

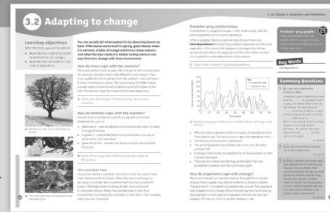
3.2 Adapting to change

Biology NC link:

- differences between species
- changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction.

Working Scientifically NC link:

- interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions.



Band	Outcome	Checkpoint	
		Question	Activity
Developing	Name an environmental change (Level 3).		Starter 1, Main 1
	Give a possible reason for adaptation or extinction (Level 4).	3	Starter 2, Main 1, Main 2, Homework
	Interpret secondary data to describe trends in predator-prey relationships (Level 4).		Maths, Main 2
Secure	Describe how organisms adapt to environmental changes (Level 6).	A, B	Starter 1, Main 1, Plenary 1
	Describe how competition can lead to adaptation (Level 6).	2	Starter 2, Homework
	Interpret secondary data to describe trends and draw simple conclusions about predator-prey relationships (Level 6).		Maths, Main 2
Extending	Explain how organisms are adapted to seasonal changes (Level 7).		Starter 1, Plenary 1
	Explain how competition or long-term environmental change can lead to evolutionary adaptation or extinction (Level 7).	2, 3	Starter 2, Main 1, Main 2, Homework
	Interpret secondary data to explain trends and draw detailed conclusions about predator-prey relationships (Level 8).		Maths, Main 2

Maths

Students draw, extract, and interpret information from graphs about predator-prey populations.

Literacy

Students read and extract information from text to answer questions that follow. Students use scientific terminology when describing adaptations, seasonal changes, and population changes.

APP

Students present numerical data as a graph (AF3), and interpret data to describe trends and draw conclusions (AF5).

Key Words

interdependence

Answers from the student book

In-text questions	<p>A Any two from: saves energy, nutrients can be reused, provide a layer of warmth/protection at the base of the tree.</p> <p>B hibernation, migration, grow thicker fur</p>
Activity	<p>Predator-prey graphs</p> <p>Graph of fox population against rabbit population should resemble that of the snowshoe hare and the Canadian lynx in the student book. When the population of the rabbit is high, the fox population increases. This reduces the number of rabbits, which in turn reduces the number of foxes, and the whole cycle starts again.</p>

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● B2 Chapter 3: Adaptation and inheritance

Summary Questions

- 1 population, predators, prey, decrease, increase (5 marks)
- 2 Changes to a habitat cause an increased competition for survival. Those organisms best adapted to the change will survive and reproduce. This increases the population of that species. Unsuccessful organisms will have to move to another habitat, or die. (3 marks)
- 3 Example answers (6 marks):
Initially, the population of European ladybirds will increase significantly because they can feed on aphids and other ladybird species. Eventually their food supply will decrease, which will lead to starvation for many seven-spotted ladybirds. The population of seven-spotted ladybirds will decrease, which allows the population of aphids to increase. The cycle then starts again. (Students must include a correct predator-prey graph.)



Starter	Support/Extension	Resources
<p>In six months' time (10 min) Students describe possible changes to the organisms in the school grounds in six months' time. If students initially talk about animals grow bigger, steer them towards how deciduous trees change through the season and the presence/absence of hibernating animals. Students should suggest why these changes have occurred as an adaptation to seasonal changes.</p> <p>Winners and losers (10 min) Show an image or a short film of a cheetah hunting. Students identify the adaptations of the cheetah that make it a successful hunter. Introduce the hyena and that cheetahs have low stamina. They often lose their food to hyenas in the wild. This is a good recap of adaptation and competition, and is a useful introduction to the effects on population when animals fail to adapt to a changing environment.</p>	<p>Extension: Encourage students to give further examples of seasonal changes in organisms.</p> <p>Extension: Encourage students to offer further examples of changes in environment. This can lead the discussion to evolution and extinction.</p>	
Main	Support/Extension	Resources
<p>Introduce the idea of seasonal changes and how this links in with adaptation. Explain how adaptation can also be brought about by competition.</p> <p>Climate change and polar bears (20 min) Students read an article about the environmental changes in the Arctic, and the effects of these changes on polar bears and their population before answering questions that follow.</p> <p>Predator-prey relationships (20 min) Students plot a graph to show the number of Canadian wolves in Quebec 2001–13. This graph is drawn on top of an existing graph showing the number of caribou in the same period. Students must interpret the graphs to answer the questions that follow.</p>	<p>Support: Read text as a class or in small groups to ensure students can understand the material given.</p> <p>Support: An access sheet is provided where the predator-prey graphs are already drawn and the questions are simpler.</p>	<p>Activity: Climate change and polar bears</p> <p>Activity: Predator-prey relationships</p>
Plenary	Support/Extension	Resources
<p>Competition or environment (5 min) Students use the interactive resource to decide whether the environment or competition is the cause of the changes provided. Students can use mini-whiteboards to answer each statement, as a way of increasing class participation.</p> <p>Competitive graphs (5 min) Students sketch a graph for a predator-prey relationship, with a third line to show the effect of competition on populations. For example, students consider the populations of zebras, cheetahs, and hyenas when cheetahs and hyenas are hunting the same prey.</p>	<p>Extension: Students explain their answers.</p> <p>Support: Students should concentrate only on the basic predator-prey sketch graph.</p>	<p>Interactive: Competition or environment</p>
Homework		
<p>Ask students to carry out research on a pair of organisms similar to the cheetah and the hyena (where one organism has adapted better than the other). Students write a short paragraph about each of their adaptations, and explain how the population of one has been affected by the other.</p>		

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Resources