How Humans Affect Biodiversity

Answer the following questions:

1. State the definition of biodiversity.
   The variety of different species in an ecosystem
2. State the definition of an ecosystem.
   The interaction of a community of organisms with the non-living parts of their habitat
3. Why is high biodiversity important for an ecosystem?
   Each species is not dependent on just one other species
4. State the type of sampling that would be used to estimate the total population of dandelions in a field.
   Random sampling
5. Explain why it is important to take repeat measurements.
   To ensure that data is accurate.

Do Now

How Humans Affect Biodiversity

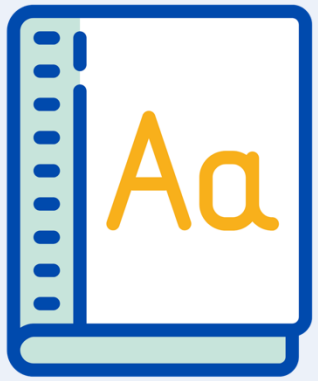
B3.2.3

Science Mastery

Following this lesson, students will be able to:

- State that the growth of the human population has increased demand for resources
- Describe the harmful effects that humans are having on biodiversity
- Explain why scientific data can sometimes be uncertain or incomplete

Key Words:



biodiversity **population**

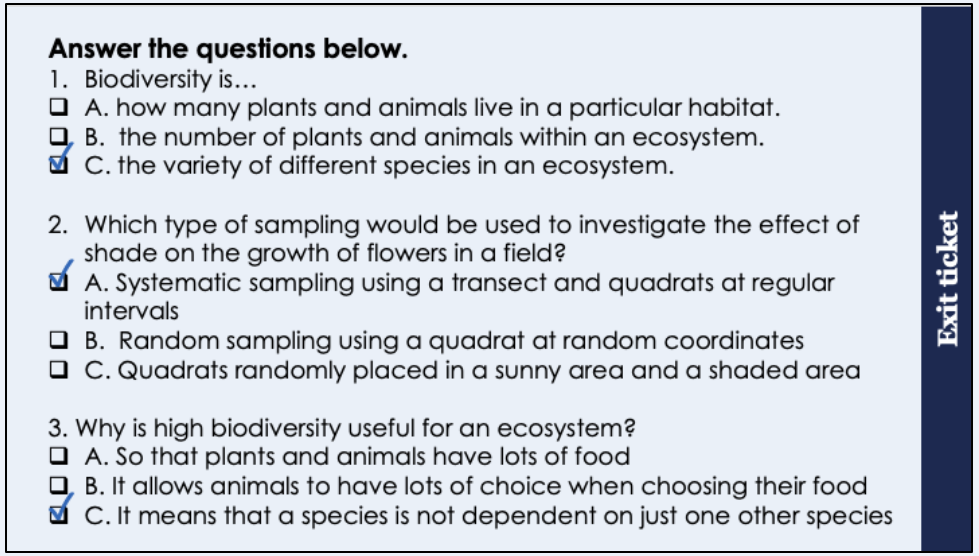
deforestation **resources**

Lesson Objectives

This is the fix-it portion of the lesson

The **fix-it** is an opportunity to respond to gaps in knowledge, especially those identified by the previous lesson's exit ticket.

- The teacher should customise this slide as needed, to facilitate
  - **reteach**, **explanation, demonstration** or **modelling** of ideas and concepts that students have not yet grasped or have misunderstood.
  - **practise** answering specific questions or of key skills.
  - **redrafting** or **improving** previous work.



Fix-it

Human Effects on Biodiversity

Huge growth of the human **population** means more **resources** are used and more **waste** is produced

Many human activities are **reducing biodiversity** on Earth

For future food sources and human **survival**, action must be taken now to maintain biodiversity

Global population has increased from 1 billion in 1800 to 7.9 billion in 2020

Human Effects on Biodiversity

Introducing **non-indigenous** species can reduce biodiversity if the species out-competes or kills **indigenous** species

This could mean the **non-indigenous** species:

- Is a **predator** to indigenous species
- **Outcompetes** indigenous species for food
- Destroys the **habitats** of indigenous species

Squirrels in the UK

The red squirrel is indigenous to the UK, the grey squirrel was introduced in the 1800s from America. Now the grey squirrel is dominant across the UK.

- *Grey squirrels can carry a disease that is fatal to red squirrels but does not affect grey squirrels.*
- *Grey squirrels are more confident and aggressive*
- *Grey squirrels eat acorns when they are still green, whereas red squirrels wait for them to ripen*

Why do you think the introduction of the grey squirrel caused a reduction in biodiversity?

Talk Task

Human Effects on Biodiversity

Humans reduce the amount of **land available** through:

- building
- quarrying
- farming
- waste disposal
- deforestation
  - **Deforestation** is used for cattle farming, rice farming and for growing crops used as biofuel

Human Effects on Biodiversity

Peat is formed when dead plant material cannot decay because of **acidic** and **anaerobic** conditions.

Peat bogs are being destroyed to provide garden and farming **compost**

Decaying or burning peat releases **carbon dioxide** into the atmosphere

A peat bog

Farmland with compost

Quick Quiz

Answer the following questions:

a. What are the effects of the human population increasing?

More resources used, more waste produced

b. What is the disadvantage of using peat bogs for compost?

Habitats are being destroyed, decreasing biodiversity

c. Why is it important for humans that biodiversity is maintained?

So that humans are not dependent on one food source alone

d. Name three ways that humans are destroying animal habitats.

Waste disposal, pollution, farming, deforestation, destroying peat bogs

Check for understanding

Scientific data can sometimes be uncertain or incomplete

Ecologists measure things in ecosystems to assess what is happening

Environmental data can often be **uncertain or incomplete.**

Scientists can decrease the uncertainty in their data by taking many readings and repeating their experiments to make their data more **accurate**.

Example: images from the Brazilian Rainforest

Drill

1. State one human activity that reduces biodiversity.
2. Define peat.
3. What are the conditions required for peat bogs to form?
4. Why are peat bogs being destroyed?
5. Name the greenhouse gas released when peat bogs are burned.
6. State how digging up peat bogs affects biodiversity.
7. Explain why.
8. Why are scientists sometimes sceptical of environmental data?
9. How do scientists improve the accuracy of their data?

Check for understanding

Drill answers

1. Introducing non-indigenous species, reducing the land available, digging up peat bogs, waste disposal, pollution
2. Peat is formed when dead plant material cannot decay because of acidic and anaerobic conditions.
3. Waterlogged land – lack of oxygen
4. To provide garden and farming compost
5. Carbon dioxide
6. Decreases biodiversity
7. Because the habitat of many organisms is destroyed.
8. Environmental data can often be uncertain or incomplete.
9. By taking many readings and repeating their experiments.

Check for understanding

I: Explain using *scientific understanding to make something clear or state the reason for something happening*

Example question:

In the last 250 years the concentration of carbon dioxide in the Earth's atmosphere has risen.

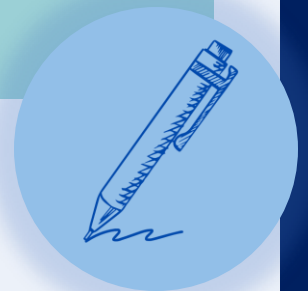
Explain how an increase in carbon dioxide concentration can decrease biodiversity.

Model answer:

- rise in carbon dioxide causes global warming
- global warming causes extreme weather patterns
- such as rise in sea levels, change in rainfall, droughts
- rise in sea levels means habitats will change due to flooding
- increased rainfall will increase water levels
- droughts can affect plant growth
- changes can cause loss of or damage to habitats
- which will affect animal and plant distributions
- which decreases biodiversity

To 'explain' your answer should:

- Begin with a **scientific statement**.
- Use 'this means that', 'because' or 'so' **to link your statement to the question**.



Writing like a scientist

We: Explain using *scientific understanding to make something clear or state the reason for something happening*

Example question:

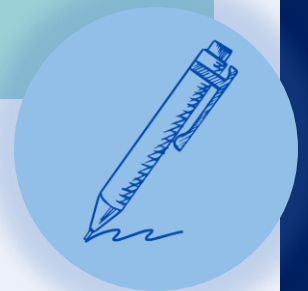
Explain how deforestation can decrease biodiversity.

Model answer:

- Loss of habitat for animals
- Less trees to absorb carbon dioxide by photosynthesis
- This leads to a rise in carbon dioxide which causes global warming
- Global warming causes extreme weather patterns
- This causes loss of habitat
- And change in weather patterns which affect plant growth

To 'explain' your answer should:

- Begin with a **scientific statement**.
- Use 'this means that', 'because' or 'so' **to link your statement to the question**.



Writing like a scientist

You: Explain using *scientific understanding to make something clear or state the reason for something happening*

Example question:

Explain how landfill sites can decrease biodiversity.

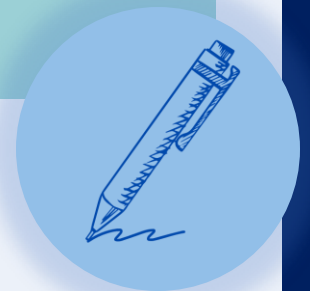
Model answer:

- Landfill sites take up space
- This causes habitat loss

- Landfill sites can cause water pollution in nearby rivers/lakes
- This can damage habitat for aquatic life

To 'explain' your answer should:

- Begin with a **scientific statement**.
- Use 'this means that', 'because' or 'so' **to link your statement to the question**.



Writing like a scientist

Answer the questions below.

1. Which statement is correct?

- ☐ A. It is fine to destroy peat bogs as long as peat is not burnt
- ☑ B. Peat bogs are a very large carbon store
- ☐ C. No species can live in a peat bog as it is acidic

2. Which best explains an effect of a growing population?

- ☐ A. Humans need more food than animals so more crops have to be grown
- ☐ B. More humans are growing bigger so need more food
- ☑ C. Humans are destroying habitats to be able to grow more crops

3. Which of these actions would not decrease biodiversity?

- ☑ A. Maintaining natural land
- ☐ B. Introducing a new species into an ecosystem
- ☐ C. Clearing forests to grow one single crop

Exit ticket

Feedback

Lesson B3.2.3	
What was good about this lesson?	What can we do to improve this lesson?

Send us your feedback by clicking this link
or by emailing sciencemastery@arkonline.org
Thank you!