Food webs and ecological pyramids

Student activity • observation and reasoning

YEAR 11 / LESSON 106 / BIOLOGY + SCIENCE (DOUBLE AWARD)

The question

What do food-web arrows and different pyramids represent?

Use the supplied examples, record your reasoning and correct it using evidence.

Equipment

- Student booklet, pencil and ruler
- Organism cards and blank pyramid templates

Paper, modelling and written reasoning only. No chemicals or biological samples are handled.

Course coverage: Shared Biology / Double Award: 4.6–4.8. Feeding relationships and transfer.

Plan, model or apparatus sketch

Draw and label the apparatus or biological model; identify one limitation.

Method and reasoning

Read the whole sequence before starting

YEAR 11 / LESSON 106 / BIOLOGY + SCIENCE (DOUBLE AWARD)

1. Construct a fictional web with grass, insects, rabbits, birds, predators and decomposers, drawing arrows from food to consumer.

2. Identify producer, primary, secondary and tertiary consumer roles, allowing one species to occupy more than one trophic level.

3. Explain decomposers' role in processing dead material from multiple levels.

4. Compare pyramids of number, biomass and energy transfer, stating the quantity and units each represents.

5. Explain how a single tree can support many insects and make a pyramid of number unlike a biomass pyramid.

6. Distinguish matter cycling from energy flow and predict a change without assuming a food web has only one pathway.

Cleanup

- Return models and keep the corrected work.

Record your evidence

Blank spaces are for your own work

YEAR 11 / LESSON 106 / BIOLOGY + SCIENCE (DOUBLE AWARD)

Reference and task data

Food-web arrows show transfer from the organism consumed to the consumer. Biomass is a stock at a time; energy transfer is measured over an interval. Pyramids of number or biomass can have unusual shapes; an energy-transfer pyramid accounts for diminishing available energy between levels. Fictional web links: grass is eaten by grasshoppers and rabbits; grasshoppers are eaten by sparrows; rabbits and sparrows are eaten by foxes. Add decomposers receiving dead material from all these organisms. A separate invented number-pyramid example is one tree supporting 200 insects; it is not a biomass measurement.

Example / trial	Observation / evidence	Explanation / limit
Evidence / comparison		
Explanation		
Limit / correction		

Show your calculations, labelled model or correction here.

Explain and evaluate

Use evidence and show calculation steps where relevant

YEAR 11 / LESSON 106 / BIOLOGY + SCIENCE (DOUBLE AWARD)

1. Which way do arrows point?

2. What is a producer?

3. Can an omnivore occupy multiple levels?

4. What do decomposers use?

5. Why can a number pyramid be inverted?

6. Is energy recycled like carbon atoms?