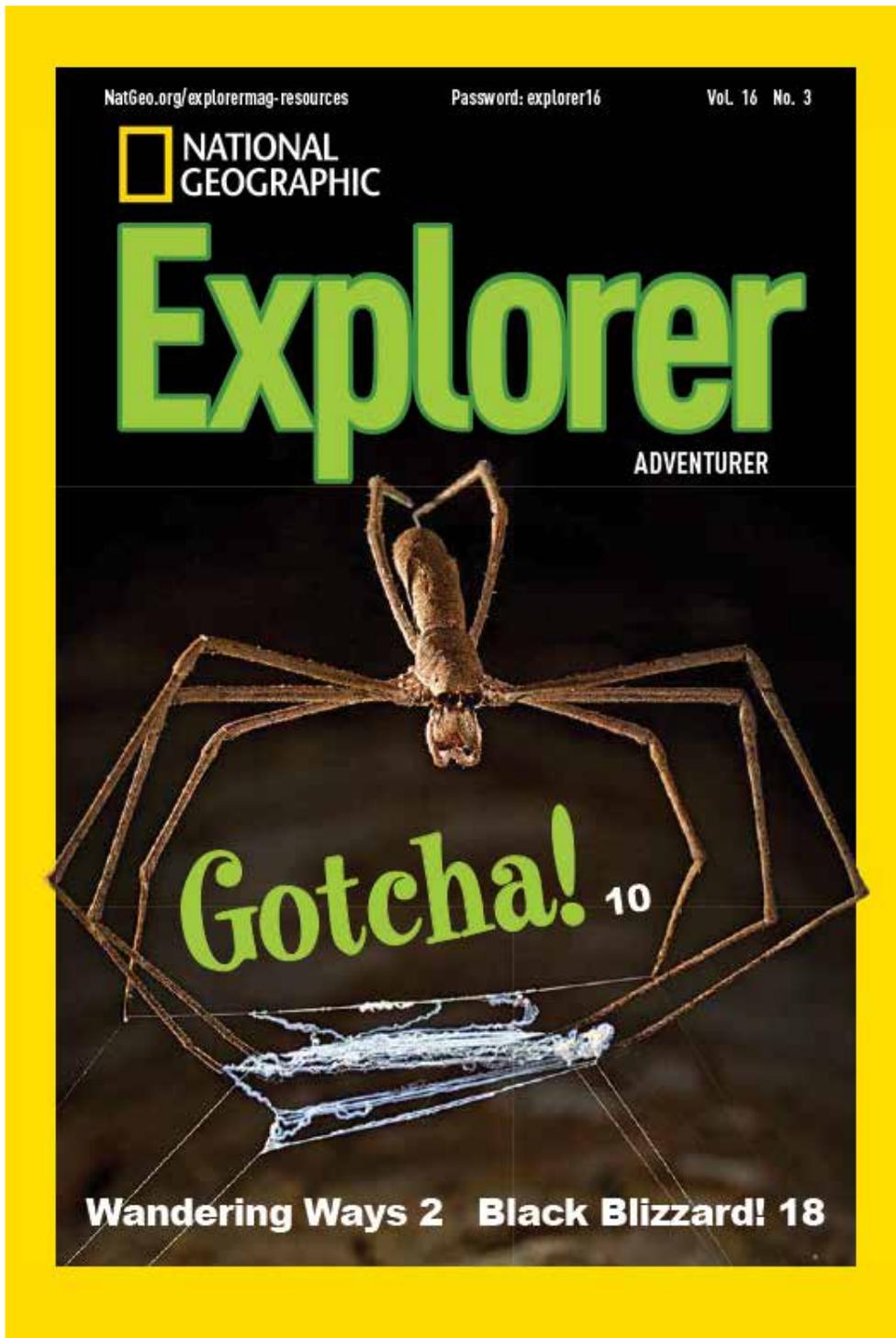


TEACHER'S GUIDE

Adventurer

Vol. 16 No. 3



In This Guide

This guide contains language arts and science lessons for articles in this issue of EXPLORER ADVENTURER.

Explorer Magazine

EXPLORER classroom magazines are specifically written for each grade, 2-5. Through great storytelling and stunning photographs, the EXPLORER magazines develop literacy skills and teach standards-based science content.

The EXPLORER magazines strive to offer a variety of reading experiences for students with different ability levels in the same class. Thus, all articles have been measured using the Lexile® Framework for Reading. Some articles will be easier to read than others, but all articles in EXPLORER ADVENTURER will be within the 520-950L range.

EXPLORER is part of NATIONAL GEOGRAPHIC EXPLORER'S Education program. For more resources, visit the "For Teachers" tab on EXPLORER'S website, natgeo.org/explorermag-resources.

Your Subscription Includes:

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

Objectives

- Students will predict definitions and then write sentences to better understand unfamiliar 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 “Wandering Ways” introduces students to three nomadic tribes across the world and explores how they live.

BUILD VOCABULARY AND CONCEPTS

- **nomad**
- **trade**
- **tradition**

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.

Using that background knowledge as a base, instruct students to predict and write a definition for each word. Then have them write a sentence using each word, based on the definitions they wrote.

Display the Wordwise feature on page 9 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 the before and after sentences they wrote for each word. In small groups, have students examine how new knowledge contributed to their understanding of each word.

READ

Inform students that the purpose of this article is to introduce them to different nomadic cultures found across the world. Discuss what a nomadic culture is.

Display pages 2-3 of the projectable magazine. Tell students to look at the photo. **Say:** *When people read, they usually focus on the words. But photos can tell you a lot, too. For example, when I look at this photo, I know that this person lives in a desert. He uses camels to carry his things.* **Ask:** *What else can you learn by looking at the photo?* Encourage students to share their ideas.

Then pose one more question to the class. **Ask:** *Where do you think this person lives?* Invite volunteers to answer the question. Then zoom in on the map of Africa at the bottom of the page. Point out to the class that you might have been able to answer this question by reading the text. But that wasn't necessary in this case. All you had to do was look at the map. **Say:** *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 answer each question and find four facts about each tribe. Tell students to record where they found each answer or fact in the article.

Wandering Ways

LANGUAGE ARTS

TURN AND TALK

Have students turn and talk to discuss what they learned about nomads. **Ask:** *What is a nomad?* (a member of a group of people that has no permanent home and moves from place to place) *On what continents do the nomadic groups featured in the article live?* (Africa and Asia) *Which two groups move to find food for their animals?* (Wodaabe and Tsaatan) *What animals do they raise?* (cows and reindeer) Invite students to share what else they learned about the nomads introduced in the article.

- **Predicting Definitions** Have students turn and talk to discuss what they learned about the three vocabulary words. Encourage them to compare their results with a partner. Instruct students to discuss how examining the information they collected impacted their understanding of each term.

- **Interpreting Information** After reading the article, remind students that articles 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** with a partner. Instruct students to compare the answers they recorded for each question. If their answers differ, suggest that they revisit the text they elements identified as sources and reevaluate their responses. Then have them share the facts they collected. If any facts are questionable, instruct students to refer to the source to clarify the information.

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 life like for the Wodaabe during the dry season? How do their lives change when it rains?*
- *Why don't the Mokens live on boats all year long?*
- *What surprised you about what you read?*

SOCIAL STUDIES

Objectives

- Students will compare and contrast three nomadic cultures.
- Students will understand that nomads live all over the world.

Resources

- Content Assessment Master (page 8)
- "Nomads" poster (Teacher's Edition)
- Comprehension Check (page 9)

Social Studies Background

They live in groups, moving from place to place in search of food and a temporary home. They take all that they own with them. They are nomads and this is their way of life.

Although it has become increasingly difficult to avoid modern infrastructure, many groups of nomads still exist. Some, like the Tuareg, live in deserts. The Tuareg live in the Sahara. Long ago, they were nomadic herders of camels, goats, and sheep. Now, they are well-known traders who travel in caravans across the desert.

The Wodaabe also live in the Sahara. These herders depend on cows for survival. During the dry season, they move around in search of grass for their cows to eat. During the rainy season, when grass is plentiful, the tribe reunites.

The Tsaatan are nomads that live in northern Mongolia. Each family keeps a small herd of reindeer, which is why the Tsaatan are also known as the Reindeer People. Reindeer take care of most of the Tsaatan's needs. To ensure that their reindeer have food, the Tsaatan move to new pastures every five weeks or so.

Not all nomads live on land. For nearly 4,000 years, the Moken have sailed around the islands off the coast of Myanmar (Burma). These sea gypsies live on boats, hunting and gathering creatures from the ocean. During monsoon season, they transition to land to avoid the dangerous storms at sea.

ENGAGE

Tap Prior Knowledge

Instruct students to think about the last time they went outside and just wandered around. Invite volunteers to tell what they did. Now tell students to imagine that this was their normal life. They had no permanent home. There were no grocery stores to buy food. They constantly moved from place to place and had to take everything they owned with them. Would students like to live like this? Encourage them to share their opinions.

EXPLORE

Preview the Lesson

Display pages 2-3 of the projectable magazine. As a class, compare and contrast this person's life to what it's like where you live. Guide the class to understand that this person is a Tuareg, a type of nomad that lives in the Sahara in Africa. **Say:** *The Tuareg are nomads. Different groups of nomads live all over the world. Although nomads are always on the move, no two groups of nomads are exactly alike.* Tell students they will learn more about the similarities and differences among nomad groups as they read the article.

Set a Purpose and Read

Have students read the article in order to compare and contrast three nomadic cultures and understand that nomads live all over the world.

EXPLAIN

Compare and Contrast Cultures

As a class, review the images in the article. Invite students to describe the people they see in each photo. With a partner, have students discuss what life would be like in each nomadic culture. Give each student a copy of the **Content Assessment Master**. Encourage students to use information from the article and notes from their **Language Arts Assessment Masters** to compare and contrast the Wodaabe, Tsaatan, and Moken nomadic groups.

Wandering Ways

SOCIAL STUDIES

EXPLAIN

(continued)

Recognizing a World of Nomads

Display pages 2-3 of the projectable magazine.

Zoom in on the second paragraph of text and invite a volunteer to read that paragraph aloud. **Say:**

According to the text, at one time, many people lived as nomads. But the world changed. It's difficult—but not impossible—to roam free in the modern world.

Remind students that they read about three groups of nomads in the article. Inform them that other nomadic groups do exist. Display the **"Nomads" poster**. Zoom in on the photo and information related to the Inuit. Invite a volunteer to read the text aloud. Encourage students to share what else they know about the Inuit. Then locate where the Inuit live on the world map. As a class, discuss how this location and the climate found here could influence the way the Inuit live. Explore the remaining groups of nomads in this same way.

ELABORATE

Find Out More

Display the **"Nomads" poster**. Point out to the class that the three nomadic groups from the article are on the poster. There are also five other nomadic cultures. Divide the class into pairs. Instruct each pair to conduct research to learn about two of the other nomadic groups. Challenge them to write a short essay comparing those two cultures. Invite partners to share what they learned with the class.

Extend Your Thinking About Nomads

Point out to students that even though nomads are constantly moving and have no permanent homes, nomadic cultures still have important traditions. The Wodaabe, for example, celebrate Gerewol for an entire week. Challenge students to identify other traditions mentioned in the article. Discuss how these traditions help the groups survive in the modern world.

EVALUATE

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

- *What is a Gerewol?* (a traditional celebration of the Wodaabe people in which they dance and feast during the rainy season)
- *How are the Moken and Tsaatan people alike?* (Both live in Asia.) *How are they different?* (The Moken live in warm ocean areas. Part of the year they live on boats hunting for seafood. The Tsaatan live on cold, high plains. They raise reindeer.)

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

Name _____

Date _____

VOCABULARY ASSESSMENT : Wandering Ways

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

Word			
Predicted Definition			
Sentence			
Definition from the Article			
Sentence			

LANGUAGE ARTS ASSESSMENT: Wandering Ways

Answer questions and record facts about nomadic cultures.

	Wodaabe	Tsaatan	Moken
Where do they live?			
What is it like there?			
How often do they move?			
Why do they move?			
What animals are important to them?			
List four other facts you learned about each tribe.			

Name _____

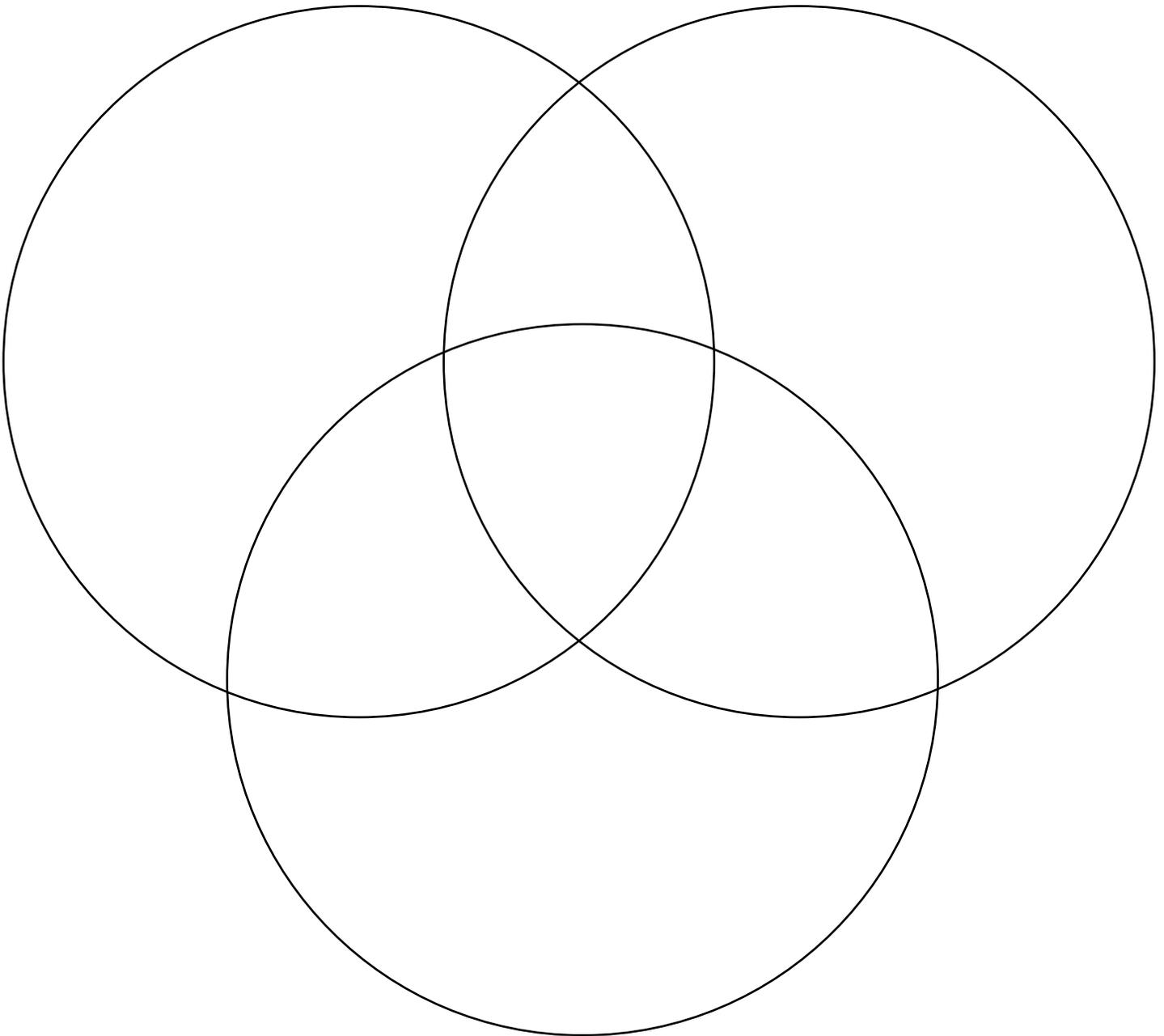
Date _____

CONTENT ASSESSMENT: Wandering Ways

Use this diagram to compare and contrast the three nomadic cultures in the article.

Culture: _____

Culture: _____



Culture: _____

COMPREHENSION CHECK: Wandering Ways

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

1. Which word best describes the Tuareg?
Ⓐ hunters
Ⓑ herders
Ⓒ traders

2. Which of the groups featured in the article live in Africa?
Ⓐ Tuareg and Wodaabe
Ⓑ Wodaabe and Moken
Ⓒ Moken and Tsaatan

3. What is the climate like where the Tsaatan live?
Ⓐ hot and dry
Ⓑ warm and rainy
Ⓒ cold and snowy

4. When do the Wodaabe celebrate Gerewol?
Ⓐ during the dry season
Ⓑ during the rainy season
Ⓒ during winter

5. Pick two groups from the article. Tell one way they are alike and one way they're different.

LANGUAGE ARTS 750L

Objectives

- Students will explore the meaning of vocabulary words in a variety of different ways.
- Students will use information in the article to explain how unusual predators catch their prey.

Resources

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

Summary

- The article “Gotcha!” Introduces students to six predators and outlines the unusual methods they use to catch their prey.

BUILD VOCABULARY AND CONCEPTS

- **bioluminescence**
- **predator**
- **prey**

Read aloud each of the vocabulary words. As you do, poll the class to see how many students are familiar with each word. Then challenge volunteers to provide a scientific definition of each term.

Point out that this task was most likely easier with some of the words than others. **Say:** *As students, your vocabulary is constantly expanding. But many of the words you learn have multiple meanings. When reading about science, it's important to understand the scientific definition. And a great way to remember that more technical definition is to study the word in multiple ways.*

Give each student a copy of the **Vocabulary Assessment Master**. Instruct students to use this worksheet to explore the vocabulary words in four different ways: writing definitions, restating the definition in their own words, using the term in a sentence, and then drawing a picture to help them remember what the word means.

READ

Inform students that the purpose of this article is to introduce readers to six predators and explain the unusual methods they use to catch prey.

Tell students that hunting for prey is a process.

Say: *To understand how a process works, you just have to follow the steps. The tricky part is to read closely enough that you find all of the steps. If you skip something important, what you're reading may not make much sense.*

Display pages 10-11 of the projectable magazine. Invite a volunteer to read aloud the headline and text. Challenge students to identify two of the surprising predators introduced in the article. (net-wielding spiders, spitting fish) Brainstorm ideas about how animals like these might be able to catch their prey.

Give each student a copy of the **Language Arts Assessment Master**. Have students read the article on their own. As they do, instruct them select three predators from the article. Tell students to draw a picture that shows how the predator catches prey. Then have them explain the process each predator uses in four simple steps.

LANGUAGE ARTS

TURN AND TALK

Have students turn and talk to discuss what they learned about unusual predators. **Ask:** *What is a predator?* (an animal that kills and eats other animals) *Why is a margay cat's hunting technique unusual?* (It copies the sound of baby animals to trick adults into coming toward it.) *How does a glowworm catch its prey?* (It has a bioluminescent glow that makes insects fly toward it. Then it snags its prey with sticky snares.)

- **Exploring Meanings** Inform students that it's essential for readers to understand the technical definition of words when reading about science. Without that knowledge, it's very difficult to understand the text. **Say:** *Once you do understand what scientific terms mean, not only can you follow along with the text but you can use the words correctly in new sentences of your own.* Challenge students to make accurate statements using each of the vocabulary words. Encourage them to use their **Vocabulary Assessment Masters** as resources. But remind them to be original. Students shouldn't restate sentences from the article. They should create new sentences of their own.

- **Explaining Processes** After reading the article, remind students that explaining processes is a strategy that people use to better understand what they're reading. Point out all the information they need can be found in order as they read the text. Have students share their **Language Arts Assessment Masters** in small groups. Instruct students to compare the steps they recorded. Then have them analyze how the pictures they drew help them understand each process.

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.

- *Why is the punch of a peacock mantis shrimp so powerful?*
- *What is unique about a netcasting spider's hunting technique?*
- *What surprised you about what you read?*

SCIENCE

Objectives

- Students will understand that some animals use unique hunting skills to get food.
- Students will recognize that predators live in all types of environments.

Resources

- Content Assessment Master (page 16)
- "Creative Carnivores" poster (Teacher's Edition)
- Comprehension Check (page 17)
- "Gotcha!" Interactive Whiteboard (optional)

Science Background

All animals need food to live. Some animals get their food by eating other animals. They are predators, and the food they eat is their prey.

Predators use a variety of techniques to capture prey. Some are simply faster or stronger than the animals they pursue. Others utilize unique body parts or interesting techniques.

For example, the margay cat attracts monkeys with its voice. Its call sounds just like a baby monkey. The peacock mantis shrimp packs a strong punch. It can take down prey twice its size. Netcasting spiders spin and throw nets. And the archerfish spits a strong stream of water to knock prey off of branches into the water.

Many predators act alone. But some attack as a team. And even as a team, unique parts or unusual techniques can give predators an edge over their prey.

Glowworms, for example, have a bioluminescent shine. When hundreds of glowworms shine from the roof of a cave, they resemble a starry night. Unsuspecting insects, attracted by the light, fly straight into their sticky snares.

Humpback whales work together, too. They blow bubbles. The bubbles cause fish to rise and pack together into a tight ball. With one gulp, a whale can capture thousands of fish.

ENGAGE

Tap Prior Knowledge

Prior to conducting this activity, download images of several common predators, such as a lion, snake, eagle, or shark. As you display each photo for the class, have students identify the predator and its likely prey. Challenge students to explain how each predator hunts for prey.

EXPLORE

Preview the Lesson

Display pages 10-11 of the projectable magazine. Have students examine the animal in the photo. Inform the class that this photo shows a peacock mantis shrimp. Point out that the text says the animals in this article are all predators with amazing and unexpected hunting techniques. Brainstorm ideas about how this shrimp might catch its food.

Set a Purpose and Read

Have students read the article in order to understand that some animals have special features that help them hunt prey and that predators live in all types of environments.

EXPLAIN

Recognizing Special Features and Skills

After students read the article, display pages 12-13 of the projectable magazine. Highlight the subhead "Killer Mimic." Discuss reasons why this subhead is a good description of the special part or skill that a margay cat uses to catch prey. (The cat's voice mimics the sound of baby monkeys. This gets the attention of adults and draws them toward the cat.) Give each student a copy of the **Content Assessment Master**. With a partner, instruct students to record the article's subheads. If two subheads relate to the same animal, have students write them in the same box. Challenge students to explain why each subhead is a good description for how the animal featured in that section gets food.

SCIENCE

EXPLAIN

(continued)

Introducing More Creative Carnivores

Display the "**Creative Carnivores**" poster. Discuss reasons why the poster's headline is appropriate for this topic. (Animals that hunt and eat other animals are carnivores. This article is about predators that hunt in unusual ways.) Invite volunteers to read aloud the information about each animal. Discuss how each carnivore hunts for food. Compare and contrast each one with the examples presented in the article.

Exploring a World of Innovative Predators

Instruct students to examine the article's photos in their student magazines. Tell them to focus on the background of each photo rather than the featured predator. **Ask:** *What do you notice?* Guide students to recognize that these predators live in a variety of different environments. Some live on land. Others live in water. Review the article for more details about where each predator lives. Have students study the animals on the "**Creative Carnivores**" poster, too. If necessary, have students conduct research to learn more about where each predators lives.

ELABORATE

Find Out More

Inform students that between the article and the "**Creative Carnivores**" poster, they learned about 10 predators that use unusual body parts or unexpected techniques when they hunt for prey. Assign each student a partner. Instruct pairs to conduct research to identify and learn about three more innovative predators. Invite partners to present what they learned to the class.

Extend Your Thinking About Predators

Remind students that the article told readers what unusual predators did to catch prey. But it didn't explain why. As a class, brainstorm reasons why each of these predators might have developed these unusual adaptations or techniques.

EVALUATE

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

- *What is a predator?* (an animal that kills and eats other animals)
- *What prey do humpback whales hunt?* (fish)
- *Why do glowworms glow?* (They are bioluminescent. A chemical reaction that takes place inside their bodies produces a light that makes them glow.)

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: Gotcha!

Use this organizer to examine each vocabulary word.

Write the definition.	What is the word?	Restate in your own words.
Draw a picture.		Use the term in a sentence.

Write the definition.	What is the word?	Restate in your own words.
Draw a picture.		Use the term in a sentence.

Write the definition.	What is the word?	Restate in your own words.
Draw a picture.		Use the term in a sentence.

LANGUAGE ARTS ASSESSMENT: Gotcha!

Identify three animals in the article. Draw a picture to show how each predator catches its prey. Summarize what happens during each attack in four simple steps.

Identify	Draw	Summarize
		1. 2. 3. 4.
		1. 2. 3. 4.
		1. 2. 3. 4.

Name _____

Date _____

CONTENT ASSESSMENT: Gotcha!

Record the subhead(s) related to each animal. Tell why each one is a good description for how the animal gets food.

Animal and Subhead(s)	Explanation

COMPREHENSION CHECK: Gotcha!

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

- 1. What unique trait helps the glowworms catch prey?
 - Ⓐ They can mimic sounds.
 - Ⓑ They are bioluminescent.
 - Ⓒ They throw nets.

- 2. Which predator spits water on its prey?
 - Ⓐ archerfish
 - Ⓑ humpback whale
 - Ⓒ netcasting spider

- 3. How are the netcasting spiders and margay cats alike?
 - Ⓐ Both use mimicry to attract prey.
 - Ⓑ Both live in rain forests.
 - Ⓒ Both are bioluminescent.

- 4. What technique does a peacock mantis shrimp use to catch prey?
 - Ⓐ hide, approach, punch
 - Ⓑ wait, spit, hit
 - Ⓒ blow, rise, launch

5. Pick one predator from the article or poster. Describe its unexpected hunting technique.

Black Blizzard!

LANGUAGE ARTS 810L

Objectives

- Students will assess their familiarity with and knowledge of vocabulary words.
- Students will distinguish between facts stated explicitly and inferences made using information in the text.

Resources

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

Summary

- The article “Black Blizzard!” uses specific examples to introduce readers to the phenomenon of dust storms. As they read, students will examine the science behind and impact of dust storms around the globe.

BUILD VOCABULARY AND CONCEPTS

- **agriculture**
- **dust**
- **haboob**
- **soil**

As a class, discuss the difference between familiarity and knowledge. Guide students to recognize that the more familiar you are with something, the more knowledge you have. Challenge students to explain how this concept applies to words when they read.

Display the vocabulary words on a word wall or on the whiteboard. Give each student a copy of the **Vocabulary Assessment Master**. Instruct students to write each word on their papers. Review the categories under the header “Familiarity with the Word.” Tell students to make a checkmark to indicate how well they know each word.

Instruct students to write what they think each word means on their worksheets. Then display the Wordwise feature on page 23 of the projectable magazine. Have students write those definitions on their worksheets and compare them with the definitions they wrote.

READ

Let students know that the purpose of this article is to introduce them to dust storms. As they read, they will examine the science behind and impact of dust storms around the world.

Tell students that one skill that all good readers have is the ability to make inferences as they read. **Say:** *When writers write, sometimes they use facts to say exactly what they mean. These facts are explicit statements. Other times, writers leave clues for readers to follow. Those clues help readers make inferences, which are logical conclusions based on information in the text*

Display pages 18-19 of the projectable magazine. Read aloud the headline. Model how to make an inference. **Say:** *There are two words in this headline: black and blizzard. Only one of those words seems to make sense. I know that a blizzard is a storm with strong winds. When I look at this photo, I can see that this man's hat is flying away. I can infer that the wind is blowing pretty hard here. This is a type of blizzard. Point out, however, that blizzards usually occur in winter when there's lots of snow. There is no snow in this photo. And the man isn't dressed for cold temperatures. **Ask:** *What is a black blizzard?* **Say:** *To figure this out, I need to look for more clues. I can see dark clouds in this photo. I also notice that the ground is bare and dry. Dry ground creates dust. My guess is that dirt is blowing around in those clouds. A black blizzard must be a giant dust storm. To know for sure, I'll need to read the article.**

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 record five explicit statements and make five inferences about black blizzards.

LANGUAGE ARTS

TURN AND TALK

Have students turn and talk to discuss what they learned about dust storms. **Ask:** *What is dust?* (dry powder consisting of tiny particles of earth) *Why does the headline call a dust storm a black blizzard?* (A dust storm has big clouds of dust and sand, which look black. There are strong winds, just like in a blizzard.) *What was the Dust Bowl?* (a period of severe dust storms in the United States in the 1930s) Encourage students to share other facts they learned about dust storms.

- **Explicit Statements and Inferences** Remind students that an explicit statement is something directly stated in the text. An inference is a logical conclusion reached after combining what you already know with information in the text. Have students share their **Language Arts Assessments Masters** with a partner. Encourage them to point out where in the article they found each explicit statement. Instruct them to evaluate the validity of each inference. If any inferences are questionable, encourage partners to reread the article to search for more clues.

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.

- *Why do dust storms occur across Earth's dry regions?*
- *Why can dust storms be dangerous?*
- *What surprised you about what you read?*

Black Blizzard!

SCIENCE

Objectives

- Students will understand what a dust storm is.
- Students will recognize how dust storms can change the landscape.

Resources

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

Science Background

Dust is a fine, dry powder consisting of tiny particles of earth. It is heavy enough to see and light enough to be carried by wind. And if enough dust is available, it can contribute to a storm that reaches thousands of meters high.

A dust storm can form over any dry region of Earth. This includes deserts, dried up lake beds, and even farmland or pastureland that has become exposed and dry.

As wind blows across areas like these, dust clouds begin to form. Particles of dust and sand bounce off each other. This keeps the particles aloft. If they happen to become caught in a thunderstorm, a violent dust storm called a haboob can occur.

Dust storms happen all over the world. Their effects can be harmful to people, who find it difficult to see or breathe.

They can also be harmful to the areas where they occur. In 1983, a dust storm struck Melbourne, Australia. In the end, the storm dumped more than 1,000 tons of dust on the city. It took many years and millions of dollars to repair the damage.

On the other hand, this dust may also settle in open farmland areas. Over time, those deposits of dust can develop into fertile soil where many crops can grow.

ENGAGE

Tap Prior Knowledge

Give each student a piece of plain white paper. Now inform them that they have 10 seconds to draw a picture of a black blizzard. When time is up, examine the results. How many students drew something resembling a dark, fat tornado? As a class, discuss what could have caused this storm to be black. Discuss reasons why it would be swirling.

EXPLORE

Preview the Lesson

Display pages 18-19 of the projectable magazine. As students examine the image, read aloud the headline and subhead. Invite students to share their opinions about what happens when fine dust, soil, and sand are captured by a turbulent wind. Encourage them to search for clues in the photo.

Set a Purpose and Read

Have students read the article in order to understand what a dust storm is and to recognize how dust storms can change the landscape.

EXPLAIN

Understanding Dust Storms

Assign each student a partner. Give pairs five minutes to examine the article's photos. Based on what they see, challenge each pair to write a succinct definition of a dust storm. Reunite as a class to share and compare the results. Guide the class to understand that a dust storm is a dangerous event in which clouds of dust and sand churn across Earth's dry regions. These storms can suddenly strike with little warning. A dust storm may rise thousands of meters high. Have students rejoin their partners. Give each student a copy of the **Content Assessment Master**. Instruct pairs to review the article for details that explain what causes a dust storm to occur.

Black Blizzard!

SCIENCE

EXPLAIN

(continued)

Recognizing How Dust Storms Change the Land

Remind students that dust storms are turbulent winds that capture fine dust, soil, and sand and move it around. **Say:** *All of those particles came from somewhere. And when those winds stop, all of that dust, soil, and sand has to go someplace new.*

As a class, discuss how this could change the land. Then divide the class into pairs. Assign each pair one section of the article. Instruct partners to reread their assigned sections to note how a dust storm changed the land. Instruct students to add this information to the bottom of their **Content Assessment Masters**.

ELABORATE

Find Out More

Remind students that a haboob is a violent dust storm or sandstorm. Inform the class that although the word *haboob* has Arabic origins, storms like these develop in many parts of the world. With a partner, have students conduct research to learn more about haboobs. Invite students to share what they learned in small groups.

Extend Your Thinking About Dust Storms

Inform students that dust storms are not to be taken lightly. One immediate concern is people's health. But there are long-term effects, too. Clean-up costs can be astronomical. In small groups, have students brainstorm a list of short-term and long-term effects. Challenge students to identify any benefits that might arise in the aftermath of a dust storm. (After the dust settles, it can turn into a rich soil where plants can grow.) Have groups present their findings to the class. Share and compare results.

EVALUATE

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

- *What is a haboob?* (a violent dust storm or sandstorm)
- *What causes a haboob to occur?* (Dust is caught in the powerful currents that make a thunderstorm.)
- *How can dust create lightning?* (Dust particles rub together, creating static electricity. In a cloud, this results in lightning.)

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

Name _____

Date _____

VOCABULARY ASSESSMENT: Black Blizzard!

Record information from the article about each vocabulary word.

Word	Familiarity with the Word			Knowledge of the Word	
	I know the word very well.	I've seen or heard the word before.	I don't know the word.	What I think the word means:	How the article defines the word:

LANGUAGE ARTS ASSESSMENT: Black Blizzard!

Record five explicit statements about black blizzards from the text. Then combine information from the text with what you already know to make five inferences.

Explicit Statements	
1.	
2.	
3.	
4.	
5.	

What the Text Says	What I Already Know	Inferences I Can Make

CONTENT ASSESSMENT: Black Blizzard!

Explain what happens when a dust storm occurs. Summarize how a dust storm can change the land.

First:

Next:

Then:

Finally:

Summary:

COMPREHENSION CHECK: Black Blizzard!

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

- 1. What is a dust storm?
 - Ⓐ a slight breeze filled with dust
 - Ⓑ billowing clouds of dust and sand
 - Ⓒ fast-moving thunderstorms

- 2. Where on Earth do dust storms occur?
 - Ⓐ dry regions
 - Ⓑ wet regions
 - Ⓒ cold regions

- 3. What is created when dust particles rub together in a cloud?
 - Ⓐ raindrops
 - Ⓑ thunder
 - Ⓒ lightning

- 4. Which material is carried highest in a dust storm?
 - Ⓐ soil
 - Ⓑ sand
 - Ⓒ fine dust

5. How can a dust storm be good for agriculture?

ANSWER KEY

Wandering Ways

Assess Vocabulary, page 6

Students' predictions and the sentences they write will vary. They should record the words and definitions from the Wordwise feature on page 9.

nomad: a member of a group of people that has no permanent home and moves from place to place

trade: to exchange one thing for another

tradition: a belief or way of doing something that is passed from one generation to the next

Sentences will vary depending on the connections students identify.

Assess Language Arts, page 7

Possible responses include:

Wodaabe: Sahara; hot desert with dry and rainy seasons; every few days; to find grass and water; cows

Tsaatan: northern Mongolia; high, windswept plains and dark forests, snowy; every month; to find mosses, lichen, and mushrooms; reindeer

Moken: around the 800 islands off the coast of Myanmar (formerly called Burma); warm ocean, big storms can bring heavy winds and rain at certain times of year; They move from the sea to land once each year; to avoid the big storms at sea; sea creatures including fish, sea cucumbers, and sea urchins

Facts will vary but should come from the article.

Assess Content, page 8

Answers will vary depending on which details students choose to compare. However, students should note that all three groups are nomads.

Comprehension Check, page 9

1. C; 2. A; 3. C; 4. B; 5: Answers will vary depending on which two groups students choose to compare.

Gotcha!

Assess Vocabulary, page 14

Students should record the words and definitions from the Wordwise feature on page 17.

bioluminescence: light produced by a chemical reaction in a living organism

predator: an animal that kills and eats other animals

prey: an animal hunted or caught by another for food

Students should restate each definition in their own words. Sentences and drawings will vary but should accurately reflect the meaning of each word.

Assess Language Arts, page 15

Answers will vary depending on which animals students choose.

Assess Content page, 16

Possible responses include:

Killer Mimic/The margay cat mimics the sound of a baby monkey with its voice. When adult monkeys approach, it kills them.

Knock Out!/The peacock mantis shrimp punches prey with front limbs. The punch is so hard that this shrimp can take down prey twice its size.

Nothing But Net; In for the Kill/The netcasting spider weaves a postage stamp-size net, which it plunges down on top of insects.

Super Soaker; Sure Shot/The archerfish spits a stream of water, which knocks its prey into the water. It almost always hits its target.

Glow with the Flow/Glowworm are bioluminescent. Their bluish glow causes insects to fly toward them, making it easy for glowworms to snag prey in their sticky snares.

Bubble Bath/Humpback whales blow bubbles from their blowholes. The bubbles cause fish to rise and bunch together. This makes it easy for the whales to gulp down thousands of fish at once.

Comprehension Check, page 17

1. B; 2. A; 3. B; 4: A; 5: Answers will vary depending on which predator students select.

Adventurer

ANSWER KEY

(continued)

Black Blizzard!

Assess Vocabulary, page 22

Students should record the vocabulary words from the Wordwise feature on page 23, make checkmarks to show how familiar they are with each word, and write definitions in their own words. Then they should record the definitions from the article.

agriculture: the raising of crops and animals

dust: fine, dry powder consisting of tiny particles of earth

haboob: a violent dust storm or sandstorm

soil: the top layer of earth in which plants grow

Assess Language Arts, page 23

Answers will vary. However, explicit statements should be facts quoted directly from the text. Inferences should be logical conclusions based on clues in the text and what students already know.

Assess Content, page 24

Students should outline a sequence of events explaining how a dust storm forms. They may choose to outline details in different ways. They should summarize what they learned about how a dust storm can change the land.

Comprehension Check, page 25

1. B; 2. A; 3. C; 4. C; 5: Dust and sand fly everywhere. Grains of sand sting your face. You can't see or breathe. You cannot escape a dust storm.