

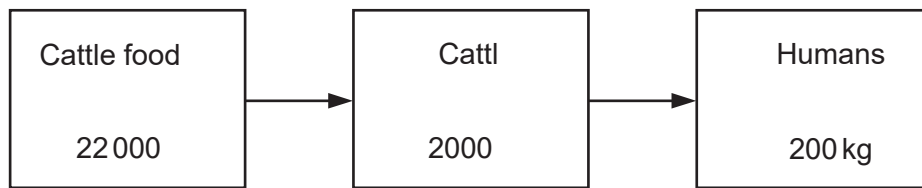
GCSE Biology A (Gateway)

J247/04 Biology A B4-B6 and B7 (Higher Tier)

Question Set: 15

1

The diagram shows the flow of biomass through an agricultural food chain.



- (a) (i) Calculate the percentage efficiency of transfer of biomass between the cattle food crop and humans.

[2]

- (ii) Write down **two** ways that biomass is lost from the food chain.

[2]

- (b)* High levels of light intensity can damage plants. To prevent damage, plants have a protection mechanism.

When light intensity levels get **too high**, the protection mechanism switches on. This stops the plant absorbing too much light.

When the light intensity drops to safe levels, the protection mechanism switches off **slowly**.

Explain why this mechanism would **reduce** the biomass available to humans.

[6]

- (c) Switching off the protection mechanism described in part (b) involves the plant making a **protein**.

Scientists have put extra copies of the gene for this protein into the plants. This makes the plant make more mRNA molecules.

- (i) Explain why making more mRNA will switch off the mechanism faster.

[2]

- (ii) Scientists have found that the genetically modified plants make 20% more biomass.

Use the agricultural food chain on page 21 to calculate the increase in biomass this would provide for humans.

[2]

- (iii) Inserting extra copies of a plant's gene into a plant is a type of genetic modification (GM).

Another example of GM involves inserting a bacterial gene into a plant which makes the plant produce an insecticide.

People are more likely to support genetic modification involving extra copies of the plant gene, rather than inserting the bacterial gene.

Suggest reasons why.

[2]

Total Marks for Question Set 15: 16

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