

## Reflect

A penguin swims through icy cold waters. It has special tightly packed feathers that are layered like shingles on a roof. These feathers keep out cold water and keep in the penguin's body heat. The penguin also has special eyes with lenses that help it see above and below the water. Its flippers help it swim through the water, and its feet help it steer as it swims.



**predator:** an animal that hunts and eats other animals

Being able to stay warm, see well, and swim quickly helps the penguin find food and avoid **predators**. What are some other characteristics that help animals survive in their environment?

### What is meant by adaptation?

An adaptation is any characteristic that helps a plant or animal survive in its environment. A penguin's feathers are an adaptation that keeps the penguin warm. Where do adaptations come from? They develop over long periods of time. It takes many generations for adaptations to develop. Adaptations usually have something to do with where an organism lives. For example, animals that live in cold places have adaptations to keep them warm. Plants that live in dry areas have adaptations to help them conserve water.

### How do external adaptations help organisms survive in their environment?

A penguin's strong flippers are an external adaptation. External means on the outside, or something you can see. Here are some examples of external adaptations:



- **Bird beaks:** Birds use their beaks to collect and eat food. A bird's beak is an adaptation to the type of food it eats. Beaks come in all shapes and sizes. For example, a hawk has a sharp, curved beak to tear its food into small pieces. A hummingbird has a long, thin beak to reach into flowers and suck up nectar. A pelican has a long beak with a pouch to scoop fish out of the water.



- **Plant leaves:** Just like animals, plants must be adapted to their environment to survive. Plants need leaves to absorb sunlight to make their own food. Also, water can escape from the plant through the leaves. Plants that live in dry climates usually have small leaves that may be coated in thick wax to prevent drying out. Plants in sunny, moist climates have big, wide leaves to absorb lots of sunlight. In windy, cold climates, plants are usually short with small leaves. Some plants protect themselves with poison. Their leaves contain oils that annoy or even kill an organism that tries to eat them.

## Reflect

- **Camouflage:** Camouflage is an adaptation that helps animals hide. Animals with camouflage look just like their environment. Camouflage allows an animal to hide from predators or to sneak up on prey. For example, an octopus can change the color of its skin and mimic the color of any object it is sitting near. This helps the octopus avoid being eaten. Lion fur is the same color as dry grass, which allows lions to approach prey without being seen.



Camouflage allows the octopus and lion to blend into their surroundings.

## How does a cactus adapt to a hot environment?

Plants that live in dry and hot climates have thick, waxy leaves and stems. The wax prevents water from leaving the plant. This activity demonstrates how wax protects a plant leaf. You will need two small pieces of white construction or notebook paper, a bowl of water, and a crayon.

1. Draw on both sides of one piece of paper with the crayon. Try to cover as much of the surface as you can, leaving none of the paper showing. Leave the other piece of paper exactly as it is.
2. Put both pieces of paper into the bowl of water. Observe what happens to the pieces of paper as they touch the water. Did water soak into both pieces?
3. Crayons are made from wax. How did this activity model how wax protects plant leaves from losing water?

Look at the picture on the right. It shows a bird that lives in a cold, snowy place. What are some external adaptations that allow this bird to survive? Do you think this bird could survive in a hot, dry, sandy desert? Explain.



Organisms cannot choose their adaptations. For example, an animal living in a cold environment cannot just choose to grow thick fur. Adaptations develop over time. They are passed down from generation to generation. Animals with adaptations that help them survive pass these adaptations on to their young.

## Look Out!

### How do internal adaptations help organisms survive in their environment?

Plants, animals, and other living things have adaptations that you cannot see. These adaptations are called internal adaptations. For example, some animals hibernate. A hibernating animal goes to sleep or is dormant during cold weather. They do not have to hunt for food. They just rest until springtime. This adaptation allows animals such as bears to survive the winter. Some animals are warm-blooded. This adaptation allows them to keep their body temperature the same no matter how hot or cold it is outside. Humans are warm-blooded, like all mammals.



Plants have internal adaptations, too. Some plants have special chemicals in their cells that help them grow toward sunlight. Some trees have internal adaptations to drop their leaves in the fall in order to conserve water during the winter and then regrow new leaves in spring. Plants also have an adaptation that allows them to make their own food inside their cells.



### Everyday Life: Wisdom Teeth



Some adaptations are useful and are passed down from generation to generation. Other adaptations become less useful as the environment changes. An example of an adaptation that may no longer be useful is wisdom teeth. Wisdom teeth are thick, flat teeth used to grind food all the way at the back of your mouth. If you tried to see your wisdom teeth, you could not. At your age, your wisdom teeth are hidden in your gums; they do not appear until you are at least 15 years old.

Wisdom teeth were useful for ancient humans when they ate tough food that wore down their regular molars. Wisdom teeth could replace molars that had been worn down. Now, humans cook food, and our teeth do not wear down as quickly. Some dentists suggest taking out wisdom teeth with surgery. They say that wisdom teeth are an adaptation that we no longer need.

## Try Now

The table below lists plant and animal adaptations. Each list of adaptations has one item that does not belong in that list. Circle the item that does not belong. Use the space in the right column to explain why the item does not belong.

Which item does not belong?	Why does this item not belong?
<ul style="list-style-type: none"><li>• Hard turtle shell</li><li>• Sharp, curved beak</li><li>• Hibernation</li></ul>	
<ul style="list-style-type: none"><li>• Camouflage</li><li>• Small leaves covered in thick wax</li><li>• Poisonous leaves</li></ul>	
<ul style="list-style-type: none"><li>• An octopus that can change color</li><li>• Warm-blooded</li><li>• An insect that looks exactly like a twig</li></ul>	

## Connecting With Your Child

### Hunting for Hidden Animals

To help your child learn more about adaptations, have them practice hunting “prey” that are camouflaged. They can pretend to be birds hunting prey in your backyard or at a local green space.

You will need string, pipe cleaners, or yarn in four different colors. Three of the colors should be bright, loud hues that are easy to see on the grass. The fourth color should be similar to the color of your lawn or green space. You will also need a stopwatch or timer and a bag.

1. Cut the string, pipe cleaners, or yarn into four inch pieces. Scatter the pieces in a large area of your yard, such as a 10 meter by 10 meter area. This will be the hunting zone. Try to make sure that the four different colors are equally distributed in the hunting zone. Make sure that your child is not watching you as you spread out the items.
2. Tell them they will have 30 seconds to hunt for as many of the “prey” items as they can and place them in the bag. While children hunt, they must move constantly through the hunting area except when they stop to pick up an item. After 30 seconds, count how many of the brightly colored prey items they were able to pick up.
3. Next, give your child 30 seconds to hunt for the prey items that are the same color as the yard or the green space. As before, they must move constantly through the hunting area except when they stop to pick up an item. After 30 seconds, count how many of these prey items they were able to pick up.

Here are some questions to discuss with your child:

- What kind of adaptation allows animals to blend into the environment around them?
- Which color represented camouflaged animals?
- Which type of “prey” were you able to catch the most of?
- How does camouflage help animals avoid being eaten?