Science
Ecosystems

Learning objectives
- Students learn about ecosystems.
- In the project stage, they research an ecosystem and make a poster.

Warmer
Brainstorm a list of animals and write them on the board. Include birds, reptiles, fish and insects.
Write *predator* (an animal that kills and eats other animals) and *prey* (an animal that is hunted and killed by another animal) on the board. Elicit or teach the meanings.
Put students into small groups to decide which of the animals on the board are predators, which are prey, and which are both. Invite students to share their ideas.

1 Write *ecosystem* on the board and elicit its meaning (all the living things in an area and the way they affect each other and the environment).

Ask students to read the text and answer the question in pairs. Check the answer and then ask different students to say what carnivore, herbivore and food chain mean without referring back to the text.
Ask students if they remember the word for someone who does not eat meat or fish (*vegetarian*).

Answer
Most humans are omnivores because they eat animals and plants.

2 Refer students to the food chain again. Monitor as they work in pairs to create a food chain containing a tiger, a wild donkey and grass. Invite a student to come to the board and write the food chain.

Ask students to work in their pairs to create a food chain of their choice. Then invite different pairs to write their food chains on the board. The rest of the class can say whether they are accurate or not.

Answers
grass ➜ wild donkey ➜ tiger

3 Write *food web* on the board and point to the one on page 72 to illustrate what it means. Then ask them what they can see in the pictures (a small bird, a snake, a mouse, an eagle, fish, a frog, an insect, plants).

Monitor as they read text B and complete the paragraph in pairs. Put pairs together to make groups of four and ask them to compare their answers. Invite different students to give their answers.

Ask them to answer the question in text B and ask some other questions about the food web, e.g. 'What isn't eaten by anything?' (an eagle).

Answers
1 and 2 fish mice **3** insects **4 and 5** plants insects
6 and 7 snakes eagles

4 Books closed. Elicit the meanings of *carnivore*, *herbivore* and *omnivore*.

Books open. Put students into small groups and ask questions 1–3 in turn. Give them a short amount of time to discuss each question (referring to the animals in the food web) and write down their answer. Check answers.

Then hold a competition to see which pair can come up with five more carnivores and herbivores the fastest.

Answers
1 eagles, snakes, birds **2** insects **3** fish
4 carnivores: wolf, tiger, lion, bear, leopard; herbivores: deer, cow, sheep, mouse, rabbit

5 Ask students to look at the animals in the box and check meaning by asking students to draw or mime the animals. Drill pronunciation, paying attention to *mosquito* /məˈskiː.təʊ/ and then ask them to work with a new partner to decide which categories the animals are in.

Write the category headings on the board and invite different students to call out the animals which belong in each category. Ask students what each animal eats.

Answers
carnivores: bat, cat, eagle
herbivores: cow, mouse, rabbit, sheep
omnivores: fly, mosquito

6 Put students into small groups to create a food web using some of the animals from exercise 5, as well as humans, carrots and grass.

Monitor and help as they are working. Remind them that ➜ means *is eaten by*, not *eats*.

Invite different groups to draw their food webs on the board. Ask the class to say which one they think is the best and why.

Mixed ability
Limit the number of animals in the food web to four or five for weaker students. Encourage stronger students to include as many animals as possible.

7 Direct students to the pyramid of numbers and ask them what they think it represents. Ask them to raise their hands if they think there are more fish than sharks. Repeat for those who think there are more sharks than fish. Tell them to read text C and check their ideas.

Answer
Yes, there are more fish than sharks.

8 Draw a pyramid with four sections on the board. Then invite a confident student to come to the board to complete the pyramid with the animals. Ask the class 'Is this correct?' If it is not correct, invite another student to come to the board and make the corrections.

Answer
1 plants **2** mice **3** snakes **4** eagles

9 2.07 Write *pollution* on the board and elicit its meaning (damage caused to water, air, etc. by harmful substances or waste). Ask students to work in pairs to brainstorm types of pollution (e.g. exhaust fumes from cars, waste chemicals from factories). Invite pairs to share their ideas with the class.

Hold a brief class discussion about why pollution is harmful to ecosystems (for example, chemicals which pollute rivers mean that plants and fish may die, which affects animals further up in the food chain).
Ask students to read the chart. Tell them that only one answer in each pair is correct. Put them into small groups to decide which answers are correct.

Play the recording for them to find out whether their answers are correct. Invite different students to read out the order of events and write them on the board.

Audioscript
Man: Ecosystems develop over long periods of time, but it's easy to damage them very quickly. Pollution is something that often damages ecosystems. Pollution could be poisonous gases from the exhausts of cars and planes.

Woman: Pollution in a river could be, for example, chemicals from a factory or from an accident on a boat. In this lesson, we're going to imagine that pollution has killed most of the fish in a river ecosystem. How would this affect other animals in the ecosystem?

Man: Small fish are an important food for small birds and some frogs. So if there aren't many fish, the frogs and the birds will have less food. Birds can easily fly a few kilometres to another area to find food, but frogs can't move very far or very quickly. So if there isn't anything apart from fish for the frogs to eat, they might die.

Woman: But the story of the ecosystem doesn't end there. We have to ask ourselves, 'What eats frogs?' The answer is bigger birds like eagles eat frogs. So if the frogs die, then eagles won't have any frogs to eat, so then they might fly to another place to find food as well.

Man: Now, imagine that lots of rabbits live near the river. What will happen to the rabbits if there aren't any eagles?

Woman: If there aren't any eagles, then the eagles won't eat the rabbits, so there'll be more rabbits.

Man: Rabbits eat grass and other plants. So river pollution could mean that there aren't as many plants near the river. So now we can see how easy it is to damage an ecosystem.

Woman: That's right. When one part of the ecosystem is reduced or dies, it affects the next animals or plants in the food chain. Everything in an ecosystem is so connected.

Answers
1 B **2** A **3** B **4** A **5** A **6** A

Cooler
Make an animal noise for students to say which animal it belongs to. The first student to call out the answer using the correct pronunciation then takes a turn to make an animal noise for the rest of the class to guess. Continue until as many students as possible have had a turn at making an animal noise.

Project
Tell students that they are going to produce an ecosystem poster. Brainstorm a list of ecosystems and write them on the board, e.g. rivers, oceans, ponds, grasslands, deserts, coastlines, mountains, forests, rainforests.
Ask students to work in pairs to research one of the ecosystems online. Tell them to find out about one plant and four animals in the ecosystem. Remind them to make notes on what the animals eat, and how many of each animal live in the ecosystem.
Students then plan their posters, creating food webs and pyramids. Check their work is accurate.
Students create their posters. Put them into small groups to present their posters to the other students. Ask confident students to present and explain their posters to the class.
Display the posters around the classroom for everyone to read. You could take a class vote on the most interesting one.