

How does food production affect ecosystems?

Ecosystems, food webs and bioaccumulation



What are we going to learn?

Learning objectives:

1. Explain how organisms in an ecosystem depend on each other, using food webs as evidence.
2. Describe how agricultural practices can disrupt food webs and reduce biodiversity.
3. Explain how toxic materials accumulate through a food chain and the consequences for organisms.

Key word:

Interdependence: all living things in an ecosystem rely on one another for survival.

Bioaccumulation: the gradual build-up of toxic, non-biodegradable chemicals (like heavy metals or pesticides) inside a living organism over time.

Starter - build a food web

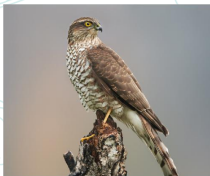
Arrange the cards into a food web on your desk and copy into your exercise book using arrows to show the energy transfer. Then answer the questions below.



1. What would happen to the sparrowhawk if the rabbit population disappeared?
2. Which organism do all other organisms ultimately depend on, and why?

What happens to the web when the landscape is changed by humans? *Key point 1*

Apex predator



Secondary consumer



Primary consumer



Producer



What happens to the web when the landscape is changed by humans? *Key point 1*



What happens to the organisms? *Key point 2*



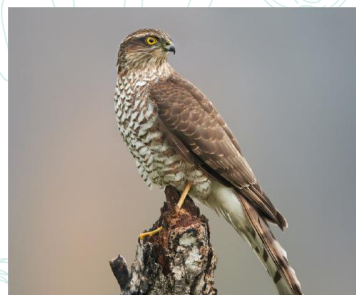
Pesticide sprayed



...absorbs
pesticide from
soil



...eats many
plants over its
lifetime



...eats many mice
over its lifetime

=

Toxic
levels

Bioaccumulation: the gradual build-up of toxic, non-biodegradable chemicals (like heavy metals or pesticides) inside a living organism over time.

Bioaccumulation: let's investigate the data

Organism	Pesticide concentration (ppm)
Wheat crop	0.02
Field vole	0.5
Kestrel	12
Peregrine falcon	160

Tasks:

1. Plot a bar chart of the data in your book.
2. Describe the pattern.
3. Explain how pesticides reached the field vole.
4. Explain why the peregrine falcon has the highest concentration - use bioaccumulation in your answer.
5. Predict: what happens to the falcon's concentration over its lifetime?

Extension: ask for the eutrophication sequencing cards and then answer, "*Is eutrophication another example of how organisms are affected by their environment?*" Explain your reasoning using evidence from the cards.

Independent task

A farmer converts a mixed hedgerow habitat into a monoculture field to grow crops for animal feed. Using your knowledge of food webs and the accumulation of toxic materials, explain two ways this could affect the ecosystem.



Hint 1

Think about the food web. What happens to biodiversity and interdependence?

Hint 2

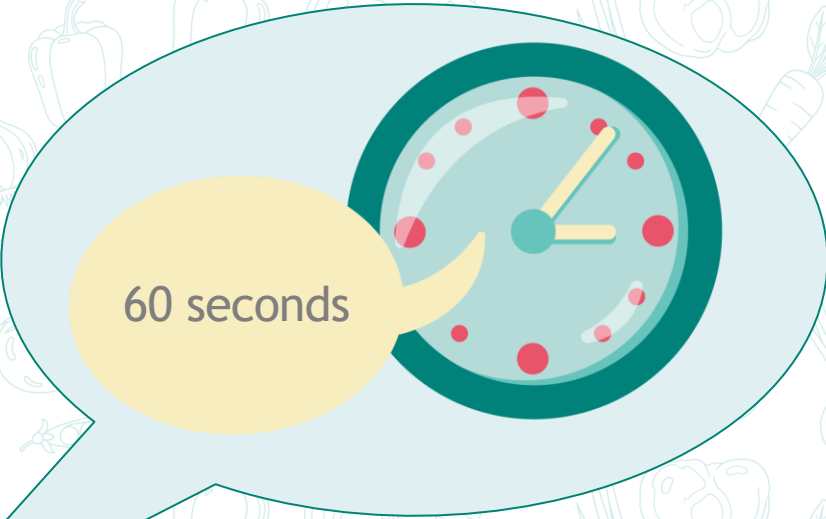
Think about pesticides. What does non-biodegradable mean for apex predators?

Stretch

Can you explain the mechanism, not just the outcome? Why does concentration increase up the chain?

Word bank: habitat - food web - interdependence - producers - consumers - pesticides - bioaccumulation - biodiversity - non-biodegradable - accumulate - apex predator - trophic level - toxic

Plenary - convince a sceptic



60 seconds

You have 60 seconds!

How can you use your knowledge and key terms from today to convince someone that farming practices are harming biodiversity?



How does food production affect ecosystems?