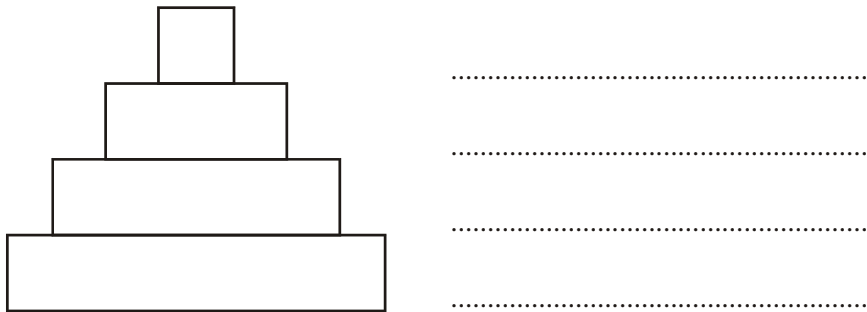


Energy in biomass

1. This is a simple food chain.

Lettuce plant → Slug → Frog → Heron

The diagram shows a pyramid of biomass for this food chain.



(a) Write the names of the organisms in the food chain on the correct lines next to the pyramid of biomass. (1)

(b) (i) The slug obtains its energy from the lettuce plant. What is the source of energy for the lettuce plant?
 (1)

(ii) What is the function of chlorophyll in a lettuce plant?
 (1)

(iii) The slugs ate some lettuce plants which contained 1620 kJ of energy. Only 10 per cent of this energy is used by the slugs for growth. Use the formula to calculate how much energy can be used by the slugs for growth. Show clearly how you work out your final answer.

$$\text{Amount of energy} = \frac{(\text{Percentage of energy used by slugs}) \times (\text{Amount of energy in lettuce})}{100}$$

.....

Amount of energy = kJ (2)
(Total 5 marks)

2. An oak wood contained the following:

- 200 oak trees
- 150 000 primary consumers
- 120 000 secondary consumers

(a) Draw and label a pyramid of biomass for **this** wood. (Your pyramid does **not** have to be drawn to scale.)

(2)

(b) A scientist estimated the total amount of energy flow through each level of the pyramid per year.

The results were:

Energy absorbed by oak trees	4 600 000 kJ per m ² per year
Energy in sugar produced by trees	44 000 kJ per m ² per year
Energy transferred to primary consumers	2 920 kJ per m ² per year
Energy transferred to secondary consumers	700 kJ per m ² per year

(i) Calculate the percentage of the energy absorbed by the trees that is transferred to sugar by photosynthesis. Show your working.

Answer %

(2)

(ii) Suggest **two** reasons why a large proportion of the energy is not transferred to sugar.

1

.....

2

.....

(2)

(iii) Give **three** reasons why some of the energy in the primary consumers is not passed on to the secondary consumers.

1

.....

2

.....

3

.....

(3)

(Total 9 marks)