per hour! Discuss the pros and cons of using a train that could travel that fast.

EVALUATE

Have students record their answers to the assessment questions in their science notebooks or on a separate sheet of paper.

- *How did early explorers use magnets?* (They used lodestone, a natural magnet, as a compass.)
- *Where can see the Aurora Australis?* (near Earth's South Pole)
- *What does magnetism help loggerhead sea turtles do?* (follow their migration route)

If you wish, have students complete the **Comprehension Check** to assess their knowledge of concepts mentioned in the article.

VOCABULARY ASSESSMENT: Magnificent Magnets

Record the definition of each vocabulary word. Create a sketch to help you remember what each word means.

Word	Definition	Sketch
attract		
electromagnet		
magnet		
magnetic field		
magnetic pole		
repel		

Name _____

Date _____

LANGUAGE ARTS ASSESSMENT: Magnificent Magnets

Record questions you have about magnets before, during, and after reading the article.
Search for answers in the text.

	Questions	Answers
Before		
During		
After		

Name _____

Date _____

CONTENT ASSESSMENT : Magnificent Magnets

Tell how magnet make each of these objects work.

Object	Explain
Lodestone	
Doorbell	
Dishwasher	
Train	

COMPREHENSION CHECK: Magnificent Magnets

Read each question. Fill in the circle next to the correct answer or write your response on the lines.

1. What did early explorers and loggerhead sea turtles have in common?

- A Both used magnets to move.
- B Both used magnets to swim.
- C Both used magnets to navigate.

2. What kind of magnet makes a doorbell ring?

- A a natural magnet
- B an electromagnet
- C lodestone

3. Why does Earth's magnetic field extend into space?

- A It is round.
- B It is magnetic.
- C It is strong.

4. What happens when magnetic poles repel each other?

- A They push away from each other.
- B They pull toward each other.
- C Nothing happens.

5. Tell one way magnets are used in everyday objects.

Okavango Adventure

LANGUAGE ARTS

Objectives

- Students will predict definitions and then write sentences to better understand unfamiliar words.
- Students will ask questions about the Okavango Delta and find answers in the text.
- Students will explain concepts based on information in the article.

Resources

- Vocabulary Assessment Master (page 22)
- Language Arts Assessment Master (page 23)

Summary

- In the article “Okavango Adventure,” National Geographic Explorer Steve Boyes takes readers through the Okavango Delta in Botswana, Africa. Boyes explains why the Okavango ecosystem is important to African wildlife and identifies potential threats from human activities.

BUILD VOCABULARY AND CONCEPTS

- **delta**
- **mokoro**
- **wetland**

Give each student a copy of the **Vocabulary Assessment Master**. Point out to students that they may have heard some or all of these words before.

Invite students to share what they already know about each word. As a class, use that background knowledge as a base to predict and write a definition for each word. Then work together to write a sentence using each word, based on the definitions the class wrote.

Display the Wordwise feature on page 23 of the projectable magazine. Review the definitions as a class. Have students add these definitions to their worksheets. Instruct them to write new sentences, using each word as it is defined in the article.

Invite volunteers to read aloud their new sentences. Compare those to the sentences the class wrote before reading the article. See how new knowledge helped students better understand each word.

READ

Let students know that the purpose of this article is to introduce them to Africa's Okavango Delta. As they read, they will learn why the ecosystem here is important to African wildlife. They will also learn about human activities that can harm the delta.

Tell students that the best way to learn more about a subject is to ask themselves questions as they read the article. **Say:** *Good readers always do this. It helps them learn more about the topic. And asking questions isn't as hard as you might think. Many questions begin with the same six question words: Who? What? Where? When? Why? and How?*

Display pages 16-17 of the projectable magazine. Read aloud the headline and text. Model how to ask and answer questions. **Say:** *When I look at this page, the first thing I notice is the image. Where is that boat going? What is it doing? The writer says this article is about an adventure. What sort of adventure? And the text says this place is dangerous. Why? What is lurking below the water?* Encourage students to introduce new questions of their own.

Give each student a copy of the **Language Arts Assessment Master**. Have students read the article on their own. As they do, instruct them to write at least one question related to the article that begins with each question word. Challenge them to find the answers to their questions in the text. Instruct students to record the answers on their worksheets.

LANGUAGE ARTS

TURN AND TALK

Have students turn and talk to discuss what they learned about the Okavango Delta. **Ask:** *Where is the Okavango Delta? (Botswana, Africa) Why is the Okavango Delta special? (Most deltas form where a river empties into the ocean. This delta is in the middle of Africa's Kalahari Desert.)* Encourage students to share other interesting facts they learned about the Okavango Delta.

- **Ask and Answer Questions** Remind students that asking and answering questions is a strategy that will help them understand what they read. **Say:** *Even the best readers come across words and ideas they don't understand. Asking questions shows you which answers you need to search for as you reread the text.* Have students share and compare their **Language Arts Assessment Masters** with a partner. Did they have the same questions? Did they find the same answers? If not, encourage partners to compare where in the text they each found the answer to reevaluate the results.

- **Explain Concepts** After reading the article, **say:** *One way to see if you understand information is to try to tell someone else about the topic. If you can't explain the concept, you might need to read the article again.* Have students turn and talk to explain to a partner what a mokoro is and why the researchers used them when they studied the Okavango Delta. Prompt discussion with questions.

WRITE AND ASSESS

You may want students to write about what they learned to assess understanding. Encourage students to reflect upon what they read and how it affected their ideas about the topic.

- *What is a delta?*
- *What is it like on the Okavango Delta?*
- *What surprised you about what you read?*

Okavango Adventure

SCIENCE

Objectives

- Students will understand that many different animals live on the Okavango Delta.
- Students will recognize how human activities can change the delta.

Resources

- Content Assessment Master (page 24)
- Comprehension Check (page 25)

Science Background

Located in the northwest corner of Botswana, the Okavango Delta spreads out across 15,000 square kilometers. It is the largest freshwater ecosystem in the world.

Africa's Okavango Delta is unique. Most deltas form where rivers flow into the ocean. This delta exists where the Okavango River empties into the Kalahari Desert.

The Okavango Delta is home to some of the world's most endangered large animal species. This includes cheetahs, white rhinoceroses, black rhinoceroses, African wild dogs, and lions. Other large animals include giraffes, antelopes, Nile crocodiles, warthogs, and the plains zebra. About 400 species of birds and 71 species of fish live here, too.

Life on the delta is ruled by the weather. The wet season typically begins in March and peaks in July. Many large animals leave the delta during this time to make their homes in the lush grasslands that surround the delta.

In 2014, the United Nations named the Okavango Delta as its 1,000th World Heritage Site.

ENGAGE

Tap Prior Knowledge

Encourage students to think of nature shows about Africa that they've seen on television. Invite volunteers to describe what the places they saw looked like. Brainstorm a list of animals that lived there. Discuss what it would be like to explore a place like this in real life.

EXPLORE

Preview the Lesson

Instruct students to turn to page 19 of their student magazines. Invite a volunteer to read aloud the text in the box at the bottom right corner of the page. Then encourage students to scan the photos in the article. Discuss reasons why the writer would call Okavango the wildest place on Earth.

Set a Purpose and Read

Have students read the article in order to understand that many different animals live on the Okavango Delta and how human activities can change the delta.

EXPLAIN

Recognizing Okavango Delta Animals

Display the Wordwise feature on page 23 of the projectable magazine. Read aloud the definition for *delta*. Review with the class what a delta is. Display the photo on pages 20-21 to show students what a delta is like. Have them examine the rest of the article's photos. **Ask:** *What two animals do you see?* (lion and hippo) Tell students that many other animals live here, too. They all get what they need to survive. As a class, review the article to identify other delta animals. (elephant, giraffe, leopard, impala, cheetah, pelican, stork, flamingo, fish) Then give each student a copy of the **Content Assessment Master**. Instruct students to pick three Okavango Delta that were not shown in the article's photos. Tell students to draw a picture of each animal in its natural habitat. Encourage them to write informative captions for each of their pictures.

Okavango Adventure

SCIENCE

EXPLAIN

(continued)

Recognizing the Impact of Humans

Display page 23 of the projectable magazine. Zoom in on the section "Saving the Okavango." Inform the class that researchers have spent years keeping track of the wildlife that live on the Okavango Delta. **Ask:** *Why is this work important?* (Many of the animals are endangered species. By studying the animals' movements and habits, researchers can learn how to save the animals.) Tell students that the Okavango Delta is now a World Heritage Site. Discuss what that is. Explain how having this status can help protect the area. Then point out that the Okavango Delta is very large. And the rivers that feed it are not protected. Challenge students to explain why this could be a threat. (Everything people do upstream affects the delta. Pollution flows down the river. If people decided to build a dam, less water would flow to this area.) As a class, think of a way to teach more people about the Okavango Delta so they'll want to protect it.

ELABORATE

Find Out More

Point out to students that the scientists who conduct research on the Okavango Delta get a lot of help from members of the ba'Yei tribe. Have students conduct research to learn more about these people, who call the Okavango Delta their home.

Extend Your Thinking About the Okavango Delta

Display page 22 of the projectable magazine. Point out that the researcher in this photograph is using solar-powered technology to study the delta. Discuss why this is necessary. Brainstorm ideas about other ways researchers could use technology to overcome obstacles when working in remote locations.

EVALUATE

Have students record their answers to the assessment questions in their science notebooks or on a separate sheet of paper.

- *What is a wetland?* (land consisting of marshes or swamps)
- *What is a mokoro?* (the traditional dugout canoe of the people of the Okavango Delta)
- *Why is a mokoro a good way to explore the Okavango Delta?* (You need a boat to move on the water. The boat must be light-weight so you can carry it if you have to.)

If you wish, have students complete the **Comprehension Check** to assess their knowledge of concepts mentioned in the article.

Name _____

Date _____

VOCABULARY ASSESSMENT : Okavango Adventure

Use this organizer to study each vocabulary word in the article.

Word			
Predicted Definition			
Sentence			
Definition from the Article			
Sentence			

LANGUAGE ARTS ASSESSMENT: Okavango Adventure

Write one question about the article that begins with each question word.
Find the answer in the text.

Question Word	My Question	My Answer
Who?		
What?		
Where?		
When?		
Why?		
How?		

Name _____

Date _____

CONTENT ASSESSMENT: Okavango Adventure

Draw pictures of three animals that live in the Okavango Delta. Write captions to tell about each.

Captions			Pictures		

COMPREHENSION CHECK: Okavango Adventure

Read each question. Fill in the circle next to the correct answer or write your response on the lines.

- 1. Where does a delta form?
A at the mouth of a river
B in mountains
C in the middle of a river

- 2. What is a mokoro?
A an type of animal
B a type of canoe
C a type of wetland

- 3. Which Okavango Delta animal lives in the water?
A lions
B hippos
C cheetahs

- 4. What is the water in the Okavango Delta like?
A dirty
B acidic
C pure

5. How is the Okavango Delta different from other deltas?

ANSWER KEY

Into the Hive

Assess Vocabulary, page 6

Students should record the words and definitions from the Wordwise feature on page 9.

beeswax: a natural wax that comes from bees

hive: a bee's home

nectar: a sweet liquid made by flowers

pollen: tiny grains a plant makes to reproduce

pollinate: to transfer pollen from one flower to another

Sentences will vary depending on which vocabulary words students select.

Assess Language Arts, page 7

Questions and answers will vary. Students should cite specific sources within the text.

Assess Content, page 8

Answer and illustrations may vary, but students might note that honeybees collect pollen on their legs. They fan nectar with their wings to turn it into honey. They drink nectar with their mouths. They store nectar in one of their two stomachs.

Comprehension Check, page 9

1. C; 2. B; 3. A; 4. C; 5: Small groups of bees huddle together. It gets hot. Liquid wax oozes from their bodies. The wax hardens into scales, which the bees scrape off and chew them. They turn into beeswax.

Magnificent Magnets

Assess Vocabulary, page 14

Students should record the words and definitions from the Wordwise feature on page 15.

attract: to pull toward

electromagnet: a piece of iron that becomes magnetic after an electric current is passed through a wire coiled around it

magnet: a material that has a magnetic force

magnetic field: the area of magnetic force around a magnet

magnetic pole: the area of a magnet where the force is strongest

repel: to push away

Sketches will vary.

Assess Language Arts, page 15

Students' questions will vary, but all questions should relate to the article. All answers should come directly from the text.

Assess Content page, 16

Lodestone: When magnetite in lodestone is hit by lightning, atoms in it line up in the direction of the North Star. The lodestone becomes a compass.

Doorbells: An electromagnet inside forces a spring-loaded piston to smack a bell.

Dishwasher: An electromagnet inside opens the drain in the dishwasher.

Trains: Magnets on the track repel magnets on the train. This lifts the train off the ground. Magnets on the track first pull the train toward them. Then they push the train ahead once it passes by.

Comprehension Check, page 17

1. C; 2. B; 3. C; 4: A; 5: Answers will vary but should be based on information in the text.

Okavango Adventure

Assess Vocabulary, page 22

Students' predictions and the sentences they write will vary. They should record the words and definitions from the Wordwise feature on page 23.

delta: an area of land shaped like a fan and formed by deposits of sand and mud at the mouth of a river

mokoro: the traditional dugout canoe of the people of the Okavango Delta

wetland: land consisting of marshes or swamps

Assess Language Arts, page 23

Answers will vary depending on what students know, what they cite from the text, and what they infer.

Assess Content, page 24

Illustrations should depict animals named in the article but not shown in photos. Captions should be accurate and written in students' own words.

Comprehension Check, page 25

1. A; 2. B; 3. B; 4: C; 5: Most deltas form where a river empties into the ocean. The Okavango Delta is located in the middle of Africa's Kalahari Desert.