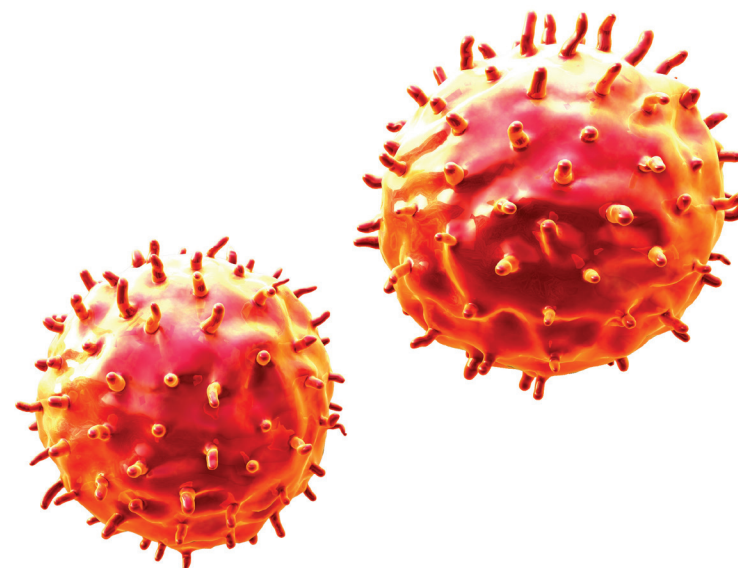


# Interactive Example Candidate Responses

Paper 4 (May / June 2016), Question 5

**Cambridge IGCSE™**  
**Biology 0610**



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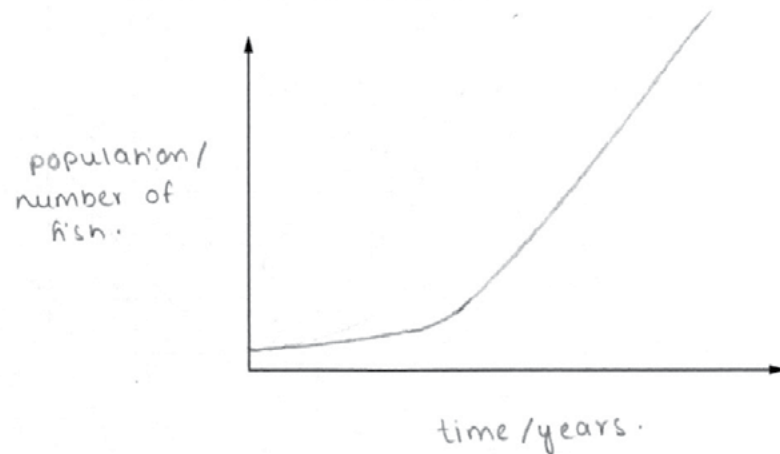
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- 5 A researcher investigated the population growth of fish for fish farming. The researcher stocked a farmer's lake with a small number of these fish and recorded the number of fish over the next five years. The researcher's results showed that the population of fish had increased exponentially.

(a) (i) Use the axes to show the **exponential growth** in the population of fish.

Label the axes and draw a suitable curve.



[3]

(ii) Explain why the population of fish increased exponentially.

There were few limiting factors.  
Fish had plenty of food from foodstock.  
So there was little competition. There  
were no predators. Spread of disease  
was controlled by antibiotics. Birth rate  
was high since there were many  
individuals to reproduce.

[4]

Select  
page

Your  
Mark

5(a)(i)

5(a)(ii)

5(b)

5(c)

5(d)

Q5	Mark scheme
(a)(i)	vertical axis – numbers / population ; horizontal axis – time / years ; curve showing exponential increase / log phase ; I lag phase / curve starting at origin <b>3 marks</b>
(a)(ii)	idea that 'birth' / reproduction / breeding, rate is greater than death rate ; I definitions of exponential growth no limiting factors ; no/little, competition ; plenty, of food / nutrients / space / mates / oxygen / resources ; no/few, predators ; no/few, parasites / pathogens / disease ; AVP ; e.g. no/little, pollution / waste products / toxins <b>4 marks</b>
(b)	between 1950 and 2012 units must be used at least once mass of fish caught increased and levels off ; 17 to 90 million tonnes / increase = 73 million tonnes ; <b>A</b> 16 to 18 / increase of 72 to 74 fluctuations / increases and decreases / described ; e.g. around 1970 / any time after 1990 ; mp4 cannot be awarded without mp3 maximum catch, 94 million tonnes / in 1996 ; steep increase between, 1950–1970 / 1973–1989 ; <b>3 marks</b>

Fig. 5.1 shows the total mass of wild fish caught worldwide between 1950 and 2012 and the mass of farmed fish produced worldwide over the same period.

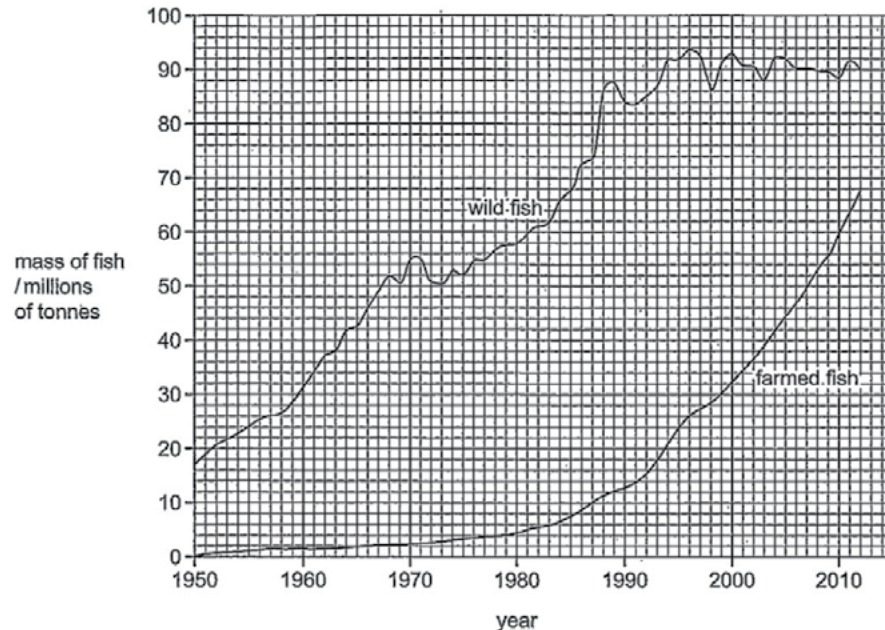


Fig. 5.1

(b) Describe the changes in the mass of **wild fish** caught between 1950 and 2012.

You will gain credit if you use data from Fig. 5.1.

There has been an overall increase in mass between 1950 and 2012 from 17 million tonnes to 90 million tonnes. It increased steeply between 1950 and 1995 and then remained fairly constant around 90 million tonnes. Greatest mass was in 1996. There were small fluctuations throughout 1950-2012. [3]

Select page

Your Mark

5(a)(i)

5(a)(ii)

5(b)

5(c)

5(d)

Q5	Mark scheme
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- (c) It is predicted that wild fish stocks will decrease and become depleted because of overfishing.

Suggest ways in which governments can try to maintain the stocks of wild fish.

~~Governments should try to reduce the effect of limiting factors~~  
Governments should pass strict laws. Fishing should not be allowed during breeding season; special nets should be provided to fishermen that don't catch baby fish and overseas fishermen should not be allowed to fish in the part of the sea that belongs to the country. Water pollution due to chemical fertilizers and sewage should be reduced as this causes eutrophication and sewage should be treated before being dumped. Plastics should not be dumped in the sea or rivers. Oil spills should be prevented, Sewage should not contain contraceptives. [6]

- (d) Like fish stocks, forests can be a sustainable resource.

Discuss what is meant by the term *sustainable resource*, using forests as an example.

Sustainable resource is a resource that can be removed from the environment without it running out. e.g. forests are cut down for agriculture, housing etc. but as long as they are replaced by planting trees elsewhere or some are left, they will not finish and will be available for future generations. and they will also grow back. [3]

[Total: 19]

Your  
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5(a)(i)

5(a)(ii)

5(b)

5(c)

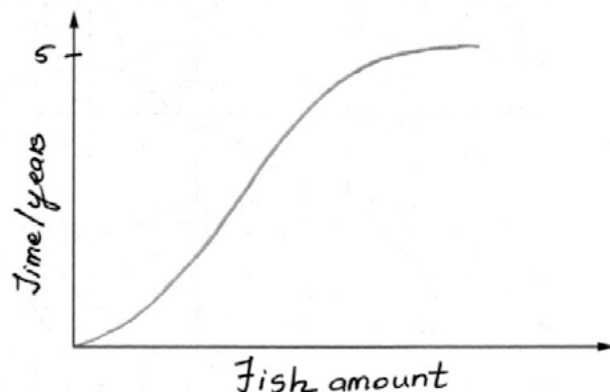
5(d)

Q5	Mark scheme
(c)	<p>answers can refer to seas, lakes and/or rivers international, agreements/treaties ;</p> <p><b>A</b> set maximum mass/number/amount/quantity quotas/permits/licenses ;</p> <p><b>A</b> 'ban unauthorised fishing' fines/sanctions, for, overfishing/illegal/unauthorised, fishing ;</p> <p><b>A</b> consequences other than fines fishery protection vessels/wardens/patrols/AW ; restrictions on times when fishing can occur ;</p> <p><b>A</b> not in breeding season exclusion zones/nursery zones/'no take' zones/reserves ;</p> <p><b>A</b> descriptions or examples total ban for some species ;</p> <p><b>A</b> named examples regulations on method of fishing ; e.g. mesh size of nets/ban nets/use of lines instead/size of fishing vessel/'fishing effort'</p> <p><b>I</b> ban on all wild fish education/raise awareness/any example ; monitoring fish stocks ; captive breeding (of wild fish) ; re-stocking (of wild stocks) ; encourage farmed fish ; e.g. provide subsidies AVP ; e.g. tax on wild fish/increase the cost of wild fish</p> <p><b>6 marks</b></p>
(d)	<p>definition of sustainable resource renewable/self-renewing/regenerates/described ; e.g. produced as rapidly as it is removed</p> <p><b>I</b> reused/recycled resource, does not/will not, run out/become exhausted ; replanting/reseeding/regrowing ; AVP ; e.g. pollarding/coppicing/leaving mature trees</p> <p><b>3 marks</b></p>

- 5 A researcher investigated the population growth of fish for fish farming. The researcher stocked a farmer's lake with a small number of these fish and recorded the number of fish over the next five years. The researcher's results showed that the population of fish had increased exponentially.

(a) (i) Use the axes to show the **exponential growth** in the population of fish.

Label the axes and draw a suitable curve.



[3]

(ii) Explain why the population of fish increased exponentially.

The fish were provided with enough may  
 for have not been within the reproductive  
 age and then when they reached it however,  
 there was an exponential growth as they  
 provided with all the nutrients, the time  
 and conditions for their population to  
 increase.

[4]

Select  
page

Your  
Mark

5(a)(i)

5(a)(ii)

5(b)

5(c)

5(d)

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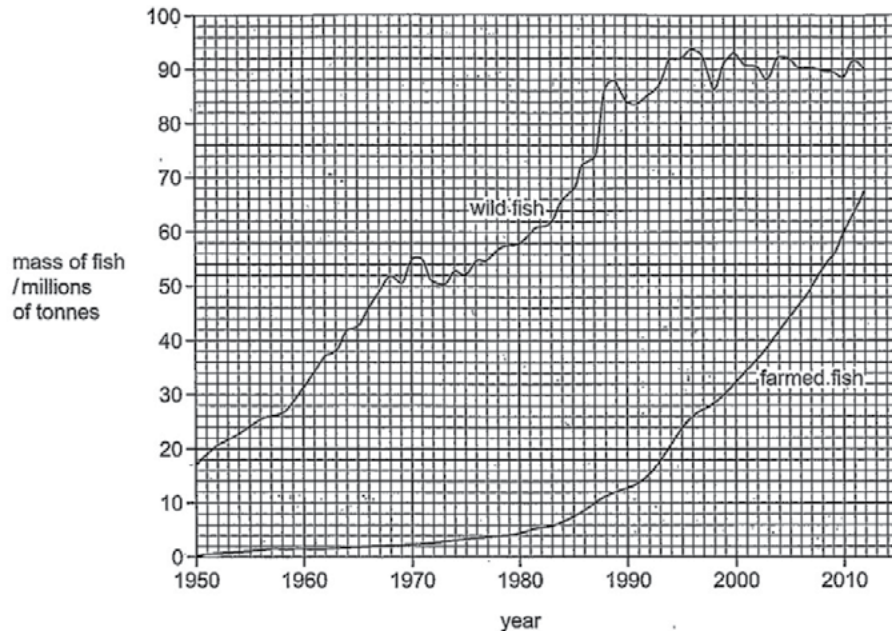


Fig. 5.1

(b) Describe the changes in the mass of **wild fish** caught between 1950 and 2012.

You will gain credit if you use data from Fig. 5.1.

The mass of fish at 1950 was around 19 million tonnes and as the years passed by there was growth but around the year 1985 there - 1990 was a growth spurt until it reached about 88 million tonnes and then the growth it increased and decreased normally until 201 was almost constant until 2010.

[3]

Your  
Mark

5(a)(i)

5(a)(ii)

5(b)

5(c)

5(d)

Q5

Mark scheme

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- (c) It is predicted that wild fish stocks will decrease and become depleted because of overfishing.

Suggest ways in which governments can try to maintain the stocks of wild fish.

The government can contribute in maintaining the stock of wild fish by:-

- Educating fishers about this issue.
- Enforcing laws that ban fishing at breeding seasons.
- Fishers should not be allowed to fish the young fishes that have not yet reached reproductive age.
- There should be a limit for fishing rate at time intervals.

[6]

- (d) Like fish stocks, forests can be a sustainable resource.

Discuss what is meant by the term *sustainable resource*, using forests as an example.

A sustainable resource is a resource that is renewable or can be produced at the same rate as it is used. We can see this in forests as we cut down a reasonable amount of wood for example, heating purposes. We can <sup>plant</sup> grow the trees that we cut down again and so repeating this no ~~cycle~~ change in the ecosystem will at the same rate as we use them and at this rate the sustainable resource will remain in our ecosystem.

[Total: 19]

Your  
Mark

5(a)(i)

5(a)(ii)

5(b)

5(c)

5(d)

## Q5 Mark scheme

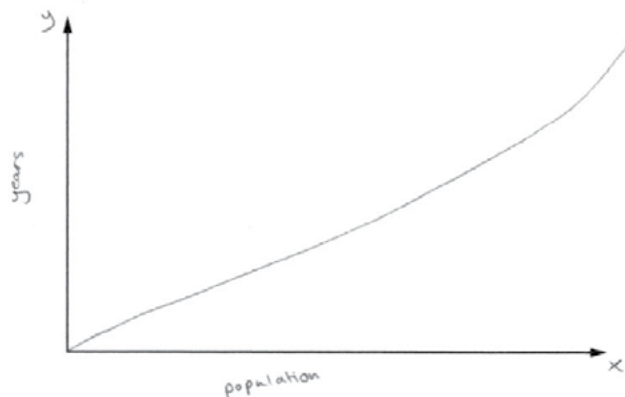
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- 5 A researcher investigated the population growth of fish for fish farming. The researcher stocked a farmer's lake with a small number of these fish and recorded the number of fish over the next five years. The researcher's results showed that the population of fish had increased exponentially.

(a) (i) Use the axes to show the **exponential growth** in the population of fish.

Label the axes and draw a suitable curve.



[3]

(ii) Explain why the population of fish increased exponentially.

Good environment, more offspring.  
~~were made~~ The right amount of  
 sunlight. ~~the~~ The lake is pure  
 water no additional compounds.  
 More oxygen.

[4]

Select  
page

Your  
Mark

5(a)(i)

5(a)(ii)

5(b)

5(c)

5(d)

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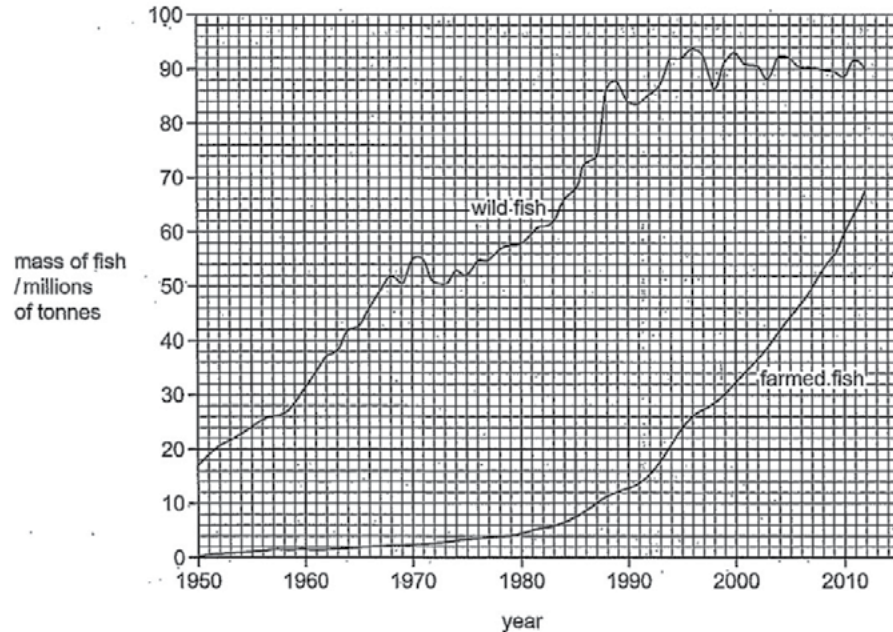


Fig. 5.1

(b) Describe the changes in the mass of **wild fish** caught between 1950 and 2012.

You will gain credit if you use data from Fig. 5.1.

The population of fish increased a lot,  
because farmed fish were used and  
so the wild fish weren't caught  
so more offsprings and less fishing.

[3]

Your  
Mark

5(a)(i)

5(a)(ii)

5(b)

5(c)

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- (c) It is predicted that wild fish stocks will decrease and become depleted because of overfishing.

Suggest ways in which governments can try to maintain the stocks of wild fish.

~~Less~~ Less fishing and Less killing for experiments

[6]

- (d) Like fish stocks, forests can be a sustainable resource.

Discuss what is meant by the term *sustainable resource*, using forests as an example.

Losses of forest are deforests cut down causing deforestation in which more carbon dioxide is present and less oxygen is made and you can't grow trees fast and it also destroys lots of habitat.

[3]

[Total: 19]

Your  
Mark

5(a)(i)

5(a)(ii)

5(b)

5(c)

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