

4.3

Surviving in Extreme Conditions

▶ LEARNING TIP

Connect new information to what you have already learned. What structures and behaviours do you think would help organisms to survive in extreme conditions?

Some organisms have adaptations that enable them to survive Earth's most extreme conditions. For example, deep in the oceans, organisms can survive with little or no sunlight. Other organisms can live in dry deserts and in regions of extreme cold. What structures and behaviours enable them to survive such harsh conditions?

Canada's Arctic is home to many animals. In the winter, food is hard to find and temperatures may drop to -45°C . Arctic animals have structures that allow them to survive in the cold. For example, the seal and the walrus have waterproof fur, the arctic grouse has fringed toes that act like a snowshoe, and the arctic fox has a thick white fur coat.

The polar bear has several structures that help it survive the Arctic cold. The polar bear has small, compact ears and a small tail, as well as thick fur. These adaptations help to keep it warm. The polar bear's white fur also helps camouflage the bear in the snow (**Figure 1**). This helps the polar bear sneak up on and hunt seals, as well as escape human hunters. The polar bear also has behaviours that help it survive in the winter. In the spring and summer, it eats as much as it can so that it has a thick layer of blubber when the winter comes. This blubber acts like insulation to protect the bear from the cold. (You will look at how insulation works in Unit C.)



Figure 1

A polar bear is well adapted to live in a snowy environment.

TRY THIS: OBSERVE ADAPTATIONS

Skills Focus: observing, inferring

Look carefully at **Figures 2** and **3**. How have these animals adapted to winter?



Figure 2
A lynx



Figure 3
A snowshoe hare

Migration

Some animals have a behaviour that helps them survive the harsh winter. They move, or migrate, to a warmer place. This **migration** may not be a great distance. For example, the elk moves from the mountains to spend the winter in the lowlands. Other animals migrate great distances. For example, the humpback whale migrates from the Arctic region in the summer to the tropics in the winter. Other animals that take incredible migration journeys include the arctic tern and the Canada goose.

Long-Distance Travellers

The winner of the migration marathon is the arctic tern (**Figure 4**). This bird travels from the Canadian Arctic to Antarctica and back every year. Why does it make such a long journey? Does it need to fly this far for food and shelter? Most biologists believe that ancient relatives of the tern began making the journey when the continents were much closer together. Over millions of years, as the continents gradually shifted farther apart, the tern adapted to the ever-increasing distance of its migration.



Figure 4
The arctic tern migrates over 35 000 km each year.

The Canada goose is another long-distance traveller. It flies all the way to the southern United States and Mexico for the winter. Geese fly in a V-formation when migrating. Why do you think they fly in this formation? Think about the way you might shape your body if you wanted to travel fast. You would try to be streamlined. The lead goose hits the air with the greatest force. It breaks up the wind so that the wind flows with less resistance over the rest of the flock. Since the lead position is very tiring, the geese take turns being in the lead!

Hibernation

Other animals cope with winter by becoming inactive. This behaviour is called **hibernation**. Animals hibernate in burrows in the ground, in tree trunks, and in snow dens. Hibernating animals include chipmunks (Figure 5), some bats, and ground squirrels. When an animal hibernates, its body temperature drops and its heartbeat and breathing slow down. This allows the hibernating animal to use less energy so that it can live off the fat reserves it stored during the spring and summer. Some hibernating animals, such as chipmunks, also store food, such as nuts and seeds, to eat during the winter months.



Figure 5

The chipmunk spends the entire winter in its underground burrow. It wakes up now and then to eat part of the food it stored over summer.

Do you think of bears when you think of hibernation? In fact, bears are not true hibernators. Their body temperature does drop a few degrees, but they are easily awakened.

▶▶ CHECK YOUR UNDERSTANDING

1. Some people travel south for the winter. Are they migrating? Why or why not?
2. How does hibernating help an animal cope with the winter?
3. Draw an imaginary animal that would be well adapted to life in the Arctic. Explain your animal's adaptations.