Biodiversity

Answer the following questions:
1. State the definition of an organism.
   Any living thing
2. State the definition of a population.
   A group of the same organisms (the same species)
3. What do plants compete for?
   Water, light, minerals and space.
4. Describe where producers are always found in food chains or webs.
   At the start/at the bottom/as the first level
5. Calculate the mean of the following numbers:
   12, 15, 18, 11, 24
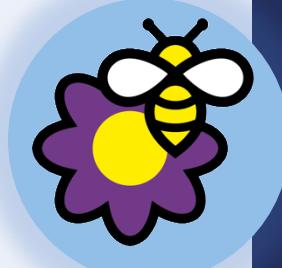
   12+15+18+11+24 = 80
   80 / 5 = 16

Biodiversity

## B3.2.2
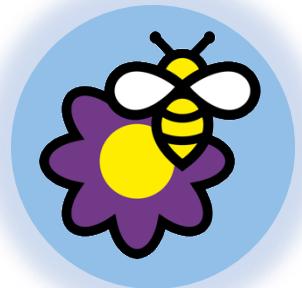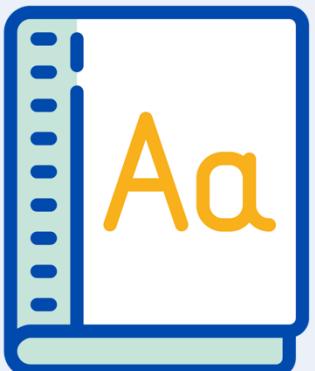
Science
Mastery

Following this lesson, students will be able to:

- State the definition of biodiversity

- Describe how biodiversity can be measured

- Explain why high biodiversity is important for an ecosystem

Key Words:

biodiversity   abundance   sample

quadrat   transect   ecosystem

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.

Answer the questions below.
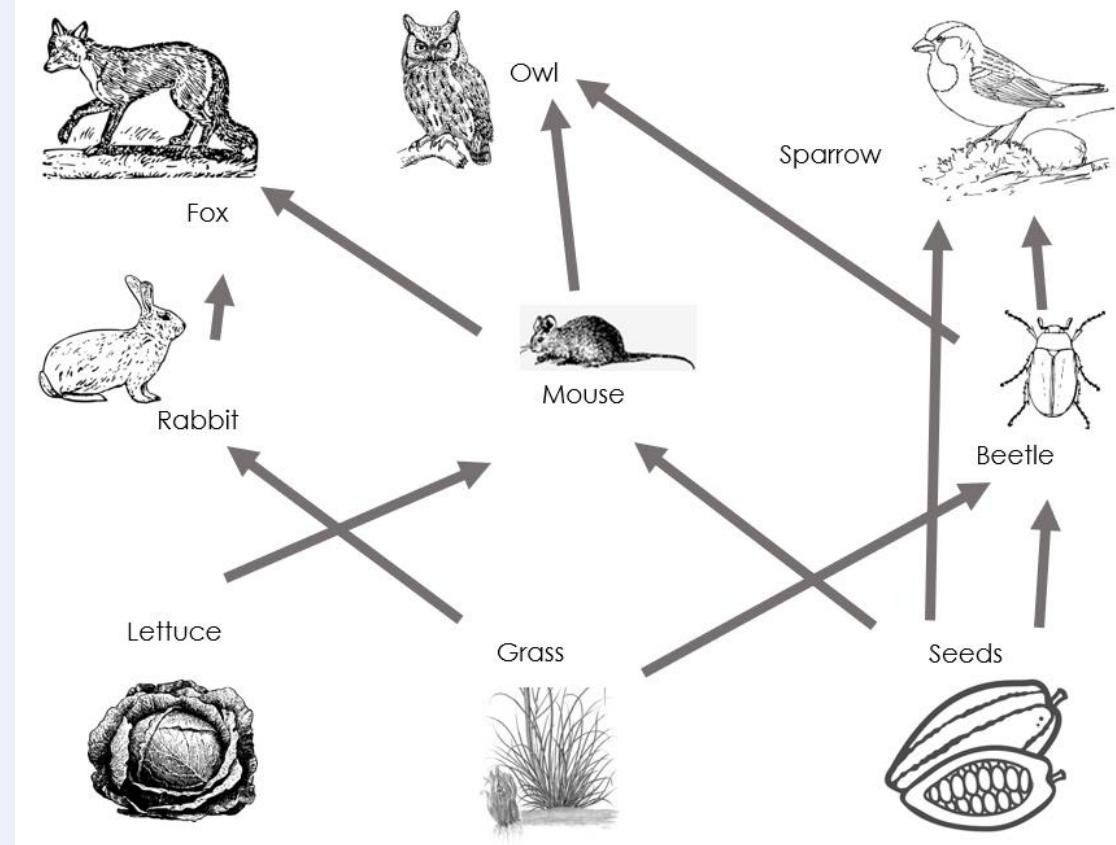
1. Which best explains what the arrows on a food chain or food web represent?
   - ☐ A. Which animals are being eaten
   - ☑ B. The direction of energy transfer
   - ☐ C. Producers, primary consumers and secondary consumers

2. A primary consumer is…
   - ☐ A. A carnivore that only eats plants
   - ☐ B. A herbivore that eats other animals
   - ☑ C. A herbivore that eats plants or algae

3. What is the correct definition of a habitat?
   - ☐ A. The interaction between a community and the non-living parts of their environment
   - ☑ B. The place where an organism lives
   - ☐ C. Forest, ocean or desert

Biodiversity

Biodiversity is the **variety** of all the different **species** in an ecosystem

High biodiversity means that an ecosystem is **stable**

Each species is not dependent on just one other species
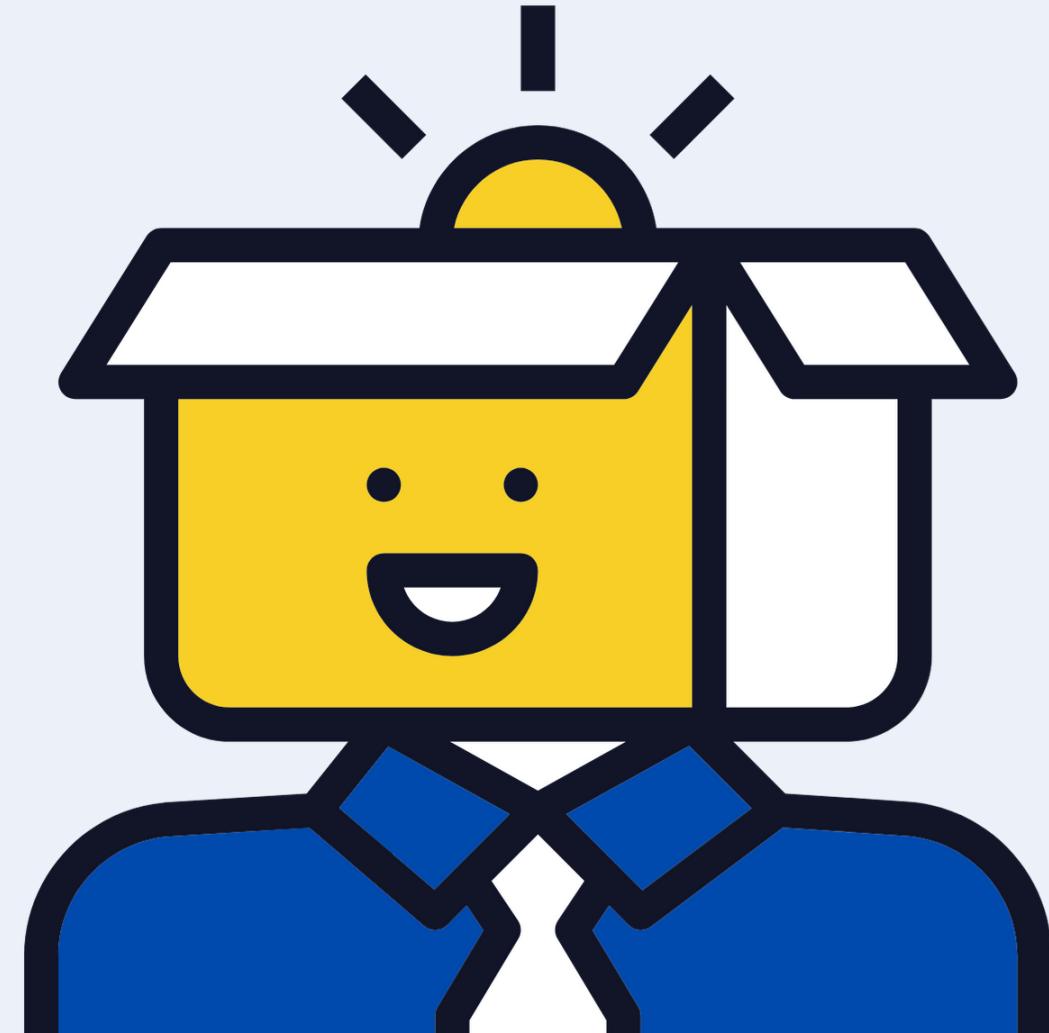
Think outside the box!

Why is biodiversity something that humans should be concerned about?

How many different foods do humans eat?

What would happen if we only had one food source?

What would happen if that food source was at risk?

Biodiversity

Biodiversity of a habitat can be measured using **sampling** techniques

This is a method of counting the **abundance** of different species
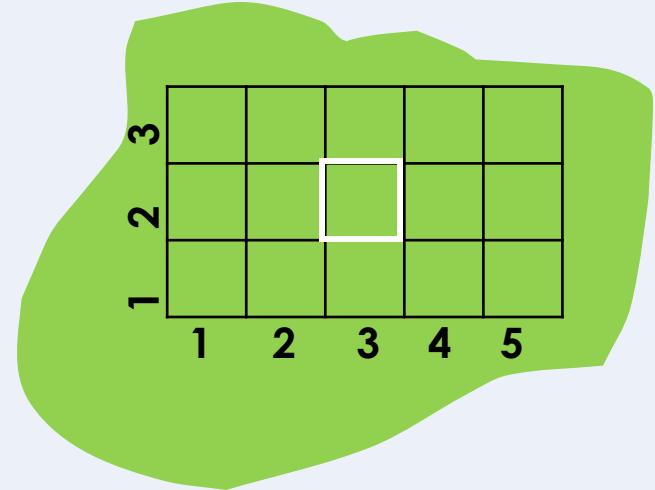
Name of habitat sampled	Number of different plant species
Football field	4
Forest	17
Farmland	2

Sampling techniques

The two most common sampling techniques are:
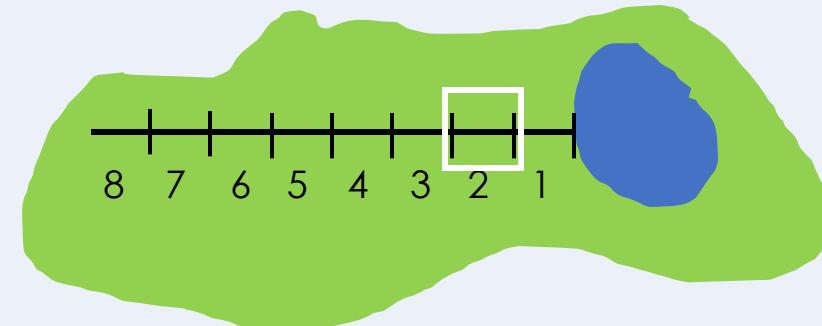
Random sampling
- Placing quadrats at **random coordinates**
- Used for investigating the number of organisms in a species, species diversity or percentage cover

Systematic sampling
- Placing quadrats at **regular intervals** along a transect line
- Used for investigating the **effect** of an abiotic factor
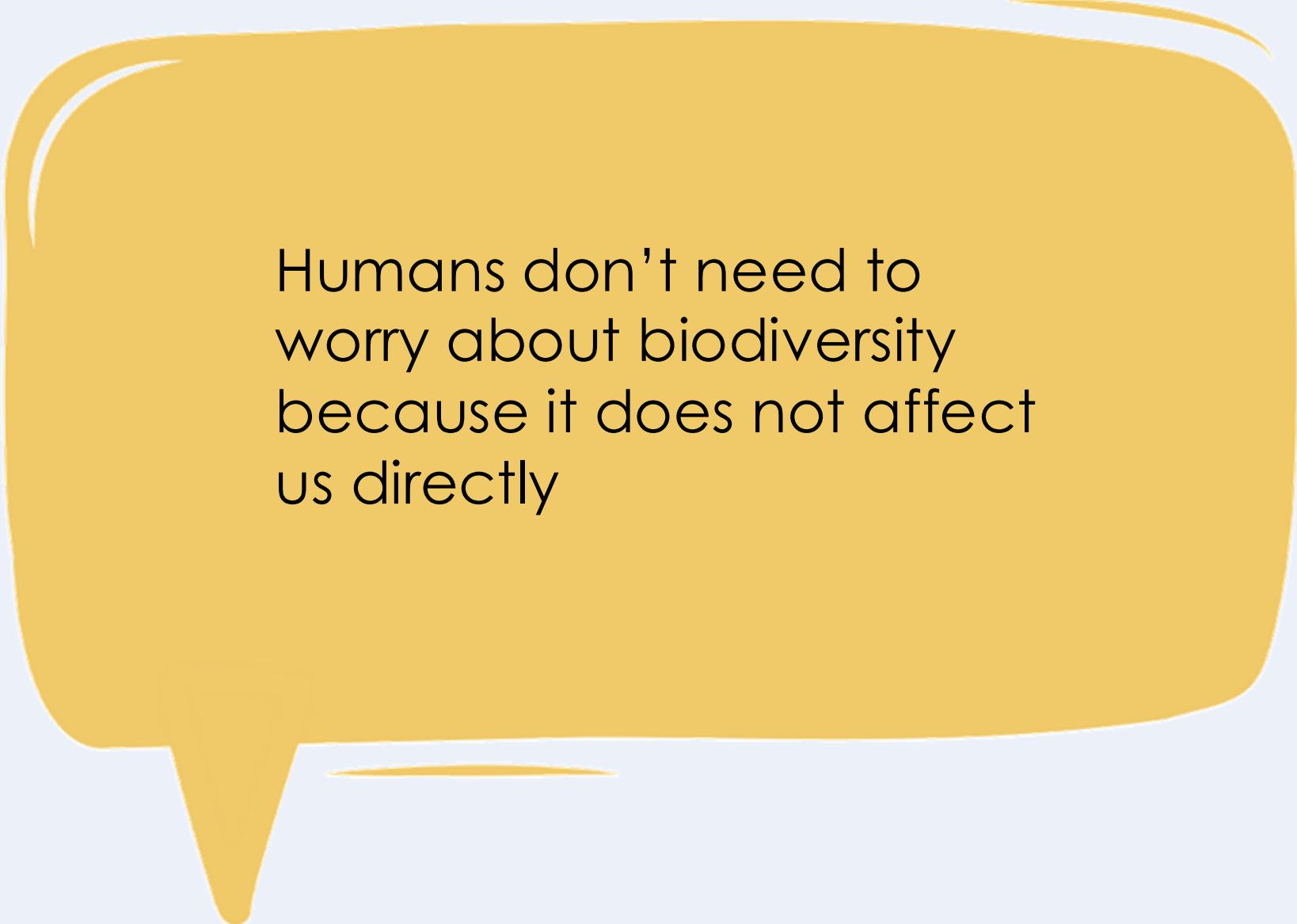
Quick Quiz

Determine if the following statements are true or false:

a. Biodiversity is the variety of different species in an ecosystem **True**

b. Low biodiversity means that species are not dependent on only one food source **False**

c. Sampling techniques can be used to measure the abundance of different species **True**

d. Biodiversity only refers to species of plants **False**

e. A transect is used to randomly sample the species diversity within a habitat **False**

Is this correct?

Humans don't need to worry about biodiversity because it does not affect us directly

Drill

1. Define biodiversity
2. Name the two sampling techniques used to measure biodiversity
3. Name two pieces of equipment required for these sampling techniques
4. Calculate the total area of a field if it is 20m long and 40m wide.
5. Describe how you would expect the distribution of plants to change as you move further away from a large, shady tree.
6. Explain your answer.
7. Name one biotic factor
8. Name one abiotic factor

Drill answers

1. Biodiversity is the variety of all the different species in an ecosystem
2. Random and systematic
3. Quadrat and tape measure
4. 20 x 40 = 800m^2
5. The number of plants would increase
6. More sunlight means the plants can photosynthesis more and grow.
7. Predators, prey availability, disease
8. Sunlight, pH of soil, water, temperature, nutrient availability, moisture levels of the soil

Check for understanding

I: Describe *to recall facts, events or processes in an accurate way*

Example question:

Describe a method to estimate the population of daisies in a field that is 20m x 20m.

Model answer:

- Place a quadrat at a set of coordinates chosen by a random number generator
- Count the number of daisies in the quadrat
- Repeat at other coordinates
- Calculate a mean number of daisies in each quadrat
- Area of field = 20 x 20 = 400m^2
- Area sampled = 400m^2 x number of quadrats used

- Estimated pop size = $\frac{(total\ area)}{area\ sampled}$ x mean number of daisies

To 'describe', your answer should:

- Use **bullet points** to keep your answer clear
- Cover enough points to **fully answer** the question
- Use scientific **keywords** in your answer
- '**Say what you see**' if there is a diagram, graph or table.

Writing like a scientist

We: Describe *to recall facts, events or processes in an accurate way*

Example question:
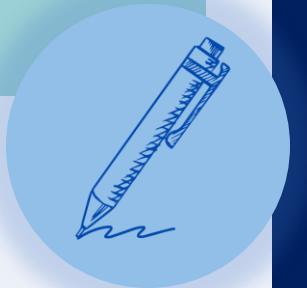
Describe a method to investigate how the increasing distance from the school affects the number of daisies growing in the field.

Model answer:

- Lay out a transect (at 90 degrees to the school)

- Place <u>quadrat</u> at intervals along the transect

- Count the number of daisies at each distance

- Repeat

- Calculate the mean at each distance

To 'describe', your answer should:

- Use **bullet points** to keep your answer clear
- Cover enough points to **fully answer** the question
- Use scientific **keywords** in your answer
- '**Say what you see**' if there is a diagram, graph or table.

Writing like a scientist

You: Describe *to recall facts, events or processes in an accurate way*

Example question:
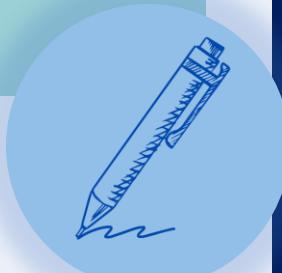
Describe a method to investigate how the increasing distance from a river affects the number of dandelions in a field. You should explain how to use a transect in your method.

Model answer:

- Place transect at 90 degrees to the river

- Place <u>quadrat</u> at intervals along the transect

- Count the number of dandelions at each distance

- Repeat

- Calculate the mean at each distance

To 'describe', your answer should:

- Use **bullet points** to keep your answer clear
- Cover enough points to **fully answer** the question
- Use scientific **keywords** in your answer
- '**Say what you see**' if there is a diagram, graph or table.

Biodiversity Practical

Part 1: *Random sampling*

Measure the population size of a species in a habitat.

Procedure:

1. *Use a random number generator to select 10 sets of co-ordinates (where the quadrats will be placed).*

2. *Count the number of daisies ( ) and marigold ( ) inside the quadrat (if only part of a flower is inside the quadrat it still counts).*

3. *Record the number of daisies and marigold flowers in each quadrat.*

4. *Calculate the average (mean) number of each plant in a quadrat.*

Quadrat	1	2	3	4	5	6	7	8	9	10	mean
daisy											
marigold											

Answer the questions below.

1. Biodiversity is…
❑ A. how many plants and animals live in a particular habitat.
❑ B. the number of plants and animals within an ecosystem.
☑ C. the variety of different species in an ecosystem.

2. Which type of sampling would be used to investigate the effect of shade on the growth of flowers in a field?
☑ A. Systematic sampling using a transect and quadrats at regular intervals
❑ B. Random sampling using a quadrat at random coordinates
❑ C. Quadrats randomly placed in a sunny area and a shaded area

3. Why is high biodiversity useful for an ecosystem?
❑ A. So that plants and animals have lots of food
❑ B. It allows animals to have lots of choice when choosing their food
☑ C. It means that a species is not dependent on just one other species

Exit ticket

Lesson B3.2.2	
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!