

-- Question --

The tables below show the populations in two ecosystems, X and Y, in South East Asia.

Ecosystem X

| Organism | Number | Total dry mass of organisms (kg) |
|----------|-----------|----------------------------------|
| Grass | 1 000 000 | 25 000 |
| Rabbit | 100 | 150 |
| Owl | 3 | 15 |

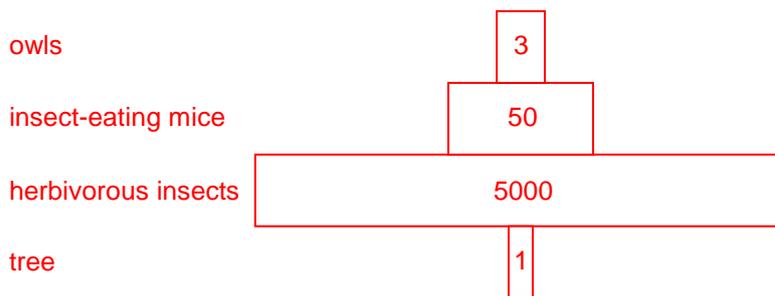
Ecosystem Y

| Organism | Number | Total dry mass of organisms (kg) |
|---------------------|--------|----------------------------------|
| Tree | 1 | 20 000 |
| Herbivorous insect | 5 000 | 200 |
| Insect-eating mouse | 50 | 50 |
| Owl | 3 | 15 |

- a** Sketch and label
- i** the pyramid of numbers of ecosystem Y. (2 marks)
 - ii** the pyramid of biomass of ecosystem Y. (2 marks)
- b** Owls can obtain food from both ecosystems.
- i** In which ecosystem can owls obtain more energy from the producers?
Explain your answer. (2 marks)
 - ii** State *three* ways that energy is lost between trophic levels. (3 marks)
- c** In South East Asia, there is little rainfall in winter. Describe and explain how this affects the population of rabbits in ecosystem X. (3 marks)

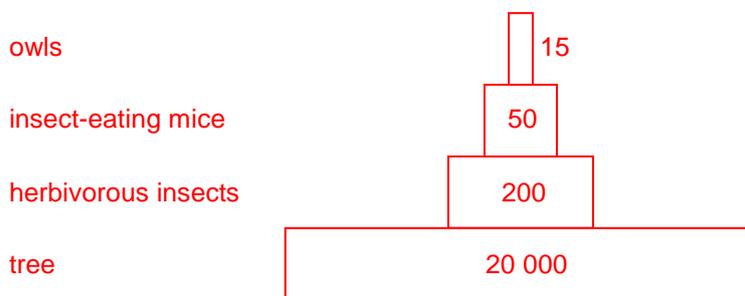
-- Answer --

a i



- Correct shape 1m
- Correct labels 1m

ii



(unit of biomass: kg)

- Correct shape 1m
- Correct labels 1m

b i

Ecosystem X 1m

There are fewer trophic levels and thus less energy is lost when energy is transferred along the food chain. 1m

ii

Some energy is lost because only a proportion of organisms is eaten by other organisms. /

Some energy is lost when undigested and unabsorbed materials are passed out as faeces. /

Some energy is lost as heat during respiration or when it is used to support body functions. /

Some energy is lost through excretory products. (any 3) 1m x 3

c

The population of rabbits decreases. 1m

There is less water for the growth of grass, and hence less food for rabbits. 1m

The owls keep feeding on rabbits and this further decreases the population of rabbits. 1m