

## Lesson 3

# Adaptations



### Look and Wonder

These walrus sleep on a bed of ice. Do you think they feel chilly? How do the walrus keep warm in such a cold place?



## Explore

## Inquiry Activity

### Does fat help animals survive in cold environments?

#### Form a Hypothesis

Can fat help keep your finger warm in cold water? Write a hypothesis. Start with "If my finger has a layer of fat, then . . ."

#### Test Your Hypothesis

- 1 Use a paper towel to spread vegetable fat over one index finger. Try to coat it completely. Leave your other index finger uncovered.
- 2 **Predict** What will happen when you put both index fingers in a bowl of ice water?
- 3 **Experiment** Put one index finger into the ice water. Ask a partner to time how long you can keep your finger in the water. Repeat with your other index finger. Record the data in a chart.
- 4 Trade roles with your partner and repeat steps 1 through 3.

#### Draw Conclusions

- 5 **Interpret Data** Which finger could you keep in the ice water longer? Why? Did your results support your hypothesis?
- 6 **Infer** Walrus have a layer of fat under their skin. How does this help them survive?

#### Explore More

**Experiment** How could you measure how well fat keeps things warm? Could you use thermometers? Make a plan and test it.

#### Materials



vegetable fat



paper towel

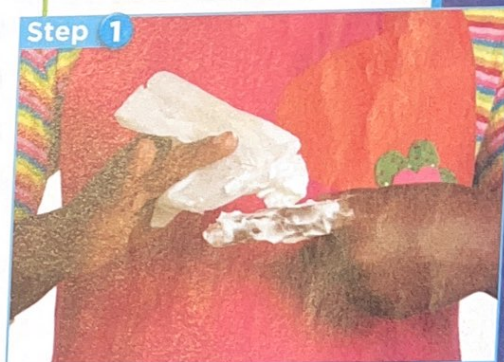


ice water

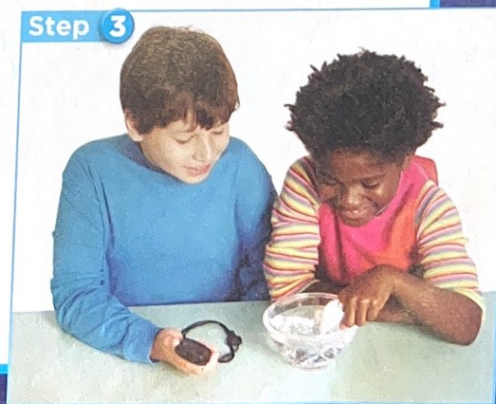


stopwatch

#### Step 1



#### Step 3





## Read and Learn

### Main Idea

Plants and animals have adaptations that help them survive in different environments.

### Vocabulary

**adaptation**, p.134

**camouflage**, p.134

**nocturnal**, p.137

**mimicry**, p.139

**hibernate**, p.139

**migrate**, p.141

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### Reading Skill

#### Predict

What I Predict	What Happens

### Technology



Explore adaptations with the Secret Agents.

## How are living things built to survive?

An insect buzzes through a forest. A frog flicks out its sticky tongue. It catches and swallows the insect whole. The frog's sticky tongue is an adaptation. An **adaptation** is a structure or behavior that helps an organism survive in its environment.

Some adaptations help living things meet their needs. Sharp claws help animals such as bears and lions hunt, for example. Flat teeth help animals such as horses chew grass.

Some adaptations help living things stay safe. For example, some animals hide from predators by blending into their environment. Blending in is an adaptation called **camouflage** (KAM•uh•flahzh). Camouflage can also help animals sneak up on their prey. A polar bear's white fur blends in with the snow and ice. This helps it hunt seals without being seen.

The frog's sticky tongue helps it catch flies for food.







Can you see the snake? Camouflage may make it invisible to a hungry hawk flying overhead.

Some adaptations help living things survive in certain climates. Plants near the North Pole may have fuzzy leaves. This keeps frost and snow away from the leaf's surface. Sea lions, walruses, and other animals in cold climates have a layer of *blubber*, or fat, under their skin. This blubber is an adaptation that helps keep them warm. Animals store more blubber in winter than in summer.

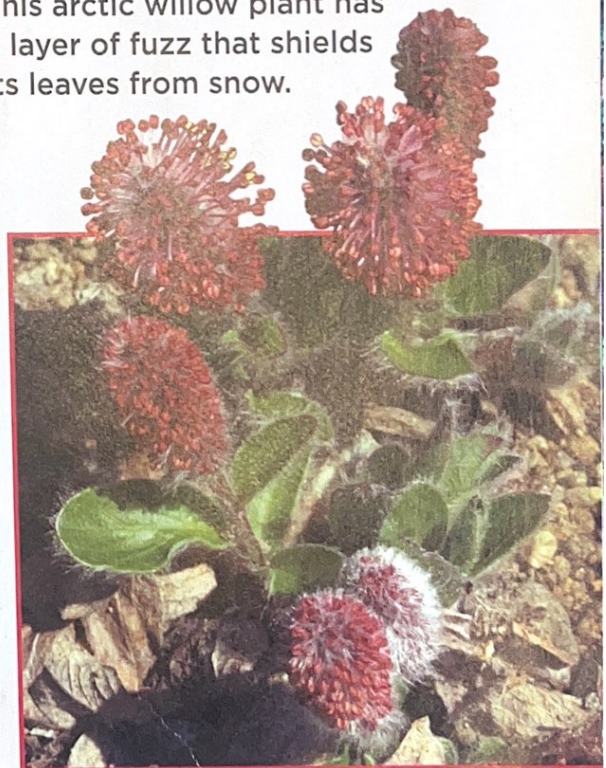


### Quick Check

**Predict** Could different types of animals have similar adaptations?

**Critical Thinking** Why don't all animals have the same adaptations?

This arctic willow plant has a layer of fuzz that shields its leaves from snow.





## What adaptations help desert plants and animals survive?

Not all living things can survive in a desert. Organisms that do survive have adaptations that help them live in a dry climate. Desert plants have adaptations for taking in and storing water, for example. Their roots may spread wide to soak up rainwater from a large area. Special stems can help store water. Desert animals eat plants to get water. Spines and thorns protect plants from thirsty animals.

### Adaptations of Desert Plants

mesquite tree

**Small leaves** do not lose much water.

**Thorns** protect the tree from hungry and thirsty animals.

**Long roots** grow deep underground where they can find **stored water**.

saguaro cactus

**Spines** help protect a cactus from animals.

A **waxy** coating helps seal in water.

Wide, **shallow roots** can quickly soak up the little rain that falls.

**Thick stems** help store water.

### Read a Diagram

What adaptations help desert plants survive?

**Clue:** Bold words show important information.



**Science in Motion** Watch desert plant adaptations at [www.macmillanmh.com](http://www.macmillanmh.com)





- ▲ This bat is nocturnal. It sleeps in the daytime when the desert is hot. At night, it feasts on fruit.

Many desert animals, such as rattlesnakes and coyotes, are nocturnal (nok•TUR•nuhl). **Nocturnal** means they are active at night. They sleep during the day. They come out at night when the desert is cooler.

Large ears and thin bodies help animals, such as the jackrabbit, stay cool. As warm blood flows through an animal's ears, it loses heat. The bigger the ears, the more heat is given off. Pale-colored body coverings keep animals from absorbing too much heat.

### ✓ Quick Check

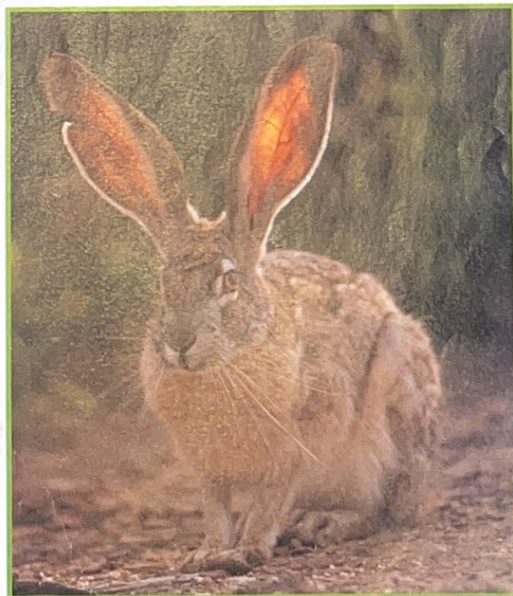
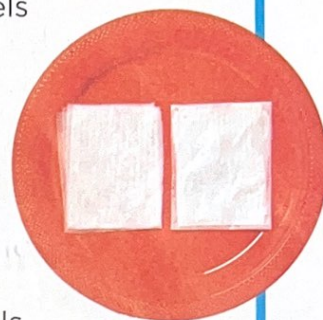
**Predict** Could an animal with a lot of blubber live in a hot desert?

**Critical Thinking** Would a desert jackrabbit survive better with large or small ears? Why?

## Quick Lab

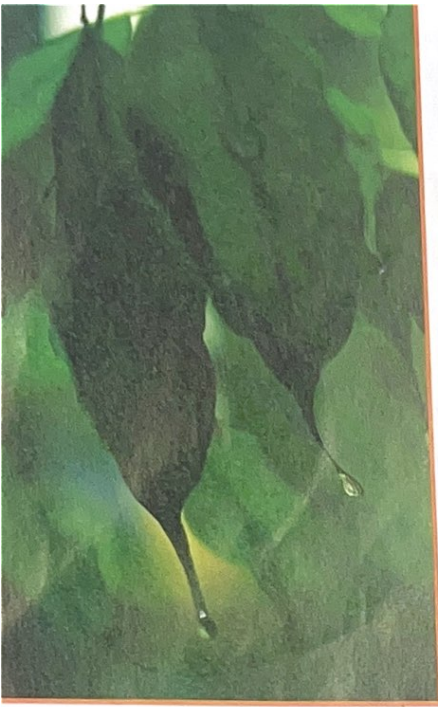
### Storing Water

- 1 **Make a Model** Wet two paper towels. Then wrap one in wax paper. This models a plant that has waxy skin. Use the uncovered towel to model a plant that does not have waxy skin.
- 2 Place your models in a sunny window.
- 3 **Observe** How do the paper towels feel later in the day?
- 4 **Infer** How does waxy skin help desert plants survive?



- ▲ Warm blood flows to the jackrabbit's ears and releases some of its heat.





- ▲ The “drip tip” at the end of each leaf helps rainwater flow off the leaf.

## What adaptations help forest plants and animals survive?

In a forest, tall trees grow toward sunlight. Small plants grow in shade under the trees. Animals may find food high in trees or on the dark forest floor. Adaptations help forest organisms survive.

### Forest Plants

In tropical rain forests, plants on the forest floor get a lot of rain and not much sunlight. Too much water can damage leaves and branches. Some rain forest leaves have grooves and “drip tips” that help rainwater flow off. These leaves are often large. They catch the little sunlight that shines through the trees.

In temperate forests, winters are cold and dry. There is not much sunlight for trees to make food. Some trees lose their leaves in fall as the temperature drops. This adaptation helps trees save energy.

These leaves can no longer make food. They fall off and make way for new leaves to grow in the spring.





## Forest Animals

Some forest animals blend in by looking like other, very different organisms. This adaptation is called mimicry. **Mimicry** is when one living thing imitates another in color or shape. Like camouflage, mimicry helps an organism stay safe in its environment. It can also help an organism hunt without being seen.

Skunks are temperate forest animals that have unusual ways of staying safe. Skunks spray a stinky chemical if a predator gets too close. This chemical can also sting a predator's eyes.

When winter comes in a temperate forest, food may be difficult to find. Animals like the dormouse survive by hibernating. **Hibernate** means to go into a deep sleep. While hibernating, animals use less energy and do not need to eat. Hibernating is an adaptation that helps some animals survive when seasons change.

### ✓ Quick Check

**Predict** What does a predator usually do when a skunk gives its warning?

**Critical Thinking** How is mimicry different from camouflage?



▲ Can you find the insect in this photo? The thorn-mimic treehopper on the right looks like the thorn on the left.



▲ Dormice curl up when they hibernate. That helps to keep them warm.

When in danger, a skunk gives a warning by raising its tail before spraying. ►







Kelp is a kind of algae. Kelp makes up this seaweed forest.

## What adaptations help ocean plants and animals survive?

Oceans are home to millions of living things. Each has adaptations that help it survive in an ocean's salty water. While salt water would kill most organisms, ocean organisms need salt water. They could not survive in the fresh water of lakes or ponds.

### Ocean Algae


The seaweed you see floating in the ocean are plantlike organisms called *algae*. Like plants, algae use sunlight to make their own food. Most algae have leaflike structures that take in sunlight. Some have rootlike structures that attach to the ocean floor. These algae can only live in shallow water where they can get sunlight. Other algae have no roots. This adaptation allows them to drift near the water's sunlit surface. Balloonlike structures called air bladders help some algae float.



air bladders

Air bladders help kelp float.





Sperm whales swim thousands of kilometers when they migrate.

## Ocean Animals

Ocean animals have adaptations for moving and living in water. A dolphin's fins and tail help it move. A fish's gills help it breathe.

Some ocean animals migrate from one part of the ocean to another in different seasons. **Migrate** means to move from one place to another. Animals may migrate when their environment gets too cold or when food or water is hard to find.

It is extremely cold and dark deep in the ocean. Few organisms have adaptations for living there. The angler fish is one. It has a growth on top of its head that lights up. The light attracts other animals. They swim close, and the angler fish attacks.



▲ The angler fish has a lighted "fishing pole" to attract prey in deep, dark ocean water.

### ✓ Quick Check

**Predict** Would the angler fish's adaptation work in sunlit, shallow water? Why or why not?

**Critical Thinking** How are algae similar to plants?



## What are adaptations to a wetland?

Wetland organisms need to be adapted to survive changes. One day their environment may be underwater, the next day it could be soggy or dry.

### Wetland Plants

Plants in wetlands must have a way to survive changing water levels. Mangroves live in wetlands along rivers and oceans. Their roots spread out to get a firm grip on the muddy ground.

### Wetland Animals

Wetland animals have ways to survive dry seasons. Walking catfish live in wetland ponds that may dry up. The catfish can use its fins to move over land to another body of water.

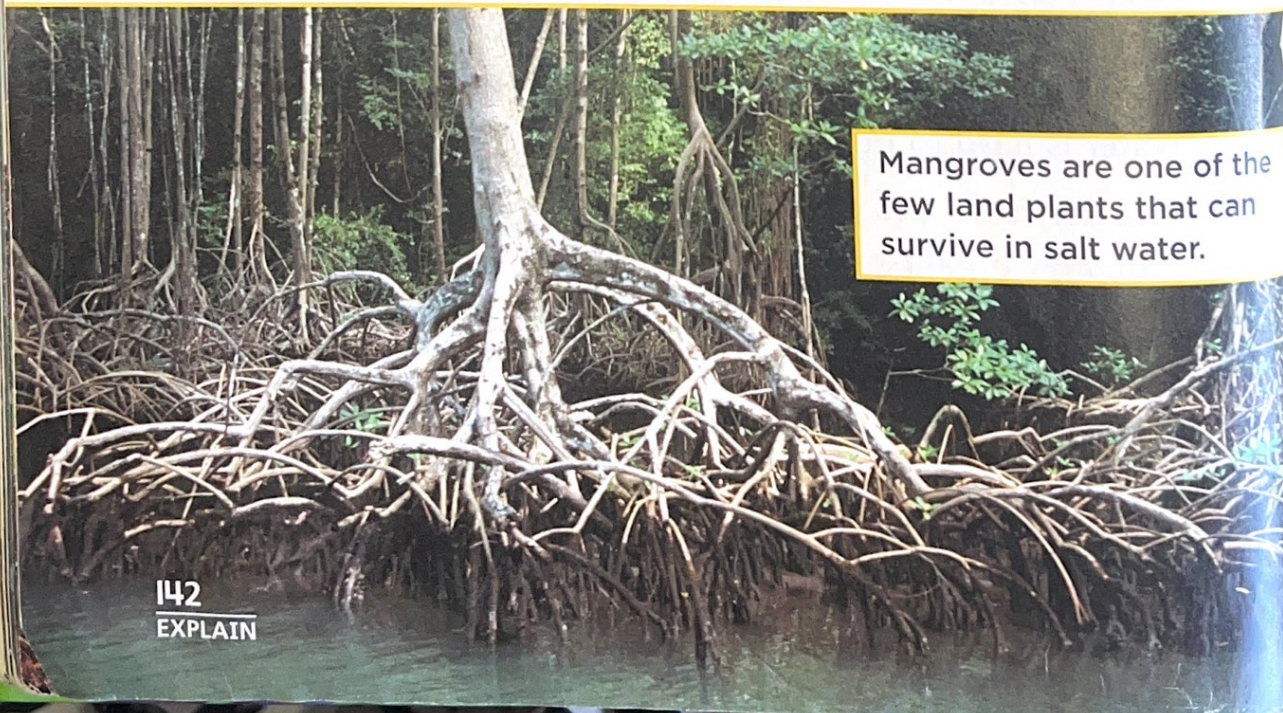


The walking catfish can breathe oxygen from the air for short periods.

### ✓ Quick Check

**Predict** Could grassland plants survive in a wetland? Why or why not?

**Critical Thinking** Think of an adaptation that would let a goldfish survive in a wetland.



Mangroves are one of the few land plants that can survive in salt water.

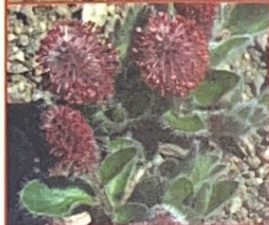


# Lesson Review

## Visual Summary



**Adaptations are** structures or behaviors that help an organism survive in its environment.



Some **plant adaptations** include fuzzy leaves, pointed leaves, and shallow roots.



Some **animal adaptations** include camouflage, mimicry, migrating, and hibernating.

## Make a **FOLDABLES™** Study Guide

Make a Three-Tab Book. Use it to summarize what you learned about adaptations.



## Think, Talk, and Write

- 1 Main Idea** Describe three adaptations that help plants or animals survive.
- 2 Vocabulary** What does nocturnal mean?
- 3 Predict** What might happen to an arctic willow plant if you moved it to a tropical rain forest?

What I Predict	What Happens

- 4 Critical Thinking** Compare two or more organisms from this lesson. Explain how the organisms are alike and different.
- 5 Test Prep** Why do some animals migrate?
  - A** to escape prey
  - B** to avoid cold weather
  - C** to find their families
  - D** to make a change



## Math Link

### Find Distance

The American robin migrates from Iowa to Alaska. It travels about 40 miles in one day. How far can it fly in five days?



## Social Studies Link

### Migration Map

Research to find out where one type of animal migrates. Draw a map to show the migration path.