AQA GCSE Biology | 8461

SPECIFICATION POINT 4.7.5.3

Sustainable fisheries

Past-paper questions

Tier	**Higher**
Question groups	**6**
Available paper years	**2007–2021**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.7.5.3 Sustainable fisheries

Question 01

June 2007 | BLY1H | Original Q1 | Legacy

1 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.

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(2 marks)

(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.

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(2 marks)

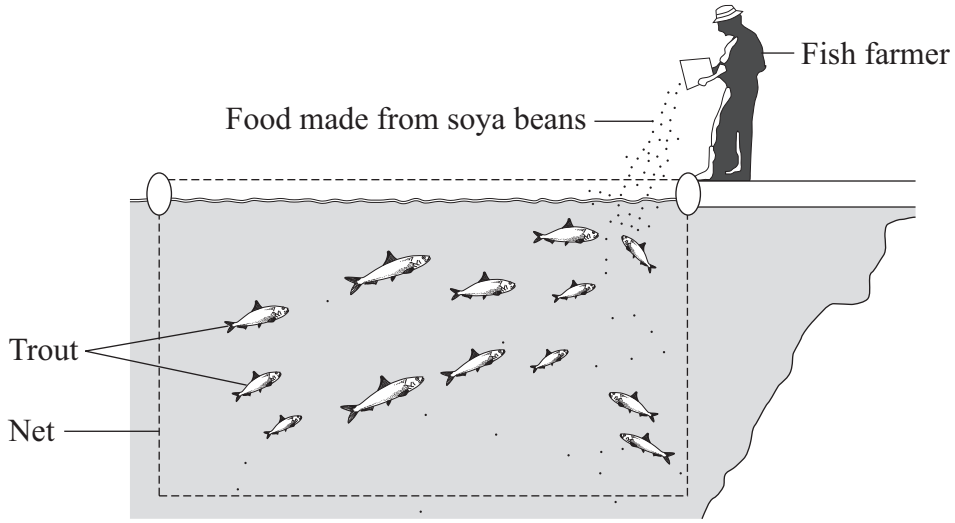
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4.7.5.3 Sustainable fisheries

Question 02

January 2010 | BLY2H | Original Q1 | Legacy

1 A fish farmer keeps trout in a large net in a lake.



The fish farmer feeds the trout on food made from soya beans.

When the trout are large enough the farmer sells them for food for people.

1 (a) Draw a pyramid of biomass for the three organisms in this food chain.

Label the pyramid.

(2 marks)

4.7.5.3 Sustainable fisheries

Question 02 · continued

for mark

1 (b) It would be more energy efficient if people ate the soya beans rather than eating the trout.

Which **two** of the following are reasons for this?

Tick (✓) **two** boxes.

Some people do not like eating animals such as trout. ☐

The trout release energy when they respire. ☐

Soya bean plants release energy when they respire. ☐

Some energy will be lost in waste from the trout. ☐

Soya bean plants absorb energy during photosynthesis. ☐

(2 marks)

1 (c) Suggest **one** advantage to the fish farmer of keeping the trout in a large net instead of letting them swim freely in the lake.

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(1 mark)

1 (d) Some trout die before they are large enough to be sold.
The dead trout contain carbon.

Use your knowledge of the carbon cycle to describe how this carbon is returned to the atmosphere after the trout die.

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(2 marks)

7

4.7.5.3 Sustainable fisheries

Question 03

June 2012 | BL1HP | Original Q6 | Legacy

6 The picture shows a zebra fish.



Illustration © Emily S. Damstra

Zebra fish are small freshwater fish that usually have black and silver stripes.
Zebra fish can tolerate a wide range of environmental conditions.

6 (a) Scientists have genetically modified zebra fish to act as pollution indicators.
The genetically modified zebra fish have a gene transferred from a jellyfish.
The gene allows the stripes of the zebra fish to change colour.

Describe how the scientists produced the genetically modified zebra fish.

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(3 marks)

6 (b) Some scientists are worried about the production of genetically modified zebra fish.

Suggest reasons why.

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(2 marks)

5

4.7.5.3 Sustainable fisheries

Question 04

1 The number of fish in the oceans is decreasing.

Table 1 shows information about the mass of fish caught by UK fishermen between 2002 and 2010.

Table 1

Year	Mass of fish caught by UK fishermen from ALL SOURCES in thousands of tonnes	Mass of fish caught by UK fishermen from SUSTAINABLE SOURCES in thousands of tonnes	Percentage of fish caught from sustainable sources
2002	690.0	427.8	62.0
2004	655.0	396.6	60.5
2006	619.0	386.0	62.4
2008	589.0	436.1	74.0
2010	611.5	465.0	

1 (a) (i) Calculate the percentage of fish caught from sustainable sources in 2010.

[2 marks]

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..... %

4.7.5.3 Sustainable fisheries

Question 04 · continued

1 (a) (ii) Describe the pattern in **Table 1** for the mass of fish caught from all sources.

Suggest reasons for this pattern.

[4 marks]

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1 (a) (iii) Suggest why the percentage of fish caught from sustainable sources is increasing.

[1 mark]

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1 (b) Give **two** methods of maintaining fish stocks at a sustainable level.

[2 marks]

1 .....

2 .....

Question 1 continues on the next page

4.7.5.3 Sustainable fisheries

Question 04 · continued

1 (c) **Figure 1** shows a fish farm.

Figure 1



In a fish farm, large numbers of fish are grown in cages in the sea.

Why do fish in the cages grow faster than fish of the same species that are free in the sea?
You should refer to energy in your answer.

[4 marks]

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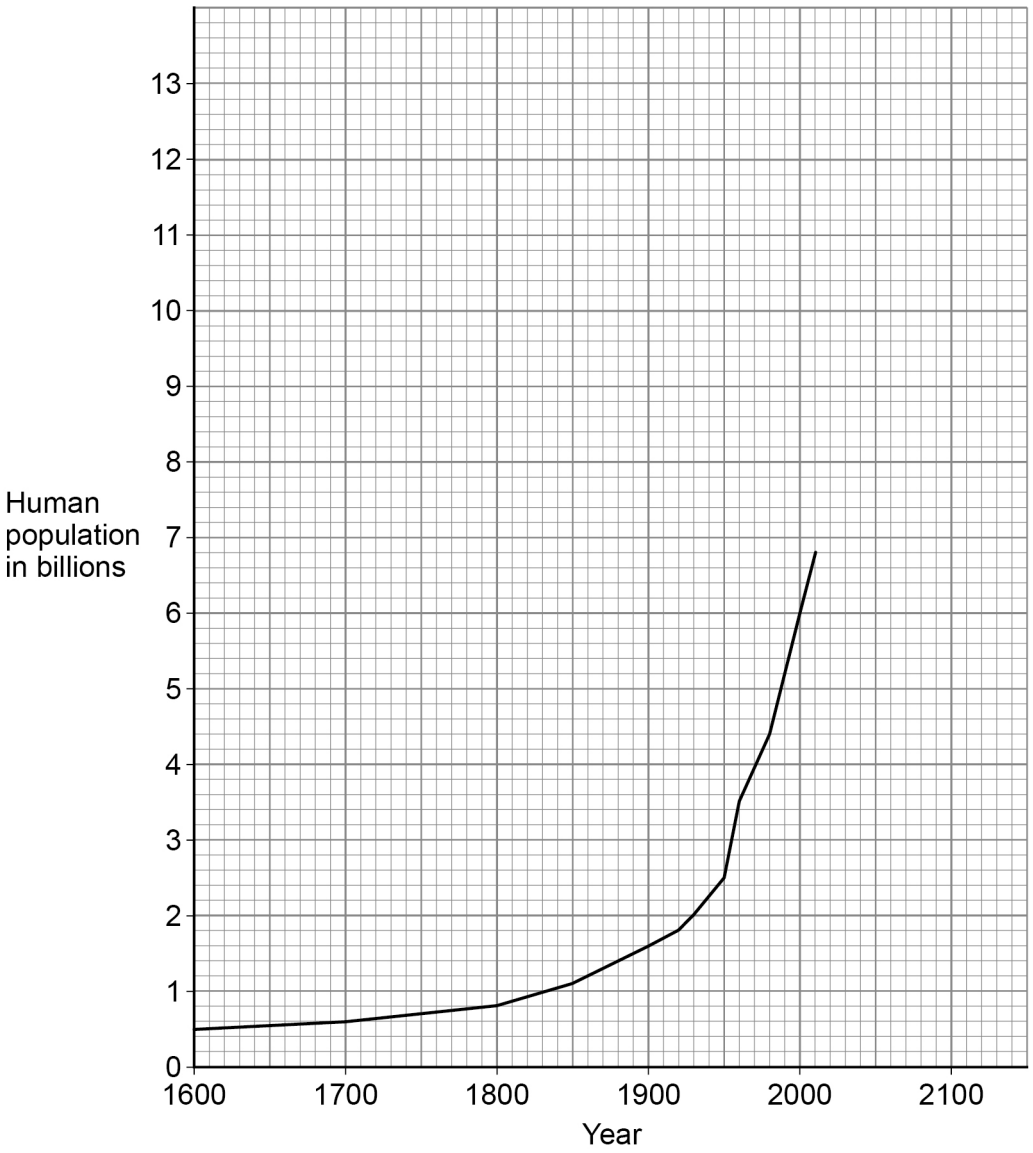
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4.7.5.3 Sustainable fisheries

Question 05

0 2 **Figure 2** shows the human population from 1600 to 2010.

Figure 2



In 1900 the human population was 1.6 billion.

0 2 . 1 Calculate how many times greater the human population was in the year 2000 compared with the year 1900.

[2 marks]

Number of times greater = _____

4.7.5.3 Sustainable fisheries

Question 05 · continued

0 2 . 2 In 1950 the human population was 2.5 billion.

Calculate the mean annual increase in the human population between 1900 and 1950.

[2 marks]

Mean annual increase = _____ billion per year

0 2 . 3 Predict the human population in 2050 if the current rate of population increase continues.

You should draw an extrapolation line on **Figure 2**.

[2 marks]

Predicted human population = _____

0 2 . 4 The increasing human population has caused a decline in fish stocks.

Describe how fishing quotas can help to return fish stocks to a sustainable level.

[2 marks]

Question 2 continues on the next page

4.7.5.3 Sustainable fisheries

Question 05 · continued

0 2 . 5 Farming techniques have changed in recent years.

Describe:

- why more land is being used for farming
- how increased farming has decreased biodiversity.

[6 marks]

4.7.5.3 Sustainable fisheries

Question 05 · continued

0 2 . 6 Genetic modification of crop plants can help meet the demands of the increasing human population.

Golden rice is a genetically modified (GM) crop.

What is the advantage of golden rice compared with non-GM rice?

[1 mark]

Tick (✓) **one** box.

Golden rice contains protein-rich mycoprotein ☐

Golden rice has improved nutritional value ☐

Golden rice produces human insulin ☐

0 2 . 7 Suggest **one** reason why some people are concerned about the use of golden rice.

[1 mark]

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_____

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4.7.5.3 Sustainable fisheries

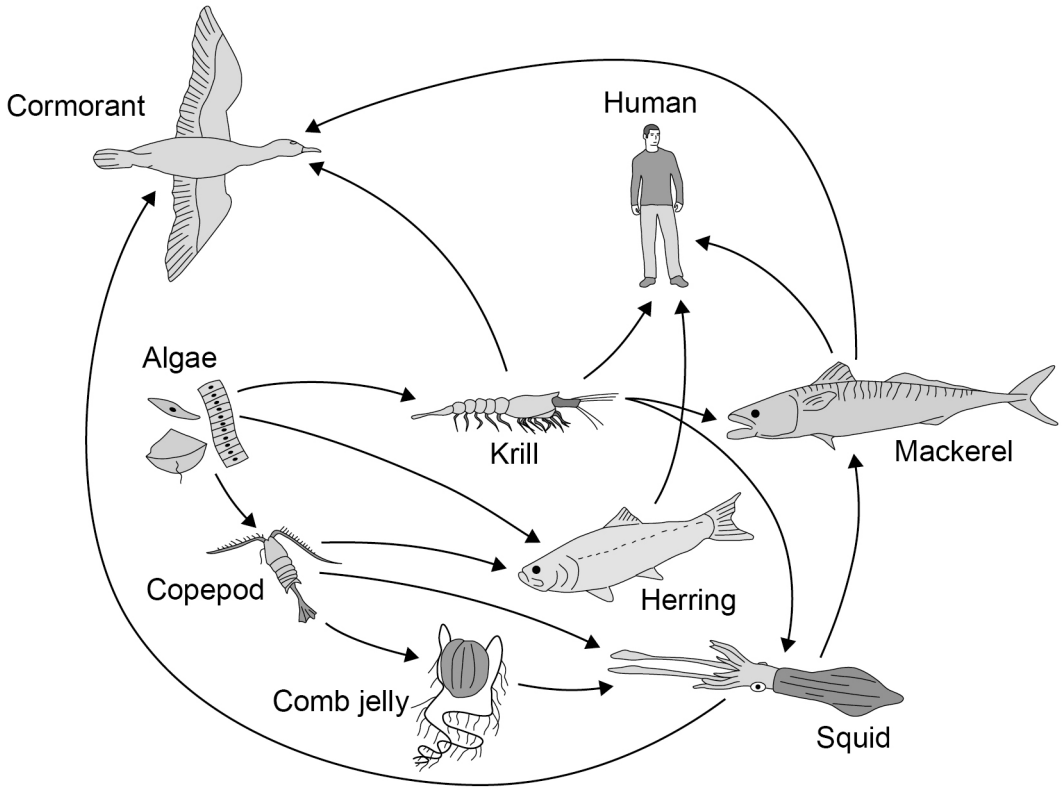
Question 06

November 2021 | 8461/2H | Original Q7

0 7 A food web contains several food chains.

Figure 9 shows a food web.

Figure 9



0 7 . 1 The animals in **Figure 9** get their energy by eating other organisms.

Describe how the algae get energy.

[2 marks]

0 7 . 2 Name **one** primary consumer in **Figure 9**.

[1 mark]

4.7.5.3 Sustainable fisheries

Question 06 · continued

0 7 . 3 Name **one** producer in **Figure 9**.

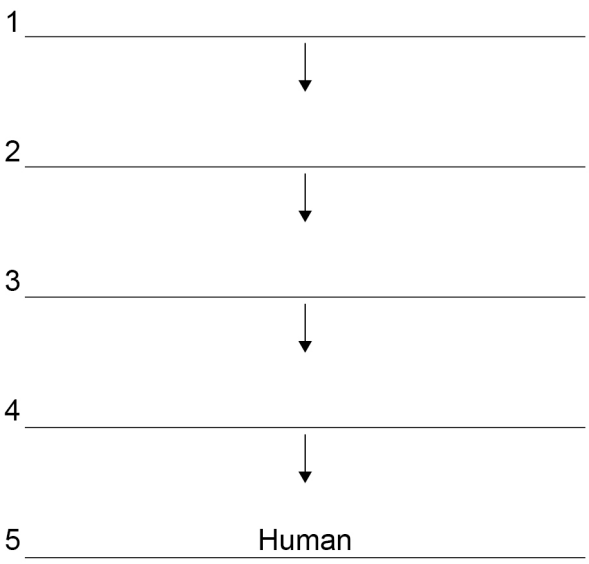
[1 mark]

0 7 . 4 The different food chains in **Figure 9** have different numbers of organisms.

Complete **Figure 10** to show a food chain in **Figure 9** with **five** organisms, including the human.

[1 mark]

Figure 10



0 7 . 5 **Figure 9** shows that mackerel eat krill and squid.

The biomass of mackerel is much less than the combined biomass of krill and squid.

One reason for this is that the mackerel cannot digest all parts of the krill and squid.

Give **two** other reasons.

[2 marks]

1

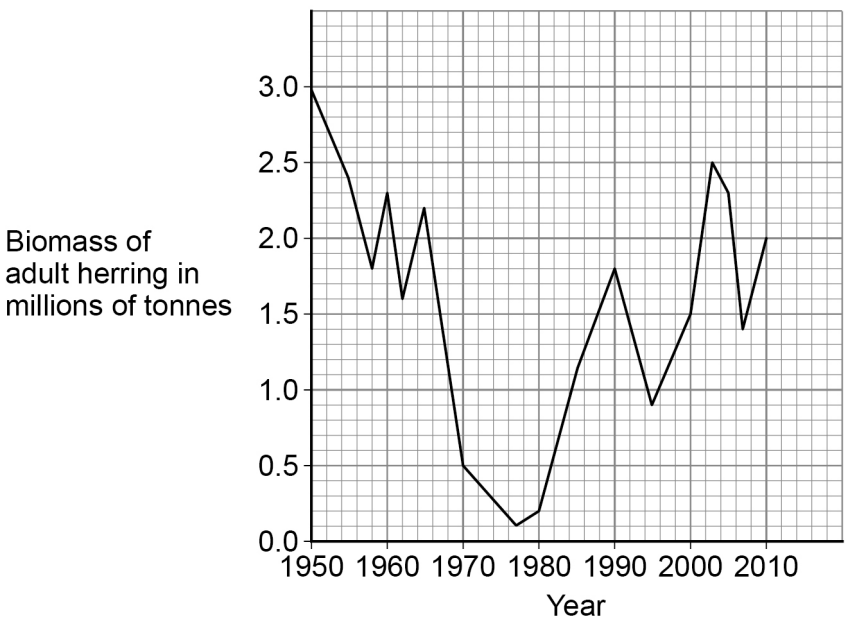
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4.7.5.3 Sustainable fisheries

Question 06 · continued

Figure 11 shows how the biomass of adult herring in the North Sea has changed between 1950 and 2010.

Figure 11



0 7 . 6 Calculate the percentage decrease in the biomass of herring between 1960 and 1977.

Give your answer to the nearest whole number.

[4 marks]

Percentage decrease = _____ %

Question 06 · continued

0 7 . 7 Too many herring were caught by fishermen between 1960 and 1977.

Herring can live for up to 12 years and begin to reproduce when 3 to 4 years old.

Laws have been introduced to help conserve herring:

- 1977 to 1981 – herring fishing was banned in the North Sea
- 1984 to present day – control of mesh size of fishing nets
- 1997 to present day – fishing quotas were introduced
- 1998 to present day – herring fishing was banned in breeding grounds during the breeding season.

Figure 12 shows how a minimum mesh size helps to conserve herring.

Figure 12

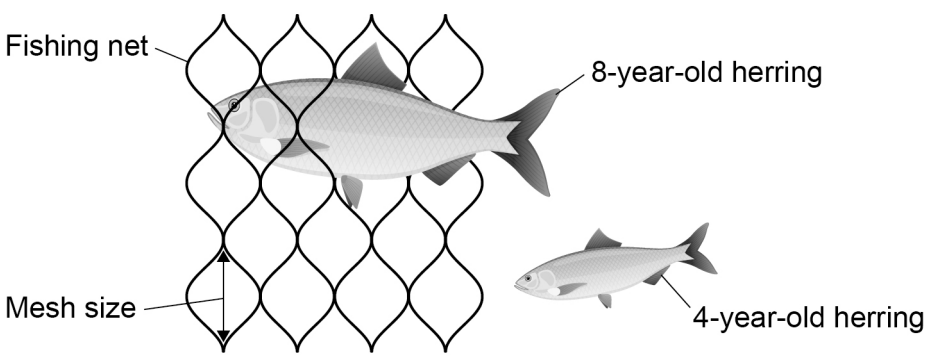
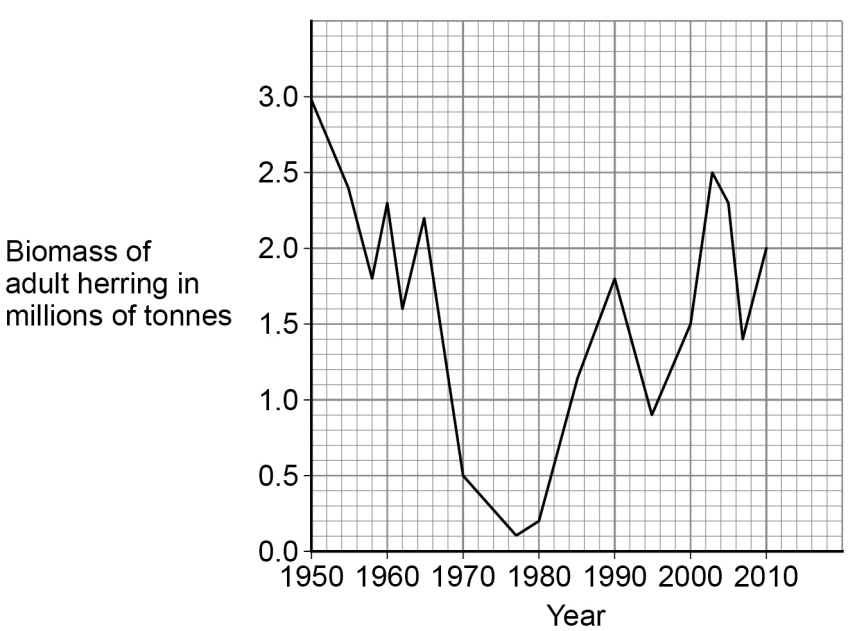


Figure 11 is repeated below.

Figure 11



4.7.5.3 Sustainable fisheries

Question 06 · continued

Evaluate the effect of these laws on the conservation of herring stocks.

Use data from **Figure 11** and information from **Figure 12** in your answer.

[6 marks]

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