BIG SCIENCE 5

STUDENT BOOK

ALWAYS LEARNING

PEARSON

Contents

Unit 1 Plants and Animals

What do living organisms need to survive?

I will learn

- what plant and animal characteristics are inherited.
- how animals respond to the environment.

1 **Look and label.**

moth goose porcupine
turtle prickly pear cactus

2 **Look at the animals and plants in the pictures above. How does each plant or animal protect itself? With a partner, make a list of your ideas.**

3 **Why do dogs usually bark? Discuss as a class.**

Think!

What helps a coconut travel across the water?

Lesson 1 · What plant and animal characteristics are inherited?

1 **Why do peacocks have showy tails? Discuss as a class.**

Key Words

- characteristics
- offspring
- heredity
- inherit
- competition
- camouflage
- advantage

2 **Read and underline the different characteristics of Mendel's pea plants.**

Characteristics of Living Things

In the middle of the nineteenth century, a monk named Gregor Mendel was hard at work in his garden. He noticed that his pea plants were not all exactly alike. All of the pea plants had stems, leaves, flowers, pods, and peas. But they also had some differences in their characteristics. **Characteristics** are the qualities an organism has. Some of the plants were tall, while others were short. Some had purple flowers, while others had white ones. The pods were green or yellow. The peas themselves were smooth or wrinkled.

pea plant

The pea plants were like their parents because of characteristics passed on to them. But Mendel found that the offspring did not always look exactly like their parents. Sometimes they had different characteristics. Some **offspring** even had different characteristics than other plants with the same parents. Mendel asked himself why. Many years later, his work became the basis for the scientific study of **heredity**, or the passing of characteristics from parents to offspring.

3 **What characteristics do most pea plants have? With a partner, make a list.**

4 **Read and write the characteristic that helps the prickly pear cactus survive in a dry environment.**

Inherited Characteristics

Animals and plants inherit their characteristics from their parents and look very much like them. In science, to **inherit** is to receive characteristics, or traits, from an organism's parents. Animals and plants will pass these traits on to their own offspring.

Plants

The prickly pear cactus has sharp spines. Look at its paddle-shaped pads. These are flattened stems that act like leaves. They have a waxy coating to help the plant hold in moisture. Notice that the pads have two kinds of sharp spines. Some spines are long. Other spines are short but break off easily. The cactus looks the way it does because it has inherited these traits.

prickly pear cactus

Characteristic that helps the prickly pear cactus survive in a dry environment:

_____

5 **Read and compare zebras and horses. Write two ways they are the same and two ways they are different.**

Animals

You are not likely to mistake a zebra for any other animal. They look like horses, but they are not horses. Zebras have black and white stripes. Their manes are short and stand up on their necks. These are inherited characteristics. They are shared by all zebras.

Same:

1. _____

2. _____

Different:

1. _____

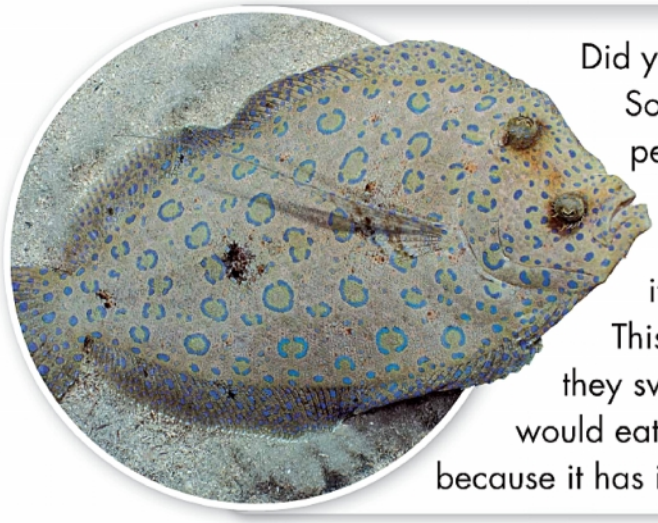
2. _____

Think!

How is a zebra's pattern like a fingerprint?

The general coat pattern is shared by zebras of the same kind. The pattern of each individual zebra is different.

6 **Read and underline three inherited characteristics of the peacock flounder.**



Did you look twice at the fish in the photo? Something does not look quite right. The peacock flounder has both eyes on one side of its body! This flat fish is unusual in another way, too. The peacock flounder can change its color and pattern to match its background. This allows it to surprise the animals it eats as they swim by. It also hides itself from animals that would eat it. This fish looks and acts the way it does because it has inherited these traits.

7 **Read and write three characteristics you may have inherited from your parents. Then share your answers with a partner.**

Human Beings

People also inherit many characteristics from their parents. A person's parents may be very tall, so that person may grow to be very tall also. Height is not the only inherited characteristic. Some characteristics, such as hair and eye color, are also inherited. However, this is not always the case. Sometimes a child may grow up to be taller or shorter than his or her parents or have a different hair color.

Characteristics I may have inherited from my parents:

1. _____

2. _____

3. _____

8 **Read and circle the animal in each situation that has the advantage. Then compare your answers with a partner.**

Parents, Offspring, and Advantages

You know that baby animals look somewhat like their parents. Cats give birth to kittens, and lions give birth to lion cubs. Sometimes, offspring from the same parents can look different from each other. They may have different characteristics than other organisms of the same type. It may be easier or more difficult for the offspring with different characteristics to compete. **Competition** occurs when two or more living things need the same resources in order to survive.

1. Two lion cubs are running after a rabbit. Which lion cub catches the rabbit?

   a. The lion cub that is hungrier.
   b. The lion cub that is faster.
   c. The lion cub that is bigger.

2. Two dogs are looking for a hidden piece of meat. Which dog finds the meat?

   a. The dog with better eyesight.
   b. The dog with the bigger mouth.
   c. The dog with the better sense of smell.

9 **Read. How did giraffes' necks get so long? Discuss as a class and write the answer.**

One example that shows competition is in giraffes. Male giraffes use their long necks to fight with other males. The winner of the fight is more attractive to female giraffes. This male reproduces. The longer and stronger a male giraffe's neck is, the better chance he has to pass these characteristics on to offspring. Over time, giraffes inherit longer and stronger necks.

Giraffes' necks got so long because _____

_____

_____.

Think!

What kinds of plants does the giraffe's neck allow it to eat more easily than other animals?

10 **Read and circle *T* (true) or *F* (false). With a partner, correct the false statements.**

In England, peppered moths used to survive by using their light color as **camouflage** against the background of the lichens growing on trees. As coal use increased in England, the lichens began to die off. Birds that ate peppered moths could see them more easily against the trees' dark color. Moths that inherited a darker color could blend in better with the trees. These moths survived and had offspring that were also darker in color. Over time, the common color of the peppered moth shifted from light to dark. The darker color gave those individual organisms an advantage over the lighter colored moths. An **advantage** is a characteristic that can help an individual compete.

1. In England, peppered moths could survive because they ate lichens. **T / F**
2. Peppered moths used to blend in with the trees that had dark gray lichen. **T / F**
3. They started to die because trees with light gray lichen were cut down. **T / F**
4. Moths that became darker could blend in better with the trees. **T / F**

11 **Read again and put the steps of the evolution of the peppered moth in order (1–4).**

a. _____ Coal use increased, and lichens died off.

b. _____ Light-colored peppered moths used color as camouflage against the lichens.

c. _____ Light-colored peppered moths died off, and only dark-colored moths survived.

d. _____ Light-colored peppered moths were easy to see, so birds hunted them.

Flash Lab

Dimpled Cheeks
Do you get dimples in your cheeks when you smile? Some people have inherited this characteristic, and some people have not. Take a survey of your classmates. Make a chart to show your data.

Lesson 2 · How do animals respond to the environment?

1 **How are the monkeys in the picture responding to their environment? Discuss as a class.**

2 **Read. Why would a turtle hide in its shell? With a partner, list two examples.**

Animal Behaviors

Have you ever tried to touch a turtle? If so, you may have seen a typical behavior of turtles. When a turtle feels threatened, it may pull its head inside its shell. This behavior protects the turtle from other animals.

Behaviors are the ways that animals act. Every behavior is caused by a stimulus. A **stimulus** is something that causes a reaction in a living thing. Some behaviors are responses to stimuli in the environment. When a turtle pulls its head inside its shell, it is reacting to something it has heard, seen, or smelled in its environment. Other behaviors are responses to stimuli inside an animal. For example, hunger is a stimulus that causes animals to look for food and eat.

A turtle would hide its head in its shell because…

1. _____

2. _____

Key Words

- behavior
- stimulus
- instinct
- migration
- protection
- hibernation

Snow monkeys in the winter.

Turtle hiding in its shell.

3 **How do you respond to the following stimuli? Write your answers and compare them with a partner.**

1. When the weather is cold, I _____

_____.

2. When the weather is hot, I _____

_____.

3. When I am scared, I _____.

4 **Which picture shows a plant? Which shows an animal? Discuss with a partner and label each picture with the words from the box.**

insect orchid

Think!

What advantages do insects that look like plants have?

bee _____ leaf _____

5 **Read and underline the definition of an instinct.**

Animal Instincts

Animals inherit physical characteristics, such as wings or fur, from their parents. They can also inherit behaviors. An **instinct** is a behavior that is inherited. Instincts help animals meet their needs and respond to stimuli in their environments.

Sea stars, for example, have an important instinct that helps them respond to changes in temperature. Sea stars live along the coast. During low tide, the water gets shallower in these areas. There is less water for sunlight to pass through, so the ocean floor gets warmer. Sea stars prepare for the warmer temperatures of low tide by sucking in cold water during high tide. The cooler water inside the animal keeps it from getting too hot.

6 **Look at the photo and discuss the following with the class.**

This dog is hot and thirsty. What does it instinctively do? How does that instinct help the dog?

7 **Read and write the titles of the texts.**

Hibernation Migration Protection

Examples of Instinctive Behaviors

_____

It is movement between habitats. Some animals are born with the instinct to **migrate** when seasons change. In spring and summer, Canada geese live in Canada and the upper United States. Flocks of geese migrate as far south as Mexico to escape cold winters and to find food.

_____

Animals have different ways of **protecting** themselves. The porcupine is born with quills. The quills are hairs with sharp edges. When the porcupine is threatened, it will turn its back and raise its quills toward its enemy. The porcupine's muscles force the quills to stand straight up.

_____

This is a state of inactivity that occurs in some animals when outside temperatures are cold. Some mammals and many reptiles and amphibians **hibernate**. Some hibernating animals conserve energy by slowing down their body functions. Marmots hibernate in burrows during the winter.

8 **Read and fill in the blanks with words from the box.**

warm escape hibernating winters migrate

Monarch butterflies are not able to survive the cold _____ of most of the United States so they _____ each autumn to _____ from the cold weather. They spend the winter _____ in Mexico and some parts of Southern California where it is _____ all year long. These butterflies are the only insects that migrate to a warmer climate that is 2,500 miles away each year!

At-Home Lab

Migrating Animals
Identify an animal in your area that migrates. Describe the path of the animal's migration.