

Unit 2

Survival

Unit at a Glance

- ▶ **Language Focus:** Describe, Elaborate
- ▶ **Reading Strategy:** Visualize
- ▶ **Topic:** Survival

?
BIG
Question

What does it take to survive?

OSA PENINSULA, COSTA RICA
A green glass frog blending in on a leaf

Share What You Know

- 1 **List** some things that help humans and animals survive.
- 2 **Write** one survival method. Tape it to your partner's back.
- 3 **Ask** questions. Try to guess each other's survival methods.

Describe

Look at the photo and listen to the description of the scene. Then use **Language Frames** to describe something else you notice in the photo.

Hidden Animals

Language Frames

- I notice _____.
- They look _____.
- The _____ appears _____.

Science Vocabulary

Key Words

Look at the photos and read the descriptions. Use **Key Words** and other words to talk about **variations**, or different types, of adaptations that help some animals and insects survive.

Key Words

camouflage
deception
duplicate
mimic
parasite
variation

How do some organisms survive?



DECEPTION

Their adaptations use a form of **deception** to make them appear like other creatures. The eye-like spots on this butterfly make predators think it is a dangerous owl.

DUPLICATION

Their colors or patterns **duplicate**, or look very similar to, other creatures. This king snake has a pattern that looks much like the pattern of a poisonous coral snake.



king snake



robber fly

MIMICRY

Their appearance or behavior can **mimic**, or look or act like, another creature. A robber fly looks and sounds like a bumblebee.

CAMOUFLAGE

Because of **camouflage**, they can blend into their surroundings. This owl's colors, patterns, and markings help it hide in a tree.



PARASITISM

They are **parasites** who live by feeding on other creatures. This tick feeds on the blood of other animals.

Talk Together

Talk with a partner about ways that animals and insects adapt to survive. Then use the **Language Frames** from page 72 and **Key Words** to describe one of the organisms in the photos above.

I notice brown leaves scattered on a forest floor. They look dirty and ragged.

The photo shows a hidden leaf-litter toad. Its brownish skin color and ragged body shape make it look a lot like a leaf.

The toad has a stripe down its back. The stripe looks similar to the spine that goes down the center of a leaf.

These amazing adaptations hide the leaf-litter toad from predators.

Main Idea and Details

Nonfiction authors often organize their writing into sections. Each section has a **main idea** and **details** that support it. When you put the main ideas of each section together, you can figure out the author's main idea for the entire selection.

Look Into the Text

MASTERS OF DISGUISE

What seems to be one thing in nature is often an imposter in disguise. Looking through the viewfinder of my camera, I have seen **plants that look like rocks, shrimp that resemble blades of grass, and flowers that up and fly away. A fly passes as a wasp; a caterpillar is disguised as a twig. Deceptions such as these allow organisms to hide from predators . . .**

"The **heading** and the **details** are both about disguises."

"The **main idea** is about how living things adapt to hide from predators."

Map and Talk

You can use a main idea chart to record important information from each section of a text. After you finish reading, analyze the main ideas of each section in order to figure out the main idea of the entire selection.

Main Idea Chart

Section Head	Important Details	Main Idea of Section
Masters of Disguise (page 80)	1. Plants look like rocks. 2. 3.	Living things adapt to hide from predators.

Talk Together

Tell a partner about two animals that have amazing abilities. Your partner creates a main idea chart that uses the animals' names as section heads and then records your details and main ideas about each animal. Then work together to determine a main idea that is true about both animals.

More Key Words

Use these words to talk about "Deception: Formula for Survival" and "Living Nightmares."

asset

noun



An **asset** is something valuable and useful. When you are hiking, a compass is a helpful **asset** that shows direction.

convince

verb



To **convince** means to make someone believe something is true. The kids will **convince** their mother to agree with their idea.

emerge

verb



To **emerge** is to appear from somewhere hidden. The sun will soon **emerge** from behind the dark clouds.

ensure

verb



To **ensure** means to make certain. This girl uses a watch to **ensure** that she meets her friend on time.

resemblance

noun



When things share a **resemblance**, they look alike. The twins share a strong **resemblance** because their features are very similar.

Talk Together

Work with a partner. Write a question using a **Key Word**. Answer the question using a different **Key Word**, if possible. Use all of the words twice.

Question: When will the animal emerge from hiding?

Answer: when it can ensure that it is safe

Learn to Visualize

When you read, do you picture how the people or scenes look? Do you imagine how things sound or smell? Sensory images are details that can help you visualize a text through all five senses: sight, sound, smell, taste, and touch.

How to Visualize



1. As you read, look for sensory details that describe how things look, sound, smell, taste, and feel.

I read _____.



2. Picture the scene using all of your senses. Use your experiences to help you imagine the details.

I picture/imagine _____.



3. Explain how visualizing helps you understand the text.

This helps me understand _____.

Here's how one student visualized a text about a kind of caterpillar called a looper.

Look Into the Text

When I bumped this branch inadvertently, the looper quickly became rigid in a vertical position, and **when I touched it, I found that the normally soft caterpillar had become as stiff as the adjacent twig.**

"I read **details** about a looper."

"I saw a moth that looks like an owl. I imagine a looper that looks and feels like a twig."

"This helps me understand how the looper hides."

Picturing a scene by using your senses and experiences can help you visualize what the author is describing. It can also help you better understand and remember what you read.

Language Frames

I read _____.

I picture/imagine _____.

This helps me understand _____.

Talk Together

Read the scientific notebook entries and sample notes. Use **Language Frames** to visualize details as you read. Then talk with a partner about how you visualized the text.

Scientific Notebook

RAINFOREST OBSERVATIONS

Monday, May 28th

On my first day in the rainforest, I encountered a sloth resting high up in a leafy, green tree. The large, hairy mammal was hanging upside-down from its long arms and gripping a branch with its long, curved claws.

Sloths' slow speed hardly seems like a helpful **asset**, but it plays a key role in their ability to **camouflage** themselves in their surroundings. Because sloths move so slowly, small algae grow on their fur. The algae turns their grayish brown hair to a silvery green color that **ensures** they will be hidden in the rainforest canopy. ◀

Tuesday, May 29th

At night, when the katydids **emerge**, the rainforest becomes a choir of chirping insects. Katydids are masters of **deception**. Their ability to **mimic** their surroundings can fool even a careful observer. One kind I spotted on the forest floor was a dry, dusty brown. I was **convinced** that it was another one of the leaves that crackled and crunched beneath my feet. Another **variation** had a remarkable **resemblance** to a leaf that had been eaten by insects. Its markings even **duplicated** the long, narrow veins exactly the way they look on a real leaf! ◀

Thursday, May 31st

Leafcutter ants are small but mighty creatures that work together. Larger workers use their jaws to cut pieces of leaf. Then they carry the leaves back to the nest. Smaller ants ride on the leaf pieces to keep harmful **parasites** from laying eggs on the larger workers. ◀

Today was my last day in the rainforest, but I will bring home a new appreciation for the diversity and adaptability of the amazing creatures that call the rainforest home.

I read that sloths have "long, curved claws."

I imagine claws that look like hooks!

This helps me understand how sloths hold on to trees when they are hanging upside-down.

◀ = a good place to visualize a detail

Read a Science Article

Genre

A **science article** is nonfiction. It gives facts and information about a topic related to the natural world.

Text Features

Science articles can include **photographs** that show readers what the author is explaining within the text. Photos can also present new information in a visual way. As you read, analyze the different types of information provided in the text and photos. Then combine the information in order to understand the author's ideas.



... the normally soft caterpillar had become as stiff as the adjacent twig.



DECEPTION

by Robert Sisson

FORMULA
FOR
SURVIVAL

► Set a Purpose

Learn how some creatures have different kinds of adaptations that help them survive.

MASTERS OF DISGUISE

What seems to be one thing in nature is often **an imposter in an intriguing disguise**. Concentrating through the viewfinder of my camera, I have seen plants that look like rocks, shrimp resembling blades of grass, and flowers that up and fly away. A fly passes as a wasp; a caterpillar is disguised as a twig. **Deceptions** such as these allow organisms to hide from predators or potential victims and to increase chances of **procreation**.

Consider the two insects in the photo (*below*). The one on the left is a species of ant that tastes bad to predatory birds. The “ant” on the right is actually a tasty plant bug whose body shape, coloring, and food sources resemble those of its unsavory neighbor. To strengthen the mirror image, it also **mimics** the ant’s posture and movements.



an imposter in an intriguing disguise
something that looks like something else
procreation producing children

CAMOUFLAGE TO HUNT OR HIDE



At the edge of a desert, I was observing a crab spider on a flower of the same color, when a bee buzzed over. Failing to see the spider, the bee ended up as breakfast. Then I spotted a looper, or

inchworm, under the blossom, chewing bits of petal and sticking them on its back (*left*). As I watched, the looper inched its way up onto the center of the blossom.

The spider, alerted by the movement, climbed over the edge of the flower to look for the intruder and froze. And so did the looper and I—for the predator was standing on the camouflaged insect (*below*). The spider finally **withdrew**, and I could breathe again.

On that one blossom I had seen two **aspects** of deception—**camouflage** to help catch prey and camouflage to escape capture.



withdrew went away
aspects **variations**

► Before You Continue

1. **Visualize** Use text details to imagine an organism described on page 80. How does visualizing help you understand the text?
2. **Make Comparisons** How do the looper and crab spider both have adaptations that use **deception**?

HIDING IN PLAIN SIGHT

Loopers usually hunch their way along with the **gait** of an **inverted U** that opens and closes. When I bumped this branch inadvertently, the looper quickly **became rigid in a vertical position** (*below*), and when I touched it, I found that the normally soft caterpillar had become as stiff as the **adjacent** twig.

Another looper, crawling from one twig to another, sensed a threat. It froze in

a horizontal position so realistically that a predator ant strolled across it—and even stopped **en route** to **preen** (*below*).

Scientists have given many names to such deceptions: mimicry, cryptic coloration, camouflage, protective **resemblance**. They theorize that at some point **a mutant** individual is born with, for example, coloring closer to that of the leaves **on which its species browses**.

Hungry birds, feeding on **its kin**, are likely to overlook it. And so it lives to breed and pass on the **protective adaptation**. Continuing adaptation allows the species to become a deceiver, often with more than one mode of disguise.

A successful mimic may not only look, feel, smell, and move like **its model**, but it even may **gear** its life to the same seasons in which its model operates. As mimics

change to resemble their models, the models themselves are also changing. Too many good-tasting mimics in a population of untasty models would be unfortunate for both, for if predators were as likely to have a good meal as a bad one, they would begin to dine on mimic and model alike. So it is in the best interest of the model to look as unlike the mimic as possible. Call it anti-mimicry, if you wish.



gait movement

inverted U upside-down letter *U*

became rigid in a vertical position made itself look hard and tall

adjacent nearby

en route on the way

preen clean itself

a mutant an unusual

on which its species browses that the species eats

its kin other insects

protective adaptation trait that keeps it safe

its model the organism it copies

gear match

► Before You Continue

- 1. Summarize** Explain why a model that is copied by too many mimics might need to adapt to change its appearance.
- 2. Main Idea/Details** What is the main idea of this section? What details support the main idea?

DEADLY DECEPTION



At first, it seems a common sight, a fly prowling along a twig (*top, left*). Suddenly the twig comes alive (*top, right*)—lashing out with clawed forelegs to **pinion** the hapless fly. My electronic flash **froze the strike**—it all took less than a tenth of a second—to show for the first time what had always before been a blur.

pinion trap
froze the strike took a picture of the event
get purchase find a good grip



Discovered by Steve Montgomery of the University of Hawaii, this caterpillar of a geometrid moth strikes when tactile hairs on its body are touched. After capturing its prey, it holds the fly so the legs cannot **get purchase** in an attempt to escape.

CHANGING DISGUISES

As a butterfly-to-be changes from an egg on a leaf to an adult, it adopts a series of disguises. After hatching, the tiger swallowtail larva survives by resembling a bird dropping (*below, lower right*).



Three molts later After the larva's skin has changed three times
false eyespots colors that look like eyes
the pupal stage this young form

Three molts later, it has turned green to match the leaves on which it feeds (*below, left*). The **false eyespots** on the caterpillar's head give it a snakelike look that may frighten away predators. In **the pupal stage** it seems like just another broken twig on a tree trunk (*below, upper right*).



► Before You Continue

- 1. Explain** How does the caterpillar of a geometrid moth catch its prey? Include text evidence in your answer.
- 2. Clarify** How do the tiger swallowtail's adaptations demonstrate **variation**?

EXPERIMENTING WITH MIMICRY



Although mimicry was first scientifically described in the middle of the 19th century by Henry Walter Bates, an English **naturalist**, only recently has it been experimentally **duplicated** under natural conditions by **entomologists** Gilbert Waldbauer, Michael Jeffords, and James Sternburg of the University of Illinois.

“Other scientists have shown that the process indeed works in the laboratory,” Waldbauer told me, “but demonstrating it in **the field** is a different matter. In our tests we use the day-flying male of the dark promethean moth—a natural mimic of the bad-tasting pipe-vine swallowtail butterfly.

“The promethean is shaped much like a butterfly and flies like one too. And the male is relatively easy to recapture in a trap **baited with** a female of the species.

“We paint some of the moths orange and leave dark wing markings to resemble the **unpalatable** monarch butterfly. Others we paint yellow, leaving wing

markings that make them look like the tiger swallowtail, which is tastier to birds. A third batch is marked with black paint, so that their weight matches that of the other groups without altering their appearance to predators.

“We release equal numbers of all three groups in the center of a one-mile-wide circle of baited traps (*above, left*). As we had expected, more of our mimics painted to look like unsavory models are caught in the traps undamaged, whereas the yellow ones may have beak-shaped bites taken out of their wings (*above, center, right*).

“**Survivors** are 37 percent ‘monarchs’ and 39 percent ‘pipe-vine swallowtails,’ but only 24 percent ‘tiger swallowtails.’ **Batesian mimicry** does seem to be effective.”



As factory smoke blackened tree trunks in England during **the Industrial Revolution**, some insects adapted to the color change. E.B. Ford of Oxford University notes that the change in moths has been **striking**.

“More than a hundred species have become **predominantly** black in England,” he told me. “It is known as ‘industrial melanism,’ and it has also occurred in the United States.”

He mentioned a study done by an associate, H.B.D. Kettlewell, using the peppered moth, which flies at night and rests exposed on tree trunks during the day. Kettlewell released equal numbers of pale and black moths in an unpolluted forest (*top, left*). Birds took more than six times as many black moths as pale ones. But in **an industrial area**, blacks survived pale moths by four to one (*center, left*).

The black moths are spreading for reasons other than camouflage. Genetically, most of them have become hardier—more tolerant of pollution—than the pale forms and have increased in industrial regions.

More than a century of industrialization has passed, and the British have made progress against air pollution. A sign of that success is the increase of pale moths in some industrial districts (*bottom, left*).

naturalist scientist who studied plants, animals, and insects

entomologists scientists who study insects

the field a natural setting

baited with holding

unpalatable bad-tasting

Survivors The moths that live

Batesian mimicry The kind of mimicry Bates described

the Industrial Revolution a historical time when many machines and factories were built

striking impressive

predominantly mostly

an industrial area a place with many factories

► Before You Continue

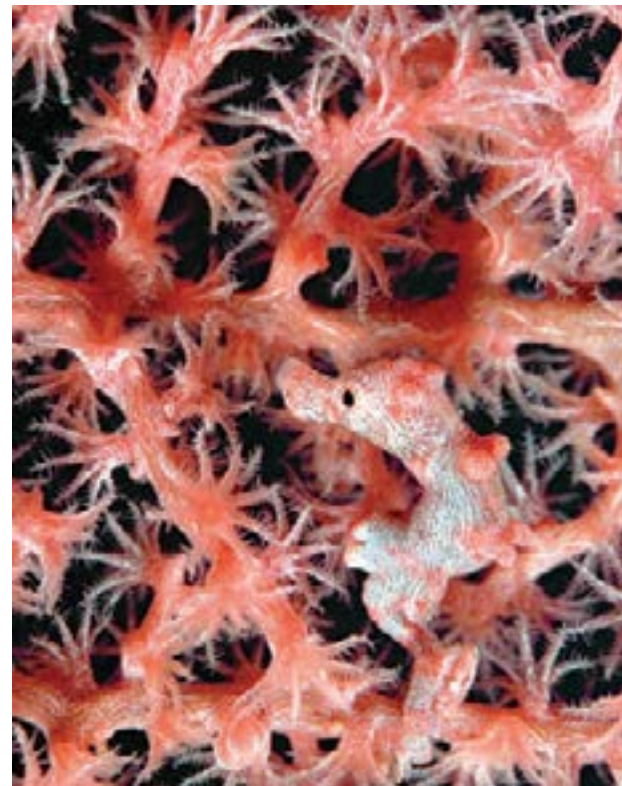
- 1. Details** How does the experiment described on page 86 show that mimicry is effective? Use evidence from the text for support.
- 2. Make Inferences** Why was it important for moths to adapt and change color during the Industrial Revolution?

UNDERWATER

DISAPPEARING ACTS

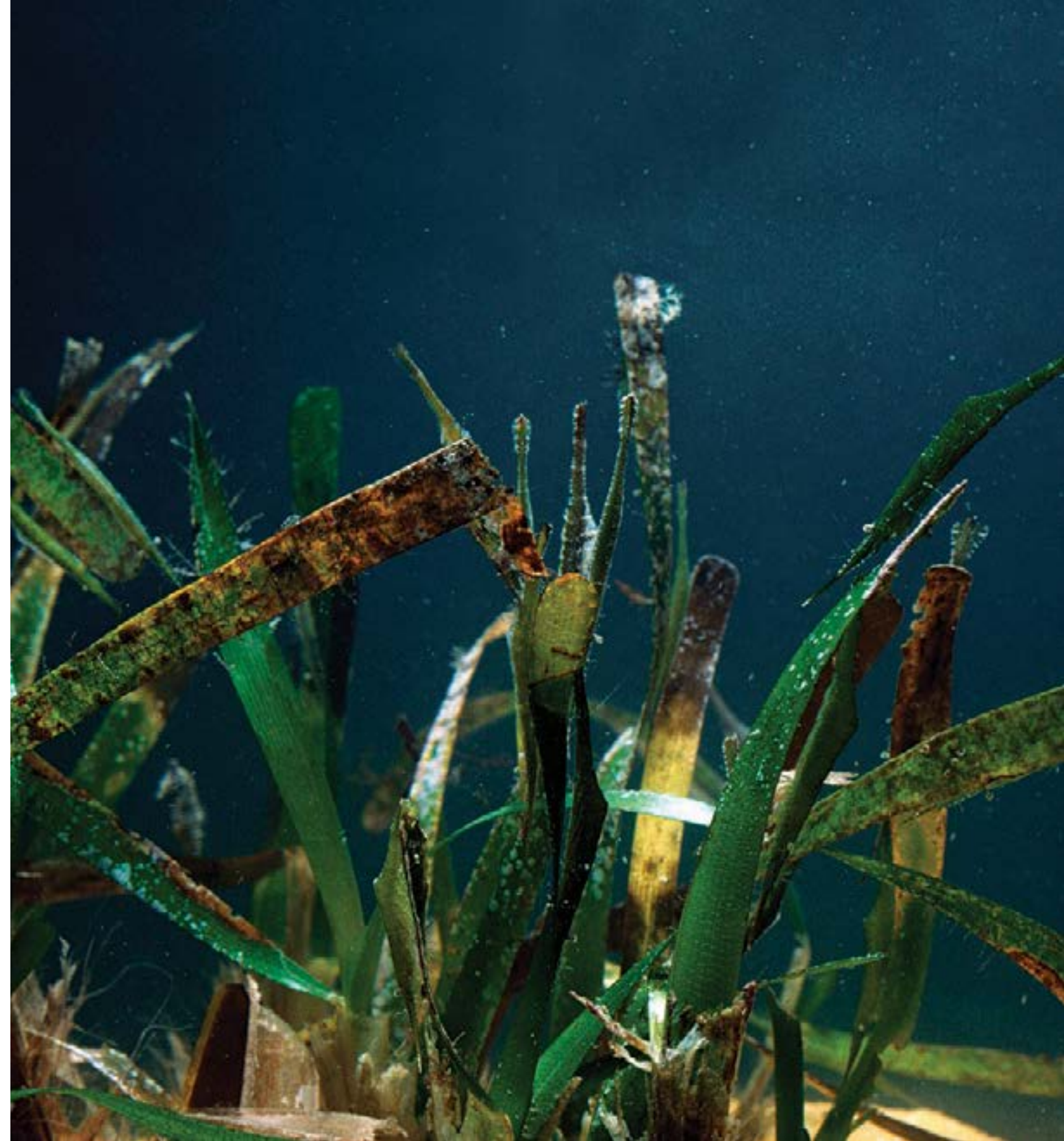


Each time I count, I come up with a different number of grass, or phantom, shrimp in this picture (*facing page*). Their body colors are so perfect that they seem to come and go before my eyes. There are at least 17 of them in and around the turtle grass—I think. Note that the dark green ones rest on dark green grass; brown and black ones choose dead or dying grass.



Sometimes a dark shrimp **masquerades as** a shadow under a leaf, which supports a **lighter-hued** shrimp on top.

Witness another victory at sea. A dwarf sea horse sways in the current, **festooned with appendages** that make them seem like the **plumes of hydroids** on the turtle grass to which it is anchored (*top, left*).



masquerades as pretends to be
lighter-hued lighter-colored
festooned with appendages covered with parts
plumes of hydroids body parts of other sea creatures

► Before You Continue

- 1. Main Idea/Details** Review the details in this section. What is the main idea that they support?
- 2. Use Text Features** How do the photos provide information that helps you better understand the text?

EXPERTS OF DECEIT

Living stones are plants that survive by looking like rocks in southern Africa's deserts (*below*). Veined wings hide a leaf katydid on a forest floor (*top, right*).

Treehoppers march up a branch (*center, right*), usually **aslant** like the real thorns. Some do stray onto thornless branches or face the wrong direction, but birds quickly scanning the branches usually do not spot them.

The blooms (*bottom, right*) are **larval** plant hoppers, members of a group of insects that deceive **en masse** rather than individually. **Botanists** in East Africa have picked plants adorned with the adult insects—and have been startled to see the “flowers” fly away.



aslant shaped and placed
larval young
en masse in groups
Botanists Scientists who study plants

The feisty wasp is especially popular as a model for other insects.

An insect I photographed in Costa Rica, a mantispid, occurs there in five different color forms, and each of the five mimics a different species of paper wasp.

Study the two face-to-face insects (*below*), and select the real wasp. Answer:

the one on the right. Its companion is a hover fly, a striking mimic of the wasp.

At least one hover fly species not only looks like a wasp but also sounds like one. The **frequency of its wingbeats** is 147 a second, very close to its model's 150. Scientists call this **audio** mimicry—another adaptation in the effort to survive by deception. ❖



frequency of its wingbeats number of times it moves its wings
audio sound

► Before You Continue

- 1. Make Judgments** Based on the photos and text, which organisms on page 90 have the most effective adaptations?
- 2. Visualize** Based on what you know about hover flies and the description in the text, how do you imagine they sound?

Talk About It

1. How do photos and text provide information in different ways? Choose a specific combination of photos and text from the science article, and explain how it helps you understand information.
2. Describe how both predators and prey have adaptations that **mimic** others as a way to survive. Include evidence from the text to support your description.
3. Review the section headings and evaluate whether they are helpful in determining the main idea in each section. Cite specific examples.
4. Why is **camouflage** an important **asset** to some animals in nature? Combine specific evidence from the text to form a generalization.
5. Which two organisms from the selection have adaptations that are the most similar? Which two organisms have adaptations that are the most different? Use evidence from the text to support your judgment.
6. The science article is written from the author's first-person point of view. Analyze how this affects your understanding of the information.

Key Words

asset	ensure
camouflage	mimic
convince	parasite
deception	resemblance
duplicate	variation
emerge	

Reread and Summarize

Main Idea and Details

Use a main idea chart to keep track of the main idea and supporting details in each section of "Deception: Formula for Survival." Then analyze the chart to figure out the main idea of the entire science article.

Main Idea Chart

Section Head	Important Details	Main Idea of Section
Masters of Disguise (page 80)	1. Plants look like rocks. 2. 3.	Living things adapt to hide from predators.
	1.	

Use your main idea chart to summarize the main idea of each section to a partner. Then use **Key Words** as you explain how you used the information to determine the author's main idea for the entire selection.

Write About It

Imagine that you are an organism in this selection. Write a paragraph that describes how your adaptations help you survive. Use at least three **Key Words** and sensory details to help your reader visualize your description.

○	As a tiger swallowtail, I mimic the bad-tasting pipe-vine swallowtail to ensure that birds will leave me alone.
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Fluency

Practice reading with phrasing. Rate your reading.

Talk Together

Which of the insects and animals described in the article have the most effective methods of **deception** to help them survive? Use **Key Words** and cite text evidence in your discussion.

Relate Words

When you read a new word, ask yourself, “Does this new word look like a word I already know?” Some words belong in the same **word family** because they look similar and have related meanings. You can use what you know about a familiar word to help you figure out the meaning of the new word.

Word	Definition	Related Words
deception (<i>noun</i>)	the act of tricking	deceive (<i>verb</i>), deceiver (<i>noun</i>)
duplicate (<i>verb</i>)	to copy	duplication (<i>noun</i>)
emerge (<i>verb</i>)	to appear	emerging (<i>adjective</i>), emergence (<i>noun</i>)
mimic (<i>verb</i>)	to imitate	mimicry (<i>noun</i>)
resemblance (<i>noun</i>)	the state of being alike	resemble (<i>verb</i>)
variation (<i>noun</i>)	different type	vary (<i>verb</i>), variety (<i>noun</i>), variable (<i>noun</i>)

The chart above shows some related words. You already know the meaning of the verb *mimic*. What do you think the noun *mimicry* may be about?

Try It

Read the sentences. Then answer the questions.

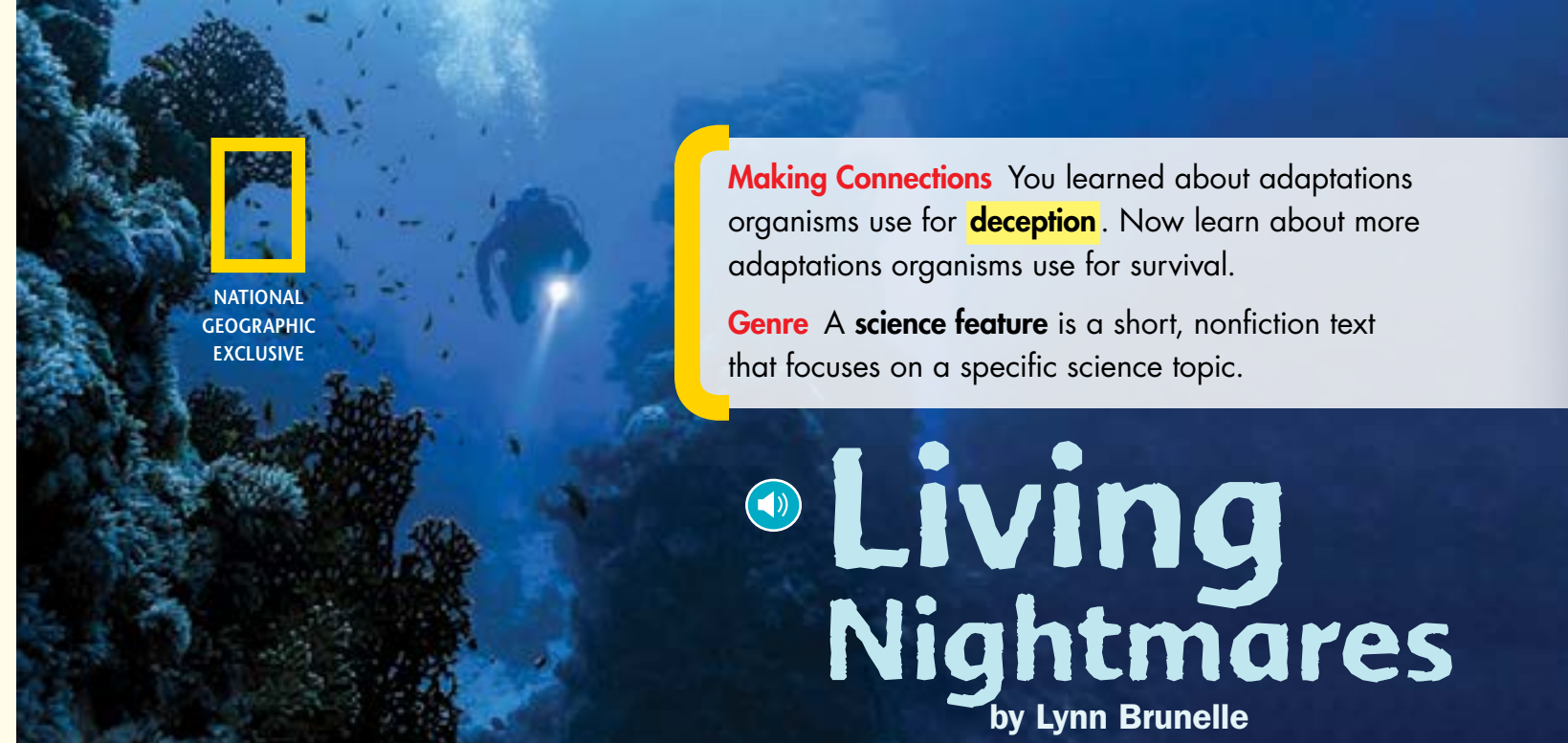
There are many different types of butterflies in the woods. Because of this large **variety** of butterflies, it is common to find two species that **resemble** each other with similar colors and markings.

1. What is the best definition for **variety** in the text?

- A number of different things
- B collection of the same things
- C similarity between things
- D different names for things

2. What is the best definition for **resemble** in the text?

- A to identify
- B to differ from
- C to look or seem like
- D to model after



Making Connections You learned about adaptations organisms use for **deception**. Now learn about more adaptations organisms use for survival.

Genre A **science feature** is a short, nonfiction text that focuses on a specific science topic.

Living Nightmares

by Lynn Brunelle

GHOSTS

These see-through animals are masters of deception.

SPOOKFISH Deep in the ocean, you see two green dots **bobbing** in the water. The dots are eyes, but they don't seem attached to a body at all. This weird animal is called a spookfish, and it has a distinctive, ghostly, see-through head. Even though this may look scary, this see-through head is actually an adaptation, and it helps the fish survive.

A spookfish lives 800 meters (about half a mile) under the surface of the ocean, and here, its clear head and dark gray body blend into the dark water. In fact, it's hard to **spot** the fish as it floats almost motionless.

Since this fish's clear skin is like a window, the spookfish can see through it. Its round, green eyes are tucked under its skin, and they move around under its skin as it searches for prey. The fish can point its eyes forward so it can see in front of its face, and it can rotate its eyes upward to look out of the top of its head.

Since the spookfish has these unique eyes, it can spot a jellyfish floating above. Small, silver fish are trapped in the jellyfish's stinging tentacles, and the spookfish **darts** up to steal one. It swims headfirst into the tentacles, and since its eyes are safely covered by skin, they won't get stung.

bobbing bouncing up and down

spot see

darts quickly swims

► Before You Continue

- Main Idea/Details** What special features make the spookfish different from most other fish? Use evidence from the text to support your answer.
- Visualize** Which details from the text help you picture the spookfish and its habitat?



GHOST SHRIMP A spookfish isn't the only ghostly sea **critter**. We spot our next one on a sea anemone. It's hard to see it, because a ghost shrimp's body is mostly clear.

The shrimp uses its body as **camouflage**, so it can blend in wherever it goes. Other critters see only the surface on which the shrimp is standing, so the shrimp remains safely hidden from predators.

Being clear only works as long as the ghost shrimp doesn't eat. When the shrimp **nibbles algae**, its food shows through its transparent body.



critter animal; creature
nibbles algae eats small plants



GLASS FROG Another ghostly creature lives in a rain forest; it makes a squeaky “peep” sound. The sound seems like it’s coming from a pale, green leaf, but it looks as if there is no critter on the leaf.

Suddenly, a bump on the leaf wiggles, and it’s a frog. Like the other ghostly creatures you’ve read about, this frog is a master of disguise. Because it blends in with the leaf, it is almost invisible until it moves. It’s not the same color as the leaf, however. Like the shrimp, a glass frog blends in

because it has almost no color at all.

The skin on its belly is clear, and its back is pale green. The bright green of the leaf shines right through this frog; it makes the frog look like part of the leaf. This **resemblance** helps the glass frog hide from its predators.

Most of the time, this frog blends in. Flip the frog over, however, and you can see its insides. You can see its heart pumping blood and watch food squeeze through its guts.

► Before You Continue

1. **Make Inferences** What might happen if a ghost shrimp is eating when a predator swims by? Why?
2. **Explain** Why is the adaptation of **camouflage** so important to the ghost shrimp and the glass frog?

ZOMBIES

Some organisms use mind control to get ahead.

ZOMBIE ANT A line of ants marches through a rain forest. One by one, the ants climb a tree trunk to head up to their warm, dry nest. Suddenly, one ant stumbles out of line, twitches a little, and then drops to the ground. Something is wrong because these ants usually never step out of line.

Near the ground, the ant finds a leaf. It crawls under the leaf where it's damp and shady, and then it bites into the leaf. Suddenly, the ant's jaws lock, and it can't let go or even move. The ant hangs from the leaf, slowly dying. This ant is acting odd for a scary reason—because it's a zombie. You can't see it, but a killer now controls the ant.

The ant was fine days earlier, until it picked up a tiny **hitchhiker** smaller than a

grain of sand. The hitchhiker was a **fungus spore**, and it dug its way into the ant's body. Even though the ant doesn't feel a thing, the **parasite** goes to work inside the ant's body. It reproduces and spreads, and it eventually takes over the ant's brain. The fungus inside of it makes the ant find a damp, shady place, because that's where a fungus grows best.

The fungus sprouts from the ant's head, and this makes the ant look like it is growing antennae. By now, the ant is dead, but the fungus keeps growing until it explodes. These new splattered spores will attach themselves to other ants to make new zombies.



get ahead get what they need
hitchhiker traveler
fungus spore tiny intruder

ZOMBIE SNAIL Fungi aren't the only zombie masters. A kind of flatworm **hijacks** a snail, and the results aren't pretty. Like the fungus, the worm is a parasite. As the snail slowly crawls across the ground looking for bird droppings to eat, it has no idea that flatworm eggs are in the droppings.

When the snail eats the droppings, the flatworm eggs hatch inside the snail. When the young flatworms start to grow, they move into the snail's eyestalks, which are the long stems that hold the snail's eyes. The snail's eyestalks start to grow bigger and more colorful.



hijacks takes over

Because its body has been taken over, the snail starts acting very odd. Usually, it hides in the shadows to avoid predators. Now, the flatworms have taken over its brain, and they make the snail crawl into wide-open spaces.

The snail wriggles its swollen eyestalks; they look like juicy caterpillars. A bird sees the moving eyestalks, swoops in, and rips the eyestalks off the snail. The doomed snail crawls away, but inside the bird's gut, the flatworms finish growing. They lay eggs, and these eggs may become food for more snails.

► Before You Continue

1. **Compare** How do the fungus spore and flatworm's adaptations help them survive?
2. **Author's Viewpoint** How does the author view the **parasites** in this section? Cite evidence to support your response.

DEVILS

These critters use scary looks and sounds to survive.



TASMANIAN DEVIL Just after midnight, a howl rises from a forest in Australia. A fearsome growl answers it, and then there's a scream. Sharp teeth **flash**, and fur flies. This forest sounds haunted, but these sounds are just caused by two Tasmanian devils fighting over a dead animal.

These scavengers eat dead animals, and it's best to stay out of their way. They may weigh only about 8 kg (about 17 pounds), but they have one of the most powerful bites of any mammal. Their teeth can crush bones and rip apart fur and guts.

These devils fight over food, they **brawl** over space, they battle for mates, and they attack predators. When Tasmanian devils fight, their ears turn bright red. Then they spray a stinky smell, **gnash** their teeth, and scream. They act devilish in order to survive.

THORNY DEVIL A second kind of devil lives in a desert in Australia. Spikes stick out from its body, and they look like sharp thorns. Meet the thorny devil lizard. Its prickly outside makes it look dangerous, but its looks are an interesting adaptation.

At dawn, the lizard rubs against a bush that is covered in dew. Dew runs down its spikes and into tiny grooves on its skin. The grooves lead to the lizard's mouth, allowing the lizard to drink the dew. Now it can survive another **devilishly** hot day in the desert.

Despite its looks, only ants should fear the thorny devil. It licks them up with its tongue and crunches them with its teeth. In fact, it can eat as many as 3,000 ants in a single meal.



HICKORY HORNED

DEVIL Our last creepy critter, the hickory horned devil, crawls along a branch high in a tree. This devil is a caterpillar, and it can grow up to 15 cm long. When it **rears up**, nearly a dozen spiky red and black horns stick out of its head. It shakes its head and buzzes. This creepy critter looks and acts devilish in order to scare away predators and get back to what it does best—munching tree leaves.

From devils to zombie masters to ghosts, these critters may seem like living nightmares. Some seem to vanish, and others howl horribly or force victims to grow freaky body parts. Their adaptations may make them look and act scary, but each adaptation helps them survive. ❖

flash bite and tear
brawl fight
gnash grind
devilishly horribly

rears up stands up straight

► Before You Continue

1. **Use Text Features** How do the photographs present information in a different way than the text? Cite specific examples.
2. **Interpret** Why does this science feature describe these creatures as "living nightmares"?

Compare Texts

The selections, "Deception: Formula for Survival" and "Living Nightmares" both tell about ways that animals survive. Think about the main idea of each text and the details the authors include. Then work with a partner to complete the chart below. Use the information to evaluate how the two selections present information about the same scientific topic.

Comparison Chart

	"Deception: Formula for Survival"	"Living Nightmares"
Main Idea of Selection	Some species _____.	Some species _____.
Details that Support the Main Idea	1. 2. 3.	1. 2. 3.
Text Features		

Talk Together

How do the authors of "Deception: Formula for Survival" and "Living Nightmares" help you understand how species are adapted for survival? Use **Key Words** and text evidence to talk about your ideas.

Key Words

asset	ensure
camouflage	mimic
convince	parasite
deception	resemblance
duplicate	variation
emerge	

Grammar and Spelling

Subject and Object Pronouns

A **pronoun** is a word that takes the place of a noun. The type of pronoun to use depends on how it is used in a sentence.

Grammar Rules Subject and Object Pronouns

Use a **subject pronoun** in place of a **noun** as the subject of a sentence.

The **jellyfish** floats by. **It** does not see the transparent spookfish.

The subject pronouns are *I, you, he, she, it, we, and they*.

The **eyes** of a spookfish are odd. **They** are tucked under the skin.

Use an **object pronoun** in place of a **noun** after an **action verb**.

Small, silver **fish** are trapped. The spookfish **eats them**.

Also use an **object pronoun** in place of a **noun** after a **preposition**.

The **tentacles** sting, but the spookfish swims **through them**.

The object pronouns are *me, you, him, her, it, us, and them*.

Read Subject and Object Pronouns

Writers want to avoid repeating the same words too many times, so they use subject and object pronouns to take the place of some repeated nouns. Read this passage from "Living Nightmares." Identify the subject and object pronouns. How do they make the writing smooth and easy to read?

Despite its looks, only ants should fear the thorny devil. It licks them up with its tongue and crunches them with its teeth. In fact, it can eat as many as 3,000 ants in a single meal.

Write Subject and Object Pronouns

Write a short paragraph about one of the creatures in "Living Nightmares." Include at least two subject and object pronouns. Then compare your work with a partner's.

Elaborate

Look at the photo and listen to the presentation. Then use **Language Frames** to elaborate on an important detail about survival from the presentation.

Language Frames

- For example, _____.
- In addition _____.
- Not only _____, but _____.



Survival Basics

When it comes to survival, humans and animals share many similarities. For example, all living creatures require food and water in order to survive. Without these two basic things, most living things would die within days. In addition to essential nutrients, humans and animals also require shelter to keep them safe from different kinds of danger, such as severe weather and predators. Not only do humans build their own homes, but many animals build complicated shelters, too, such as birds that build nests and beavers that construct dams. All living things share the same basic needs, and all have found amazing ways to adapt and survive.

Science Vocabulary

Key Words

Look at the illustration and read the text. Use **Key Words** and other words to talk about how you can **overcome**, or conquer, the challenges in nature.

Key Words

exhaust
necessity
overcome
reliance
resourceful

Tips for Hiking

When you are hiking, the most important **necessity** that you must have is water. Take small sips so that you do not **exhaust**, or use up, your water supply too quickly.

TIP 1

If you have to camp overnight, you can be creative and **resourceful** by making a shelter out of the materials around you.

TIP 2

TIP 3

Most hikers wear sturdy boots or shoes. Some also have a **reliance** on tools, such as walking sticks. They need these tools to stay safe on the trail.

Talk Together

Talk with a partner about the three safety tips above. Then give another safety tip. Use the **Language Frames** from page 104 and **Key Words** to elaborate on your idea with more information and details.

Character

Most stories focus on a main **character** who has a problem or goal. To understand the character, think about the person's:

- **motives:** reasons why the character does or says something.
- **actions:** what the character says and does.

As you read the story, look for text evidence that helps you understand the main character.

Look Into the Text

Here I am and that is nowhere. With his mind opened and thoughts happening, it all tried to come in with a rush, all of what had occurred and he could not take it. The whole thing turned into a confused jumble that made no sense. So he fought it down and tried to take one thing at a time . . .

My name is Brian Robeson and I am thirteen years old and I am alone in the north woods of Canada.

All right, he thought, that's simple enough.

"Brian's **motive** is that he is confused and scared. He needs to figure out what is happening."

"His **actions** are to calm down and think clearly."

Map and Talk

A character chart can help you analyze details about a character's motives and actions to help you learn more about the character.

Character Chart

Character: Brian Robeson	
Motives	Actions
wants to figure out what is happening	

Talk Together

Tell a partner about a time you had to do something important. What motivated you? What actions did you take? Describe the experience while a partner completes a character chart about the experience and explains something that it shows about you.

Academic Vocabulary

More Key Words

Use these words to talk about "Hatchet" and "Survival Stories: The Girl Who Fell from the Sky."

concentrate

verb



When you **concentrate**, you give all of your attention to something. The boy must **concentrate** when he glues the tiny pieces together.

intense

adjective



Something that is **intense** is very strong. The **intense** wind made the tree tops bend over.

motivation

noun



Motivation is the reason for doing something. My **motivation** for studying is to get good grades.

resilience

noun



When you show **resilience**, you can recover from or adapt to difficult situations. Plants show **resilience** by growing in places with little or no soil.

resolve

verb



When you **resolve** to do something, you reach a decision about it. After seeing the litter, the kids **resolve** to pick up trash once a week.

Talk Together

With a partner, make an Expanded Meaning Map for each **Key Word**.

Definition to get better	Characteristics strong successful
Examples studying practicing	Non-examples giving up quitting

resilience

Learn to Visualize

As you read, use details in the text to create mental images, or pictures in your mind. When you combine these images with your own experience, you react to what you read. These reactions, or emotional responses, can deepen your understanding of the text.

How to Visualize



1. As you read, notice words and phrases that create images in your mind.

I read _____.



2. Describe what you "see" and "hear" in your mind.

I see/hear _____.



3. Combine these mental images of the text with your own experience to identify how you feel. Consider how identifying your emotional responses helps you understand the text.

I feel _____.

I understand _____.

Here's how one student visualized a text and responded.

Look Into the Text

"I'm hungry." He said it aloud. In normal tones at first, then louder and louder until he was yelling it. "I'm hungry, I'm hungry, I'm hungry!"

When he stopped there was sudden silence, not just from him but the clicks and blurps and bird sounds of the forest as well. The noise of his voice had startled everything and it was quiet. He looked around, listened with his mouth open, and realized that in all his life he had never heard silence before. **Complete silence.** There had always been some sound, some kind of sound.

"I read **details** about **silence.**"

"I hear the total **silence** in the forest."

"I remember feeling **silence** like that, so I feel worried about **Brian**. I understand how scared and lonely he must feel."

Visualizing and forming emotional responses to the text can help you relate to the story and gain a deeper understanding of what you've read.

Language Frames

I read _____.

I see/hear _____.

I feel _____.

I understand _____.

Talk Together

Read the journal entry and sample notes. Use **Language Frames** to visualize and form emotional responses as you read. Then talk with a partner about how you responded to the text.

Journal Entry

A Backcountry Adventure

Sunday, July 10th

We are back from our three-day camping trip to the Shenandoah Valley. Mom and Dad had been concerned about our family's **reliance** on computers, cell phones, and video games for entertainment. So they decided a camping trip would help us **overcome** our dependence on electronic devices. I knew we'd have to be **resilient** in order to find a way to survive without the comforts of home.

When you camp in the backcountry, you have to carry all of your supplies with you. We could only bring **necessities** that we needed to survive, such as food, clothes, a camp stove, fuel, rope, a map, and a water container. At first, I was surprised that we weren't bringing bottled water with us. Then my heavy, overstuffed backpack made me realize we'd soon **exhaust** any supply we could carry. Instead, we'd have to be **resourceful** and boil or filter water from nearby streams. ◀

Our first day in the wilderness was incredible. We scrambled up rocky paths and waded in an ice-cold stream that made my feet tingle. Fragrant wildflowers waved their colorful petals at us. I felt like I had stepped into a dreamy landscape painting. After all that exercise, an **intense** hunger burned in the pit of my stomach. Mom's homemade trail mix had never tasted so good. ◀

At night, the darkness seemed like a black curtain had been dropped over us. I tried to read with a flashlight, but I couldn't **concentrate**. I finally fell asleep to a chorus of chirping crickets.

By our last day, I had blistered feet and bug-bitten arms. I was ready to go home. I couldn't wait to play video games. But a funny thing happened. Soon after I started my favorite game, I lost the **motivation** to continue. I headed outside to get some fresh air. Mom and Dad's plan had worked after all. Right then I **resolved** to spend more time in the great outdoors. ◀

I read about the supplies the family needs to carry.

I see big, heavy packs bulging with food and equipment.

I feel sympathy for the family because each person has to carry a heavy load.

I understand why the family could only pack necessities.

◀ = a good place to form mental images

Read an Adventure Story

Genre

An **adventure story** tells about events that are dangerous or exciting. In this fictional adventure story, the author describes how a character reacts to his experiences and overcomes obstacles.

Point of View

Point of view describes how a story is told. In **third-person point of view**, a narrator who is not a character tells the story. When the third-person point of view is **omniscient**, the narrator knows everything about the story's events, including all of the character's thoughts and feelings.

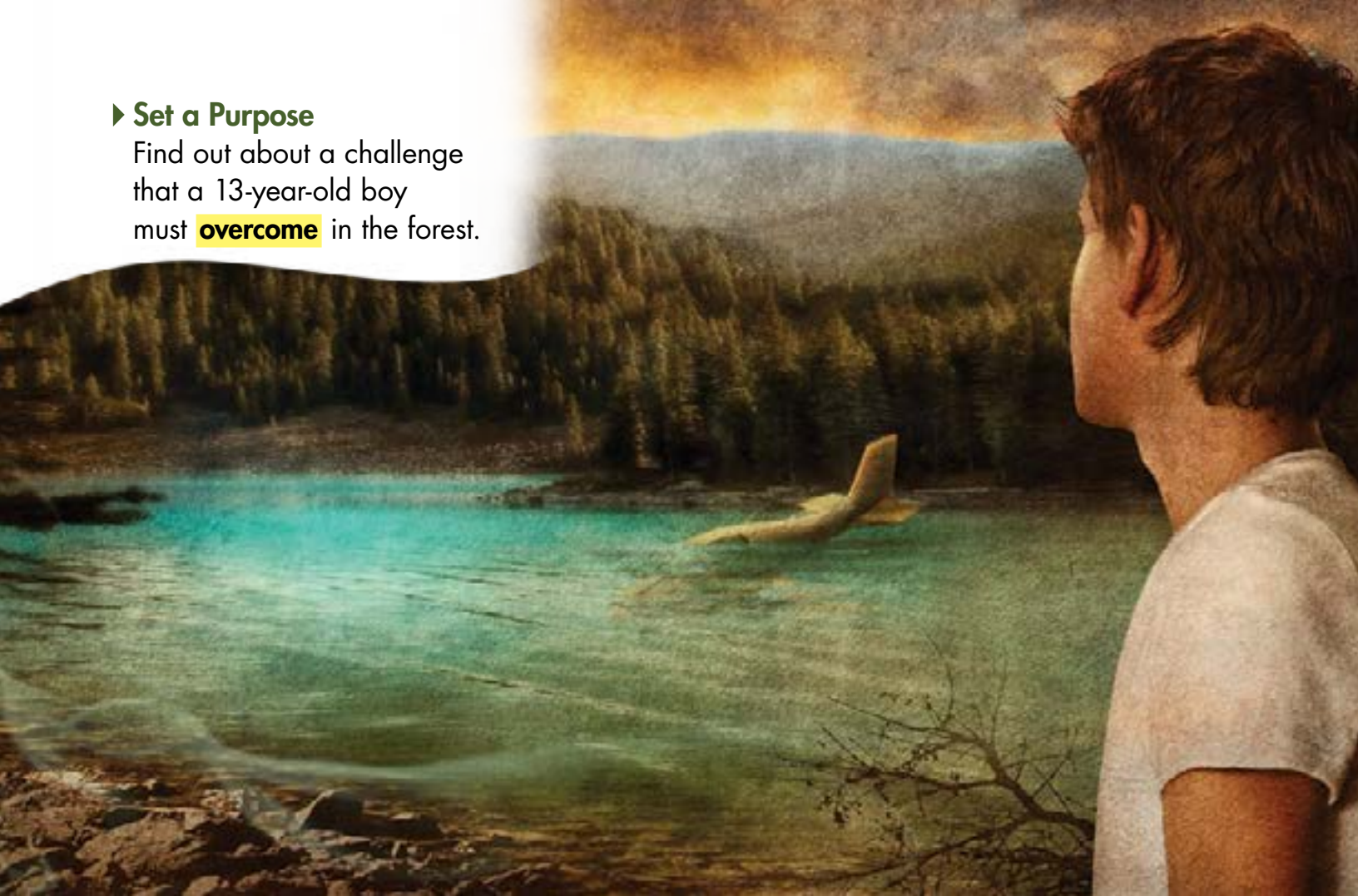
The narrator describes the character's actions and thoughts.

Brian rubbed his stomach. The hunger had been there but something else—fear, pain—had held it down. Now, with the thought of the burger, the emptiness roared at him.

from  **HATCHET**
by Gary Paulsen
ILLUSTRATED BY JULIANA KOLESOVA

► **Set a Purpose**

Find out about a challenge that a 13-year-old boy must **overcome** in the forest.



Here I am and that is nowhere. With his mind **opened** and thoughts happening, it all tried to come in with a rush, all of what had occurred and he could not **take it**. The whole thing turned into a confused jumble that made no sense. So he **fought it down** and tried to take one thing at a time.

He had been flying north to visit his father for a couple of months in the summer, and the pilot had had a heart attack and had died, and the plane had crashed somewhere in the Canadian north woods but he did not know how far they had flown or in what direction or where he was . . .

opened able to think
take it understand it all
fought it down made himself calm down

Slow down, he thought. Slow down more.
My name is Brian Robeson, and I am thirteen years old, and I am alone in the north woods of Canada.
All right, he thought, that's simple enough.
I was flying to visit my father and the plane crashed and sank in a lake. There, keep it that way. Short thoughts.
I do not know where I am.
Which doesn't mean much. More to the point, *they* do not know where I am—*they* meaning anybody who might be wanting to look for me. The searchers.

They would look for him, look for the plane. His father and mother would be **frantic**. They would tear the world apart to find him. Brian had seen searches on the news, seen movies about lost planes. When a plane went down they **mounted extensive searches** and almost always they found the plane within a day or two. Pilots all filed flight plans—a detailed plan for where and when they were going to fly, with all the courses explained. They would come, they would look for him. The searchers would get government planes and cover both sides of the flight plan filed by the pilot and search until they found him.

Maybe even today. They might come today. This was the second day after the crash. No. Brian frowned. Was it the first day or the second day? They had gone down in the afternoon and he had spent the whole night **out cold**. So this was the first real day. But they could still come today. They would have started the search immediately when Brian's plane did not arrive.

frantic very afraid and worried
mounted extensive searches sent many people to help
out cold unconscious

Yeah, they would probably come today.

Probably come in here with amphibious planes, small bushplanes with floats that could land right here on the lake and pick him up and take him home.

Which home? The father home or the mother home. He stopped the thinking. It didn't matter. Either on to his dad or back to his mother. Either way he would probably be home by late night or early morning, home where he could sit down and eat a large, cheesy, juicy burger with tomatoes and double fries with ketchup and a thick chocolate shake.

And there came hunger.

Brian rubbed his stomach. The hunger had been there but something else—fear, pain—had held it down. Now, with the thought of the burger, the emptiness **roared at him**. He could not believe the hunger, had never felt it this way. The lake water had filled his stomach but left it hungry, and now it demanded food, screamed for food.

And there was, he thought, absolutely nothing to eat.

Nothing.

What did they do in the movies when they got stranded like this? Oh, yes, the hero usually found some kind of plant that he knew was good to eat and that took care of it. Just ate the plant until he was full or used some kind of cute trap to catch an animal and cook it over a **slick** little fire and pretty soon he had a full eight-course meal.

The trouble, Brian thought, looking around, was that all he could see was grass and brush. There was nothing obvious to eat, and aside from about a million birds and the beaver, he hadn't seen animals to trap and cook; and even if he got one somehow, he didn't have any matches, so he couldn't have a fire . . .

roared at him was **intense**
slick perfect



Nothing.

It kept coming back to that. He had nothing.

Well, almost nothing. As a matter of fact, he thought, I don't know what I've got or haven't got. Maybe I should try and figure out just how I **stand**. It will give me something to do—keep me from thinking of food. Until they come to find me.

Brian had once had an English teacher, a guy named Perpich, who was always talking about being positive, thinking positive, **staying on top of things**. That's how Perpich had put it—stay positive and stay on top of things. Brian thought of him now—wondered how to stay positive and stay on top of this. All Perpich would say is that I have to get motivated. He was always telling kids to get motivated.

Brian changed position so he was sitting on his knees. He reached into his pockets and took out everything he had and laid it on the grass in front of him.

It was **pitiful** enough. A quarter, three dimes, a nickel, and two pennies. A fingernail clipper. A billfold with a twenty dollar bill— “In case you get stranded at the airport in some small town and have to buy food,” his mother had said—and **some odd** pieces of paper.

stand am doing
staying on top of things keeping focused on what you need to do
pitiful sad
some odd a few

And on his belt, somehow still there, the hatchet his mother had given him. He had forgotten it and now reached around and took it out and put it in the grass. There was a touch of rust already forming on the cutting edge of the blade and he rubbed it off with his thumb.

That was it.

He frowned. No, wait—if he was going to **play the game, might as well play it right**. Perpich would tell him to quit messing around. Get motivated. Look at *all* of it, Robeson.

He had on a pair of good tennis shoes, now almost dry. And socks. And jeans and underwear and a thin leather belt and a T-shirt with a windbreaker so torn it hung on him in tatters.

And a watch. He had a digital watch still on his wrist but it was broken from the crash—the little screen blank—and he took it off and almost threw it away but stopped the hand motion and lay the watch on the grass with the rest of it.

There. That was it.

No, wait. One other thing. Those were all the things he had, but he also had himself. Perpich used to **drum that into them**—“You are your most valuable asset. Don’t forget that. *You* are the best thing you have.”

play the game, might as well play it right
survive, he had to do his best
drum that into them always remind them

► **Before You Continue**

1. **Paraphrase** What lessons has Brian learned from Perpich?
2. **Point of View** Identify examples in which the narrator includes Brian’s thoughts. How does this help you understand the story?



► **Predict**

Will Brian have the **resilience** he needs to survive?

Brian looked around again. I wish you were here, Perpich. I'm hungry and I'd trade everything I have for a hamburger.

"I'm hungry." He said it aloud. In normal tones at first, then louder and louder until he was yelling it. "I'm hungry, I'm hungry, I'm hungry!"

When he stopped there was sudden silence, not just from him but the clicks and blurps and bird sounds of the forest as well. The noise of his voice had startled everything and it was quiet. He looked around, listened with his mouth open, and realized that in all his life he had never heard silence before. Complete silence. There had always been some sound, some kind of sound.

It lasted only a few seconds, but it was so **intense** that it seemed to become part of him. Nothing. There was no sound. Then the bird started again, and some kind of buzzing insect, and then a chattering and a cawing, and soon there was the same background of sound.

Which left him still hungry.

Of course, he thought, putting the coins and the rest back in his pocket and the hatchet in his belt—of course if they come tonight or even if they take as long as tomorrow the hunger is no big thing. People have gone for many days without food as long as they've got water. Even if they don't come until late tomorrow I'll be all right. Lose a little weight, maybe, but the first hamburger and a malt and fries will bring it right back.

A mental picture of a hamburger, the way they showed it in the television commercials, thundered into his thoughts. Rich colors, the meat juicy and hot . . .

He pushed the picture away. So even if they didn't find him until tomorrow, he thought, he would be all right. He had plenty of water, although he wasn't sure if it was good and clean or not.

He sat again by the tree, his back against it. There was a thing bothering him. He wasn't quite sure what it was but it kept chewing at the edge of his thoughts. Something about the plane and the pilot that would change things . . .

Ahh, there it was—the moment when the pilot had his heart attack his right foot had jerked down on the rudder pedal and the plane had **slewed** sideways. What did that mean? Why did that keep coming into his thinking that way, nudging and pushing?

It means, a voice in his thoughts said, that they might not be coming for you tonight or even tomorrow. When the pilot pushed the rudder pedal the plane had jerked to the side and **assumed** a new course. Brian could not remember how much it had pulled around, but it wouldn't have had to be much because after that, with the pilot dead, Brian had flown for hour after hour on the new course.

Well away from the flight plan the pilot had filed. Many hours, at maybe 160 miles an hour. Even if it was only a little off course, with that speed and time Brian might now be sitting several hundred miles off to the side of the recorded flight plan.

And they would probably search most heavily at first along the flight plan course. They might go out to the side a little, but he could easily be three, four hundred miles to the side. He could not know, could not think of how far he might have flown wrong because he didn't know the original course and didn't know how much they had pulled sideways.

Quite a bit—that's how he remembered it. Quite a jerk to the side. It pulled his head over sharply when the plane had swung around.

They might not find him for two or three days. He felt his heartbeat increase as the fear started. The thought was there but he fought it down for a time, pushed it away, then it exploded out.

They might not find him for a long time.

slewed turned
assumed taken

And the next thought was there as well, that they might never find him, but that was panic and he fought it down and tried to stay positive. They searched hard when a plane went down, they used many men and planes and they would go to the side, they would know he was off from the flight path, he had talked to the man on the radio, they would somehow know . . .

It would be all right.

They would find him. Maybe not tomorrow, but soon. Soon. Soon.

They would find him soon.

Gradually, like sloshing oil his thoughts settled back and the panic was gone. Say they didn't come for two days—no, say they didn't come for three days, even push that to four days—he could live with that. He would have to live with that. He didn't want to think of them taking longer. But say four days. He had to do something. He couldn't just sit at the bottom of this tree and stare down at the lake for four days.

And nights. He was in deep woods and didn't have any matches, couldn't make a fire. There were large things in the woods. There were wolves, he thought, and bears—other things. In the dark he would be in the open here, just sitting at the bottom of a tree.

He looked around suddenly, felt the hair on the back of his neck go up. Things might be looking at him right now, waiting for him—waiting for dark so they could move in and take him.

He fingered the hatchet at his belt. It was the only weapon he had, but it was something.

He had to have some kind of shelter. No, make that more: He had to have some kind of shelter and he had to have something to eat.

He pulled himself to his feet and jerked the back of his shirt down before the mosquitos could get at it. He had to do something to help himself.

I have to get motivated, he thought, remembering Perpich. Right now I'm all I've got. I have to do something. ❖

► Before You Continue

1. **Character** What motivates Brian to stop panicking and take action?
2. **Visualize** Which details help you picture Brian's actions and feelings? How do they help you understand the story?

Meet the Author

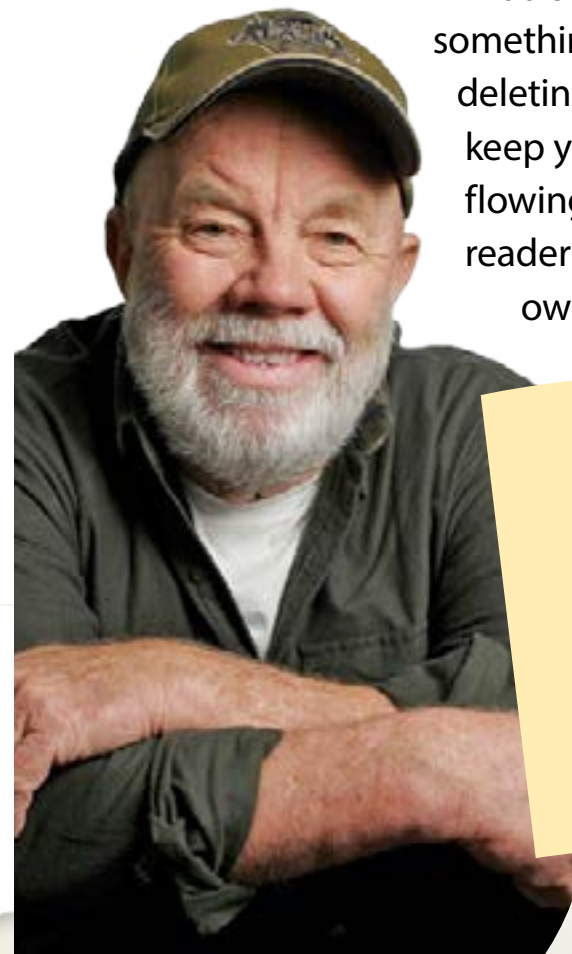
GARY PAULSEN

AWARD
WINNER

Much of Gary Paulsen's work is inspired by his real-life adventures. When he was just 14, he traveled with the circus. He spent summers working on ranches and ships. Becoming independent at a young age became a major theme in many of his novels, including *Hatchet* and its four sequels. Paulsen also competed twice in the Iditarod, a brutal 1,180-mile Alaskan dog sled race that inspired him to write an award-winning novel called *Dogsong*.

Thanks to Paulsen's writing, his readers are invited to join in his experiences, too.

Paulsen says that writers should write something every day. "Even if you wind up deleting everything you've written, at least keep your hand moving and the words flowing." With luck—and hard work—his readers could go on to write about their own real-life adventures.



Writer's Craft

In "Hatchet," the author uses a combination of long and short sentences to convey Brian's sense of helplessness and fear: "I was flying to visit my father and the plane crashed and sank in a lake. There, keep it that way. Short thoughts."

Write a brief description of a scary situation. Use a variety of sentence lengths to convey your mood. Think about how you can share your personal thoughts in your description like Brian in the novel.

Talk About It

1. "Hatchet" is an adventure story. Use specific examples from the text to describe Brian's situation and the obstacles he must **overcome**.
2. Identify the **necessities** that Brian needs in order to survive in the wilderness. Elaborate on the dangers Brian faces and how he should deal with them.
3. What causes Brian to change his attitude about waiting for rescue? Use evidence from the text to explain the change and what this shows about Brian.
4. How does Brian show **resilience** during his ordeal? Cite evidence from the text to support your answer.
5. Review Brian's actions. Based on what you have read and what you know about survival, which of Brian's decisions is the best example of being **resourceful**? Why?
6. How would Brian's story be different if it were told from Brian's viewpoint instead of a third-person narrator? Choose a specific scene from the selection and analyze how the point of view affects the story.

Write About It

Imagine that Brian has been rescued. Write a speech in which Brian describes and elaborates on his experiences. Use at least three **Key Words**.

●	Well, at first I was overcome with panic. I couldn't believe all the things that had happened to me in such a short time.
---	--

Key Words

concentrate	overcome
exhaust	reliance
intense	resilience
motivation	resolve
necessity	resourceful

Reread and Describe

Analyze Character

Use a character chart to organize your thoughts about Brian. Look back at the story to see what Brian does and why he does it.

Character Chart

Character: Brian Robeson	
Motives	Actions
wants to figure out what is happening	stops panicking and tries to think clearly

Use your character chart to describe Brian to a partner. Explain what his actions and **motivations** show you about his character. Use **Key Words**.

Fluency

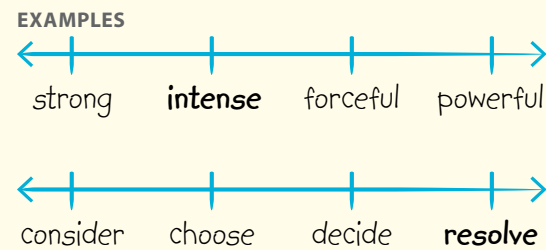
Practice reading with expression. Rate your reading.

Talk Together

What qualities are the key to survival in the wilderness? Include **Key Words** and examples from Brian's experiences in "Hatchet" as you discuss your ideas with a small group.

Shades of Meaning

Good writers choose words that say exactly what they mean. Many words have **synonyms**, or words that have similar meanings. You can consult a thesaurus for synonyms. Then arrange the words on a synonym scale to show how they relate.



According to the synonym scale above, the word *consider* is not as strong a word as *resolve*. What is another word you could add to the scale?

Try It

Read the sentence. Then answer the two-part question. First, answer part A. Then answer part B.

That night, the storm completely destroyed Brian’s shelter, ruined his supplies, and threatened his life.

PART A

1. What is most likely the author’s reason for describing the shelter as “completely destroyed”?
 - A to give details about Brian’s shelter
 - B to show the strength of the storm
 - C to show how to survive a storm
 - D to explain why Brian has a shelter

PART B

2. Which synonym best describes the storm in part A?
 - A strong
 - B intense
 - C forceful
 - D powerful



Making Connections You read a story about a boy who must survive in a forest. Now read the true account of a teenager who survived a real-life plane crash.

Genre In a **personal narrative**, an author tells a story about true events from his or her life.

from Survival Stories:

The Girl Who Fell from the Sky

by Juliane Koepcke Diller



▲ Juliane Koepcke Diller in the Peruvian rain forest

The first half of the hour-long flight from Lima to Pucallpa is uneventful. We’re served a sandwich and a drink for breakfast. Ten minutes later, as the **flight attendants** begin to clean up, we fly into a huge thunderstorm.

Suddenly, daylight turns to night and lightning flashes from all directions. People

gasp as the plane shakes violently. Bags, wrapped gifts, and clothing fall from overhead lockers. Sandwich trays soar through the air, and half-finished drinks spill onto passengers’ heads. People scream and cry.

“Hopefully this goes all right,” my mother says nervously.

flight attendants workers on the airplane

► Before You Continue

1. **Setting** How does the setting of the narrative drastically change? Use evidence from the text to support your answer.
2. **Make Connections** What is a connection that helps you understand Diller’s feelings about this experience?

I see a blinding white light over the right wing. I don't know whether it's a flash of lightning or an explosion. I lose all sense of time. The airplane begins to **nosedive**. From my seat in the back, I can see down the aisle into the cockpit.

My ears, my head, my whole body are filled with the deep roar of the plane. Over everything, I hear my mother say calmly, "Now it's all over."

We're falling fast. People's shouts and the roar of the turbines suddenly go silent.

My mother is no longer at my side, and I'm no longer in the plane. I'm still strapped into my seat on the bench, at an altitude of about 10,000 feet. I'm alone. And I'm falling.

My free fall is quiet. I see nothing around me. The seat belt squeezes my belly so tight that I can't breathe. Before I feel fear, I lose consciousness.

When I **come to**, I'm upside down, still falling, the Peruvian rain forest spinning slowly toward me. The densely packed treetops remind me of broccoli. I see everything as if through a fog before I pass out again.

When I regain consciousness, I've landed in the middle of the jungle. My seat belt is unfastened, so I must have woken up at some point. I've crawled deeper into the sheltering back of the three-seat bench that

was fastened to me when I fell from the sky. Wet and muddy, I lie there for the rest of the day and night.

I will never forget the image I see when I open my eyes the next morning: The crowns of the giant trees above me are **suffused** with golden light, bathing everything in a green glow. I feel abandoned, helpless, and utterly alone. My mother's seat beside me is empty.

I can't stand up. I hear the soft ticking of my watch but can't read the time. I can't see straight. I realize that my left eye is swollen shut; I can see only through a narrow slit in my right eye. My glasses have disappeared, but I finally manage to read the time.

It's 9 a.m. I feel dizzy again and lie exhausted on the rain forest floor. After a while, I manage to rise to my knees, but I feel so dizzy that I immediately lie back down. I try again, and eventually I'm able to hold myself in that position. I touch my right collarbone; it's clearly broken. I find a deep gash on my left **calf**, which looks as if it has been cut by a rough metal edge. Strangely, it's not bleeding.

I get down on all fours and crawl around, searching for my mother. I call her name, but only the voices of the jungle answer me.



For someone who has never been in the rain forest, it can seem threatening. Huge trees cast mysterious shadows. Water drips constantly. The rain forest often has a musty smell from the plants that intertwine and ramble, grow and decay.

Insects rule the jungle, and I encounter them all: ants, beetles, butterflies, grasshoppers, mosquitoes. A certain type of fly will lay eggs under the skin or in wounds. Stingless wild bees like to cling to hair.

Luckily, I'd lived in the jungle long enough as a child to be acquainted with

the bugs and other creatures that scurry, rustle, whistle, and snarl. There was almost nothing my parents hadn't taught me about the jungle. I only had to find this knowledge in my **concussion-fogged** head.

Suddenly I'm seized by an **intense** thirst. Thick drops of water sparkle on the leaves around me, and I lick them up. I walk in small circles around my seat, aware of how quickly you can lose your **orientation** in the jungle. I memorize the location and markings of one tree to **keep my bearings**.

nosedive fall toward the ground

come to wake up

suffused filled

calf lower leg

concussion-fogged injured and confused

orientation sense of direction

keep my bearings remember where I am

► Before You Continue

1. **Visualize** What words does the author use to help you picture the forest? How does this make you feel about her situation?
2. **Point of View** How does the author's first-person point of view help you understand the story?

I find no trace of the crash. No wreckage, no people. But I do discover a bag of candy and eat a piece.

I hear the hum of airplane engines overhead. I look up, but the trees are too dense: There's no way I can make myself noticeable here. A feeling of powerlessness **overcomes** me. I have to get out of the thick of the forest so that rescuers can see me. Soon the engines' hum fades away.

I hear the dripping, tinkling, gurgle of water that I hadn't noticed before. Nearby I find a spring, feeding a tiny **rivulet**. This fills

me with hope. Not only have I found water to drink, but I'm convinced that this little stream will lead the way to my rescue.

I try to follow the rivulet closely, but there are often tree trunks lying across it, or dense **undergrowth** blocks my way. Little by little, the rivulet grows wider and turns into a stream, which is partly dry, so that I can easily walk beside the water. Around six o'clock it gets dark, and I look in the streambed for a protected spot where I can spend the night. I eat another candy.



rivulet stream of running water
undergrowth plant life

December 28, my watch, a gift from my grandmother, stops for good, so I try to count the days as I go. The stream turns into a larger stream, then finally into a small river. Since it's the rainy season, there's barely any fruit to pick, and I've sucked on my last candy. I don't have a knife to use to **hack palm hearts** out of the stems of the palm trees. Nor can I catch fish or cook roots. I don't dare eat anything else. Much of what grows in the jungle is poisonous, so I keep my hands off what I don't recognize. But I do drink a great deal of water from the stream.

Despite counting, I mix up the days. On December 29 or 30, the fifth or sixth day of my trek, I hear a buzzing, groaning sound that immediately turns my **apathetic** mood into **euphoria**. It's the unmistakable call of a hoatzin, a subtropical bird that nests exclusively near open stretches of water—where people settle! At home in Panguana, I heard this call often.

With new impetus, I walk faster, following the sound. Finally, I'm standing on the bank of a large river, but there's **not a soul** in sight. I hear planes in the distance, but as time



▼ hoatzin

hack palm hearts cut vegetables
apathetic hopeless
euphoria great happiness
not a soul no one
despair feeling of sadness

passes, the noise fades. I believe that they've given up, having rescued all the passengers except me.

Intense anger overcomes me. How can the pilots turn around, now that I've finally reached an open stretch of water after all these days? Soon, my anger gives way to a terrible **despair**.

But I don't give up. Where there is a river, people cannot be far away.

The riverbank is much too densely overgrown for me to carry on hiking along it. I know stingrays rest in the riverbanks, so I walk carefully. Progress is so slow that I decide to swim in the middle of the river instead—stingrays won't venture into the deep water. I have to look out for piranhas, but I've learned that fish are dangerous only in standing water. I also expect to encounter caimans, alligator-like reptiles, but they generally don't attack people.

► Before You Continue

1. **Make Connections** How is the author's attitude different from Brian's attitude in "Hatchet?" How does reading Brian's story help you understand this text?
2. **Clarify** Use context clues to figure out the meaning of the phrase *new impetus*.

Each night when the sun sets, I search for a reasonably safe spot on the bank where I can try to sleep. Mosquitoes and small flies called midges buzz around my head and try to crawl into my ears and nose. Even worse are the nights when it rains. Ice-cold drops pelt me, soaking my thin summer dress. The wind makes me **shiver to the core**. On those bleak nights, as I cower under a tree or in a bush, I feel **utterly abandoned**.

By day, I go on swimming, but I'm getting weaker. I drink a lot of river water, which fills my stomach, but I know I should eat something.

One morning, I feel a sharp pain in my upper back. When I touch it, my hand

comes away bloody. The sun has burned my skin as I swim. I will learn later that I have **second-degree** burns.

As the days wear on, my eyes and ears fool me. Often I'm convinced I see the roof of a house on the riverbank or hear chickens clucking. I am so horribly tired.

I fantasize about food, from elaborate feasts to simple meals. Each morning it gets harder to stand up and get into the cold water. Is there any **sense in going on**? Yes, I tell myself. I have to keep going.

I spend the tenth day drifting in the water. I'm constantly bumping into logs, and it requires a great deal of strength to climb over them and not break any bones



in these collisions. In the evening, I find a gravel bank that looks like a good place to sleep. I doze off for a few minutes. When I wake up, I see something that doesn't belong here: a boat. I rub my eyes, look three times, and it's still there. A boat!

I swim over and touch it. Only then can I really believe it. I notice a **beaten trail** leading up the bank from the river. I'm sure I'll find people there, but I'm so weak that it takes me hours to make it up the hill.

When I get to the top, I see a small shelter, but no people. A path leads from the shack into the forest. I'm certain that the owner of the boat will emerge at any

moment, but no one comes. It gets dark, and I spend the night there.

The next morning, I wake and still no one has **shown up**. It begins to rain, and I crawl into the shelter and wrap a **tarp** around my shoulders.

The rain stops in the afternoon. I no longer have the strength to struggle to my feet. I tell myself that I'll rest at the hut one more day, then keep moving.

At twilight I hear voices. I'm imagining them, I think. But the voices get closer. When three men come out of the forest and see me, they stop in shock.

"I'm a girl who was in the LANSÁ crash," I say in Spanish. "My name is Juliane." ❖



Amazon River

shiver to the core very cold
utterly abandoned completely alone
second-degree very serious
sense in going on reason to keep going

beaten trail path that has been used often
shown up come; appeared
tarp plastic sheet

► Before You Continue

1. **Draw Conclusions** What will happen to Diller now that she has found people? How do you know?
2. **Use Text Evidence** What examples and evidence from the story illustrate what Diller is like?

Compare Choices

The main characters in the selections “Hatchet” and “Survival Stories: The Girl Who Fell from the Sky” both face many obstacles. Use a comparison chart to compare how the characters respond to their situations. Then use the information to draw a conclusion about the choices the characters make in order to survive.

Comparison Chart

	“Hatchet”	“Survival Stories: The Girl Who Fell from the Sky”
Person / Character	Brian Robeson	Juliane Koepcke Diller
Problem		
Goal or Motive		
Choices Made to Achieve Goal	1. 2. 3.	1. 2. 3.

Talk Together

What qualities do Juliane and Brian share that help them in a survival situation? How do these qualities affect the choices they make? Use **Key Words** and cite text evidence to talk with a partner about your ideas.

Key Words

concentrate	overcome
exhaust	reliance
intense	resilience
motivation	resolve
necessity	resourceful

Grammar and Spelling

Possessive Adjectives and Pronouns

Use possessives to show ownership. A **possessive adjective** identifies who owns something or has something. A **possessive pronoun** refers to the thing owned and who owns or has it.

Grammar Rules Possessive Adjectives and Pronouns

Use a **possessive adjective** before a **noun**.

The plane adjusted **its** wings.

The possessive adjectives are *my, your, his, her, its, our, and their*.

Passengers were upset when **their** bags fell.

A **possessive pronoun** is used in place of one or more **nouns**.

Both **Juliane Koepcke Diller** and **Brian Robeson** have adventures. **Theirs** are both tales of bravery. **Hers** is a true story. **His** is fiction.

The possessive pronouns are *mine, yours, his, hers, ours and theirs*.

Read Possessive Adjectives and Pronouns

Writers use possessive adjectives and possessive pronouns to make their writing clearer and easier to understand. Read this passage based on “Hatchet.” Identify the possessive adjectives and possessive pronouns.

Brian Robeson was scared. His plane had crashed. Its pilot was gone. “My parents will begin searching,” Brian thought. “But for now, all of the life-saving decisions are mine.”

Write Possessive Adjectives and Pronouns

Reread the first two pages of “Survival Stories: The Girl Who Fell From the Sky.” Write sentences about what happens to Juliane Koepcke Diller. Be sure to include at least two sentences with possessive adjectives and two with possessive pronouns. Then trade sentences with a partner. Find the possessive adjectives and possessive pronouns in each other’s sentences.

Writing Project

Write to Inform

Write an Expository Report

Write an expository report on the topic of animal survival. Then add it to a class magazine about how animals survive.

Study a Model

In an expository report, you present information about a topic. You start by introducing a main idea about the topic. Then you illustrate and elaborate on the topic with supporting details and examples. Read an expository report by Gabriel Ponce.

Survival in the Dark

By Gabriel Ponce

Humans need night-vision goggles—or at least flashlights—to see in the dark, but not every creature has trouble at night. Many animals have developed amazing adaptations that allow them to survive in the dark.

Some animals rely on senses other than sight to survive in dark habitats. For example, bats use sounds and their echoes to locate food and sense predators in the dark. This ability is called echolocation, and it allows bats to thrive in caves. Other animals, such as mole rats, are almost blind but use their sharp sense of smell to detect predators in the dark.

Other animals adapt to the dark by emitting their own light. This is called bioluminescence. Fireflies use this ability to communicate. Bioluminescence is also useful for creatures that live deep in the ocean where light from the surface does not reach. Two of these “living lights” are appropriately named the lanternfish and flashlight fish.

From bats to fireflies to fish, nature has created many fascinating ways for animals to thrive and survive in the dark.

The first sentence introduces the topic in an interesting way.

Each paragraph includes details and examples that support the main idea.

The conclusion repeats the main idea of the report.

The main idea is the most important idea about the topic.

Domain-specific vocabulary helps explain the topic.

Prewrite

1. **Choose a Topic to Write About** Think about the science articles you have read on animal survival. Talk with a partner to choose a topic to write about.

Language Frames

Tell Your Ideas

- One interesting thing about this topic is _____.
- I would like people to know _____.
- Writing about _____ will help me _____.

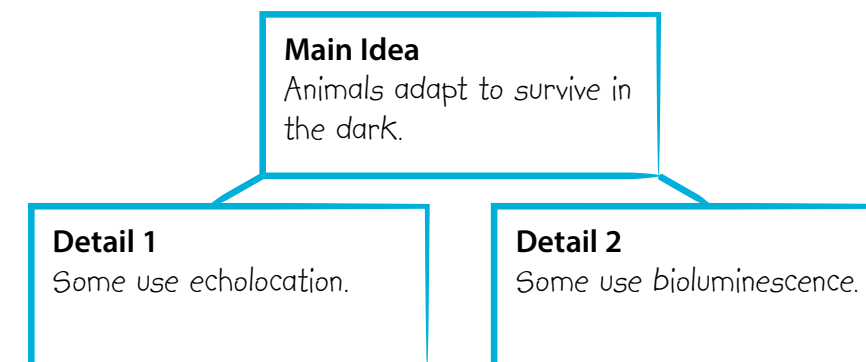
Respond to Ideas

- I don't know much about _____. Can you tell me more?
- I'm not sure why you want to write about _____. Can you clarify?
- I don't think I agree with your choice because _____.

Use sentences and questions like these to choose a topic.

2. **Gather Information** Use self-stick notes to mark important information in books, or take notes and then underline or highlight ideas. You may also use a computer to record and organize the information you find. Always note the sources where you found the information, such as websites, books, or magazines.
3. **Get Organized** Use a main idea chart to help you organize your ideas.

Main Idea Chart



Draft

Use the main idea chart and the ideas you collected to write a draft that includes a main idea and supporting details. Be sure to write the ideas in your own words with a style that is appropriate for an expository report.

Writing Project, continued

Revise

- 1. Read, Retell, Respond** Read your draft aloud to a partner. Your partner listens and then retells your main points. Then talk about ways to support your main ideas and improve your writing.

Language Frames

Retell

- You wrote about _____.
- The main idea of your report is _____.
- The important details are _____.

Make Suggestions

- Your main idea needs to be developed more. Add _____.
- Could you clarify the detail about _____?
- I like that you included _____.
Can you give another example of _____?

- 2. Make Changes** Think about your draft and your partner's suggestions. Use revision marks to make your changes.

- Did you introduce your topic in an interesting way?

Humans may need night-vision goggles—or at least flashlights—to see in the dark, but not every creature has trouble at night.

~~In the dark, no one can see.~~

- Did you include only details related to your main idea? Do you need to delete unnecessary information?

Other animals, such as mole rats, are almost blind but use their sharp sense of smell to detect predators in the dark.

~~They are born to serve their queen.~~

Grammar Tip

Make sure that your pronouns match the words they are replacing by using subject, object, and possessive pronouns correctly.

Edit and Proofread

Work with a partner to edit and proofread your report. Pay special attention to using pronouns and possessives correctly. Use revision marks to show your changes.

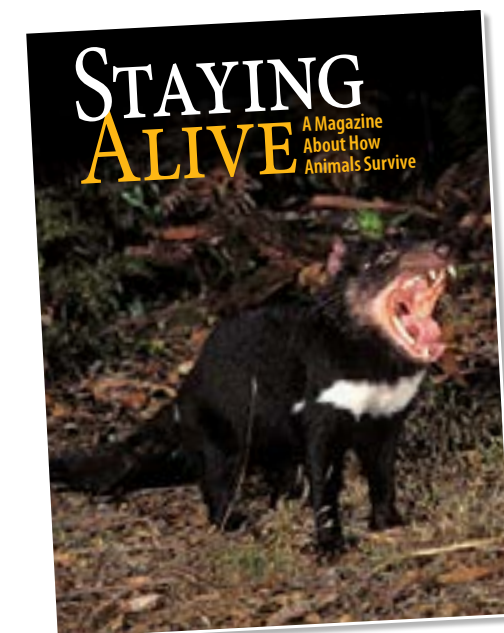
Present

- 1. On Your Own** Make a final copy of your report. Read it to a group of your classmates.

Presentation Tips

If you are the speaker . . .	If you are the listener . . .
Work on pronouncing words correctly. Practice saying any scientific or technical terms.	Listen for the main idea and supporting details.
Adjust your volume, pitch, and tone to keep your report interesting.	Afterward, share your own knowledge and ideas about the topic.

- 2. With a Group** Combine your reports into a class magazine. Design a cover and think of a great title. Add graphics to the reports and format them in various ways. Add section heads and use different fonts and colors.



?
BIG
Question

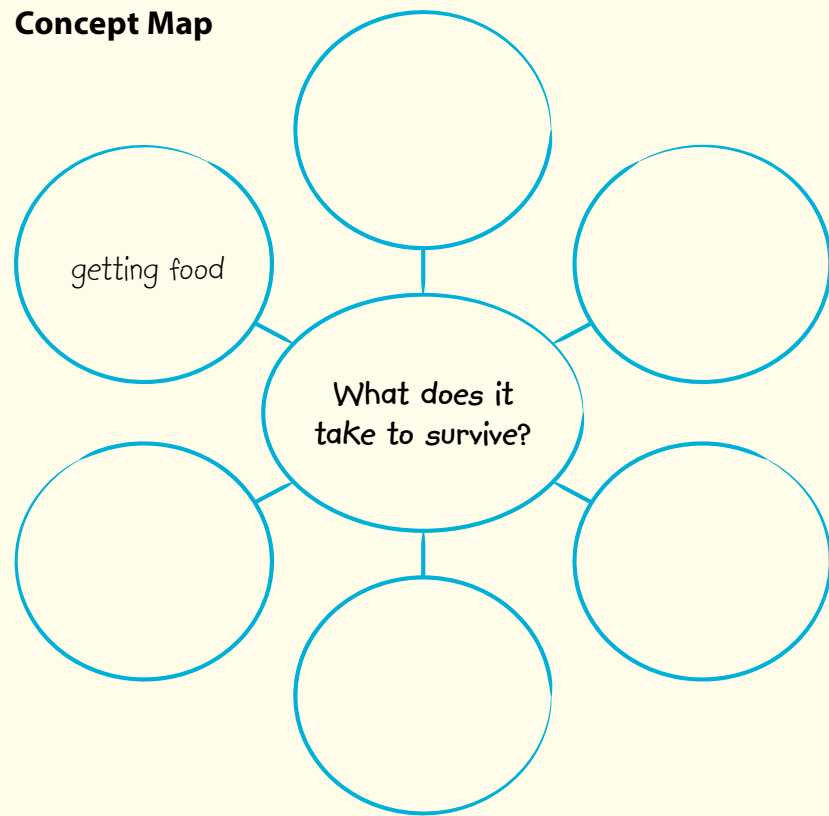
What does it take to survive?



Talk Together

In this unit you found many answers to the **Big Question**. Now use your concept map to discuss it with the class. Think about some things that people and animals need in order to survive.

Concept Map



Performance Task: Explanatory

Consider what you learned from the selections about survival. Write an article for a children's science magazine that explains what living things need in order to survive.

Checklist

Does your article

- ✓ use text evidence from the selections about survival?
- ✓ clearly introduce the topic?
- ✓ include facts, definitions, details, or other information and examples from the sources?
- ✓ include precise language and transition words?

Share Your Ideas

Choose one of these ways to share your ideas about the **Big Question**.

Write It!



Write an Ode

An ode is a short poem written to praise its subject. Write an ode about your favorite animal. Describe how it uses survival skills to get food or to defend itself from predators. Read your ode to the class.



Talk About It!



Do a Mock News Report

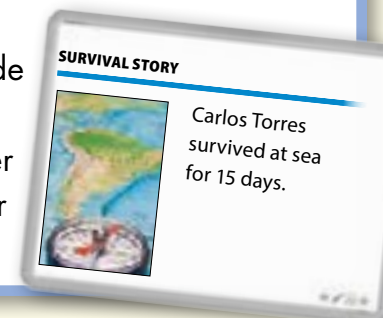
Use your knowledge from the unit and pretend that you are a news reporter informing your viewers about a real or imaginary event that includes the topic of survival. Write down some key points that you would like to talk about during your mock news report. Report your story to the class.

Do It!



Make a Presentation

Use the Internet to research a person who had to survive in the wild alone. Use presentation software to describe how the person came to be stranded in the wild and what he or she did to survive. Include pictures, maps, or other visuals in your presentation.



Write It!



Write a Brochure

Imagine that you run a survival camp for people who like the great outdoors. What skills would you teach? What activities would you plan to help campers practice their skills? Use ideas from the selections and from the Internet to plan your camp brochure.

