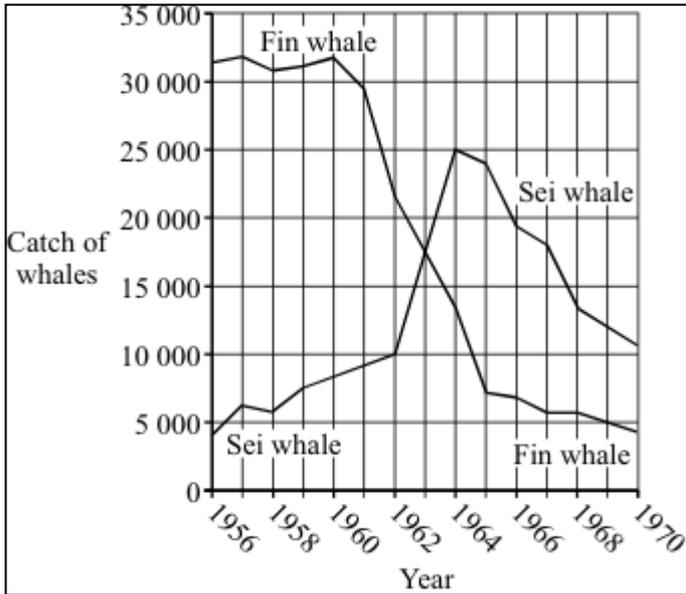


Fishing

Q1. During the last hundred years many species of whales have been over-hunted. This has led to a dramatic decrease in their numbers. The graph shows the catches of two of these species, Fin whales and Sei whales, between 1956 and 1970.



(a) When did over-hunting begin to affect the Fin whale population?

.....
 (1)

(b) Complete the sentence.

When a species is over-hunted many adults are killed. The population numbers fall dramatically because the death rate is far greater than the

..... (1)

(c) (i) In what **year** were the catches of Fin whales and Sei whales the same?

..... (1)

(ii) Between 1963 and 1964 how did the catches of Fin whales and Sei whales alter?

Fin whales

Sei whales

(1)

(d) Suggest why the catches of Sei whales increased between 1956 and 1964.

.....

.....(1)

(Total 5 marks)

Q2. Read the article about sustainable cod fishing.

Every December the European Commission makes suggestions for cod fishing quotas in European Union (EU) waters. These quotas use data from scientists' investigations.

Scientists calculate what proportion of the cod stock is being caught each year. Scientists do this by working out the numbers in each age-group of cod.

Every year the fishermen say the scientists are making the danger to the stocks in the North Sea seem worse. The scientists say the fishermen might lose their jobs because the fishermen are ignoring warnings of the cod numbers going down.

The scientists say that fishermen go only to parts of the sea where there are a lot of cod, so the fishermen get the wrong idea of the number of cod in the whole area.

(a) The scientists and the fishermen have different opinions about the size of the cod population.

Explain why.

.....
.....
.....
.....

(2)

(b) (i) Give **one** method, **other than** quotas, by which fish stocks can be preserved.

.....

(1)

(ii) State how the method you have given in (b)(i) helps to preserve fish stocks.

.....
.....

(1)

(Total 4 marks)

Q3. (a) Tuna fish are carnivores. In the wild they feed on smaller fish called herring. Herring feed on plankton. Tuna can be attacked by parasitic worms which feed on their flesh.

(i) In the space below sketch the appearance of a pyramid of biomass for this food chain.

Do not forget to label each section of the pyramid.

(2)

(ii) If a tuna eats 1 kg of herring, it gains about 65 g in mass.

Give **two** reasons why so little of the mass of the herring is converted into mass of the tuna.

1

.....

2

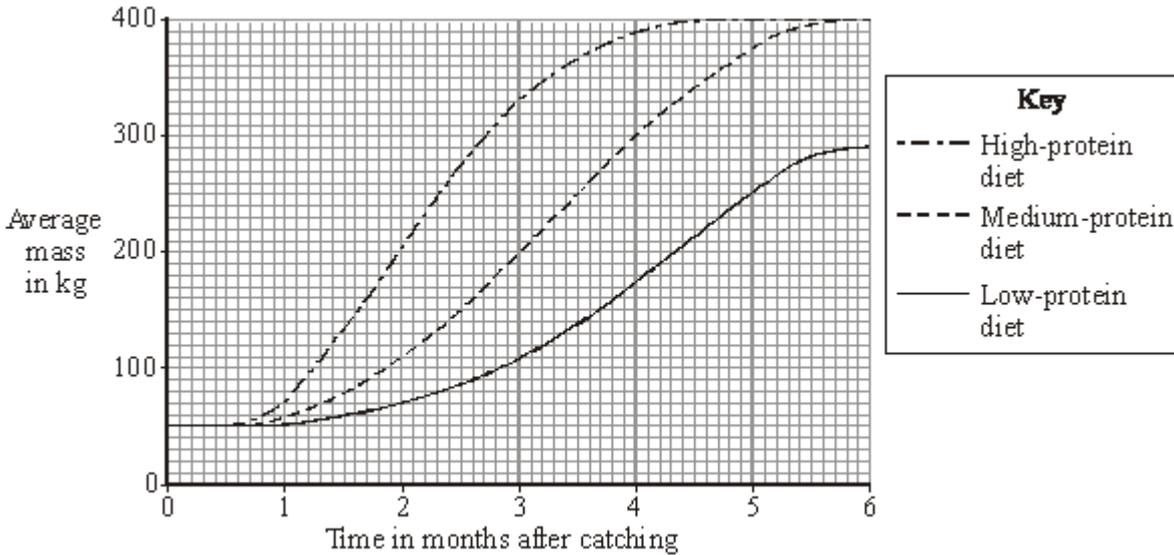
.....

(2)

(b) Young tuna are caught by fish farmers and reared in large pens in the sea.

The fish are fed more food than they would normally catch themselves so they grow quickly. When they reach 400 kg they are sold.

The graph below shows the effect of feeding tuna different amounts of protein in their food.



(i) Calculate the average increase in mass per month of the fish fed on the low-protein diet over the six months.

Show clearly how you work out your answer.

.....

Average increase in mass per month kg

(2)

(ii) There is not enough information in the graph to allow the fish farmer to decide whether to use the high-protein diet or the medium-protein diet.

Suggest **one** other piece of information that he needs in order to make this decision.

.....
(1)

(c) Some consumers will not buy tuna grown in this way.

Suggest **one** reason for their decision.

.....

.....(1)(Total 8 marks)

Q4 Read the article about sustainable cod fishing.

Every December the European Commission makes proposals for cod fishing quotas in European Union (EU) waters. These quotas take into account data obtained by scientists.

Scientists calculate what proportion of the cod stock is being caught each year. They do this by working out the numbers in each age-group of cod.

Every year the fishermen say the scientists are exaggerating the danger to the stocks in the North Sea. The scientists say the fishermen are threatening their own long-term livelihoods by ignoring their warnings of a collapse of cod populations.

The scientists say that fishermen go only to parts of the sea where there are a lot of cod, so they get the wrong idea of the number of cod in the whole area.

- (a) The scientists and the fishermen have different opinions about the size of the cod population.

Explain why.

.....
.....
.....
.....

(2)

- (b) The final decision on how many cod the fishermen are allowed to catch may not depend entirely on the data produced by the scientists.

Suggest **two** reasons for this.

1.
.....
2.
.....

(2)

(Total 4 marks)

Fishing – mark scheme

- M1.** (a) 1960 **or** 1961 1
- (b) birth rate
accept reproductive rate 1
- (c) (i) 1963 1
- (ii) Fin go down
Sei go up
both are required for the mark to be given 1
- (d) any **one** from

there are fewer Fin whales so Sei whales start being caught more

Sei whales are breeding more
accept population goes up

there are more Sei whales because there are fewer Fin whales to eat their food
to compensate for lower catches of other whales
accept argument based on predation 1
- M2.** (a) the scientists' figures based on research / calculations / data
or scientists sample whole area
ignore reasons based on bias
because scientists sample a wider area than the fishermen = 2 marks 1
- whereas the fishermen's opinions are based on impression /
hearsay / experience **or** fishermen's opinions are based on
fishing in well-stocked / limited areas
because fishermen only fish in well-stocked areas = 2 marks 1
- if no marks gained fishermen's opinion **and** scientists' opinion gains 1 mark*
- (b) (i) net size 1
- (ii) allows younger fish to reach maturity / breeding age 1
- M3.** (a) (i) a triangular-shaped pyramid, with 4 layers – widest at the bottom
either in blocks or as a triangle 1
- labels in food chain order (from widest part)
ie plankton – herring – tuna – parasitic / worms
upside down labelled pyramid with producer at top

[5]

[4]

gains 2 marks

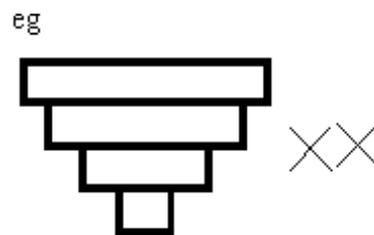
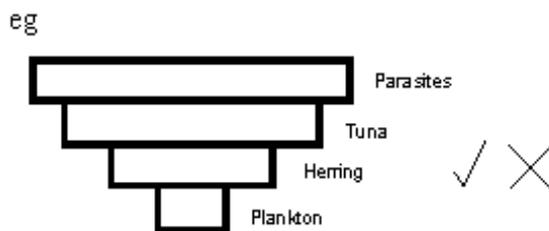
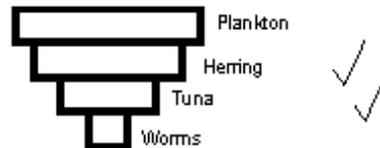
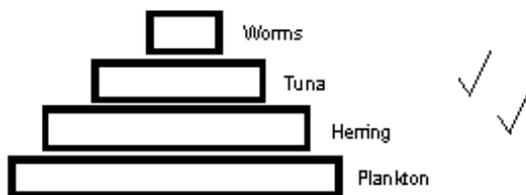
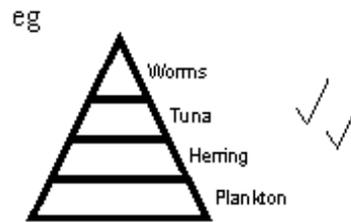
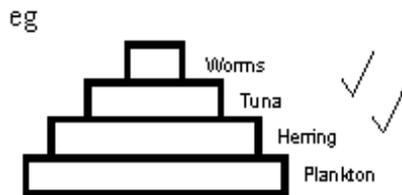
upside down labelled pyramid with producer at bottom gains 1 mark for labels

unlabelled upside down pyramid = 0 marks

accept separate boxes

correct food chain with correct arrows if given gains 1 mark

1



(ii) any **two** from:

- waste / excreted / urine / faeces / CO₂ (from tuna)
from / of tuna not required but do not accept if of / from other organisms
- respiration (of tuna)
ignore used in reproduction
- movement (of tuna) / hunting
if a mark is not awarded for respiration / movement / heat allow 1 mark for energy (unqualified)
- used for heat (production) (of tuna)
- not digested / absorbed

(b) (i) 40

2

award **both** marks for correct answer, irrespective of working
allow $(290 - 50) / 6$ or $240/6$ for 1 mark

allow $48.3 / 48 \frac{1}{3} / 48$ for 1 mark

2

(ii) cost of food / protein

1

(c) any **one** from:

- concern about animal welfare **or** examples **or** cruel to tuna **or** unethical **or** lack of space

allow immoral

ignore not natural

- poorer flavour / quality

1

[8]

M4. (a) scientists figures based on research / calculations / data

or

scientists sample whole area

ignore reasons based on bias

1

fishermen based on impression / hearsay / experience

or

fishermen fish in well-stocked / limited areas

scientists sample a wider area = 2 marks

fishermen only fish in well-stocked areas = 2 marks

*if no marks gained fishermen's opinion **and** scientists' opinion gains 1 mark*

1

(b) any **two** from:

- economic considerations

eg fear for jobs, profits, big demand for cod

- political impact

eg allow EU / government decide or laws will be passed

- pressure groups **or** fears of extinction

2

[4]