

3.2 Adapting to change

Learning objectives

After this topic you will be able to:

- describe how organisms adapt to environmental changes
- describe how competition can lead to adaptation.



▲ Deciduous trees lose their leaves in winter.



▲ The snowshoe hare. Its predator is the Canadian lynx.

You can usually tell what season it is by observing leaves on trees. If the leaves are in bud it is spring, green leaves mean it is summer, shades of orange and brown mean autumn, and when the tree is bare it is winter. Losing leaves is one way that trees change with their environment.

How do trees cope with the seasons?

Plants and animals have to cope with changes in their environment. For example, deciduous trees look different in each season. They grow rapidly during the spring when the weather is wet and warm but lose their leaves in winter. This saves energy. The fallen leaves provide a layer of warmth and protection around the base of the tree. The tree can reuse the nutrients from these leaves too.

A State two advantages of trees losing their leaves in winter.

How do animals cope with the seasons?

Animals have a number of ways of coping with cold winter temperatures, such as:

- hibernation – animals like bears find somewhere warm to sleep through the winter
- migration – animals like birds move somewhere warmer, or somewhere with more food
- grow thicker fur – animals like sheep are kept warm by their thick coat.

B Name three ways that different animals adapt to the winter.

The snowshoe hare

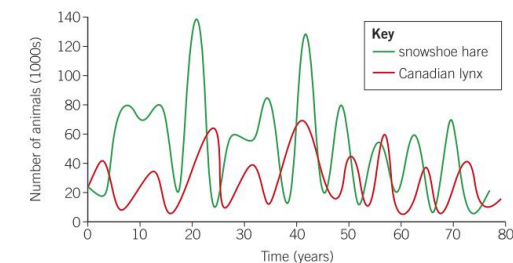
During the winter, snowshoe hares have white fur, which helps them blend in with the snow. When the seasons change to spring and summer, the snowshoe hare's fur turns a reddish-brown. This helps them to blend in with rocks and earth in mountain forests. When they are blended in with their environment it is harder for a predator to see them. This increases their chances of survival.

Predator–prey relationships

Animals have to adapt to changes in their food supply. Only the best competitors will survive to reproduce.

When a predator feeds on just one type of prey, there is an **interdependence** between the predator population and the prey population. This means that changes in the population of one animal directly affects the population of the other. When plotted on a graph this relationship shows a clear pattern.

C State what is meant by interdependence.



▲ Predator–prey graph showing the interdependence of the lynx and the hare.

- When the prey population (hare) increases, the predators (lynx) have more to eat. The lynx survive longer and reproduce more.
- This increases the number of predators.
- The growing predator population eats more prey. The prey numbers fall.
- Eventually there is not enough food for all the predators so their numbers decrease.
- There are now fewer lynx feeding on the hares. The hare population increases, and the cycle starts again.

How do organisms cope with change?

Plants and animals can lose their habitat through fire or climate change. Food supplies may also be reduced by disease. Sudden changes result in increased competition for survival. The organisms best adapted to the change will survive and reproduce, increasing the population of that species. Organisms that are not very well adapted will have to move to another habitat, or die.

Predator–prey graphs

Foxes are predators that eat rabbits. Sketch a graph showing how the fox and rabbit populations change over time.

Key Words

interdependence

Summary Questions

- Copy and complete the sentences below.
A predator–prey relationship shows how the _____ of a predator and its prey are linked. When there are lots of prey, the population of _____ increases. However, a large predator population will cause the _____ population to _____. There is not enough food for all the predators so its population decreases. As a result, the prey population will _____, and the cycle starts again. (5 marks)
- Describe how competition can lead to adaptation. (3 marks)
- Ladybirds with seven spots have spread to the UK from Europe. They are more successful than native UK ladybird, as they eat more aphids and reproduce faster. They also eat other ladybird species. Explain in detail how the population of seven-spotted ladybirds will vary over time. Draw a predator–prey graph as part of your answer. (6 marks)