

# Feeding relationships: practice questions

7 questions · 23 marks · mark scheme at the back

For Pearson Edexcel International GCSE Biology 4BI1 and Science (Double Award) 4SD0. **Biology only** is not in the Double Award and is only examined on Paper 2.

Name .....

Total ..... / 23

**1** In the food chain grass → grasshopper → frog → snake, which organism is the tertiary consumer? [1 mark]

- A. ☐ Grass
- B. ☐ Grasshopper
- C. ☐ Frog
- D. ☐ Snake

**2** Describe the role of decomposers in an ecosystem. [3 marks]

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**3** The table shows what some organisms in a meadow are eaten by. Use it to answer the questions. (a) Write a food chain with three organisms that ends with the buzzard. (2) (b) Name one secondary consumer in the meadow. (1) (c) Suggest what would happen to the rabbit population if all the mice died. (1) [4 marks]

| Feeding relationships in a meadow |               |
|-----------------------------------|---------------|
| Organism                          | Eaten by      |
| Grass                             | Rabbit, mouse |
| Rabbit                            | Fox, buzzard  |
| Mouse                             | Fox, owl      |

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- 4** A food chain is: one oak tree → 1000 caterpillars → 5 blue tits. Explain why a pyramid of number for this food chain is not pyramid-shaped but a pyramid of biomass would be. **[3 marks]**

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- 5** The producers in a lake store 15 000 kJ of energy. The primary consumers gain 1200 kJ of this energy. Calculate the percentage of energy transferred from the producers to the primary consumers. **[2 marks]**

Answer = .....

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- 6** Explain why only about 10% of the energy in one trophic level is transferred to the next trophic level. **[4 marks]**

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**7** A food chain is: grass → grasshopper → frog → snake. Describe how energy and substances pass along this food chain, and explain why there is much less biomass at the snake level than at the grass level. **[6 marks]**

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## Mark scheme

One mark for each point unless a maximum is given. Words in brackets are not needed for the mark.

**1. [1]**

**D D (1)**

**2. [3]**

- break down dead plants and animals / waste (1)
- by secreting enzymes (onto the material) (1)
- small soluble molecules diffuse into the decomposer / mineral ions or nutrients are returned to the soil for plants to take up (1)

**3. [4]**

- (a) a food chain in the correct order, e.g. grass → rabbit → buzzard (1)
- arrows pointing from the food to the organism that eats it (1)
- (b) fox / buzzard / owl (1)
- (c) rabbit numbers fall because the foxes / predators eat more rabbits (1)
- allow for (c): rabbit numbers rise because there is less competition for grass

**4. [3]**

- a pyramid of number only counts the organisms and ignores their size (1)
- there is one (very large) oak tree supporting many caterpillars, so the bottom bar is the narrowest (1)
- a pyramid of biomass shows the mass of living material, and the oak tree has the greatest mass (1)

**5. [2]**

- $1200 \div 15\,000 \times 100$  (1)
- 8 (%) (1)
- award 2 marks for the correct answer with no working

**6. [4]**

- not all of the organism is eaten, for example bones / roots (1)
- some of what is eaten is not digested and is lost as faeces (1)
- energy is released by respiration and lost as heat to the surroundings (1)
- energy is used for movement / keeping warm (1)
- energy is lost in waste such as urine (1)
- Max 4

## 7. [6]

|                              |                                                                                                                                                                                                                                                |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Level 3</b><br><b>5-6</b> | A detailed, well-structured answer that describes the transfer of both energy and substances along the chain by feeding, and explains at least three ways energy or biomass is lost, linking this to the decrease in biomass at higher levels. |
| <b>Level 2</b><br><b>3-4</b> | Describes transfer along the chain and gives at least two ways energy or biomass is lost, with a partial link to the decrease in biomass.                                                                                                      |
| <b>Level 1</b><br><b>1-2</b> | States that energy passes along the chain or that energy is lost, with little or no explanation.                                                                                                                                               |

### Indicative content

- grass absorbs light energy and uses it in photosynthesis to make biomass; this stores energy
- energy and substances (carbon compounds) pass to each organism when it eats the one before
- only about 10% of energy is transferred at each step
- losses: parts not eaten (bones, roots); not digested and lost in faeces
- losses: respiration releases energy as heat; energy used for movement and keeping warm; waste such as urine
- so less energy and biomass is available at each higher trophic level, and the snake level has the least