

Energy Pathways: The Meadow Ecosystem

Learning objective: To identify and describe the roles of producers, predators, and prey within a local food chain.

Read the passage carefully, then answer the questions below. Think carefully about how energy flows through the ecosystem.

In a lush British meadow, Bea the honeybee observes a fascinating dance of energy. Every food chain begins with a producer, typically a green plant that harnesses sunlight through photosynthesis. In this meadow, the tall, swaying grasses act as the primary producer. A hungry field mouse acts as a primary consumer, nibbling on grass seeds to gain energy. However, the mouse must stay alert, for it is the prey of the swift kestrel. The kestrel, a carnivore, sits atop this specific chain as an apex predator. When the kestrel eventually passes, decomposers like fungi break down the nutrients, returning them to the soil to nourish the grass once more. This cycle is a delicate balance; if the population of mice fluctuates, the entire ecosystem reacts. Energy is transferred at each stage, though some is lost as heat. Bea understands that every creature, from the smallest blade of grass to the soaring bird, plays a vital role in maintaining the health and stability of our natural world.

Word bank: producer · consumer · herbivore · carnivore · ecosystem · predator · prey · photosynthesis

1. Identify the primary producer and the primary consumer mentioned in the text. (2 marks) (2 marks)

2. According to the passage, what happens to the energy that is not passed on to the next animal in the chain? (1 mark) (1 mark)

3. Explain why the kestrel is described as an 'apex predator' based on its position in this food chain. (2 marks) (2 marks)

4. What might happen to the meadow ecosystem if a disease caused the population of field mice to decrease significantly? Justify your answer. (3 marks) (3 marks)

5. Do you agree with Bea that every creature plays an equally vital role in the ecosystem? Justify your answer using evidence from the text. (3 marks) (3 marks)

Draw: Draw a labelled food chain diagram based on the passage, including the sun as the energy source, the grass, the field mouse, and the kestrel. Add arrows to show the direction of energy flow.



Extension challenge: Research a woodland food web. Compare and contrast a simple food chain with a complex food web. Why do you think most scientists prefer to study food webs rather than individual food chains when assessing the health of a habitat?