



### In This Guide

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

### 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](http://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)

# Fantastic Flier

## LANGUAGE ARTS

### Objectives

- Students will identify the overall structure of ideas presented in the text.
- Students will explain concepts based on information in the text.

### Resources

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

### Summary

- The article “Fantastic Flier” introduces students to the rufous hummingbird, a tiny bird that makes one of the longest migratory journeys of any bird in the world, as measured by body size.

## BUILD VOCABULARY AND CONCEPTS

- adaptation
- migration
- torpor

Display the vocabulary words on a word wall or on the whiteboard. Say the words aloud and invite students to share what they know about each.

Give each student a copy of the **Vocabulary Assessment Master**. Instruct students to write each word and its definition on their papers. Then have students draw a picture to remind themselves of what each word means.

When students are finished drawing their interpretations of individual words, discuss with the class how the words could be related to a hummingbird. Then challenge students to sketch a larger picture showing how the three items are related in that context. Instruct students to label each item in their drawings.

### READ

Give students a few minutes to scan the subheads in the article. Then display page 5 of the projectable magazine. Tell students to examine the map. As a class, discuss how the subheads and map are related.

Guide students to recognize that the map shows where the hummingbird in the article flew. The subheads tell what the bird did along the way. In essence, the subheads are a roadmap that will guide them as they read the article.

Explain to students that there are four basic types of text structure: chronology, comparison, cause/effect, and problem/solution. Review the basics of each. **Then say:** *When you're reading about a journey, chances are good that the overall structure of the text will follow a chronological order. But within that text, writers will often use different types of text structure to make specific points. For example, why does the bird need to fuel up? Does doing that solve a problem? If so, the writer could outline a problem and its solution in this section.*

Give each student a copy of the **Language Arts Assessment Master**. Instruct students to circle the overall text structure used in this article. (chronology) Then have students read the article on their own. As they read, instruct students to identify specific sections where the writer used each type of text structure. Challenge them to explain why they think the writer chose a specific structure for each sections.

### TURN AND TALK

Have students turn and talk to discuss what they learned about the rufous hummingbird's migration.

**Ask:** *Where did the bird's journey start?* (Alaska) *Where did it end?* (Mexico) *Why is this migration so extraordinary?* (It's the longest migration, measured in body lengths, of any bird on Earth.) Invite students to identify specific things the bird did along the way.

- **Identify Text Structure** Review with students the different types of text structure. Discuss reasons why chronology is the most logical choice for the overall text structure of this article. Then have students turn and talk to share their **Language Arts Assessment Masters** with a partner. Did they identify the same sections for each type of text structure? If so, did they explain the writer's choice in the same way? If students identified different sections, do both of their selections make sense? If not, encourage partners to read the section again.

- **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 why the rufous hummingbird completes this lengthy migration. Prompt discussion with questions such as: *Why do these birds fly to Alaska in the summertime?* (The weather is mild and food is plentiful.) *Why do they fly to Mexico for the winter?* (It's too cold in Alaska in the winter and there is no food.) *How do the birds get food as they make their journey?* (They visit patches of flowers along the way. They drink nectar from the flowers. That gives them energy.)

### 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 migration?*
- *What does the rufous hummingbird prepare for its long journey to Mexico?*
- *What surprised you about what you read?*

# Fantastic Flier

## SCIENCE

### Objectives

- Students will understand how the rufous hummingbird's wings allow it to fly in many different ways.
- Students will recognize rufous hummingbirds have internal and external body structures and behavioral adaptations that help them migrate.

### Resources

- Content Assessment Master (page 8)
- Comprehension Check (page 9)

### Science Background

Rufous hummingbirds are brightly colored birds. The male has brilliant orange feathers. Females are green and orange. They have been described as the feistiest hummingbirds in North America.

These slender, little birds—which measure between 8-9 cm (3.2 - 3.7 in) long—don't hesitate to fight off other birds twice their size. They will even chase away a curious chipmunk.

It takes bravado like that to accomplish everything this little bird does. The rufous hummingbird can beat its wings up to 62 wing beats a second. And it has an amazing memory.

But its biggest achievement, by far, is the annual solo migration it completes from Alaska to Mexico. The one-way journey is 5,600 kilometers (3,900 miles) long. If you break that down by body lengths, the rufous hummingbird has the longest migration of any bird on Earth.

Once a female arrives at the desired location, she starts building a nest. When finished, the nest will be 5 cm (2 in) wide. She builds it out of soft plants held together with spider webs. As a final touch, she decorates her nest with lichen, moss, and bark. This camouflages the nest and keeps it hidden from predators.

## ENGAGE

### Tap Prior Knowledge

Ask students if they've ever seen a hummingbird. Have them describe what the hummingbird looked like and what it was doing. Guide students as they compare hummingbirds to other birds they've seen.

## EXPLORE

### Preview the Lesson

Display pages 2-3 of the projectable magazine. Tell students to examine the photo and describe the hummingbird. Invite a volunteer to read aloud the headline and subhead. **Ask:** *According to the headline, this hummingbird is fantastic flier. What about the picture helps you see that?* (Students may note that the wings are blurred, which indicates that they are beating very quickly.) *Based on the subhead, why does this hummingbird need to be a fantastic flier?* (It completes a long-distance journey.) As a class, brainstorm ideas about where the hummingbird might be traveling. Challenge students to identify adaptations that could help the bird reach its destination.

### Set a Purpose and Read

Have students read the article in order to identify internal and external body structures and behavioral adaptations that help the rufous hummingbird migrate.

## EXPLAIN

### Understanding How Hummingbirds Fly

Display the diagram at the bottom of pages 6-7 in the projectable magazine. Explain to the class that hummingbirds are such amazing fliers because their wings can move in many different ways. Point out that people do this same thing with their arms when they swim. Zoom in on the first illustration. Discuss how the bird is moving its wings. Invite a volunteer to move his or her arms to demonstrate. Examine the other illustrations in this same way. Discuss how being able to rotate the wings 180° helps hummingbirds survive when they migrate.

# Fantastic Flier

## SCIENCE

### EXPLAIN

(continued)

#### Identifying Parts and Adaptations

Display page 5 of the projectable magazine. Remind students that the rufous hummingbird migrates from Alaska to Mexico and back each year. Then hold up a ruler and measure off roughly 9 cm (3.7 in). Inform students that the bird that makes this migration is only this big.

Discuss reasons why it would be difficult for a bird this small to complete a journey this long. Then point out that the rufous hummingbird has internal and external parts as well as behavioral adaptations that help it survive as it migrates.

Give each student a copy of the **Content Assessment Master**. Then divide the class into pairs. Instruct partners to review the article to record internal parts, external parts, and behavioral adaptations of a rufous hummingbird. Challenge them to explain how each one helps these hummingbirds migrate. Rejoin as a class and have pairs share what they learned.

### ELABORATE

#### Find Out More

Remind students that the article describes the rufous hummingbird's migration from Alaska to Mexico. Point out, however, that this is an annual trip. Each spring, the hummingbird flies from Mexico to Alaska to reach its breeding grounds. Instruct students to conduct research to learn about this trip. What happens along the way, and what happens when the hummingbird reaches its destination?

#### Extend Your Thinking About Hummingbirds

Display page 9 of the projectable magazine. Remind students that there are many different kinds of hummingbirds. Invite volunteers to read aloud the information to learn about the four species shown here. Discuss how adaptations help each bird survive. Then instruct students to conduct research to find more species of hummingbirds. Challenge them to identify interesting adaptations of each.

### EVALUATE

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

- *Why can rufous hummingbirds fly in so many different ways?* (Their wings are adapted to rotate almost 180°.)
- *What is torpor?* (a deep sleep)
- *What happens during torpor and how does this help rufous hummingbirds survive their migration?* (Their breathing rate is cut in half, the heartbeat drops by 50 beats a minute, and digestion slows to five percent its normal rate. This helps the hummingbirds save energy.)

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

Name \_\_\_\_\_

Date \_\_\_\_\_

**VOCABULARY ASSESSMENT : Fantastic Flier**

Write each word and its definition. Draw a small picture to show what each word means. Draw a larger picture to show how the words are related to a hummingbird. Label each word in your sketch.

Word	Definition	Picture	Larger Picture	

## LANGUAGE ARTS ASSESSMENT: Fantastic Flier

Circle the overall text structure of the article. Identify sections that use each type of text structure. Tell why you think the writer used a certain type of structure in each section.

Text Structure	Section	Explanation
Chronology		
Comparison		
Cause/Effect		
Problem/Solution		

Name \_\_\_\_\_

Date \_\_\_\_\_

**CONTENT ASSESSMENT: Fantastic Flier**

Identify internal parts, external parts, and behavioral adaptations of the rufous hummingbird. Tell how each of these helps the hummingbird survive when it migrates.

	Identify Examples	Explain
Internal Parts		
External Parts		
Behavioral Adaptations		

**COMPREHENSION CHECK: Fantastic Flier**

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

1. What is a regular move from one region or climate to another?

- A a migration
- B a migrant
- C an immigrant

2. What does hovering allow rufous hummingbirds to do?

- A fly backward
- B feed while flying
- C do upside-down rolls

3. Which adaptation helps the rufous hummingbird find food?

- A a long beak
- B great eyesight
- C an excellent memory

4. What does a rufous hummingbird do during torpor?

- A fly
- B sleep
- C eat

5. Explain how a hummingbird's wings move when it hovers?

---

---

---

---

# A Star Is Born

## LANGUAGE ARTS

### Objectives

- Students will predict definitions and then write sentences to better understand unfamiliar words.
- Students will use details and examples to make inferences.

### Resources

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

### Summary

- The article “A Star is Born” invites students to explore space to learn how matter is pulled together to create new stars.

## BUILD VOCABULARY AND CONCEPTS

- **atom**
- **constellation**
- **dense**
- **gravity**
- **molecule**
- **nebula**

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 15 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. As a class, examine how new knowledge contributed to students' understanding of each word.

### READ

Let students know that the purpose of this article is to examine what happens when a star is born. As they read, they will learn about different objects in space and how they are involved in this process.

Display pages 10-11 of the projectable magazine. **Say:** *Sometimes writers state things explicitly. That information is easy to understand. Other times, they don't. Readers have to follow clues to figure out what the writer means. When you combine those clues with what you already know, you can make an inference, or a logical guess. Point out the headline and model how to make an inference. **Say:** *When I first saw this headline, the first thing I did was start asking questions. How are stars born? Where are stars born? How long does it take for this to happen? To find the answers, I know that I need to find clues in the text. Read aloud the subhead. Instruct students to examine the images. **Say:** *According to the subhead, the author plans to take readers on a journey through space. And these are all photos of space, so it's pretty easy to infer that this is where stars are born. I figured that out anyway, because I already know that stars exist in space. Zoom in on the reading strategy. Invite a volunteer to read it aloud. **Say:** *This is new information. I'm not sure yet how it's connected to the birth of a star, but I can assume that there is a logical connection. To find out more, I'll have to read the article.****

Give each student a copy of the **Language Arts Assessment Master**. Instruct students to read the article on their own. As they do, challenge them to combine what they know with what the text says to make five inferences about how a star is born .

# A Star Is Born

## LANGUAGE ARTS

### TURN AND TALK

Have students turn and talk to discuss what they learned about how a star is born. **Ask:** *Where in space does a star form?* (in a cloud called a nebula) *Could a star form in a cloud that wasn't dense?* (no) *Why not?* (Only dense clouds contain enough matter for a star to form.) Encourage students to share other interesting facts they learned about the formation of stars. **Then ask:** *What has to happen before a star can form in Barnard 68?* (The cloud must collapse.)

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

- **Make Inferences** Remind students that an inference isn't a wild guess. It's a logical conclusion based on information in the text. **Say:** *Writers want readers to understand any inferences they make, so they try to leave a clear path of clues for readers to follow.* Have students share their **Language Arts Assessment Masters** with a partner to evaluate the validity of each inference students made. 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.

- *What is an nebula?*
- *How is a nebula involved in the birth of a star?*
- *What surprised you about what you read?*

# A Star Is Born

## SCIENCE

### Objectives

- Students will understand how a star is born.
- Students will recognize that newborn stars radiate energy by giving off light.
- Students will identify connections between constellations and star formation.

### Resources

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

### Science Background

When you look up at the night sky, it's hard to miss the stars. They shine and they twinkle. It's easy to imagine that they'll be there forever. But like everything else in the universe, stars have a life cycle. They are born and they die.

A star is born in a cloud of dust called a nebula. There are nebulae scattered throughout most galaxies. When enough gases and dust collect, the gravitational attraction becomes too great. This causes the cloud to collapse upon itself.

As the cloud collapses, it shrinks and starts to spin. The material in the center of the cloud grows hotter and denser. Over time, it forms a core. The core grows as it collects more gasses and dust. When the temperature and pressure get high enough, the core ignites and a star is born.

Newborn stars give off light that carries energy deep into space.

## ENGAGE

### Tap Prior Knowledge

Ask students to close their eyes and imagine that they're looking up at a nighttime sky full of stars. Invite a few volunteers to describe what they see. Then ask students if they've ever wondered where all of those stars came from. Invite students to share what they know about star formation.

## EXPLORE

### Preview the Lesson

Display pages 12-13 of the projectable magazine. Instruct student to examine the photos. **Ask:** *What do you see?* (stars) Invite volunteers to read aloud the three captions. Then challenge students to identify one important word that appeared in each caption. (nebula) If any students have heard this word before, invite them to share what they know. Tell students that they will learn more about nebulae and how they are involved in the birth of stars as they read the article.

### Set a Purpose and Read

Have students read the article in order to understand how a star is born, recognize that newborn stars radiate energy by giving off light, and identify connections between constellations and star formation.

## EXPLAIN

### Understand How Stars Are Born

Display the Wordwise feature on page 15 of the projectable edition. Point out that these words aren't just the vocabulary words for this article. They're also important clues that can help readers understand how a star is born. Give each student a copy of the **Content Assessment Master**. With a partner, have students locate the each bold word in the article. Tell them to summarize the information near where each word appears. Have students then summarize the final paragraph in the article. Based on what they've learned, challenge students to write a brief sequence of events telling how a star is born. Instruct them to use each Wordwise word.

# A Star Is Born

## SCIENCE

### EXPLAIN

(continued)

#### How Stars Transfer Energy

Give students one minute to brainstorm a list of words that describe stars. (Possible responses: big, bright, hot, shiny, distant, etc.) Give them one more minute to brainstorm a list of things that stars do. If students have trouble thinking of examples other than "shine," suggest that they reread the first paragraph of the article. Guide students to understand that newborn stars radiate energy when they create light. Their light carries that energy deep into space.

#### Identifying Constellations Connections

Display page 14 of the projectable magazine. Zoom in on the section "Star Light, Star Bright." Highlight the bold word *constellation*. **Say:** *People often think of constellations as a small group of stars that creates an outline in the sky. But constellations also contain all the space in between. And in that space, you're likely to find a nebula. Something had to create all of those stars.* Zoom in on the photo at the bottom of page 14. Inform students that this photo shows the Orion Nebula, which is located in the constellation Orion. Then display the "**Constellations**" poster for the class. Challenge students to find the constellation Orion on the poster. Invite a volunteer to read aloud the text. Encourage students to share what they know about constellations.

### ELABORATE

#### Find Out More

Display pages 12-13 of the article. Inform students that the photos on these pages show three different nebulae: the Eagle Nebula, the Crab Nebula, and the Ring Nebula. Instruct students to conduct research to learn more about each nebula. Challenge them to identify where in the sky each nebula is located.

#### Extend Your Thinking About Stars

Tell students that this article is about how stars are born. But everything that is born eventually dies. Instruct students to conduct research to about each phase in the life cycle of a star.

### EVALUATE

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

- *Why are stars only born in dense space clouds?* (Starlight destroys molecules. The dust in a dense cloud hides molecules so they can survive.)
- *How does gravity help form a star?* (Gravity pulls the matter in a space cloud toward its center and causes the cloud to collapse.)
- *What is a molecule?* (two or more atoms joined together)

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

Name \_\_\_\_\_

Date \_\_\_\_\_

**VOCABULARY ASSESSMENT: A Star Is Born**

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

<b>Word</b>							
<b>Predicted Definition</b>							
<b>Sentence</b>							
<b>Definition from the Article</b>							
<b>Sentence</b>							

## LANGUAGE ARTS ASSESSMENT: A Star Is Born

Combine what you know and what the text says to make five inferences about how a star is born.

What I Know

What the Text Says

What I Can Infer

+

=

+

=

+

=

+

=

+

=

**CONTENT ASSESSMENT: A Star Is Born**

Summarize information about each Wordwise word and the final paragraph of the article.

atom	
constellation	
dense	
gravity	
molecule	
nebula	
last paragraph	

Tell how a star forms. Use each Wordwise word in the sequence of events.

1.
2.
3.
4.

**COMPREHENSION CHECK: A Star Is Born**

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

1. What is a nebula?  
A a cloud of gas and dust  
B a group of stars  
C a particle of matter
2. What kind of space cloud can create a star?  
A fluffy  
B dense  
C dark
3. What does gravity cause space clouds to do?  
A grow  
B float  
C collapse
4. What do newborn stars transfer through light?  
A gases  
B energy  
C dust

5. Summarize how a star is born.

---

---

---

---

# A Tale of an Atoll

## LANGUAGE ARTS

### Objectives

- Students will assess their familiarity with and knowledge of vocabulary words to strengthen their understanding of scientific terms.
- Students will explain how the writer uses reasons and evidence to support key points in the text.

### Resources

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

### Summary

- In the article “A Tale of an Atoll,” photographer and biologist Thomas P. Peschak takes readers on a tour of the Aldabra Atoll, the second largest coral atoll in the world.

## BUILD VOCABULARY AND CONCEPTS

- **atoll**
- **corals**
- **herbivore**
- **lagoon**

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 edition. Have students write those definitions on their worksheets and compare them with the definitions they wrote.

### READ

Write the words reasons and evidence on the board.

**Then ask:** *What’s the difference between these two words?* Invite students to share their ideas. Guide the class to understand that a reason tells why something happened. Evidence shows how.

Tell students that valid reasons and solid evidence are crucial elements of any text. Writers use them to support key points on the topic.

Display pages 16-17 of the projectable magazine. Instruct students to examine the image. Then invite a volunteer to read aloud the headline, introduction, and caption. **Say:** *According to the writer, the Aldabra Atoll is astounding. Astounding is a strong word. To understand why he’d use that word to describe this place, you have to search for reasons and evidence in the text. Point out that the giant tortoise in the photo is a good clue. Say: These animals are rare. The fact that they live here is evidence that the Aldabra Atoll is astounding.*

Give each student a copy of the **Language Arts Assessment Master**. Have students read the article on their own. As students read, encourage them to search for reasons and evidence that prove that the Aldabra Atoll is astounding. Have students summarize what they learned in their own words.

# A Tale of an Atoll

## LANGUAGE ARTS

### TURN AND TALK

Have students turn and talk to discuss what they learned about the Aldabra Atoll. **Ask:** *What is an atoll?* (a ring-shaped, coral reef that forms an island) *What is unique about the giant tortoises that live here?* (They are herbivores, but they are the largest land animals that live here.) *What other giant land-dweller lives on this atoll?* (coconut crab)

- **Strengthen Understanding** Inform students that it's essential for readers to understand technical terms when studying 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** and their **Language Arts 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.

- **Identifying Reasons and Evidence** After reading the article, remind students that reasons tell why something happened. Evidence explains how. Invite students to share their **Language Arts Assessment Masters** in small groups. Challenge them to examine one another's results to determine that all reasons are valid, all evidence is solid, and both support the writer's point that the Aldabra Atoll is astounding.

### 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.

- *How do plants and animals survive on and around the Aldabra Atoll?*
- *Why is it important to protect large animals on the Aldabra Atoll?*
- *What surprised you about what you read?*

# A Tale of an Atoll

## SCIENCE

### Objectives

- Students will understand what an atoll is and how an atoll forms.
- Students will recognize how coral affects every living thing found on or around the Aldabra Atoll.
- Students will identify adaptations that help plants and animals survive on the Aldabra Atoll.

### Resources

- Content Assessment Master (page 24)
- "Amazing Atolls" poster (teacher edition)
- Comprehension Check (page 25)
- "A Tale of an Atoll" Interactive Whiteboard (optional)

### Science Background

An atoll is a ring-shaped coral reef that forms an island. The Aldabra Atoll, located east of Africa in the Indian Ocean, is an amazing example.

Aldabra consists of four main islands made out of coral limestone. Those islands are separated by narrow openings that all lead into the large, central lagoon. Measuring 34 km long by 14.5 km wide at its widest point, it covers an area of 155 km<sup>2</sup>. It is one of the largest atolls on Earth.

The climate on Aldabra is harsh. Because the atoll is located in the tropics, it is extremely hot. Yet it gets little rain. The rain that does fall here drains away very quickly.

The land is stark. The coral rock makes for a sharp landscape, and there is very little shade. Despite this, plants and animals do live here. Giant tortoises and large coconut crabs roam the islands. Octopuses, fish, and sharks live around the reef. Mangrove trees thrive in the lagoon.

Many of the species that live here are found nowhere else in the world. This remote atoll provides a safe refuge where they can survive.

## ENGAGE

### Tap Prior Knowledge

Inform students that the headline for this article is "A Tale of an Atoll." The key words listed in the Wordwise feature are *atoll*, *corals*, *herbivore*, and *lagoon*. Brainstorm ideas about what the tale they are about to read might tell them about a remote island located off the east coast of Africa in the Indian Ocean.

## EXPLORE

### Preview the Lesson

Display pages 16-17 of the projectable magazine. Highlight the word *atoll* in the headline. If any students know what an atoll is, encourage them to share what they know with the class. Then have students describe the animal in the photo. Brainstorm ideas about what other strange animals might live in this place.

### Set a Purpose and Read

Have students read the article in order to understand what an atoll is and how an atoll forms, recognize the importance of coral, and identify adaptations that help plants and animals survive on the Aldabra Atoll.

## EXPLAIN

### Understanding Atolls

Display the "**Amazing Atolls**" poster for the class. Invite volunteers to read aloud each caption. Discuss how an atoll forms. Display pages 18-19 of the projectable magazine. Review the sidebar with students to gain more knowledge about each stage. Then give each student a copy of the **Content Assessment Master**. Instruct students to draw their own diagrams illustrating the three stages in the development of an atoll. Instruct them to write a thorough caption in their own words to describe what happens during each stage.

# A Tale of an Atoll

## SCIENCE

### EXPLAIN

(continued)

#### Recognizing the Importance of Corals

Remind students that the Aldabra Atoll is a coral reef. It formed when corals colonized the water around a volcano. Point out that corals are animals. When they died their skeletons remained, building the coral reef. Guide students to understand the presence of corals makes it possible for every other living thing to exist here. For example, giant tortoises and coconut crabs live on land that exists because of ancient coral skeletons. As a class, review pages 22-13 to learn how corals also created ecosystems where plants and animals that live in the water can survive. (Some animals hide in the reef. Others go there to find food.)

#### Investigating Aldabra Plants and Animals

Inform students that each of the plants and animals identified in the article has unique adaptations that help it survive on the Aldabra Atoll. The giant tortoise's size, for example, could help it survive. The fact that its droppings fertilize the soil so short grasses can grow helps all of the other animals that live there. As a class, review the article to identify adaptations of other plants and animals living on or around the Aldabra Atoll. Discuss how those adaptations affect the plant or animal involved as well as other organisms living nearby.

### ELABORATE

#### Find Out More

Despite the fact that it's a herbivore, the giant tortoise is the largest land-dwelling animal on the Aldabra Atoll. Have students conduct research to learn more about these reptiles and how they are able to survive on the Aldabra Atoll

#### Extend Your Thinking About Atolls

Remind students that the four main islands of the Aldabra Atoll rise just 8 meters above the surface of the ocean. Yet there have been many reports indicating that global warming is causing the water level of Earth's oceans to rise. Discuss what this could mean for the future of the Aldabra Atoll.

### EVALUATE

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

- *What is an atoll?* (a ring-shaped, coral reef that forms an island)
- *Why is there a lagoon in the middle of an atoll?* (The atoll forms around a volcano. After the volcano sinks, the area fills with water and forms a lagoon.)
- *Why is coral such an important species on the Aldabra Atoll?* (The atoll is composed of ancient coral skeletons. Without the coral, there would be no atoll.)

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.

Name \_\_\_\_\_

Date \_\_\_\_\_

## VOCABULARY ASSESSMENT: A Tale of an Atoll

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: A Tale of an Atoll

Record reasons and evidence that illustrate how the Aldabra Atoll is an astounding place. Summarize what you learned.

Reasons

Evidence

Summary

Name \_\_\_\_\_

Date \_\_\_\_\_

**CONTENT ASSESSMENT: A Tale of an Atoll**

Draw pictures and write captions to tell what happens during each stage when an atoll develops.

Captions			Pictures		

**COMPREHENSION CHECK: A Tale of an Atoll**

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

- Which animal created the Aldabra Atoll?  
A giant tortoise  
B coconut crab  
C corals
- Which animal lives on the Aldabra Atoll?  
A coconut crab  
B dugong  
C potato grouper
- What helps mangrove trees survive in the lagoon?  
A tall trunks  
B long roots  
C low branches
- Where is the Aldabra Atoll located?  
A Indian Ocean  
B Atlantic Ocean  
C Pacific Ocean

5. Summarize how an atoll forms.

---

---

---

---

## ANSWER KEY

### Fantastic Flier

#### Assess Vocabulary, page 6

Students should record the words and definitions from the Wordwise feature on page 8.

**adaptation:** a behavior or body part that helps a plant or animal survive

**migration:** to move regularly from one region or climate to another

**torpor:** a deep sleep

Sketches should accurately reflect the meaning of each word and how the terms are connected. Students should label all three terms in the larger drawing. Evaluate each response for accuracy.

#### Assess Language Arts, page 7

Students should circle "Chronology" as the overall text structure of the article. Sections identified for each type of text structure could vary. Students should have a valid reason to support each choice.

#### Assess Content, page 8

Students' answers may vary. Possible responses include: Internal adaptations: large brain/good memory, large breast muscles/strong flier, torpor/save energy while sleep; External adaptations: long beak/drink nectar from specific flowers, wing rotation/strong, variable flier; Behavioral adaptations: hovering/feed while flying, patterns for visiting flowers/know where to find food, pit stops/find food while traveling, dive-bomb intruders/defend territory.

#### Comprehension Check, page 9

1. A; 2. B; 3. C; 4: B; 5: The hummingbirds wings move forward and backward in a repeated figure-eight.

### A Star Is Born

#### Assess Vocabulary, page 14

Students predictions for definitions and the sentences they write will vary. They should record the words and definitions from the Wordwise feature on page 15.

**atom:** a small particle of matter

**constellation:** a part of the sky, including all the stars there

**dense:** having parts packed closely together

**gravity:** the force that causes one mass to attract another

**molecule:** two or more atoms joined together

**nebula:** a cloud of gas and dust in space

#### Assess Language Arts, page 15

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

#### Assess Content page, 16

Students' summaries may vary but should come directly from the article. Each sequence of events must contain all Wordwise words and should resemble the following: 1. **Atoms** and **molecules** of matter gather in a **dense** cloud called a **nebula**. A nebula may be in a **constellation**. 2. The cloud collapses when **gravity** pulls it toward its center. 3. The molecules move, gain more energy, and crash into one another. 4. The center gets hot and dense enough for a star to form.

#### Comprehension Check, page 17

1. A; 2. B; 3. C; 4: B; 5: Molecules of gases and dust collect in a nebula. Gravity pulls the mixture toward its center until it collapses. The molecules gain energy and crash into one another. The hot, dense center begins to glow.

### A Tale of an Atoll

#### 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.

**atoll:** a ring-shaped, coral reef that forms an island

**corals:** marine invertebrates that typically live in colonies

**herbivore:** an animal that gets its energy from eating plants

**lagoon:** a shallow body of water separated from a larger body of water by reefs or barrier islands

# Pathfinder

## ANSWER KEY

### A Tale of an Atoll

(continued)

#### **Assess Language Arts, page 23**

Students should identify reasons and evidence that support the writer's point that the Aldabra Atoll is astounding. Answers may vary, but they should all come directly from the text. Students should summarize what they learned in their own words.

#### **Assess Content, page 24**

Students' illustrations should resemble those on the "Amazing Atolls" poster and pages 18-19 of the article. Captions should be accurate and written in students' own words.

#### **Comprehension Check, page 25**

1. C; 2. A; 3. B; 4. A; 5: Wind and water wear down the volcanic island. Coral polyps build a reef around the island as it sinks. Eventually, the island disappears. Water takes its place, forming a lagoon. The ring of islands forms an atoll.