

Week 28

IGCSE Biology

Homework bundle for this week

本周作业合集

exercises.lol

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20. Human influences on ecosystems

Starter Quiz · 课前小测

IGCSE Biology

Name: _____ Score: _____

- Fertilisers increase crop yields by:
 - ☐ adding nutrients to the soil
 - ☐ killing all insects
 - ☐ removing water
 - ☐ blocking sunlight
- Deforestation is the:
 - ☐ clearing of forests
 - ☐ planting of new forests
 - ☐ cleaning of rivers
 - ☐ breeding of crops
- Eutrophication is usually started by:
 - ☐ fertiliser or sewage adding nitrates to water
 - ☐ too little water
 - ☐ too much sunlight only
 - ☐ removing algae
- Most plastics are a problem because they are:
 - ☐ non-biodegradable (do not rot away)
 - ☐ too expensive
 - ☐ easily eaten safely
 - ☐ good fertilisers
- Conservation is:
 - ☐ protecting species and habitats and using resources sustainably
 - ☐ clearing all forests
 - ☐ increasing pollution
 - ☐ hunting endangered species
- Which are greenhouse gases? (Select all that apply.)
 - ☐ carbon dioxide
 - ☐ methane

- ☐ oxygen
- ☐ nitrogen

Tick every correct option.

7. Which are conservation methods? (Select all that apply.)

- ☐ national parks
- ☐ captive breeding
- ☐ seed banks
- ☐ deforestation

Tick every correct option.

8. Which increase food supply? (Select all that apply.)

- ☐ fertilisers
- ☐ selective breeding
- ☐ machinery
- ☐ removing all nutrients

Tick every correct option.

9. Which are effects of deforestation? (Select all that apply.)

- ☐ more carbon dioxide in the air
- ☐ soil erosion
- ☐ loss of habitats
- ☐ increased biodiversity

Tick every correct option.

10. Overusing fertilisers can pollute rivers.

- ☐ True
- ☐ False

20. Human influences on ecosystems

Answers · 答案

IGCSE Biology

1. adding nutrients to the soil

Fertilisers supply nutrients like nitrates.

2. clearing of forests

Deforestation removes forests.

3. fertiliser or sewage adding nitrates to water

Extra nitrates trigger the process.

4. non-biodegradable (do not rot away)

Non-biodegradable plastics persist and harm wildlife.

5. protecting species and habitats and using resources sustainably

Conservation protects and sustains.

6. carbon dioxide; methane

CO₂ and methane trap heat; oxygen and nitrogen do not.

7. national parks; captive breeding; seed banks

Deforestation harms; the others conserve.

8. fertilisers; selective breeding; machinery

Removing nutrients would reduce yields.

9. more carbon dioxide in the air; soil erosion; loss of habitats

Deforestation reduces biodiversity, not increases it.

10. True

Fertiliser run-off causes eutrophication.

20.1 Food supply

Name: _____ Class: _____ Date: _____ **Total: 19 marks**

KEY WORDS monoculture 单一栽培 • livestock 牲畜 • weeds 杂草 • selective breeding 选择育种
• herbicides 除草剂

Objective

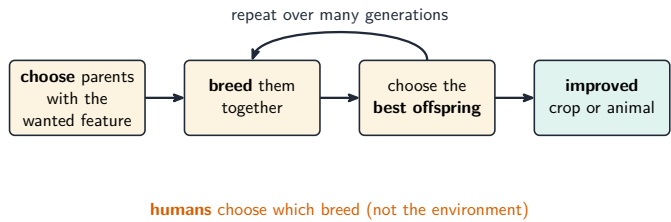
Build the skills to answer exam questions on **food supply** 食物供应 — methods of increasing it, and the pros and cons of **monoculture** 单一栽培 and intensive farming.

You must be able to:

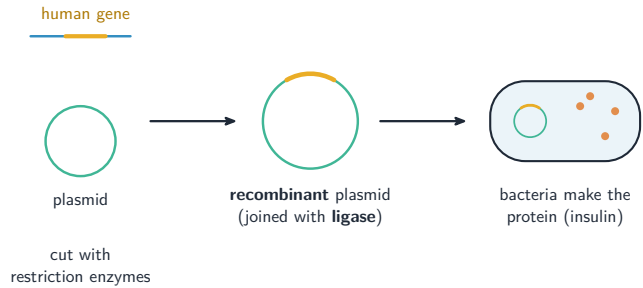
- give the methods used to increase food production
- state the advantages and disadvantages of monoculture
- discuss intensive livestock farming

1 Worked examples

■ Increasing food supply



Methods: machinery, fertilisers, insecticides, herbicides, selective breeding



Genetic modification can raise food supply

- **monoculture:** big easy harvest but one pest can destroy it and biodiversity falls.
- **intensive livestock:** cheap meat but welfare and disease concerns.

2 Practice

2.1 State two methods used to increase crop yields. [2]

2.2 State what a monoculture is. [1]

3 Exam-style questions

3.1 Herbicides are used in farming to: [1]

- **A** kill insect pests
- **B** kill weeds
- **C** add nitrate
- **D** breed crops

3.2 A farmer grows a large monoculture.

(a) State one advantage of a monoculture. [1]

(b) State two disadvantages of a monoculture. [2]

3.3 A farmer plants one crop across a whole large field, uses fertiliser and pesticide, and keeps hens indoors in cages.

(a) Name **three** methods used to increase food supply, other than the ones described above. [3]

(b) State **two** advantages and **two** disadvantages of monoculture. [4]

(c) Explain how intensive indoor livestock production increases the yield of meat. [3]

(d) Give **two** concerns raised by intensive livestock production. [2]

Solutions

2.1 any two of: machinery; fertilisers; insecticides; herbicides; selective breeding.

2.2 growing one crop over a large area.

3.1 B. Herbicides kill weeds.

3.2 (a) a big/easy harvest.

(b) one pest or disease can destroy the whole crop; it lowers biodiversity.

3.3 (a) Any three of: machinery for ploughing, sowing and harvesting; irrigation to supply water; selective breeding, or genetic modification, for higher-yielding varieties; adding fertiliser or using pesticides and herbicides is also acceptable if not already described.

(b) Advantages: one crop can be sown, treated and harvested by the same machinery, so it is efficient and cheap; a large amount of one product can be produced for market. Disadvantages: pests and diseases of that crop spread very easily through the whole field; the same minerals are removed from the soil every year, so fertiliser use rises and biodiversity falls.

(c) The animals are kept warm, so less of their food energy is used to keep their body temperature up; movement is restricted, so less energy is used in moving; more of the energy in the food is therefore converted into growth, and food, water and medicine can be supplied exactly.

(d) Animal welfare — the animals cannot move or behave naturally; heavy antibiotic use encourages antibiotic-resistant bacteria, and large amounts of waste in one place can pollute water.

38 What are reasons for using chemical fertilisers in food production?

	to reduce the use of herbicides	to increase crop yields	to reduce competition between crops and weeds
A	yes	yes	yes
B	no	yes	no
C	yes	no	no
D	no	no	yes

38 What is an **advantage** of large scale monocultures?

- A increased biodiversity
- B increased crop yield
- C increased susceptibility to disease
- D increased variation in the crop plant

5 (a) Discuss the advantages of intensive livestock production.

[3]

(b) One disadvantage of intensive livestock production is that antibiotics are often used.

Suggest why antibiotics are needed in intensive livestock production.

[2]

- (c) Fig. 5.1 shows the changes in antibiotic use in livestock production in seven countries between 2010 and 2016.

The suggested limit for antibiotic use in livestock is 50 mg per kg of livestock.

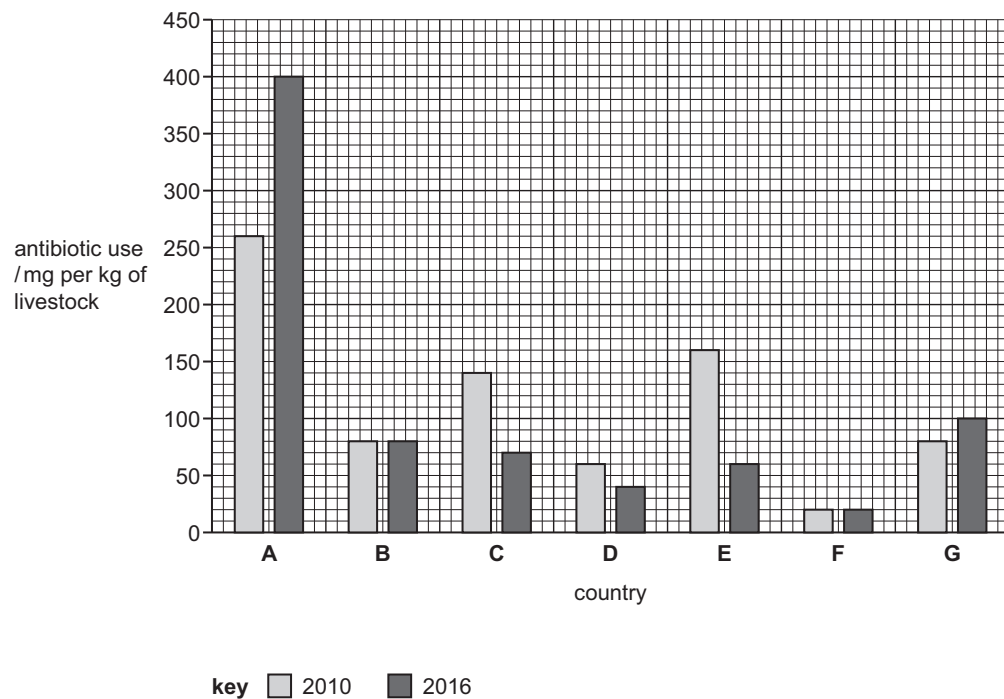


Fig. 5.1

- (i) State the letters of the countries in Fig. 5.1 that used less than the suggested limit of 50 mg of antibiotics per kg of livestock in 2016.

..... [1]

- (ii) Calculate the percentage increase in antibiotic use in country A in Fig. 5.1 between 2010 and 2016.

Give your answer to **two** significant figures.

Space for working.

- (iii) Explain the development of antibiotic resistance in bacteria.

.....

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.....

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.....

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.....

.....

[4]

[Total: 13]

- 39 When managing fish stocks as a **sustainable resource**, what is a reason for harvesting only the larger fish of a particular species?

- A Larger fish are easier to harvest.
- B Larger fish sell at a higher price.
- C Smaller fish are eaten by predators.
- D Smaller fish are too young to breed.

- 39 What is a **disadvantage** of large-scale monocultures of crop plants?

- A a decrease in use of insecticides
- B a decrease in fossil fuel emissions
- C an increase in biodiversity
- D an increase in risk of disease destroying the entire crop

20.2 Habitat destruction

Name: _____ Class: _____ Date: _____

Total: 21 marks

KEY WORDS deforestation 森林砍伐 • carbon dioxide 二氧化碳 • species 物种 • extinction 灭绝
• biodiversity 生物多样性

Objective

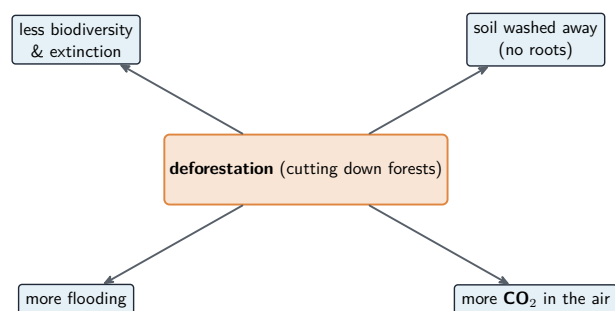
Build the skills to answer exam questions on **habitat destruction** 栖息地破坏 — **biodiversity** 生物多样性 and the effects of **deforestation** 森林砍伐.

You must be able to:

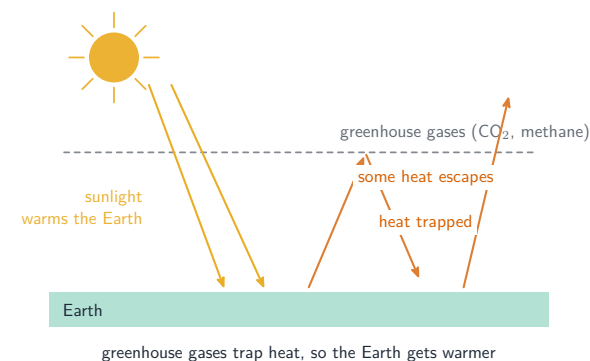
- explain how humans destroy habitats and reduce biodiversity
- list the effects of deforestation
- link habitat change to food webs

1 Worked examples

■ Deforestation



Deforestation lowers biodiversity, washes away soil, causes flooding and adds CO₂



Habitat loss links to the enhanced greenhouse effect

- **biodiversity** = the number of different species in an area.

2 Practice

2.1 Define biodiversity. [1]

2.2 State one way humans destroy habitats. [1]

3 Exam-style questions

3.1 Deforestation increases the amount of carbon dioxide in the air because: [1]

- A trees release it when cut
- B fewer trees take it in by photosynthesis
- C soil makes it
- D rivers flood

3.2 A large area of forest is cleared.

(a) State two effects of this deforestation. [2]

(b) Explain why removing the trees leads to soil being washed away. [2]

3.3 A large area of tropical rainforest is cleared for cattle farming.

(a) State what is meant by *biodiversity*. [2]

(b) Describe **four** effects of deforestation on the environment, explaining each. [8]

(c) Explain why species that live only in that forest are at risk of extinction. [2]

(d) Suggest **two** ways of reducing the impact of using forest land. [2]

Solutions

2.1 the number of different species living in an area.

2.2 any of: clearing land; mining; pollution.

3.1 B. Fewer trees take in less carbon dioxide by photosynthesis.

3.2 (a) any two of: lower biodiversity/extinction; soil loss; flooding; more CO₂.

(b) the tree roots no longer hold the soil, so rain washes it away.

3.3 (a) Biodiversity is the number of different species present in an area, and how many individuals there are of each.

(b) **Loss of habitat** — the organisms living in the trees lose their food, shelter and breeding sites, so populations fall and some become extinct. **Soil erosion** — tree roots no longer bind the soil, and there are no leaves to break the rainfall, so the topsoil is washed away. **Flooding** — less water is taken up by roots and lost by transpiration, so more runs straight into rivers. **More carbon dioxide in the atmosphere** — fewer trees photosynthesise, so less is removed, and burning the timber releases more, adding to the greenhouse effect. (Also accept: less transpiration means lower local rainfall.)

(c) A species found nowhere else has no other population to survive elsewhere; once its only habitat is destroyed there is nowhere left for it to live, so it becomes extinct.

(d) Replant trees after felling, or fell in rotation so the forest can recover; protect areas as reserves and use land already cleared more productively instead of clearing more.

6 In Fig. 6.1, the diagrams of an island show the land covered by forest in 1982 and 2013.

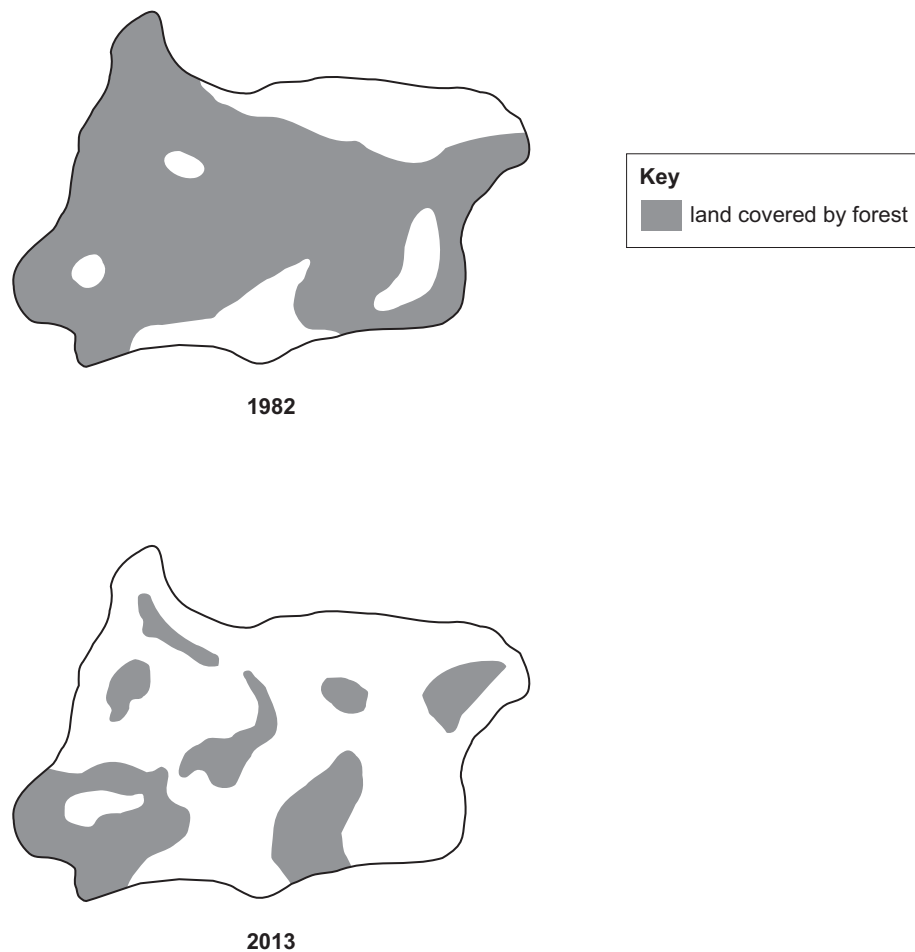


Fig. 6.1

(a) (i) Describe the change in land covered by forest between 1982 and 2013 in Fig. 6.1.

..... [2]

(ii) State **two** possible causes for the change in land covered by forest in Fig. 6.1.

1

.....

2

.....

[2]

(b) Fig. 6.2 is a diagram of the carbon cycle.

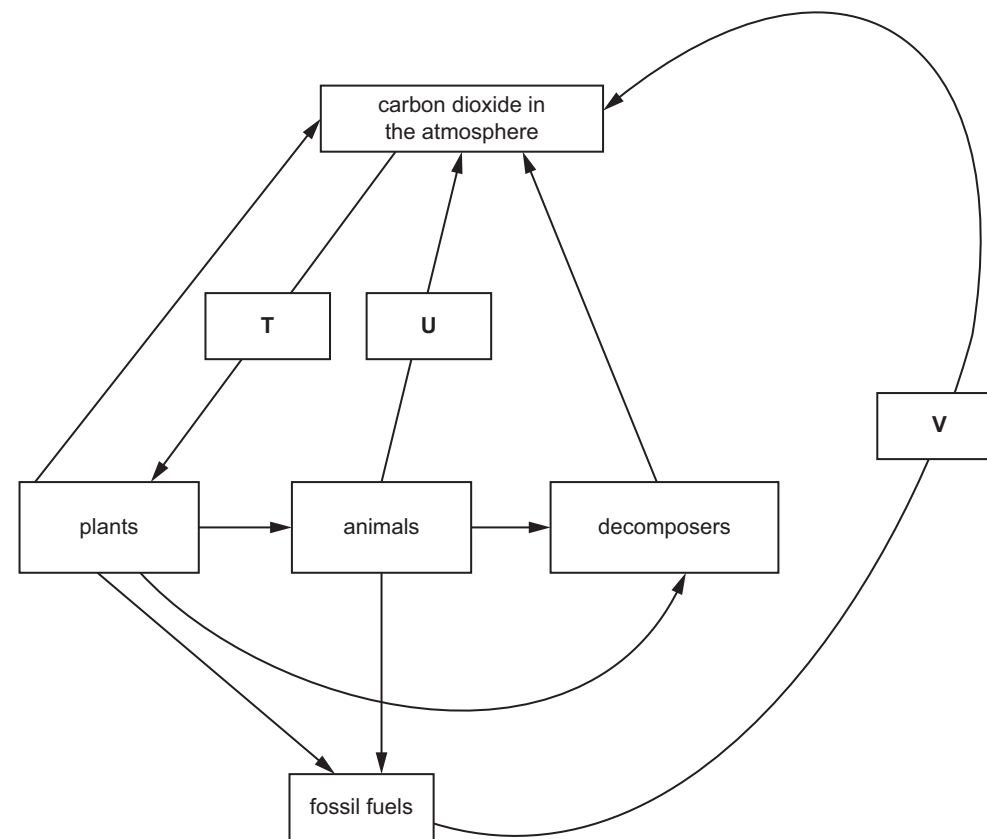


Fig. 6.2

State the names of the processes labelled **T**, **U** and **V** in Fig. 6.2.

T
U
V 

(c) Deforestation is linked to an increase in global temperatures.

(i) Explain how deforestation can contribute to an increase in global temperatures.

..... [3]

(ii) Describe **other** undesirable effects of deforestation.

..... [3]

[Total: 13]

20.3 Pollution

Name: _____ Class: _____ Date: _____ **Total: 22 marks**

KEY WORDS eutrophication 富营养化 • climate change 气候变化 • fish 鱼类 • oxygen 氧气
• methane 甲烷

Objective

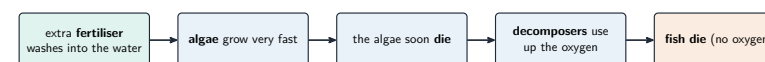
Build the skills to answer exam questions on **pollution** 污染 — water pollution and **eutrophication** 富营养化, plastics, and the **greenhouse effect** 温室效应.

You must be able to:

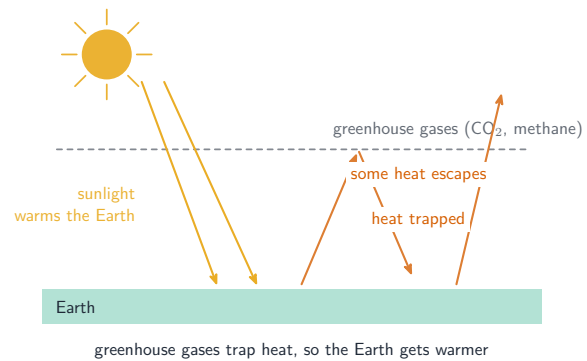
- describe the steps of eutrophication
- describe the problems caused by non-biodegradable plastics
- explain how greenhouse gases cause climate change

1 Worked examples

- Eutrophication and the greenhouse effect



Eutrophication: extra fertiliser makes algae bloom, then the water loses oxygen and fish die



Greenhouse gases (CO_2 , methane) trap heat $\rightarrow$ climate change

2 Practice

2.1 Name two greenhouse gases.

[2]

2.2 State one problem caused by non-biodegradable plastics.

[1]

3 Exam-style questions

3.1 In eutrophication, the fish die because:

[1]

- A the water becomes too cold
- B decomposers use up the dissolved oxygen
- C the algae eat the fish
- D there is too much oxygen

3.2 Excess fertiliser runs into a river.

(a) Describe the steps of eutrophication that follow.

[4]

3.3 Fertiliser runs off farmland into a river. Over several weeks the river becomes cloudy, then the fish die.

(a) Name this process and describe, in the correct order, the **four** stages that lead to the fish dying. [5]

(b) Explain why the fish die even though the plants were photosynthesising and making oxygen. [3]

(c) Describe **two** problems caused by plastic waste in the sea. [2]

(d) Explain how the greenhouse effect works, and name **two** greenhouse gases. [4]

Solutions

2.1 carbon dioxide; methane.

2.2 they build up and harm wildlife (animals eat them or get trapped).

3.1 B. Decomposers use up the dissolved oxygen, so the fish die.

3.2 (a) fertiliser adds nitrate ions to the water; algae grow very fast then die; decomposers break them down and use up oxygen in respiration; the dissolved oxygen falls, so fish and other organisms die.

3.3 (a) **Eutrophication.** Nitrate and phosphate in the fertiliser make algae and water plants grow very quickly, forming an algal bloom; the bloom blocks the light, so the plants underneath die; decomposer bacteria feed on the dead material and multiply rapidly; the bacteria respire aerobically and use up the dissolved oxygen, so the fish suffocate.

(b) Most of the photosynthesis is happening in the surface bloom, not throughout the water; the bacteria decomposing the dead plants use oxygen faster than it is replaced; at night the algae respire too and add to the demand, so the dissolved oxygen falls too low for the fish.

(c) Animals swallow plastic, which fills the gut so they cannot eat and they starve, or they become entangled in it and drown; plastic does not decompose, so it stays for hundreds of years and breaks into microplastics that pass along food chains.

(d) Short-wave radiation from the Sun passes through the atmosphere and warms the Earth's surface; the surface re-radiates energy as longer-wave heat radiation; greenhouse gases absorb this outgoing radiation and re-radiate some back down, so the atmosphere stays warmer than it otherwise would. Carbon dioxide and methane.

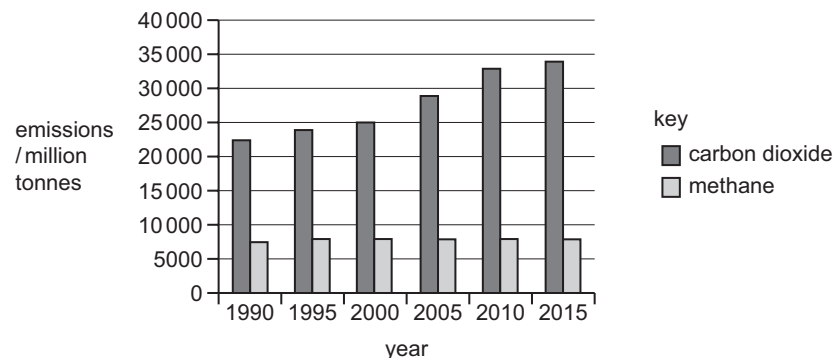
37 Eutrophication results in a reduction in the dissolved oxygen in streams and lakes.

What causes the reduction in dissolved oxygen?

- A decreased aerobic respiration by decomposers
- B decreased aerobic respiration by fish
- C increased aerobic respiration by decomposers
- D increased aerobic respiration by fish

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39 The graph shows the global emissions of carbon dioxide and methane from 1990 to 2015.



A student makes four statements about carbon dioxide and methane.

- Carbon dioxide and methane were the only sources of greenhouse gases produced in 1990.
- Carbon dioxide emissions continue to rise to the present day.
- Carbon dioxide has a greater effect on climate change than methane.
- Methane emissions were lower than carbon dioxide emissions between 1990 and 2015.

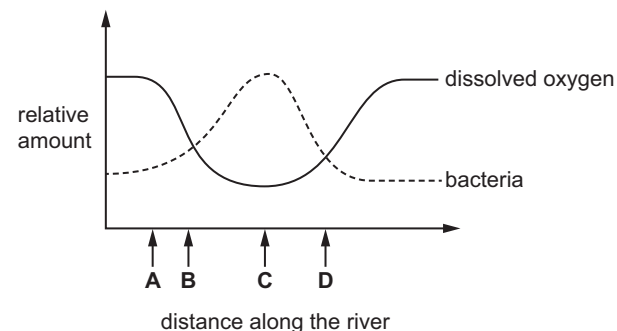
How many statements are supported by these data?

- A 1
- B 2
- C 3
- D 4

39 The graph shows the relative amounts of bacteria and dissolved oxygen at different locations along a river.

Fertiliser has entered the river.

At which distance along the river did the fertiliser enter the river?



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39 Which source of pollution can cause eutrophication?

- A carbon dioxide
- B methane
- C non-biodegradable plastic
- D sewage

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39 How does eutrophication lead to the death of fish?

- A A sudden increase in the number of bacteria increases the spread of disease.
- B Algae respire instead of photosynthesise.
- C Decomposer bacteria lower the oxygen concentration in the water.
- D Fertilisers reduce the availability of nitrates in the water.

6 (a) Microplastics are pieces of plastic with a diameter less than 0.5 cm.

Fig. 6.1 shows the mass of microplastics in the oceans between 2000 and 2040. The data between 2000 and 2020 is an estimate. The data after 2020 is a prediction.

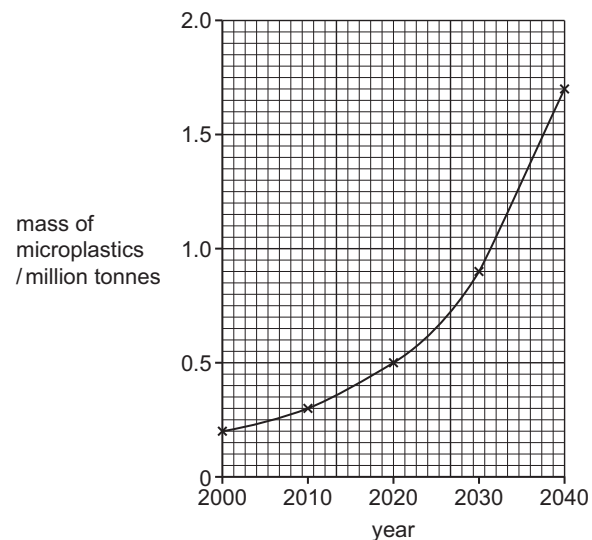


Fig. 6.1

(i) Suggest why the mass of microplastics between 2000 and 2020, shown in Fig. 6.1, is an estimate.

.....

.....

.....

.....

..... [2]

(ii) Using Fig. 6.1, calculate the predicted percentage increase in the mass of microplastics in the oceans between 2000 and 2040.

Space for working.

.....%

[2]



(b) Phytoplankton are producers found in the ocean. Phytoplankton absorb microplastics into their cells.

(i) Describe what is meant by the term producer.

.....

.....

.....

..... [2]

(ii) Fig. 6.2 shows a shearwater bird.

Shearwater birds feed on fish in the ocean.



Fig. 6.2

Suggest how microplastics can end up in consumers such as shearwater birds.

.....

.....

.....

..... [2]



(iii) The population of shearwater birds is decreasing.

Describe **three** ways the population of shearwater birds can be conserved.

- 1
-
- 2
-
- 3
-

[3]

(iv) Explain the risks to a population if its population size decreases.

-
-
-
-
-
-

[3]

[Total: 14]



20.4 Conservation

Name: _____ Class: _____ Date: _____ **Total: 7 marks**

KEY WORDS conservation 保护 • seed banks 种子库 • endangered 濒危
• captive breeding 圈养繁殖 • endangered species 濒危物种

Objective

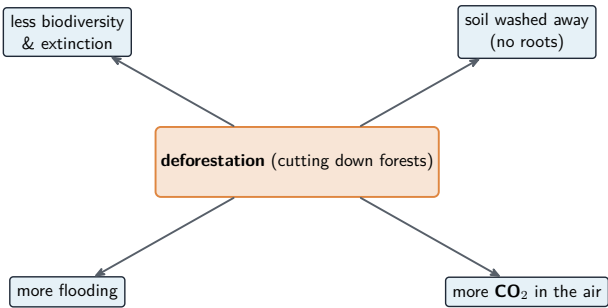
Build the skills to answer exam questions on **conservation** 保护 — **sustainable** 可持续 resources, saving **endangered species** 濒危物种, and why conservation matters.

You must be able to:

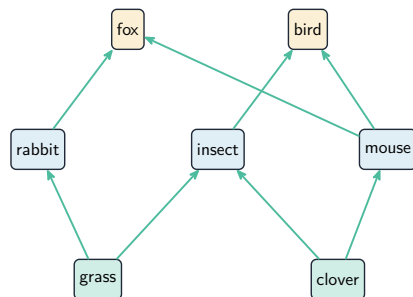
- explain sustainable use of forests and fish stocks
- describe methods to conserve endangered species
- explain why small populations are at risk

1 Worked examples

■ Conservation



Sustainable: produced as fast as it is used, so it never runs out



Conservation protects the web of life

- **fish stocks:** closed seasons, quotas, net mesh size, monitoring.
- **endangered species:** protect habitat, captive breeding, seed banks.
- small populations lose genetic variation → harder to survive change.

2 Practice

2.1 State what a sustainable resource is.

[1]

2.2 State one method used to conserve fish stocks.

[1]

3 Exam-style questions

3.1 A method used to conserve an endangered animal species is:

[1]

- A deforestation
- B captive breeding
- C overharvesting
- D pollution

3.2 Conservation helps maintain biodiversity.

(a) State two reasons why we conserve species.

[2]

(b) Explain why a very small population is at greater risk of extinction.

[2]

Solutions

2.1 a resource produced as fast as it is used up, so it never runs out.

2.2 any of: closed seasons; quotas; controlled net mesh size; protected areas; monitoring.

3.1 B. Captive breeding conserves endangered species.

3.2 (a) any two of: keep up biodiversity; reduce extinction; protect ecosystems; provide food/drugs/genes.

(b) a small population has less genetic variation, so it is harder for the species to survive future change/disease.

Name:

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31 Which technique is **not** used to conserve endangered animal species?

- A** artificial insemination
- B** captive breeding programmes
- C** *in vitro* fertilisation
- D** seed banks

IGCSE Biology: **s25 21**

38 Which term describes the number of different species living in an area?

- A** biodiversity
- B** conservation
- C** ecosystem
- D** population