

# Chapter 9

# Habitat and Adaptation



We learnt that animals and plants grow together in their environment.



Can you find any animal in the picture? The shape and colour of the animal is very similar to the coral.



Photo of the Pygmy Seahorse hiding in the environment

# 9.1

# Habitats

## Lesson 1 Habitats

The environment is everything around us. Plants and animals live in the environment.



**What kinds of environment do living things live in?**



### Activity : Place where plants and animals live

#### What to Do:

1. Draw a table like the one shown below.

Name of living thing	Place where it lives	Conditions of the place where it lives

2. Study the pictures of plants and animals below. Think about where they live and the conditions of the place. Complete the table.
3. Share your ideas with your classmates. Discuss the place where plants and animals live.



Bird of Paradise



Sea turtle



Water lily



Beetle



Seaweed



Frog



Cuscus



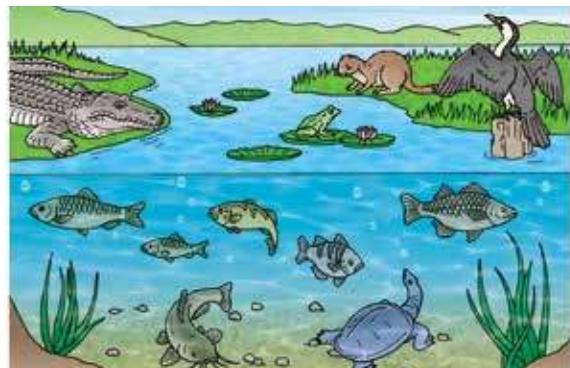
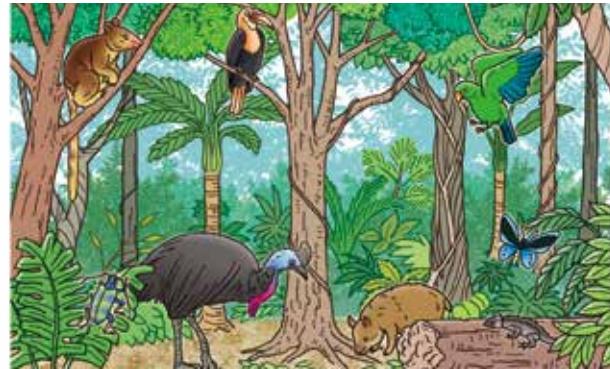
Crab



Crocodile

# Summary

Different living things live in different environments. The part of an environment where a plant or an animal lives is called its **habitat**. The habitat provides plants and animals with food, water, shelter and space to live. Rainforests, grasslands, rivers and oceans are different kinds of habitats. Each habitat has different conditions such as temperature, light and moisture. Some habitats are hot and dry. Other habitats are cold and wet. Plants and animals live in the conditions that best meet their needs.



Different living things live in different habitats.



Grassland habitat



Freshwater habitat



Rainforest habitat



Ocean habitat

## Lesson 2 Freshwater Habitat

Even though freshwater covers only 3 percent of the Earth's surface, it is also a habitat for many kinds of plants and animals.



What is a freshwater habitat?



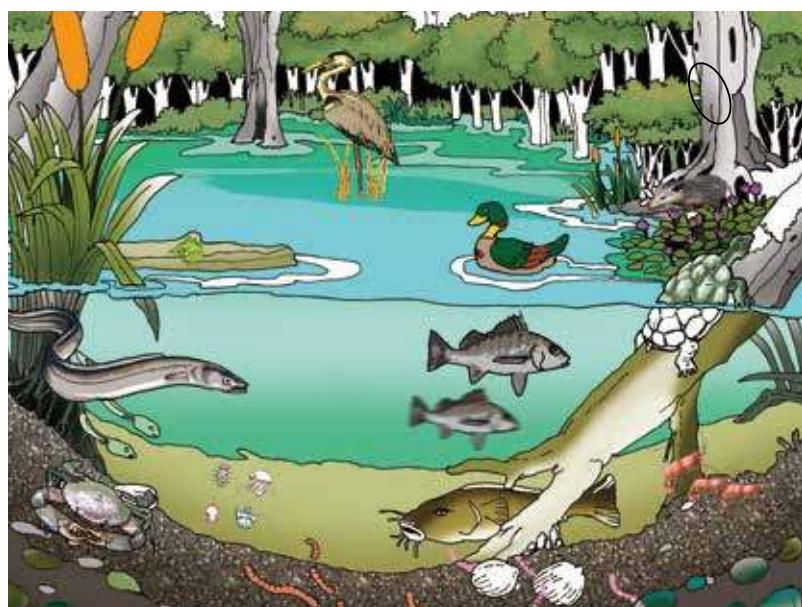
### Activity : Living things in freshwater habitats

#### What to Do:

1. Go out of the classroom and find a freshwater habitat such as; a river, a pond, a wetland or a lake around you.
2. Observe the freshwater habitat and find the living things that live in or around it.
3. Record your observations in your exercise book.
4. Share your ideas with your classmates. Discuss what kinds of living things that live in and around the freshwater habitat.



I found different kinds of living things in different places.



Living things in freshwater habitat  
Date: \_\_\_\_\_

Place: pond

Frog                      Bird  
Grass                      Water lilies  
Small fish

List of living things

1. frog  
2. .....

# Summary

**Freshwater habitats** are natural water sources that do not contain salt.

They include streams, rivers, ponds, lakes, wetlands and the area around them. Streams and rivers are flowing water. Ponds and lakes are still water. A wetland is a place where the land is covered by shallow water.



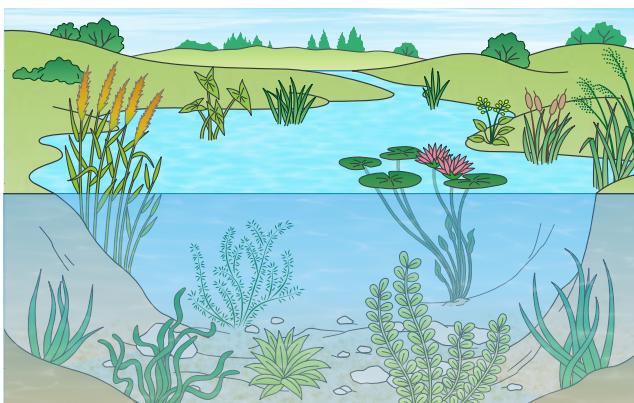
River



Lake



Wetland



Many kinds of plants live in freshwater habitats.

Many kinds of animals and plants live in or near freshwater habitats. They rely on the habitats to provide food, water and shelter. Freshwater habitats contain different kinds of plants such as grass, algae, reed and water lily but very few trees.

Some animals like frogs and dragonflies rely on water to complete their life cycles.

Others such as fish and shrimps spend their entire life in the water. Many birds, reptiles and mammals visit freshwater habitats to feed.



Different kinds of animals rely on freshwater habitats.

# Lesson 3 Ocean Habitat

An ocean is one of the habitats. Oceans cover about 70 percent of the Earth's surface.



## What is an ocean habitat?



### Activity : Living things in ocean habitats

#### What to Do:

1. Draw a table like the one shown below.

Area	Name of living things
Coast	
Top layer of open ocean	
Deep ocean	

2. Study the pictures of plants and animals below and think about the area of the ocean which they live in. Make a list of the living things in the table.
3. Share your ideas with your classmates. Discuss the types of living things and the area where they live in the ocean habitat.



Tuna



Sea turtle



Coral



Mangrove



Frill Shark



Lobster



Starfish

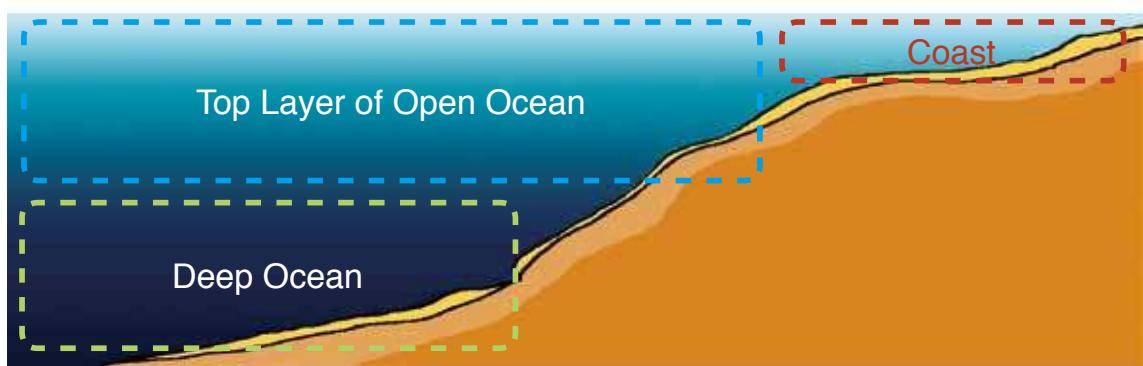


Angler fish



Whale

Do you know other living things that live on the coast, top layer of open ocean and deep ocean?



# Summary

An **ocean habitat** is a place with salty water. Each plant and animal lives in a certain ocean habitat depending on how much sunlight they receive.

Ocean habitats can be divided into two: coastal and open ocean habitats.

## Coastal Habitats

A coast is a place where the land meets the sea. Coastal habitats are shallow, sunny and warm. Coastal habitats include beaches, rock pools, coral reefs, estuaries and mangrove forests. Animals such as shore birds, fish, crabs, corals and starfishes can be found in the coastal habitats. Mangroves, algae and kelp are examples of plants found in the coastal habitats.



Coral reefs



Rock pools

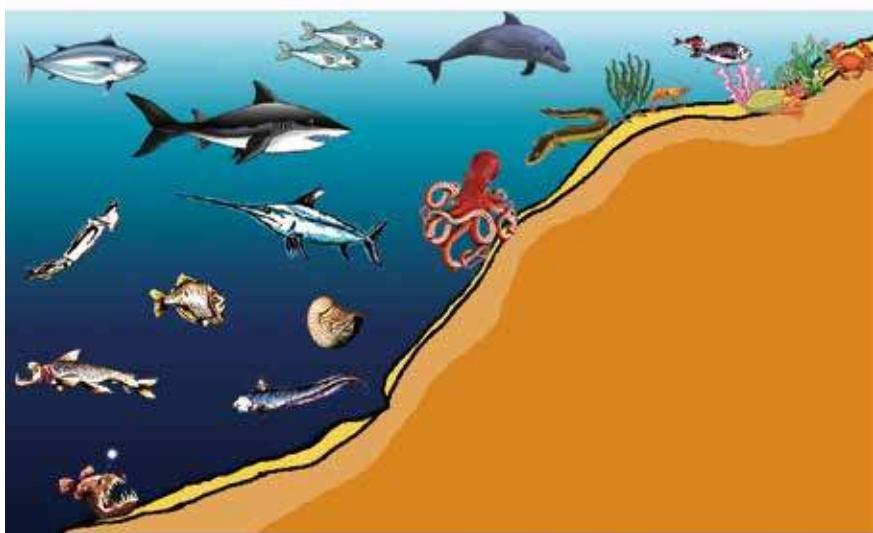


Estuaries

## Open Ocean Habitats

The open ocean is the area of the ocean outside of coastal areas. The top layer of the open ocean gets the most sunlight. Tiny algae floats near the surface. Dolphins can be found near the surface in the open ocean.

The deeper the water, the less the sunlight reaches. So, the deepest parts of the ocean are very dark and cold. Many types of living things including fish, shrimps, worms, crabs and clams live in this habitat.



Living things in ocean habitats.

## Lesson 4 Rainforest Habitat

A rainforest is one of the habitats. Rainforests are found closer to the equator.



### What is a rainforest habitat?



### Activity : Living things in rainforest habitats

#### What to Do:

1. Study the picture of plants and animals below.
2. Think about the following questions:

- (1) What kinds of animals live in a rainforest?
- (2) How do different kinds of plants grow in a rainforest?
- (3) Where do different kinds of animals live in a rainforest?
- (4) Why do many kinds of animals live in a rainforest?

3. Share your ideas with your classmates.

Do you know other living things that live in a rainforest?



# Summary

A **rainforest habitat** is a place with a lot of rain, warm climates and tall trees. Though a rainforest covers less than 2 percent of the Earth's surface, about 50 percent of the Earth's plants and animals live in rainforests. It also produces 20 percent of the oxygen on the Earth.

Different kinds of plants in a rainforest tend to grow close together. Some plants grow taller than other plants. This dense forest has the different heights of branches and leaves and provide shelter and food for many kinds of animals to live.

A lot of animals get energy by eating plants or by eating other animals in a rainforest. Tree kangaroos, cuscus and many kinds of birds find their shelter among the branches of trees in the rainforest. Different kinds of insects also find their shelter in the rainforest.



Plants in rainforests grow densely and in different sizes.



A bird builds its nest among the branches of trees.



Bees make hives on trees.



Cuscus find shelter in trees.

# Lesson 5 Grassland Habitat

Living things live in grassland. Grassland is an area mostly covered by grasses.



## What is a grassland habitat?



## Activity : Living things in grassland habitats

### What to Do:

1. Study the pictures below and think about the following questions:
  - (1) What kinds of plants grow in grassland habitat?
  - (2) What kinds of animals live in grassland habitat?
  - (3) How do plants in rainforest and grassland look different?
  - (4) Which habitat is easier for animals to hide themselves?  
Explain why.
  - (5) Where can animals find their shelter in a grassland habitat? Explain why.
2. Share your ideas with your classmates.



Let's compare the types and heights of plants in a rainforest and a grassland.



Rainforest



Grassland

# Summary

A **grassland habitat** is a place with few or no trees.

The grassland receives more rain than deserts but less than forests. Grasslands are too dry for many trees to grow. Most of the plants there are grasses.



Most of the plants in grasslands are grasses.

Grasslands are sometimes called prairies, savannahs or steppes.

Most animals that live in a grassland feed on grasses and their seeds. Some animals feed on other animals to get energy. Grassland animals include wallabies, lizards, snakes, rats, a variety of birds and insects.



A wallaby lives in grassland.



A grasshopper feeds on grasses.

A grassland is a big open space, therefore provides limited places for animals to hide. Grassland animals find different ways to shelter and protect themselves from danger. For example, many grassland animals find shelter and make their homes underground.

Why do many grassland animals make their homes underground?



A rat appearing from its home underground.

# Lesson 6 Habitat Changes

Different plants and animals live in different habitats. Fish live in freshwater or ocean habitats. Tree kangaroos and cuscus live in rainforest habitats.



## What happens to living things when habitats change?



### Activity : Effects of habitat change

#### What to Do:

1. Draw a table like the one shown below.

Do you have any idea about the causes of habitat change?



Causes of habitat change	What will happen to the habitats and living things?
People cut down trees in a forest.	
It rains heavily and rivers flood.	
It does not rain for a long time and a pond dries up.	
A forest fire occurs and burns a large portion of a forest.	
People drain oil or harmful materials into rivers or land.	

2. Think about the relationship between the causes of habitat change and its effects on the habitats and the living things that live there.
3. Describe your ideas in the table.
4. Share your ideas with your classmates. Discuss the causes and effects of habitat change.



# Summary

The habitat is the place where an organism lives. An **organism** is any living thing. Plants, animals and other living things are organisms. Organisms are affected in many ways when their habitats change. Habitats can be changed by natural events and people.

What are the causes  
of habitat change?



## Natural Events

Natural events such as droughts, fire and floods can cause habitats to change. For example, the ponds or streams will dry up when a drought happens. Most plants that live in ponds will die. Many pond animals would not get the food and shelter they need. They would have to find other places to live or they will die, but new plants and animals may make the dried-up pond as their habitat.



Drought



Bush fire



Plants growing on ground after drought.

## People

Habitats can also be changed by human activities. People cut down trees to build houses and roads, and change streams or rivers to build dams. In the process, people destroy the habitats of organisms.



Human activities destroy the habitats.

Pollution is also caused by human activities. People pollute the habitats by throwing away trash, emitting smoke in the air and allowing harmful materials to leak into the soil. Pollution kills plants and causes animals to get sick or die.



Pollution causes organisms to get sick or die.

## Habitat

- Habitat is the part of an environment where a plant and an animal live.
- The habitat provides plants and animals with food, water, shelter and space to live.
- Different kinds of habitats have different conditions such as temperature, light and moisture.

## Different Kinds of Habitats

- Freshwater habitats are any natural water sources that do not contain salt including rivers, ponds, lakes, wetlands.
- Ocean habitat is a place with salty water. There are two main types of habitats; the coastal habitat and the open ocean habitat.
- A rainforest habitat is a place with a lot of rain, warm climate, and tall trees. The rainforest is always moist and warm, more kinds of plants and animals live in the rainforest than in any other habitats.
- A grassland habitat is a place with few or no trees. Grasslands are too dry for many trees to grow and most of the plants here are grasses.



## Habitat Changes

- Habitats can be changed by natural events and people. The habitat changes have good and bad effects on organisms that live there.
- Natural events such as droughts, fires and floods can cause habitats to change.
- Human activities such as cutting down trees, building dams, throwing away trash, emitting smoke in the air and leaking harmful materials into the soil can cause habitats to change.

# Exercise

## 9.1 Habitats

Q1. Complete each sentence with the correct word.

- (1) The part of an environment where a plant and animal live is called \_\_\_\_\_.
- (2) Coastal and open ocean habitats make up the \_\_\_\_\_ habitat.
- (3) A \_\_\_\_\_ habitat is a place with a lot of rain, warm climates and tall trees.
- (4) Most animals in the \_\_\_\_\_ habitat feed on grasses and their seeds.
- (5) Rivers, lakes and streams are examples of \_\_\_\_\_ habitat.

Q2. Choose the letter with the correct answer.

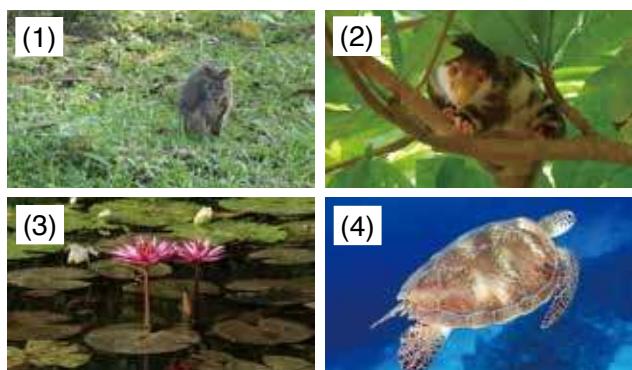
- (1) What is the cause of habitat change shown in the picture on the right?  
  - A. Drought
  - B. Earthquake
  - C. Flood
  - D. Bush fire



- (2) Which of the living things are found in the coastal habitat?  
  - A. Coral and Mangrove
  - B. Turtle and Tuna fish
  - C. Seaweed and Angler fish
  - D. Whale and Nautilus

Q3. Answer the question below.

What is the name of the habitats for the living things labelled (1), (2), (3) and (4) in the pictures on the right?



Q4. Explain what will happen to the living things in the rainforest habitat if there is a bush fire.

# 9.2

# Adaptations

## Lesson 1 What is Adaptation?

Different organisms live in different habitats. Organisms can survive in their habitats only if their needs are met.



How do adaptations help organisms?



### Activity : Body parts of animals

#### What to Do:

1. Draw a table like the one shown below.

Body parts	How the body part helps the animal?
Long neck of a giraffe	
Thick fur of a polar bear	
Long and sharp spines of a echidna	

Do you have any ideas on body parts that help organisms?



2. Study the pictures of the animals below.

Think about how each of the body parts help animals to survive and write your ideas in the table.

3. Share your ideas with your classmates.  
Discuss how the body parts help the animals.



Giraffe



Polar bear



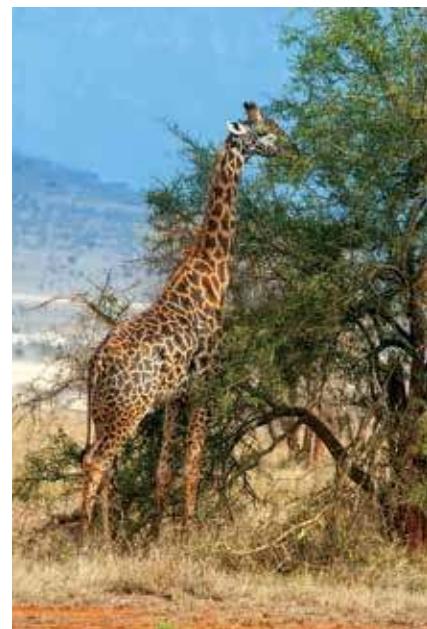
Echidna

# Summary

**Adaptation** is the use of body parts or a behaviour that helps an organism survive in its environment. **Behaviour** is the way organisms act in a certain situation. Adaptations help organisms survive in many ways.

## Getting Food

Adaptations help organisms get food to survive. For example, giraffes have long necks. The long neck helps giraffes to eat leaves of trees that other animals cannot reach.



A long neck helps a giraffe to eat the leaves of a tree.

## Surviving Severe Conditions

Some habitats have severe conditions. Some are very cold and snowy. Some are very hot and dry. Organisms living in severe conditions have adaptations that help them to survive. For example, some animals such as polar bears have thick fur. The thick fur helps keep them warm to survive in cold habitats.



The thick fur helps keep polar bear warm.



## Self-Defence

Most organisms have adaptations for self-defence. For example, some organisms such as echidnas and cactus plant are covered with long sharp spines. The spines help keep organisms from being eaten by enemies. Some animals such as octopus change colour as their environment changes. Some adaptations help organisms hide in their surroundings.



Spines help keep echidna from being eaten.

## Lesson 2 Adaptations to Habitats

Adaptations help organisms get food, hide from other animals and survive in conditions of their habitats.



### How do organisms adapt to their habitats?



### Activity : Turtles adaptation

#### What to Do:

1. Draw a table like the one shown below.

How are they similar?	How are they different?

Both of them are turtles but what are the differences between them?



2. Study the pictures of the two turtles below.

3. Compare and describe how they are similar or different in the table.

4. Based on your results, think about the following questions.

- (1) Where do they live?  
(2) How do their body parts adapt to their habitats?

Think about what body parts they use to move in their habitat. Explain why.



Sea turtle

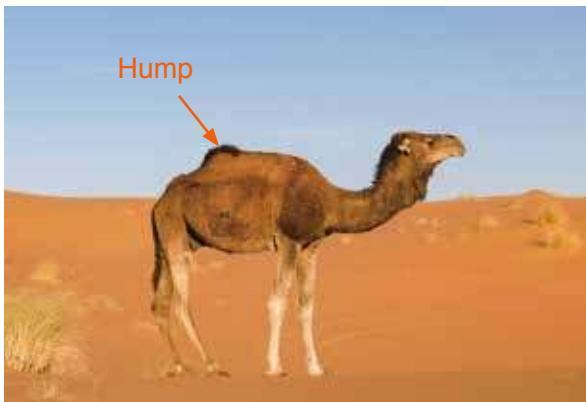


Freshwater turtle

# Summary

Organisms need to adapt to their habitats to survive. Habitats are different, so organisms living in different habitats need different adaptations to survive.

A **desert** is one of the habitats. The desert is a place with very little water. It can be hot and dry. It is hard for organisms to get food and water in a desert. Desert organisms have adaptations to desert habitats. A camel stores fat in its hump(s) that helps it to survive long periods without food and water. A cactus plant has thick stems and waxy skin that holds water for survival in a dry habitat.



A camel stores fat in its hump.



A cactus has thick stems and waxy skin that holds water.

Organisms living in water also have adaptations that help them to meet their needs. Some animals such as fish and dolphins have fins or flippers that help them swim through water. Animals living on land have different adaptations. They have legs that help them to walk easily on land. Some animals such as birds have wings that help them fly in the air.



Fins are adapted for swimming.



A pig has legs for walking.



Wings help birds to fly.

## Lesson 3 Camouflage

Organisms need to adapt to their habitats to survive. What other kinds of adaptations do organisms have?



### What is camouflage?



### Activity : Can you find animals?

#### What to Do:

1. Study the pictures below carefully and find the animals.
2. Make a list of the animals you find.
3. Think about the following questions.
  - (1) Which animals were easy or hard to find? Explain why.
  - (2) How are the colours and patterns of the animal body parts helpful to them?
4. Share your ideas with your classmates.

How many animals can you find?



Why are some animals difficult to find?



# Summary

**Camouflage** is a type of animal adaptation. It is the colours, patterns or shape of body parts of an animal that allows it to blend in with its surroundings. Camouflage helps animals to hide from enemies and to find their food.

The colour and pattern of an owl's feathers helps it to blend in with trees, making it easier to stay hidden from other animals in the daytime. A tiger also uses camouflage. Its striped fur helps it to blend in with the tall grasses. The tiger can hunt without being seen.

Some insects use their body parts to camouflage. A stick insect uses camouflage to look like the branches or leaves of the trees where it lives. Its physical appearance helps the stick insect to blend in with its surroundings and hide from its enemies.

The following pictures show examples of animals camouflaging.



An owl blends in with a tree.



Striped fur helps tigers blend in with the tall grasses.



A stick insect looks like twigs.



Examples of animals camouflaging to blend in with their surroundings.

# Lesson 4 Mimicry

Organisms use their body parts to camouflage themselves. Do organisms use their body parts in different ways?



## What is mimicry?



## Activity : Which one is an owl's eye?

### What to Do:

1. Study the pictures below carefully. Some are owls' eyes and others are the spots on butterflies' wings.
2. Think about the following questions.
  - (1) Which pictures are the owls' eyes or the spots of butterflies?
  - (2) How do the spots help the butterflies?
3. Share your ideas with your classmates.

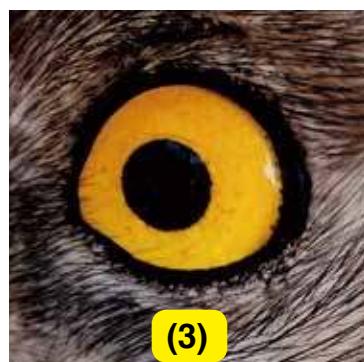
The spots on the butterflies' wings are similar to the owl's eyes. Explain why.



(1)



(2)



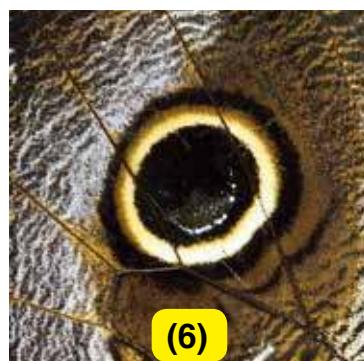
(3)



(4)



(5)



(6)

# Summary

**Mimicry** is a type of animal adaptation that allows an animal to look like another kind of animal. Mimicry can keep them from being eaten or it can help them get food.

Mimicry helps protect some types of butterflies from birds. Some butterflies have large eye-spots on their wings. These spots resemble the eyes of animals such as owls to scare away birds that want to eat the butterfly.



Some butterflies have large eye-spots to scare away birds.

Other animals use mimicry to behave like another animal. Some harmless snakes have colours and patterns that look like dangerous snakes. Birds see these colours and patterns and stay away.

How does mimicry help animals to survive?



A snake with poison (Coral snake)



A snake without poison (Scarlet king snake)



Some animals use mimicry for hunting.

Angler fish has a lure that sticks out from its head. The lure looks like small animals such as worms, shrimps or smaller fish to attract a fish's attention. Once a fish gets closer to the lure, the angler fish eats it.



Angler fish has a lure to attract other fish.

# Lesson 5 Behavioural Adaptation

Behaviour is also an adaptation. It is the way organisms behave to survive.



## How do organisms behave to survive in their environment?

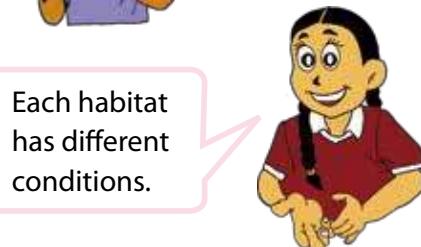


### Activity : Animal Behaviour

#### What to Do:

1. Study the pictures below.
2. Think about the following questions.
  - (1) Why do penguins come together?
  - (2) Why does a rat live in a burrow?
  - (3) How do their behaviour help them?
3. Record your ideas in your exercise book.
4. Share your ideas with your classmates.

What kind of conditions do they live in?



Each habitat has different conditions.



The Antarctic is covered with ice and is the driest and coldest continent on the Earth. It is where penguins come together.



A rat lives in the desert. It stays in its burrow during the daytime. A burrow is a hole or tunnel in the ground made by animals for shelter.

# Summary

**Behaviour** is a type of adaptation. It is the way that animals act or react to their environment. Behaviour helps animals to find food and water, move to safe places and protect themselves.

Some animals move from one habitat to another where the weather is warmer or where they can find food. This is called **migration**. For example, some birds move to another habitat during winter to be in a place where the habitat is warm.

Some animals have behavioural adaptations that help them to survive in cold winter. Bears go into a long deep sleep through the winter. This is called **hibernation**. They need little or no food during hibernation. So do frogs, snakes and even some insects. Emperor penguins gather together in the cold to keep warm.

Other animals behave in different ways.

Female turtles always return to the same beach where they hatched to lay their eggs. Some animals such as birds and fish travel in a large group that helps to protect the members of the group from enemies.



Birds move to another habitat during winter.



A bear goes into a deep sleep during winter.



Sea turtles return to the same beach to lay eggs.



Fish travel in a large group for protection.

## What is Adaptation?

- An adaptation is the use of a body part or a behaviour that helps an organism survive in its environment.
- Behaviour is the way organisms act in a certain situation.

## Adaptation to Habitats

- Adaptation helps organisms to get food, hide from other animals and survive in conditions of their habitats.
- Organisms living in different habitats need different adaptations to survive.



A camel stores fat in its hump to survive in a desert.

## Camouflage

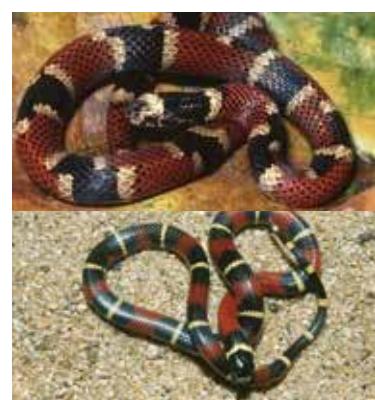
- Camouflage is the colour, pattern or the shape of the body parts of animals that allows them to blend in with their surroundings.
- Camouflage helps animals to hide from enemies and to look for food without being seen.



An owl blends in with a tree.

## Mimicry

- Mimicry is a type of animal adaptation that allows an animal to look like another kind of animal.
- Mimicry can keep animals from being eaten or help them to get food.
- Some harmless animals have colours and patterns that look like those of dangerous animals.



A harmless snake taking on the colour and patterns of the poisonous snake.

## Behavioural Adaptation

- Behaviour is a type of adaptation. It is a way that animals act or react to their environment. Migration and hibernation are examples of the behaviour.
- Behaviour helps animals find food and water, move to safe place and protect themselves.

Q1. Complete each sentence with the correct word.

- (1) An animal body part or its behaviour helps the organism to survive in its environment is called \_\_\_\_\_.
- (2) Organisms live in different \_\_\_\_\_ so they need to adapt in order to survive.
- (3) An adaptation that allows an animal to look like another kind of animal is called \_\_\_\_\_.
- (4) An adaptation that makes animals to act or react to its environment is called \_\_\_\_\_.

Q2 Choose the letter with the correct answer.

- (1) What is the adaptation for cactus plant to have thick stems and waxy skin?
  - A. To hold water in dry environment.
  - B. To attract animals for pollination.
  - C. To poke animals that try to eat it.
  - D. To allow water to run out easily.
- (2) Why do some insects blend in with their surroundings?
  - A. To hide from enemies.
  - B. To scare away enemies.
  - C. To be eaten other animals.
  - D. To be easy to be seen.

Q3. Some butterflies have large eye-spots on their wings. Why do the butterflies have such eye-spots?



Q4. How do some animals behave during cold winter to survive?

## **How does an octopus use camouflage, mimicry and change its colours?**

Octopuses are masters in using camouflage to catch animals they want to eat and hide from animals that want to eat them. Octopuses have very good vision and they use it to better camouflage themselves.

An octopus can change the way its skin looks and feels. It controls the muscles under its skin by changing its skin to match the rock's or plant's bumpiness near to blend in it.

It can also change the way it moves. It mimics a rock, by not only folding its eight tentacles (legs) close to the body but changing the way its skin looks. It can also change the way it swims to mimic the way waves might push a rock through the ocean.

The octopus can change the colour of its skin.

It can control the colour of its skin because it has special cells in its skin that are filled with different colours. If the octopus relaxes the muscles connected to its red colour cells, these cells will become really small and we would not be able to see red on the octopus' skin.

However, if the octopus stretches the muscles connected to its red colour cells, these cells will also stretch and get bigger so that we would be able to see lots of red on the octopus' skin.

By changing the sizes of all the different coloured cells, the octopus can very rapidly create complex patterns that allow it to better blend in with its surroundings.



The octopus blends in the rock.



The octopus can change the colour and patterns of its skin.

## Chapter Test

# 9. Habitat and Adaptation

**Q1**

Complete each sentence with the correct word.

- (1) The part of the environment where plants and animals live to get all their needs is called \_\_\_\_\_.
- (2) Animals can camouflage themselves by blending in with their surroundings using their \_\_\_\_\_, patterns or shapes of body parts.
- (3) Some butterflies use \_\_\_\_\_ by having two large eye-spots on their wings to imitate an owl's eye to scare birds away.

**Q2**

Choose the letter with the correct answer.

- (1) Which animal lives in a freshwater habitat?
  - A. Whale
  - B. Tuna fish
  - C. Frog
  - D. Lobster
- (2) What is the type of adaptation when geese fly away from winter to summer in other regions?
  - A. Mimicry
  - B. Behaviour
  - C. Acting
  - D. Camouflage
- (3) Which statement best describes the rainforest habitat?
  - A. Trees and other plants tend to grow close together.
  - B. Most plants are grass which animals eat.
  - C. There are a few trees growing with fewer rainfalls.
  - D. Most plants grow in lots of water with areas of grass.
- (4) If the sea turtle was living on the land, which of its body part would adapt to that environment to survive?
  - A. Eyes
  - B. Head
  - C. Flippers
  - D. Nose



**Q3**

- (1) Observed the dried branches on the picture on the right. There is an insect among the branches. Explain what made the insect difficult to be spotted?



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- (2) Algae is a kind of plant. Why does it live and float near the top of the open ocean surface?

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- (3) What is the purpose of the lure on this fish?

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**Q4**

- (1) The picture on the right is the result of drought causing a pond to dry-up. How is the habitat change good for the plants and animals?

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- (2) The giraffe lives in the savannah grassland of Africa. One of its main food is eating the leaves of a tree. How has the giraffe adapted to eat the leaves at the very top of the tree?

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