



ELA GRADE 5

SPRING BREAK LEARNING

MARCH 10-14

2025

**The Office of
Literacy**

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Spring Break Learning Academy



STUDENT RESOURCES

The materials contained in this packet provides students with additional practice reading, speaking, listening, and writing. Students can return the completed packet to their teacher for review. The materials are organized as follows:

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- I. Reading/Writing Companion: Shared Read Text**
- II. Literature Anthology: Anchor Text**
- III. Practice Book Pages: Vocabulary**
- IV. Leveled Reader (On Level)**



Reading/Writing Companion

Shared Read Text

Name _____

Mysterious Oceans

1 Main Question

Strange animals live on the deep, dark ocean floor.
What is one example?

Deep Diving

It has no mouth, eyes, or stomach. Its soft body is in a white **cylinder**. It has a red top and can grow to be eight feet tall. It is a giant tube worm and it lives on the deep, dark ocean floor.



Glossary

cylinder (*cilindro*) tube



Additional Questions

1 What animal has a soft body and a red top?

It is a giant _____.

2 Where do tube worms live?

They live on the _____ where it is _____.

Word Bank

tube worm
ocean floor
dark

Main Question 1 Revisited

Strange animals live on the deep, dark ocean floor. What is one example?

2 Main Question

Oceans cover most of Earth. What makes oceans so big?

Oceans cover about two-thirds of Earth's **surface**. **On average**, oceans are about two miles deep. However, the deepest point is nearly seven miles deep. It is called Challenger Deep.

Glossary

surface (*superficie*) top layer

on average (*de media*) usually

The Deepest Known Point on Earth



The Challenger Deep is located in an undersea canyon called the Mariana Trench.



Additional Questions

1 How much of the Earth's surface is ocean?

About _____ of the Earth's surface is ocean.

2 How deep is the ocean?

The ocean is _____ two miles deep.

3 How deep is the Challenger Deep?

It is _____ miles deep.

Main Question 2 Revisited

Oceans cover most of Earth. What makes oceans so big?

3 Main Question

The ocean is very large, and parts of it are a mystery. What is not a mystery any more?

The ocean's floor has **vast** plains, steep canyons, and **towering** mountains. There are **active**, **dormant**, and **extinct** volcanoes. The environment is **harsh** because it has **frigid** temperatures and no sunshine.

The deep ocean is a mystery. We know little about it. For example, we knew giant squids **existed** from discovering their corpses. We finally found a live giant squid just a few years ago.

Word Bank

usually
two-thirds
seven

Glossary

vast (*grandes*) very large

towering (*altas*) very tall

active (*activos*) working, or currently erupting

dormant (*inactivos*) not erupting

extinct (*extintos*) will never be active again

harsh (*duro*) difficult, or hard to live in

frigid (*muy bajas*) very cold

existed (*existieron*) were real



Additional Questions

1 What is the ocean's floor made up of?

The ocean's floor is made up of plains,
_____, and _____.

2 What makes the ocean's floor a harsh environment?

The ocean's floor is _____, or very
cold and there is no _____.

3 What did we learn from finding corpses, or dead bodies, of giant squids?

People _____ that giant squids
_____, or lived in the ocean.

4 When did scientists find a live giant squid?

Scientists found one just a _____ years ago.

Word Bank

existed
canyons
frigid
few
sunshine
discovered
mountains

Main Question 3 Revisited

The ocean is very large, and parts of it are a mystery. What is not a mystery any more?

4 Main Question

There are ways to explore the ocean floor. How do scientists explore the ocean floor?

Amazing Adaptations

A submersible, or submarine, is a **craft** that goes underwater. The submersible **allows** scientists to **explore** the deep ocean floor. However, exploration **remains** difficult, and scientists have explored only five percent of the deep ocean.



Additional Questions

1 What is a submarine?

A submarine is a _____ that goes _____.

2 What does the submarine let scientists do?

The submarine lets scientists _____
the deep _____.

3 How much of the deep ocean have scientists explored?

Scientists have only explored _____
of the ocean because it is _____ to go
very _____ underwater.

Glossary

adaptations (*adaptaciones*) changes in an animal or plant that helps it survive

craft (*barco*) small boat

allows (*permite*) lets

explore (*explorar*) look at and find out about

remains (*sigue siendo*) is still, or continues to be

Word Bank

underwater

five percent

explore

difficult

craft

ocean floor

deep

Main Question 4 Revisited

There are ways to explore the ocean floor. How do scientists explore the ocean floor?

5 Main Question

Animals have to adapt to survive at the bottom of the ocean. Why?

Life is sparse at the bottom of the deep ocean. **Food sources**, such as dead plants and animals, **rarely drift** down from the surface. As a result, animals must **adapt to an environment** that is very cold and dark and has little food.



A basket starfish rests in a deep-sea coral reef.

Glossary

life is sparse (*hay pocos seres vivos*) there aren't many living things

food sources (*fuentes de alimento*) things that can be eaten

rarely (*rara vez*) don't frequently

drift (*se mueven*) move

adapt to an environment (*se adaptan a un ambiente*) change to survive in the environment



Additional Questions

- 1** What food sources are missing at the bottom of the deep ocean?

Food sources like _____ and _____ are missing.

- 2** Why is there little life at the bottom of the ocean?

Food sources _____ travel, or drift, down from the _____.

- 3** What is the environment like at the bottom of the ocean?

It is cold, _____, and there is little _____.

Word Bank

down
food
animals
plants
surface
dark
rarely

Main Question 5 Revisited

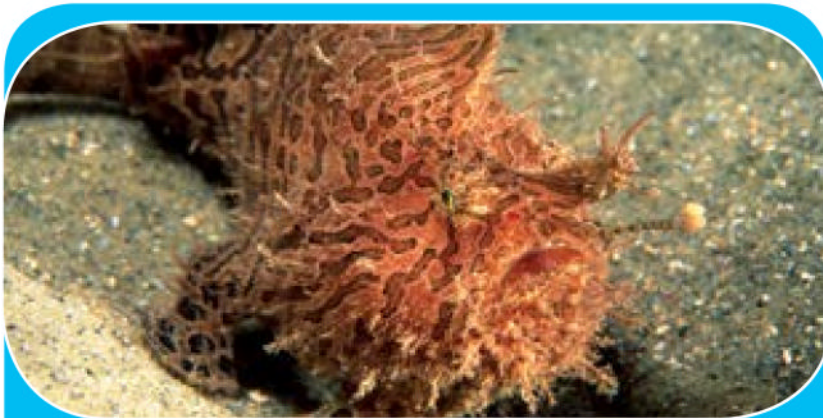
Animals have to adapt to survive at the bottom of the ocean. Why?

6 Main Question

Animals at the bottom of the ocean have adapted to survive. How have they adapted?

One example of an adaptation to this environment is the deep sea starfish. They grow larger and are **more aggressive than** the starfish in **shallow** waters. Deep sea starfish are **predators**. They reach up with their five arms to catch and eat shrimp.

Anglerfish also have adapted to find **scarce** food. The top of their head are bioluminescent lures that glow and **attract other fish**. The lure **feels vibrations** of others and attracts them. Anglerfish then quickly use their huge jaws to catch their **prey**.



This fish, the striated frogfish, lures prey. The nose is an adaptation to life in the deep ocean.

Glossary

more aggressive than (*más agresivos que*) more ready to attack than

shallow (*poco profundas*) not deep

predators (*predadores*) animals that hunt other animals

scarce (*poco*) hard to find

attract other fish (*atraen a otros peces*) make other fish come to them

feels vibrations (*siente vibraciones*) feels other fish moving

prey (*presa*) the fish they want to eat



Additional Questions

- 1** The deep sea starfish are different from the shallow water starfish. How?

The deep sea starfish are _____ and more _____ than the starfish in _____ waters.

- 2** How do anglerfish attract their prey?

The top of an anglerfish's _____ is a _____.

- 3** What does the anglerfish's lure do?

The lure feels _____. It also _____ and _____ prey.

- 4** How do anglerfish catch their prey?

They use their _____ jaws to _____ catch their prey.

Word Bank

aggressive
attracts
glows
shallow
quickly
huge
vibrations
head
lure
larger

Main Question 6 Revisited

Animals at the bottom of the ocean have adapted to survive. How have they adapted?

7 Main Question

Parts of the deep ocean are heated. How does it become heated? What animals live there?

Heated Habitats

One surprising **discovery** was that cracks, or vents, **appear** on the deep ocean floor, **just as they do** on dry land. Sea water rushes into the vents and mixes with chemicals. Next, magma, or hot melted rock, heats the water. Then the water bursts back into the ocean and creates geysers and hot springs.

Surprisingly, the waters around these vents **teem with life**. In addition to tube worms, there are **huge** clams, eyeless shrimp, crabs, mussels, and many kinds of bacteria. One odd creature is the Pompeii worm. Bacteria cover the back of the worm and **insulate it from heat**.



Additional Questions

1 What is a vent?

A vent is a _____ on the _____.

2 What does sea water do in these vents?

Sea water mixes with _____
and gets _____ by the _____.

3 Is there a lot of life by these vents?

The areas by the vents teem, or are _____
life. There are _____ shrimp and many kinds
of _____.

Glossary

discovery (*descubrimiento*)
new thing we learned

appear (*aparecen*) can be
seen

just as they do (*igual que*)
the same as they do

teem with life (*están llenas
de vida*) are full of life

huge (*grande*) very big

insulate it from heat (*lo
aislan del calor*) keep the
worm from getting too hot

Word Bank

chemicals

eyeless

crack

magma

full of

warm

bacteria

ocean floor

heated up

4 What lives on the Pompeii worm?

The Pompeii worm has _____
 living on its back, and that keeps the worm from
 getting too _____.

Main Question 7 Revisited

Parts of the deep ocean are heated. How does it become heated? What animals live there?

8 Main Question

Many creatures have adapted to live near vents on the deep, dark ocean floor. What are these adaptations?

How can so much life exist where there is so little food or sunlight? Many creatures **transform** chemicals from the vents into food. This **process** is called chemosynthesis. Creatures that don't use chemosynthesis, such as crabs, eat the ones that do.

In the last **few decades**, scientists have discovered more than 1,500 **ocean species**! If sea exploration continues, then they will discover many more.

Glossary

transform (*transforman*)
change

process (*proceso*) action

few decades (*unas cuantas décadas*) thirty or forty years

ocean species (*especies marinas*) different ocean plants and animals



Additional Questions

1 What is chemosynthesis?

Chemosynthesis is when _____ transform,
or _____, chemicals into _____.

2 What do the creatures that don't use chemosynthesis eat?

They eat the creatures that do use _____.

3 How long did it take to discover more than 1,500 ocean species?

It took _____ the last few _____.

4 Why is sea exploration important?

It is important because _____ can discover
many more _____.

Word Bank

chemosynthesis

scientists

food

species

creatures

decades

change

Main Question 8 Revisited

Many creatures have adapted to live near vents on the deep, dark ocean floor.
What are these adaptations?

Comprehension Skill

Cause and Effect: How does the author use cause-and-effect text structure to help you understand why animals in the deep sea have adaptations?

A text structure shows how the author organized information in a text. In a cause-and-effect text structure, the author presents a cause, which is an event or action that makes something else happen, and that is known as an effect.



Practice

- 1 The author uses a cause-and-effect _____ to explain why the ocean floor is a _____ environment. It has _____ temperatures and is _____ because there is not much _____. Food sources also _____ down from the _____ because it is so deep.
- 2 **Extension:** This deep, dark environment is the _____, or reason why, animals adapted to _____ to survive. These adaptations are _____. For example, a deep sea starfish has long _____ and is _____. An anglerfish has a _____ that glows to attract _____.

Word Bank

effects
cause

Comprehension Skill Revisited

Cause and Effect: How does the author use cause-and-effect text structure to help you understand why animals in the deep sea have adaptations?



Reread Use the graphic organizer to take notes about causes and effects as you reread “Mysterious Oceans.”

Summarize



Talk with a partner to summarize events in “Mysterious Oceans.”

Title _____

Name _____

Cause	→	Effect
	→	
	→	
	→	
	→	



Literature Anthology

Anchor Text

SURVIVAL AT 40 BELOW

by Debbie S. Miller,

illustrated by Jon Van Zyle



Essential Question

How are living things adapted to their environment?

Read about how some animals are adapted to the Arctic environment.



Go Digital!

Along the Koyukuk River, towering mountains guard the magnificent valley. Their sheer faces watch the seasons change.

Click...click...click. Snapping hooves and grumbling voices fill the autumn air. With heads held high, a herd of caribou follows the river through Gates of the Arctic National Park.

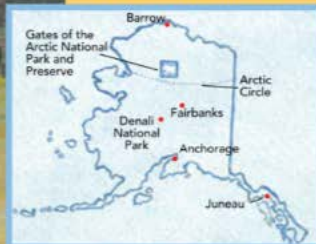
These regal deer wear new coats of dense fur, with velvet antlers curving toward the sky. Ready for winter, the caribou have gained a thick layer of fat from summer grazing on the tundra.

Other arctic animals scurry and prepare for the coming eight months of snow. Chickadees and gray jays cache seeds and morsels of carrion, hiding the food in cracks beneath

tree bark. Red squirrels pluck spruce cones and hurl them to the ground.

They will tear open the cones and eat the spruce seeds through the winter.

A weasel snatches a brown lemming and carries it to an underground food cache.



Nights grow colder. A thin layer of ice creeps across a pond near the river. Snug in their lodge, beavers rest after cutting many saplings for their underwater cache. Near their food pile, an Alaska blackfish paddles slowly through pond vegetation, searching for insect larvae. This bottom dweller can survive the winter in shallow frozen ponds with little oxygen. Along with gills, the blackfish has an unusual esophagus that can work like a lung, absorbing oxygen from the air. During the winter, this fish will find holes in the ice and breathe through its mouth.



Leaves rustle softly as a wood frog burrows into the duff of the forest floor. Suddenly, the frog feels its skin freezing. Its heart begins to beat rapidly. The frog's liver quickly produces lots of glucose. This sugary fluid, which the frog pumps through its body for several hours, will protect the insides of the cells from ice crystals. When more than three-quarters of its body freezes, the frog stops breathing and its heart stops beating.

But, like magic, the frog is still alive. Beneath the insulating layers of duff and snow, this frozen amphibian will hibernate until spring. It's a live frogsicle!

Farther up the valley, a small golden mammal is plump after a summer diet of tundra plants and seeds. As days grow shorter, the male arctic ground squirrel tunnels into the earth to prepare its burrow. He digs an underground chamber, about the size of a basketball, and stuffs it with grasses and tufts of caribou fur. Then he collects and stores seeds and berries.



Sik...sik...sik. The squirrel chatters a warning signal. Across the river, a grizzly bear browses on berries and digs up thick potato-like roots with her sharp claws. Alarmed by this huge predator, the squirrel dashes beneath the tundra. Like the squirrel, this grizzly will soon dig her winter den on a mountain slope.

STOP AND CHECK

Ask and Answer Questions How does the change in season affect the arctic ground squirrel? Go back to the text to find the answer.



As snowflakes swirl, the squirrel is ready to hibernate. He curls into a ball in his burrow, then slowly supercools his body, lowering his temperature to just below the freezing point of water. His heart rate gradually drops to three beats per minute, and his brain activity ceases. This ice-cold furry squirrel looks dead, but, amazingly, he is only in the inactive state of torpor.

After three weeks, something triggers the squirrel to wake up. His heart rate increases. He warms his body by burning brown fat. This insulating fat protects his vital organs and acts like a heating pad. Within several hours, his heartbeat and temperature are normal.

After rearranging his nest, the squirrel curls back into a ball and falls asleep. He dreams and sleeps soundly for about twelve hours. Then his body supercools again. Like a yo-yo, the squirrel warms himself, sleeps, and supercools about a dozen times during the winter to conserve enough energy to survive.



Above the squirrel's burrow, an arctic fox searches for prey. The fox picks up the scent of voles beneath the snow. These mouselike animals are huddling in their nest to keep warm. Like an acrobat, the fox springs high in the air and pounces on the voles. Breaking through the snow, he traps one by surprise.

The arctic fox keeps warm in **frigid** temperatures because he wears two winter coats. His dense underfur **insulates** him like the down in a fluffy sleeping bag. His thick outer coat has tiny air pockets inside the hair shafts, instead of color pigment. The snow-white coat perfectly camouflages the fox for hunting prey and escaping predators. Fur also covers the soles of his paws, and his big, bushy tail provides extra warmth.



Inch by inch, the layer of snow deepens with each winter storm. On a frigid January day, the temperature plummets to 40 below zero. Thick pond ice cracks and makes eerie sounds. The fluffy quilt of snow insulates and protects the many animals, plants, and insects beneath it. It is much warmer under the snow layer than in the open air.

Other animals are well adapted to survive the colder air temperatures above the ice and snow. Snowshoe hares and ptarmigan zigzag between the willow bushes. Both animals can travel lightly across the snow with insulated feet that help spread out their weight. But the ptarmigan can't survive the lethal night temperatures and fly off at dusk to seek shelter.



Puff! They dive into a drift of powdery snow. Invisible to the world, the ptarmigan roost inside their snow burrows, protected from predators and the extreme cold.

Another bird combats the deep freeze. A black-capped chickadee flits from tree to tree, eating his cached food. He must gain enough fat each day to survive the night.

But this small bird needs more than food to survive. He fluffs up his dense feathers for better insulation. Tiny muscles control the angle of each feather, while other muscles shiver to produce heat. The chickadee can also lower his temperature and metabolism to save energy. He roosts in a thick forest or in tree cavities that give him the best shelter.

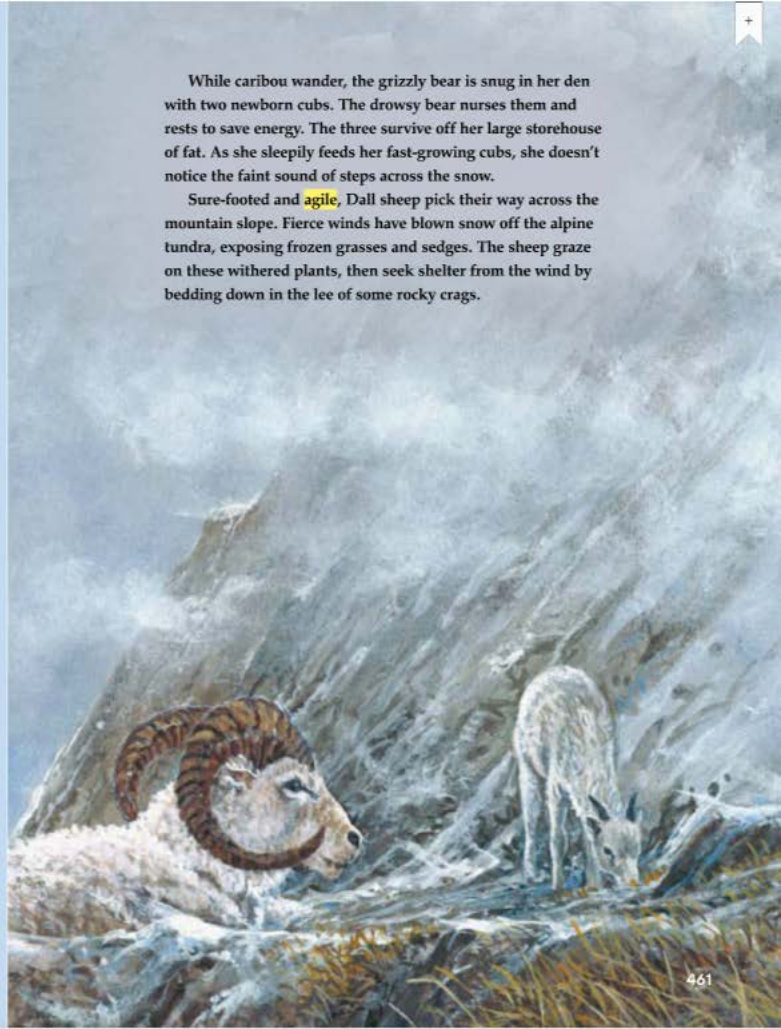


While birds roost beneath a full moon, all is not quiet. A wolf howls on a distant ridge as caribou crunch through the snow with their broad hooves. These deer are well insulated for the Arctic by dense fur and hollow guard hairs. They sniff the snow and detect the smell of ashes from an old forest fire. Turning away, the caribou avoid this burned area.

Muzzles to the ground, the caribou later detect the mushroomlike scent of lichens. They dig craters and forage on clumps of these rootless plants. Their hooves and thin legs are well adapted for digging. A special liquid fat protects their joints. Blood traveling directly to the hooves helps warm the returning blood to the heart. This circular flow protects the legs and reduces heat loss.

STOP AND CHECK

Ask and Answer Questions How are the caribou adapted to a cold environment? Go back to the text to find the answer.



While caribou wander, the grizzly bear is snug in her den with two newborn cubs. The drowsy bear nurses them and rests to save energy. The three survive off her large storehouse of fat. As she sleepily feeds her fast-growing cubs, she doesn't notice the faint sound of steps across the snow.

Sure-footed and agile, Dall sheep pick their way across the mountain slope. Fierce winds have blown snow off the alpine tundra, exposing frozen grasses and sedges. The sheep graze on these withered plants, then seek shelter from the wind by bedding down in the lee of some rocky crags.

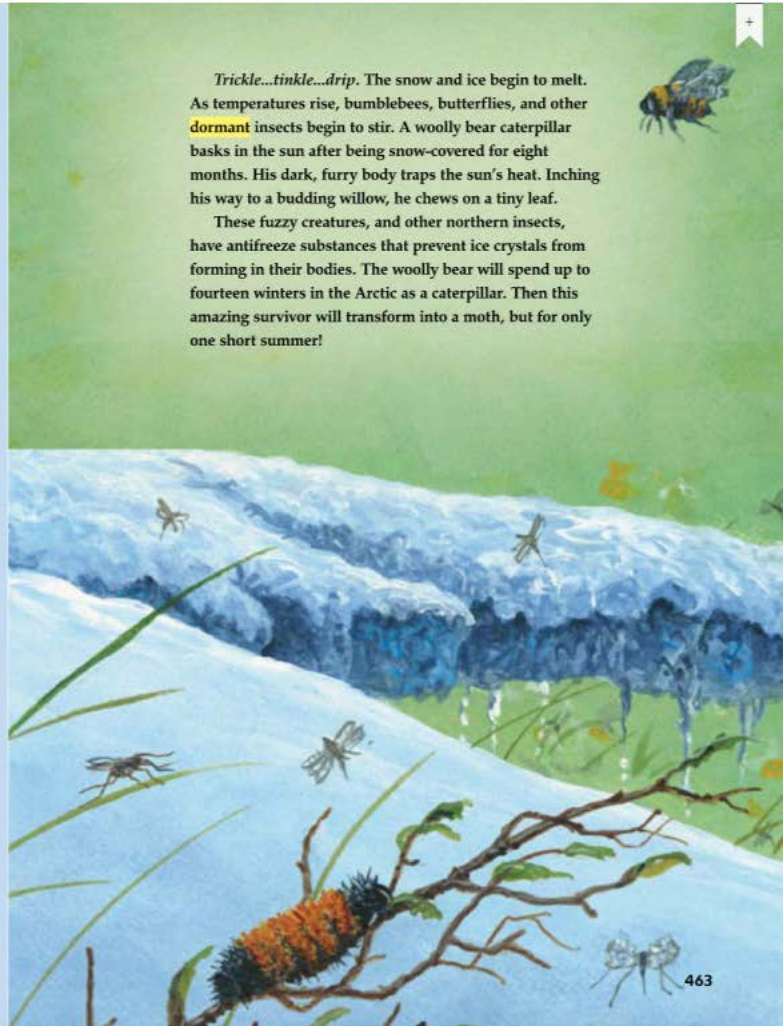
Month by month, winter passes slowly. Backs to the wind, a group of musk oxen stands on the snow-covered tundra, conserving energy. Short legs, small ears, and fluffy underwool, known as *qiviut*, insulate musk oxen from even the deepest cold. One musk ox sees wolves approaching and senses danger. Immediately, the musk oxen gather together. Shoulder to shoulder they form a circular wall of thick fur and horns. As one wolf draws near, a large bull lowers his deadly sharp horns. With a sudden burst, he charges the wolf.

Wheeling away, the wolf quickly retreats. The musk oxen continue to work as a team, charging and driving off the hungry wolves.



Trickle...tinkle...drip. The snow and ice begin to melt. As temperatures rise, bumblebees, butterflies, and other **dormant** insects begin to stir. A woolly bear caterpillar basks in the sun after being snow-covered for eight months. His dark, furry body traps the sun's heat. Inching his way to a budding willow, he chews on a tiny leaf.

These fuzzy creatures, and other northern insects, have antifreeze substances that prevent ice crystals from forming in their bodies. The woolly bear will spend up to fourteen winters in the Arctic as a caterpillar. Then this amazing survivor will transform into a moth, but for only one short summer!



One by one, moist leaves rustle near the pond. The wood frog slowly thaws out, and its heart beats once again. *rrrrRuk... rrrrRuk*. The frog begins calling for a mate, making a ducklike sound near the pond's edge. Slapping their tails in the open water, the beavers dive while the blackfish dart after prey on the pond's bottom. Farther up the valley, the male ground squirrel eats his stored cache of food, then leaves his burrow in search of a mate.

Hour by hour, day by day, the pulse of life increases with warmer June days and greening plants. Caribou feast upon a summer buffet, while playful grizzly bear cubs tussle and explore the tundra as their mother searches for prey. Birds that migrated south for the winter return to their birthplace, building nests on the tundra and filling the air with music. For more than two months the days will be endless, as the top of the world tilts toward the sun and the magical Land of the Midnight Sun explodes with life.

STOP AND CHECK

Visualize How does the warmer weather affect life in the Arctic? Visualizing the animals and their actions may help you.

ABOUT THE AUTHOR AND ILLUSTRATOR

Debbie S. Miller first moved to Alaska to teach in a community of Athabaskan people native to the Arctic. Once there, Debbie explored the nearby Arctic National Wildlife Refuge and learned about the environment and its inhabitants. Alaska's wildlife and landscape have inspired many of her award-winning books. She hopes her books help to build an appreciation for the natural environment.



Jon Van Zyle has illustrated nine of Debbie S. Miller's picture books. He lives near Eagle River, Alaska, where he and his wife raise Siberian huskies. Jon has participated in the Iditarod sled-dog race twice and has created a new poster for the race each year since 1979. In addition to painting dog teams, Jon paints Alaska's people, landscapes, and wildlife.



Author's Purpose

In *Survival at 40 Below*, the author writes about a variety of animals through the course of four seasons. Why do you think she arranged the text in this way?

Respond to the Text

Summarize

Use details from *Survival at 40 Below* to summarize how Arctic animals adapt to their environment during the winter. Your Cause and Effect Chart may help you.

Cause → Effect



Write

How does the author express her point of view about the animals that live and adapt to the Arctic environment? Use these sentence frames to organize your text evidence.

The author uses words and phrases to help me understand . . .

She uses figurative language to compare . . .

I know how she feels about animals because . . .



Make Connections



Talk about how Arctic animals adapt to their environment during the winter. **ESSENTIAL QUESTION**

Which animal's adaptation did you find the most unusual or interesting? What might people learn by studying this animal? **TEXT TO WORLD**





Practice Book Pages

Vocabulary

Name _____

Content words are words that are specific to a field of study. For example, words like *hypothesis*, *biology*, and *species* are science content words.

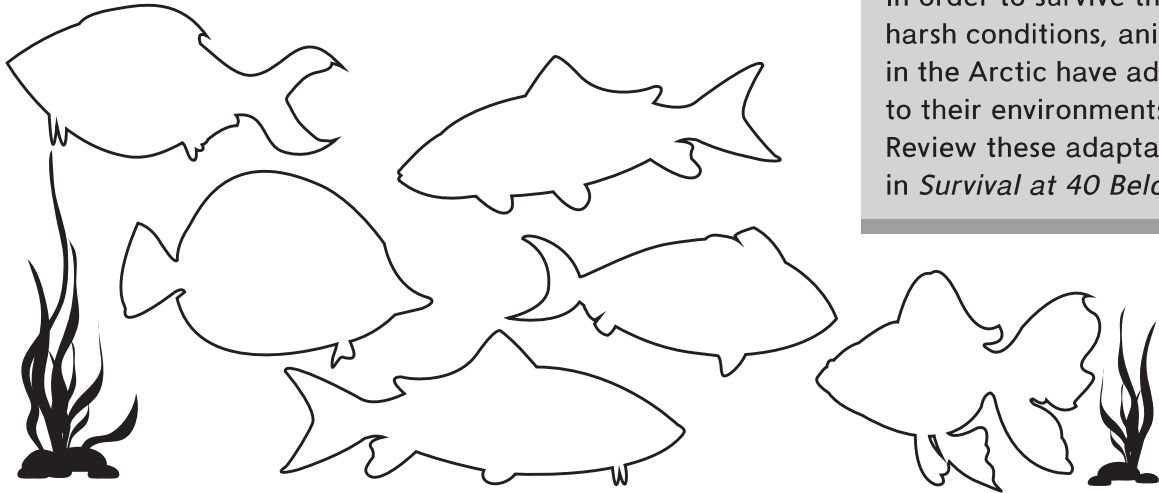
Authors use content words to explain a concept or idea. Sometimes you can figure out what a content word means by using context clues. You can also use a dictionary to help you find the meaning of unfamiliar content words.

Go on a word hunt with a partner. Find as many content words related to survival as you can. Write them in the chart.

Science Words

CONNECT TO CONTENT

In order to survive the harsh conditions, animals in the Arctic have adapted to their environments. Review these adaptations in *Survival at 40 Below*.



























Circle two words that you were able to figure out the meaning to using context clues. Write the words and what they mean on the lines.

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Name _____

Score! Match the definitions on the left with the vocabulary words on the right. Use a print or electronic dictionary if you get stuck.

- | | | |
|--|--|---|
| 1. recruits  | a great difference or variety |  |
| 2. weakling  | to think about something again |  |
| 3. bulletin  | feelings of understanding toward someone |  |
| 4. diversity  | someone who lacks physical strength |  |
| 5. contributions  | joining armed forces of own free will |  |
| 6. survival  | new members of armed forces |  |
| 7. enlisting  | short announcement of the latest news |  |
| 8. sympathy  | to make sure or certain |  |
| 9. reconsider  | the act of continuing to live |  |
| 10. intercept  | plans or processes for doing something |  |
| 11. operations  | to stop moving from one place or person to another |  |
| 12. guarantee  | gifts of money, time, or effort given to a cause |  |

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Leveled Reader

On Level

Expository
Text

CAVE CREATURES

by Jocelyn Cranefield

Mc
Graw
Hill
Education

PAIRED
READ

Why Bat Flies at Night

STRATEGIES & SKILLS

Comprehension

Strategy: Ask and Answer
Questions

Skill: Cause and Effect

Content Standards

Science
Life Science

Vocabulary

adaptations, agile, caches,
dormant, forage, frigid,
hibernate, insulate

Word Count: 1,724**

Photography Credit: MICHAEL NICHOLS/National Geographic Creative

**The total word count is based on words in the running text and headings only. Numerals and words in captions, labels, diagrams, charts, and sidebars are not included.

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Essential Question

How are living things adapted to their environment?



CAVE CREATURES

by Jocelyn Cranefield

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INTRODUCTION

Caves are found all over the world. They often extend far beyond their entrances and go deep beneath Earth's surface. At first, a cave might seem to be just a dark, empty space.

If you shine your flashlight inside the cave, you'll probably just see emptiness. However, chances are

that if you go inside, you won't be alone.

Caves can be on the coast, in the forest, or under the desert. Some are made out of limestone and others out of marble or lava. Some caves are full of beautiful stone formations, and others are full of smelly, poisonous gases. However, the world's caves all have one thing in common—they're a **haven** for animals.



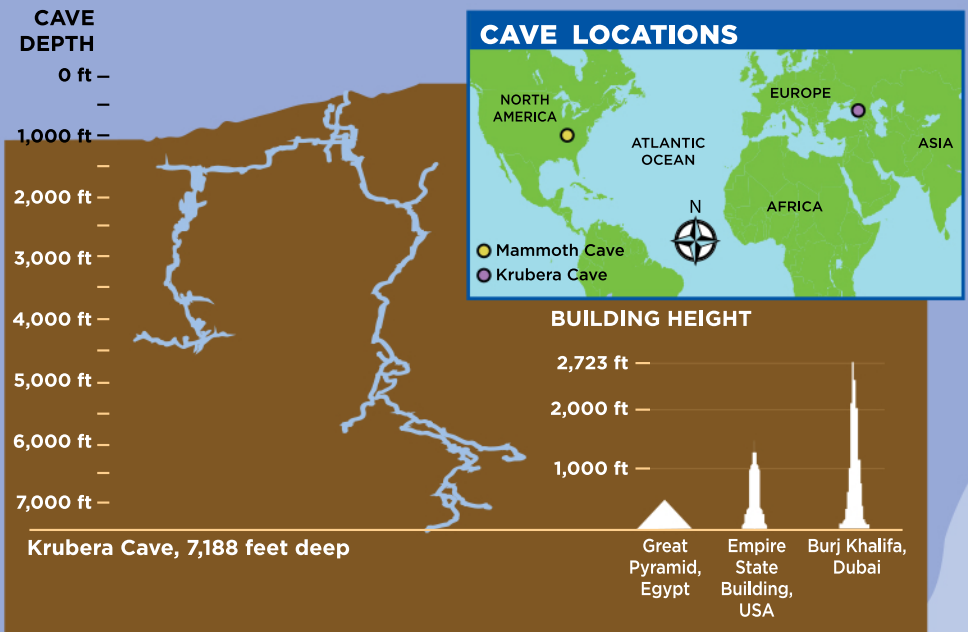
Lechuguilla Cave in New Mexico is famous for its beautiful mineral formations.

Some of these animals are visitors to the cave, while others are permanent residents. Many of these creatures have adaptations to help them live in a cave environment. Adaptations are special features that help a living thing survive in particular conditions.

CAVES OF ALL SIZES

Explorers have discovered more than 50,000 natural caves in the world. Some caves are single tunnels, but others are systems of connected underground spaces. The deepest known cave is the Krubera Cave, near the Black Sea. It is at least 7,188 feet deep. Compare its depth with the heights of some tall buildings, below. The world's longest cave is Kentucky's Mammoth Cave. This limestone **labyrinth** runs for more than 350 miles underground.

The Krubera Cave



FROM THE ENTRANCE TO THE TWILIGHT ZONE



As the sun sets,
these bats emerge
from their cave
to hunt.

Some animals, such as bats, skunks, raccoons, and snakes, visit caves for shelter or to sleep. They stay near the cave entrance, where it can be warm in winter and cool in summer. These animals are called troglomenes, or cave visitors. Troglomenes spend just part of their lives in caves. They can't survive without going outside to get food.

The Mexican free-tailed bat is a troglomene. It is **nocturnal** and roosts in **colonies** hanging from cave roofs during the day. At dusk it flies out of the cave to catch and eat insects.

Like most bats, the Mexican free-tailed bat has an adaptation called echolocation to help it find its way in the dark cave. The bat makes high-pitched squeaking sounds, then listens for an echo. It uses the echo to figure out where things are.

In some places, bats hibernate in caves during the winter. However, they don't spend the whole winter asleep. They usually wake up from their dormant state around every 15 to 30 days for short periods. A place where a bat hibernates is called a hibernaculum.

In cold climates, bears sometimes spend the winter in caves, too. The air inside the cave is warmer than the air outside, helping to insulate animals from the cold.



The endangered Virginia big-eared bat hibernates in caverns in West Virginia.

Bears enter a deep sleep in winter that some scientists consider to be a type of hibernation.



If the glowworm hears a noise,
it can turn off its light.



Farther into the cave is the cool, damp twilight zone. There is very little light here, so green plants can't grow. Many of the creatures that live here are troglaphiles, or cave lovers. They can spend their whole lives in caves, but they can also survive outside. Troglaphiles include certain types of spiders, earthworms, beetles, frogs, and crickets.

Food in the twilight zone is scarce. The animals living here can't rely on their sight alone to survive. They use other senses, such as hearing or touch, to help them locate food and find their way around. Their adaptations help them to live in these conditions.

The glowworm, the larva of an insect called a fungus gnat, is also a troglaphile. Its adaptation is the ability to light up its abdomen to attract prey. First the glowworm spins a web out of sticky droplets, then it switches on its light. The glowworm caches its insect victims in the web until it needs a meal.

The New Zealand cave weta, a cricket, lives in colonies on the undersides of cave roofs. It has extra-long **antennae**—up to seven times longer than its body. These antennae help it to navigate and to feel around for food. With its tiny body and long legs, this agile insect can leap more than 6 feet!



The New Zealand cave weta's long legs help it to leap quickly out of harm's way.

ADAPTING TO SILENCE

In a place where food is scarce, it's useful to keep quiet! Instead of chirping, the African cave cricket communicates secretly. It uses its wings to send out tiny doughnut-shaped puffs of air called vortices. Other cave crickets can feel these vortices, but predators can't.



What do animals eat in a cave? Plants can't grow in the dark, but plant-based **nutrients** are brought into caves in different ways. Rain and underground streams wash in twigs, leaves, seeds, and insects. The droppings of animals such as bats and cave crickets include recycled plant material. These are important sources of food for permanent cave dwellers.

Molds, **fungi**, and **bacteria** break down all this organic material and make it suitable for microscopic animals to eat. These microscopic animals are eaten by larger cave dwellers. The larger animals are then eaten by other cave predators.

CAVE LIONS



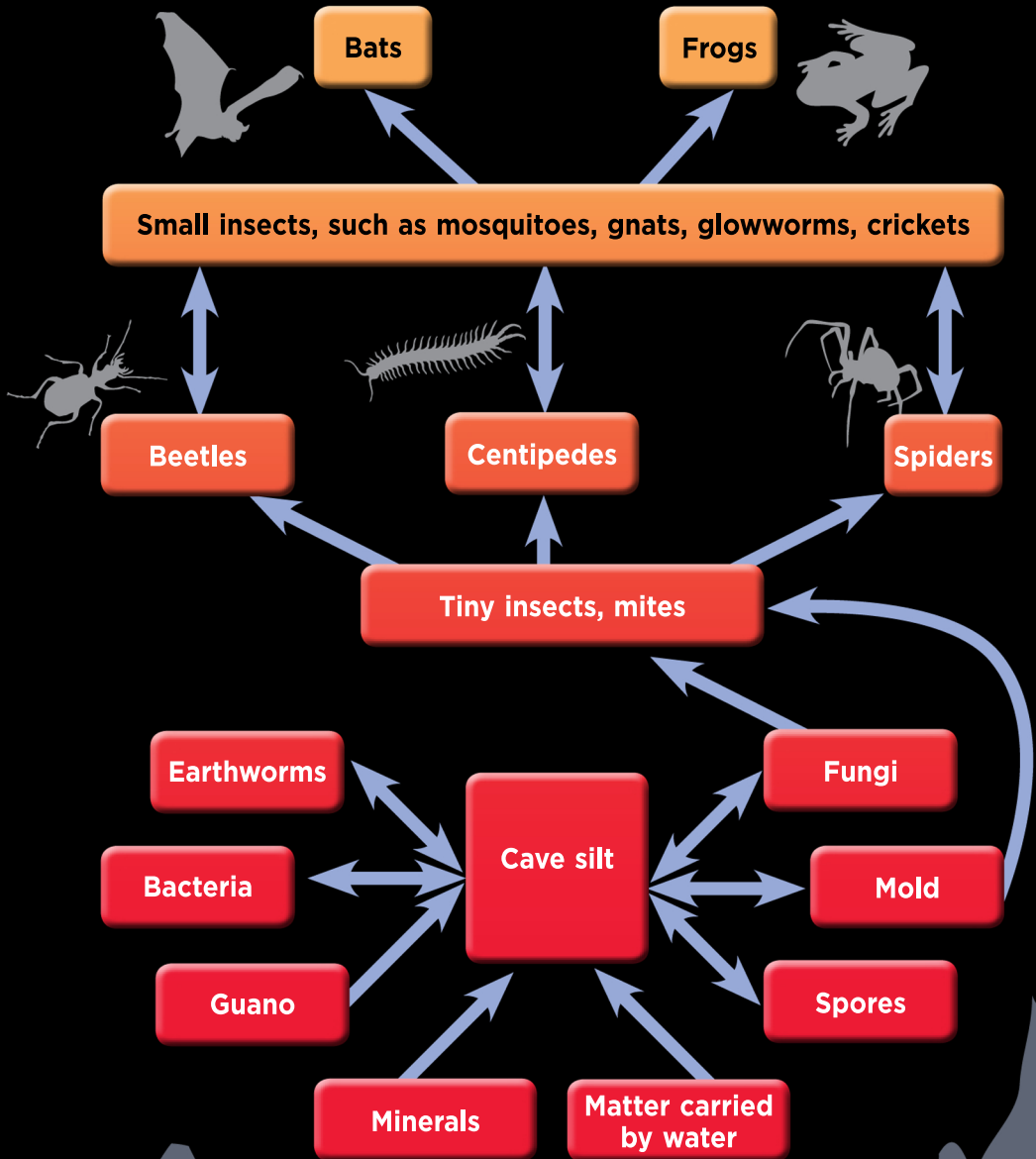
Scientists have been able to learn about these big cats from their very old bones.

Based on the ages of bones they have found, scientists believe that the European cave lion lived between 12,000 and 40,000 years ago. It was about 25 percent larger than today's lions. Scientists think that it probably didn't live in caves most of the time. It is called the cave lion because the bones of these animals were found in caves.

Underground conditions are usually stable. Skeletons of animals that die in caves can be preserved for a long time.

CAVE FOOD WEB

The nutrients in guano, or bat droppings, and other materials are broken down and recycled by some cave creatures and microscopic organisms. These creatures are eaten by larger predators.



DARK AND SURPRISING PLACES

Imagine if you were transported deep underground into the heart of a cave—the dark zone. Here there is no light or wind, and no plants grow. What would it take to live here?

Life in the Dark Zone

Animals that live permanently in this dark zone are called troglobites, or cave dwellers. They have adaptations, such as small bodies, long limbs, and long antennae. Other adaptations are less obvious, such as the ability to detect small vibrations or smells. Their adaptations help these creatures to move, forage, and feed efficiently in a pitch-black environment where food is scarce.



This eyeless, wingless insect called a dipluran has long antennae and two tails.



This pseudoscorpion has very long pincers but no eyes

Many troglobites do not have the same adaptations that animals above ground need to survive. If you live your whole life in the dark, then eyes are not very useful. Animals living in the dark zone typically have tiny eyes or none at all.

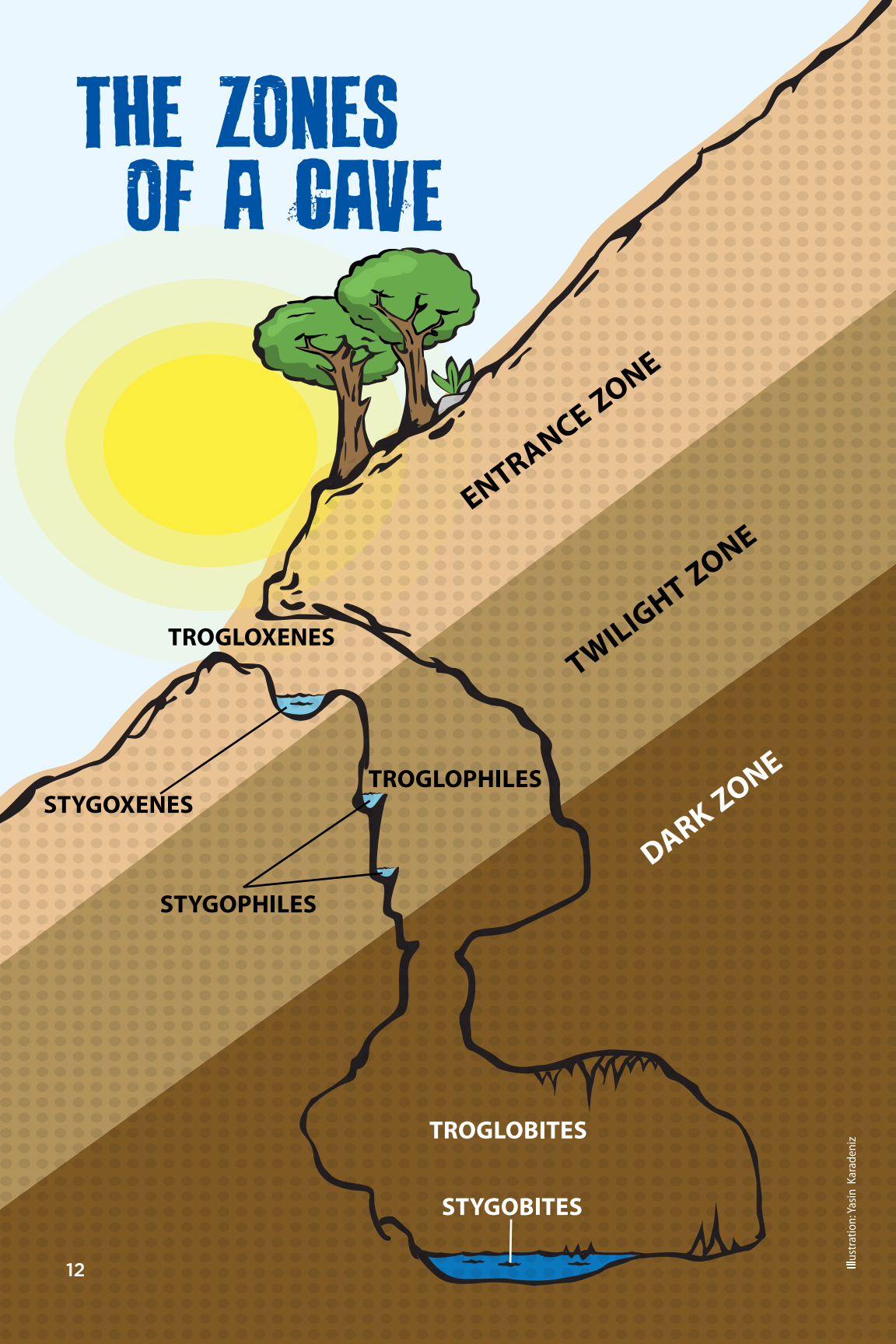
In the outside world, most animals have coloring in their skin called pigment. Pigment is an adaptation that protects animals from the sun or provides them with camouflage. However, pigment is of no use in the dark zone of a cave. As a result, some troglobites have skin that is nearly see-through. Animals with these adaptations are well suited to deep-cave life. However, they could not survive for long in the world outside.

(a) Tom Hartman/Oxford Scientific/Getty Images, (b) Dante Fenolio/Science Source



This cave harvestman has long, thin legs and a tiny body. It is also blind.

THE ZONES OF A CAVE



ENTRANCE ZONE

TROGLOXENES

TWILIGHT ZONE

STYGOXENES

TROGLOPHILES

DARK ZONE

STYGOPHILES

TROGLOBITES

STYGOBITES



The Texas blind salamander has no eyes and hunts by sensing its prey's movements in the water.



This cave crayfish has no pigment.

Aquatic Cave Dwellers

Creatures that live on land aren't the only cave dwellers. Many caves contain networks of underground streams and ponds with specially adapted **aquatic** animals living in and around them.

Aquatic cave dwellers that can't survive outside the cave environment are called stygobites. Stygobites include blind fish, salamanders without eyes, **translucent** crayfish, and other **crustaceans** with no pigment.

The water that flows through underground caves usually enters from outside the cave, then flows back out again. It transports aquatic creatures into and out of the cave. Stygoxenes are aquatic visitors from outside. Stygophiles are water lovers that may also spend time outside the cave environment.

Extreme Cave Dwellers

Cave creatures have been found in unexpected places. In 2001, tiny stygobites that resembled shrimp were discovered in limestone caves under the Western Australian desert. The caves are difficult to access, so scientists stay above ground and use fishing rods and nets to scoop up the tiny animals.

Some caves provide even more hostile conditions. These environments are too cold, too hot, or too toxic for most cave creatures to live in. Yet scientists have found specially adapted microscopic forms of life living there. Animals that are adapted to live in extreme conditions are called extremophiles.

The water bear can survive in harsh environments. These environments include boiling water, frozen water, and even radiation!





Extremophiles live in Greenland's frozen ice caves.

Most animals could not survive in the frigid conditions in Greenland's ice caves. But scientists have discovered microscopic creatures living there, too. These creatures are able to withstand the caves' sub-zero temperatures.

Mexico's Cueva de Villa Luz is another extreme cave environment. The cave emits a toxic gas called hydrogen sulfide. Scientists have given the microbes that live on this poisonous gas names such as snottites, blue goo, and slime balls! Scientists working here carry meters to monitor the level of gas inside the cave.

Mexico's Cueva de Villa Luz is home to extremophiles such as these sulfur-eating bacteria.





CONCLUSION

Cave creatures live in dark underground worlds. Just as we couldn't live for long in their environments, many cave creatures couldn't survive in ours. The adaptations that help them live beneath the ground would make it dangerous for them to live above it.

How do we know which features of cave creatures are adaptations? And how do we learn how each adaptation helps a creature to survive? We rely on scientists for answers to these questions. These researchers climb, dive, or squeeze into cold and dark spaces. Then they patiently observe and photograph cave creatures to learn more about them.



Creatures living in the deepest parts of caves can't easily travel to another cave, so scientists have discovered some unique and rare species. Scientists sometimes bring **organisms** to the surface. The scientists mimic a cave's conditions in their laboratories and examine these microscopic organisms in detail.

Scientists have found an amazing range of creatures in caves around the world. There is still a lot that we don't understand about them and the way they live. For anyone interested in exploring underground, there are many things left to discover about life in caves.

Respond to Reading

Summarize

Use the most important details from *Cave Creatures* to summarize the selection. Your graphic organizer may help you.

Cause → Effect
→
→
→
→

Text Evidence

1. What text features help you identify *Cave Creatures* as an expository text? **GENRE**
2. Reread page 11. Why do some cave dwellers have tiny eyes or no pigment? What words in the text help you find causes and effects? **CAUSE AND EFFECT**
3. What is the meaning of the word *hostile* on page 14? How do context clues in the paragraph help you figure it out? **PARAGRAPH CLUES**
4. Write about three different cave creatures and the kinds of adaptations they have. What is each adaptation, and how does the adaptation help the creature live in the cave? Use details from the text in your writing. **WRITE ABOUT READING**



Compare Texts

Read a folktale that explains why bats only fly at night.

Why Bat Flies

AT NIGHT

One night Rat invited his old friend, Bat, over for dinner. “Oh, no!” thought Bat to himself. “I’m going to be eating Rat’s boring, flavorless stew for the millionth time!” Even though Bat had given Rat a cookbook for his birthday, Rat still made the same old stew from his aunt’s recipe time after time after time.

In those days, Bat walked slowly from place to place. On the way to Rat’s house, he came up with a cunning plan to get a little bit of flavor into his dinner.

“Rat!” exclaimed Bat when he arrived. “There’s a competition for the best-flavored stew in the land. The winner gets a whole field of wheat.”

“Fantastic!” said Rat. “I’ll enter.”

“Here’s an idea,” Bat continued. “Your fur has such a lovely musky aroma—true essence of rodent. If you hop into the stew for a minute or two, it will become really tasty. You won’t even need to change your aunt’s recipe.”

But the two friends hadn’t thought very carefully about Bat’s idea. They both forgot how hot the stew would be. Rat leaped into the simmering stew pot and leaped out again at once with an enormous scream.

Bat was frightened. He ran for the door without sticking around to taste the stew!



The next day, Rat's aunt was very angry, and she took Rat to the king's court to complain. She thought that Bat had purposely played a mean trick on Rat. The king ordered his soldiers to find Bat and bring him back to the castle.

But the soldiers couldn't find Bat, who was hiding in a dark cave. Even when they came to search the cave, they couldn't see him. Bat was high above, hanging upside down from the cave roof.

From that day forward, Bat only ventured out at night. He swooped through the darkness, feasting on fresh, juicy insects. Bat was happy because the insects were much tastier than Rat's stew!



Make Connections

Why do you think people made up a story to explain an adaptation of bats? **ESSENTIAL QUESTION**

From what you've learned in *Cave Creatures*, how close is *Why Bat Flies at Night* to the truth?

TEXT TO TEXT

Glossary

antennae (*an-TE-nee*) thin, sensitive feelers on an insect's head (**page 7**)

aquatic (*uh-KWAH-tik*) living in water (**page 13**)

bacteria (*bak-TEER-ee-uh*) simple, single-celled organisms (**page 8**)

colonies (*KAH-luh-nee-z*) animals of the same type living closely together (**page 4**)

crustaceans (*kruh-STAY-shuhn-z*) animals whose skeletons are outside their bodies (**page 13**)

fungi (*FUHN-gah-y*) living things, such as mushrooms, that do not make their own food but absorb food from decaying matter (**page 8**)

haven (*HAY-vuhn*) a safe place (**page 2**)

labyrinth (*LA-buh-rinth*) a place containing lots of passageways and blind alleys (**page 3**)

nocturnal (*nahk-TUHR-nuhl*) active at night and not during the day (**page 4**)

nutrients (*NOO-tree-uhnts*) food that contains all that a plant or animal needs to live and grow (**page 8**)

organisms (*OHR-guh-ni-zuhmz*) living things, such as plants or animals (**page 17**)

translucent (*tranz-LOO-suhnt*) see-through (**page 13**)

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Focus on Science

Purpose To explore the adaptations an animal would need to live in a cave

Procedure

Step 1

Make a list of adaptations that enable cave-dwelling creatures to live underground. Use the text, as well as research from the Internet, to help you make your list. For which zone of the cave is each adaptation important? How does each adaptation help cave dwellers survive?

.....

Step 2

Choose two zones found in a cave. Make a chart that has two columns. Label the columns with each of your chosen zones. In each column, list the kinds of adaptations an animal would need in order to live in that zone, such as changes to senses or skin pigment.

.....

Step 3

Choose one of your adapted animals to illustrate. Label the adaptations and include a caption that describes the cave zone in which your animal would live.

.....

Step 4

Present your adapted animal to your group.

Conclusion Compare the adaptations of your adapted animal with those of real creature that lives in the same zone. What is the same? What is different? Do you think an animal really could adapt to living in your chosen zone? Why or why not?

Literature Circles

Nonfiction

Thinkmark

Text Structure

How does the author organize information in *Cave Creatures*? How do different types of headings help organize the information?

Vocabulary

What new words did you learn in the text?
What helped you understand their meanings?

Conclusions

What conclusions can you draw about creatures that live in caves?

Author's Purpose

Why do you think the author wrote *Cave Creatures*?

Make Connections

How are the insects in *Cave Creatures* similar to insects you have seen or read about? How are they different?

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