

10: Human influences on the environment – Topic questions**Paper 4**

The questions in this document have been compiled from a number of past papers, as indicated in the table below.

Use these questions to formatively assess your learners' understanding of this topic.

Question	Year	Series	Paper number
4	2016	March	42
4	2016	June	41
6	2016	November	42

The mark scheme for each question is provided at the end of the document.

You can find the complete question papers and the complete mark schemes (with additional notes where available) on the School Support Hub at www.cambridgeinternational.org/support

- 4 (a) Increasing human population is linked to a change in carbon dioxide concentration in the atmosphere. Fig. 4.1 shows the carbon dioxide concentration between 1958 and 2010 measured at Mauna Loa, Hawaii.

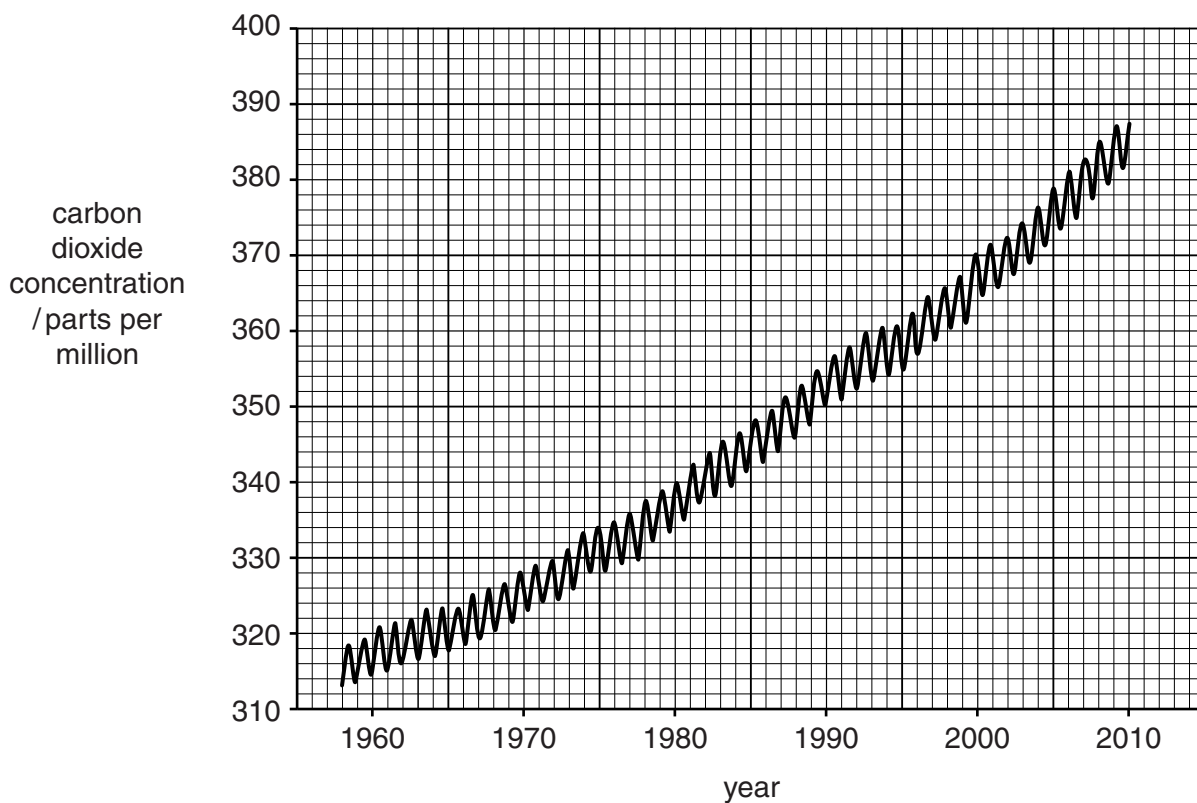


Fig. 4.1

Describe how the carbon dioxide concentration has changed between 1958 and 2010. You will gain credit for using data from Fig. 4.1.

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.....[3]

- (b) (i)** Carbon dioxide is a greenhouse gas.
Name **one other** greenhouse gas.

.....[1]

- (ii)** Explain how carbon dioxide enhances the greenhouse effect.

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[3]

- (c)** Mineral ions are needed for plant growth.

Complete Table 4.1 to show the function and effect of the lack of some mineral ions on plants.

One has been done for you.

Table 4.1

mineral ion	function in plants	effect of lack of mineral ion on plants
nitrate		
magnesium		
phosphate	used for making DNA	poor root growth

[4]

- Explain what happens in aquatic environments, such as Lake Udai Sagar, when eutrophication occurs.

[6]

4

- 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.

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[4]

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.

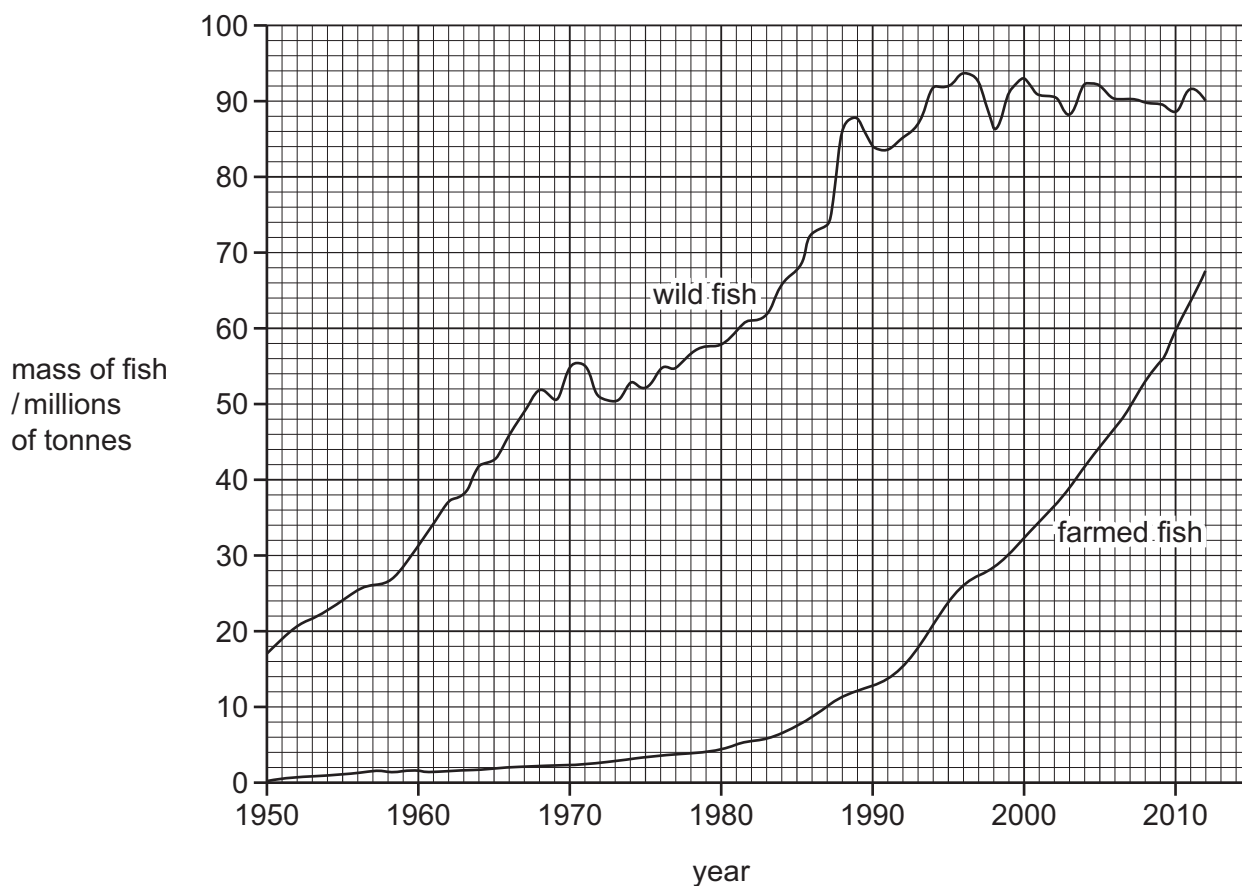


Fig. 5.1

(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.

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[3]

- (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.

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[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.

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[3]

[Total: 19]

- 6 Wetlands are internationally important ecosystems. The spoon-billed sandpiper, *Calidris pygmaea*, is an endangered species.

Fig. 6.1 shows a spoon-billed sandpiper feeding in a wetland ecosystem. The wetland is a stopover on the bird's long migration from north-east Russia to south-east Asia.

The smaller photograph is a close-up of the bird's legs to show that it has been ringed.

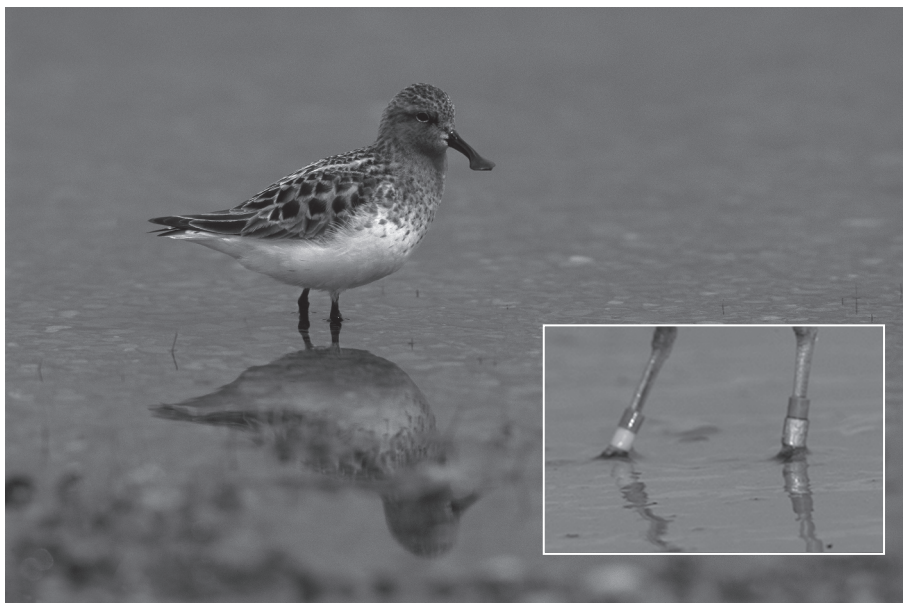


Fig. 6.1

Spoon-billed sandpipers stop to feed at the Rudong mudflats near Shanghai, China.

Putting one or more rings on a bird's leg is a common way to identify individual birds. Spoon-billed sandpipers ringed in Russia have been seen at the Rudong mudflats.

- (a) Suggest why scientists put leg rings on birds, such as the spoon-billed sandpiper.

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..... [2]

(b) Explain why it is important to conserve ecosystems, such as wetlands.

..... [5]

[Total: 7]

Abbreviations used in the Mark Scheme:

;	separates marking points
/	alternatives
I	ignore
R	reject
A	accept (for answers correctly cued by the question, or guidance for examiners)
AW	alternative wording (where responses vary more than usual)
AVP	any valid point
ecf	credit a correct statement / calculation that follows a previous wrong response
ora	or reverse argument
()	the word / phrase in brackets is not required, but sets the context
<u>underline</u>	actual word given must be used by candidate (grammatical variants excepted)
max	indicates the maximum number of marks that can be given

Question	Answer	Marks												
4 (a)	1 overall carbon dioxide concentration increases ; 2 at a steady rate ; 3 there are minor fluctuations in carbon dioxide concentration ; 4 the fluctuations occur, regularly / yearly / seasonally ; 5 use of comparative figures with year and concentration with units ;	[max 3]												
4 (b) (i)	methane	[1]												
4 (b) (ii)	1 radiation / light from the Sun hits, Earth / atmosphere ; 2 (named) short-wave radiation passes through carbon dioxide layer ; 3 re-radiated / reflected, from the ground as long-wave radiation / infrared / heat energy ; 4 long-wave radiation / infrared / heat energy, trapped / prevented from escaping from atmosphere by carbon dioxide ;	[max 3]												
4 (c)	<table border="1"> <thead> <tr> <th>mineral ion</th><th>function in plants</th><th>effect of ion deficiency on plants</th></tr> </thead> <tbody> <tr> <td>nitrate</td><td>make amino acids / proteins / DNA / RNA / enzymes / chlorophyll ;</td><td>poor growth / lower leaves die early ;</td></tr> <tr> <td>magnesium</td><td>used to make chlorophyll / pigments ;</td><td>yellow leaves / chlorosis ;</td></tr> <tr> <td>phosphate</td><td>used for making DNA</td><td>poor root growth</td></tr> </tbody> </table>	mineral ion	function in plants	effect of ion deficiency on plants	nitrate	make amino acids / proteins / DNA / RNA / enzymes / chlorophyll ;	poor growth / lower leaves die early ;	magnesium	used to make chlorophyll / pigments ;	yellow leaves / chlorosis ;	phosphate	used for making DNA	poor root growth	[4]
mineral ion	function in plants	effect of ion deficiency on plants												
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Question	Answer	Marks
4 (d)	1 fertiliser / nutrients, leached into / enter, rivers / streams / lakes ; 2 causing algal bloom / algae growth ; 3 algae block sunlight from entering water ; 4 so rooted plants unable to photosynthesise ; 5 so plants die ; 6 bacteria, decompose / feed, on dead plants ; 7 so bacterial population increase ; 8 bacteria respire aerobically ; 9 bacteria use up the oxygen in the water ; 10 organisms / fish / creatures, die / suffocate / migrate, due to lack of oxygen ;	[max 6]
[Total: 17]		
4 (a)	carbon dioxide / CO ₂ ; (aerobic) respiration ; (simple) diffusion ;	[3]
4 (b)	water enters by osmosis ; down a water potential gradient / high(er) to low(er) water potential ; through partially permeable membrane ; needs to remove water to prevent bursting ;	[max 3]
4 (c)	as concentration of sea water increases the removal of water decreases ; as concentration of sea water increases the water potential gradient decreases ; therefore less water enters at higher concentrations of sea water ; less excess water ;	[max 3]
4 (d)	cell walls, inelastic / do not stretch / rigid / inflexible / keep shape of cell ; cells, are turgid / have high turgor pressure ; resist any increase in, volume / pressure ; these cells do not absorb excess water ; the cells will not burst ;	[max 3]
[Total: 12]		

Question	Answer	Marks
6 (a)	1 ringing allows monitoring of, species / population; 2 to check on (population) numbers; 3 find out about life span; 4 to find out where they go (during migration) / to track their position; 5 find out how far birds travel; 6 to find out when they migrate; 7 allows checks on, health of birds / survival rates; 8 breeding success; 9 do not harm the birds / do not make them obvious to predators; 10 AVP; e.g. information from ringing is used in conservation	[2]
6 (b)	1. to prevent extinction; 2. maintain biodiversity; 3. provide feeding grounds for animals / ref. to disruption of food, chains / web; 4. provide, breeding grounds / places for breeding; 5. provide, habitats / shelter; 6. vulnerable to the effects of, development / drainage / AW; 7. ref to flooding / natural disasters; 8. ref to nitrogen cycle; 9. ref to maintenance of water cycle; 10. ref to carbon cycle; e.g. greenhouse gas / carbon storage / carbon sink 11. waste disposal; 12. provide, resources / food / fuel / drugs / raw materials; 13. idea of areas for, recreation / (eco)tourism / education; 14. ethical reasons / aesthetic reasons / AW; 15. AVP; e.g. soil erosion	[5]
		[Total: 7]