

Mark schemes

1

Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also apply a 'best-fit' approach to the marking.

0 marks

No relevant content

Level 1 (1 – 2 marks)

There is at least one reason for deforestation

or

an attempt at a description of at least one way deforestation is affecting the atmosphere.

Level 2 (3 – 4 marks)

There is at least one reason for deforestation

and

a description of the way deforestation is affecting one gas in the atmosphere

or

the process that causes an effect.

Level 3 (5 – 6 marks)

There are reasons for deforestation

and

a clear description of the way deforestation is affecting one gas in the atmosphere

and

the process that causes this.

examples of the points made in the response

Reasons for deforestation

- timber for construction / furniture / boat building / paper production
- growing plants for biofuels for motor fuel / aviation / lawnmowers
- use of wood as a fuel
- land for building or agriculture to provide food, such as rice fields and cattle ranching

Effects of deforestation

- increase in carbon dioxide in atmosphere
 - due to burning
 - due to activities of microbes
 - less carbon dioxide taken in / locked up (by trees)
 - less photosynthesis
- increase in methane in atmosphere
 - due to rice production / cattle

extra information

ignore references to oxygen

accept explanations of the effect of water (vapour)

[6]

2

(a) any **two** from:

ignore CO₂ release unqualified

- burning
- activity of microbes / microbial respiration
- less photosynthesis

or

trees take in CO₂

*do **not** accept CO₂ taken in for respiration*

or

less CO₂ locked up in wood

- CO₂ given off by clearing machinery

2

(b) (i) range of different species

accept idea of variety of organisms or plants or animals

1

(ii) any **two** from:

- organisms may produce substances useful to humans
*do **not** accept if food is only example*
- duty to preserve for future generations
- effect on other organisms, eg food chain effects
ignore effect on human food supply
- loss of environmental indicators

2

[5]

3

(a) microorganisms / microbes / bacteria / fungi / decomposers

*allow named example **or** mould*

ignore germs / worms / other detritivores

1

(b) (weather / it is) warm(er) / hot(ter)

accept optimum conditions for enzymes

allow cold(er) in winter

ignore wet(ter) / light(er) / sun

*do **not** accept heat dries the leaves out*

1

(c) oxygen

no mark if more than one box is ticked

1

[3]

4

(a) (i) increase / higher / faster / quicker

1

numerical comparison eg from 30 to 60 **or** by 30 **or** it is 30 at 15°C *and* 60 at 25°C

award 2 marks for doubles / goes twice as fast or 30 units more

1

(ii) any **two** from:

- oxygen / air (in)
ignore air out
*do **not** accept lets oxygen*
ignore reference to other substances / light passing in or out
- for microorganisms / bacteria / microbes / fungi / decomposers
ignore microorganisms passing in
ignore worms / germs / bugs / other detritivores
- (for aerobic) respiration (of microorganisms)
- let excess heat out
ignore heat in

2

(b) compost contains minerals / nutrients / elements / ions / named

allow improve drainage / moisture

allow contains nitrogen

ignore CO₂ / food / goodness / fertiliser

*do **not** accept vitamins / glucose*

1

[5]

5

(a) any **two** from:

- (microorganisms) produce enzyme / amylase / carbohydrase
- to break down / digest starch / carbohydrate (in potato)
- into sugars / glucose
- which diffuse back into microorganism
accept decomposer / fungus / bacterium / cell

2

- (b) (i) (microorganisms)
(accept bacteria / fungi / decomposers)
- digest the potato (starch)
allow breakdown / feed on / consume / decompose
*do **not** accept eat* 1
- use starch / glucose / carbohydrate for respiration 1
- which releases carbon dioxide / CO₂ (into the atmosphere) 1
- (ii) up to 40 °C the potato took less time to decay / the rate is faster
ignore yes / no
answers must be comparative 1
- but at 50 °C it took longer / the rate is slower
- or**
- at 50 °C / a high(er) temperature the enzymes have denatured
accept at a higher temperature / above 40 °C 1

[7]

6

- (a) any **two** from:
- fewer trees to take in carbon dioxide for photosynthesis
 - decomposers / microorganisms respire (as they decay debris) releasing carbon dioxide
 - burning of wood releases carbon dioxide
allow carbon dioxide released by burning fossil fuels in vehicles / factories

2

- (b) Marks awarded for this answer will be determined by the Quality of Communication (QC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5, and apply a 'best – fit' approach to the marking.

0 marks

No relevant content.

Level 1 (1 – 2 marks)

There is a brief description of some steps in the process but the order is not clear with little biological vocabulary used.

Level 2 (3 – 4 marks)

There is a reasonably clear description of the process involving many of the steps and using some biological vocabulary.

Level 3 (5 – 6 marks)

There is a clear, logical and detailed scientific description of the process using appropriate biological vocabulary.

examples of biology points made in the response:

- this contains mineral ions (and organic matter)
- this increases growth of algae / water plants
- the plants / algae (underneath) die
- due to lack of light / photosynthesis / space
- decomposers / microorganisms feed on decaying matter **or** multiply rapidly
- the respiration of decomposers uses up all the oxygen
- so invertebrates die due to lack of oxygen
- this is called eutrophication

6

[8]

7

- (a) 8.05 / 8.1 / 8

correct answer with or without working gains 2 marks

*allow 1 mark for 8.0 **or** 8.10*

allow 35/100 x 23 (million) for 1 mark if no answer or incorrect answer

*allow 1 mark for 805 **or** 8 050 000*

2

- (b) (i) any **one** from:

- less landfill sites used
- less cost (of landfill sites) / saves money
- less effort / cost to collect
allow less to collect

1

(ii) compost can be used on garden

*allow idea of compost can be used to help plant growth **or** compost provides minerals / named **or** compost improves the soil*

1

[4]

8

Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information in the [Marking guidance](#).

0 marks

No relevant content.

Level 1 (1-2 marks)

For at least one process **either** the organism that carries it out **or** the carbon compound used **or** the carbon compound produced is described **or** for at least one organism **either** the carbon compound it uses **or** the carbon compound it produces is described **or** at least one process is named

Level 2 (3-4 marks)

For some processes (at least one of which is named) **either** the organisms involved **or** the carbon compounds used **or** the carbon compounds produced are described

Level 3 (5-6 marks)

For at least one named process an organism **and** either the carbon compound used for the process **or** the carbon compound produced by the process are described **and** for other processes (at least one of which is named) **either** the organism **or** the carbon compounds used **or** the carbon compounds produced are described (as in Level 2)

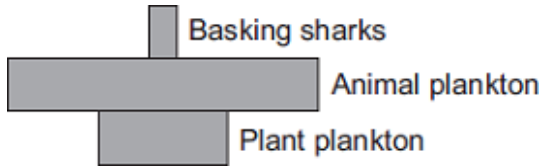
Examples of Biology points made in the response:

- (green) plants photosynthesise
- photosynthesis takes in carbon dioxide
- (green) plants use carbon to make carbohydrate / protein / fat / organic compounds / named (e.g. enzymes / cellulose)
- animals eat (green) plants (and other animals)
- (green) plants respire
- animals respire
- respiration releases carbon dioxide
- (green) plants and animals die
- microorganisms decay / decompose / rot / break down / feed on dead organisms
- microorganisms respire

[6]

9

(a)



if more than one box is ticked award no mark

1

(b) increasing / higher light / temperature

ignore references to months other than February – April

*do **not** accept mineral / ions increase*

1

more / increased photosynthesis

*for both marks there must be a reference to 'more' at least once
(e.g. 'more light for photosynthesis' gains 2 marks)*

*allow 1 mark for reference to light **and** photosynthesis without an
idea of 'more'*

1

(c) increase due to increase in plant plankton / food

ignore references to months other than April – July

1

decrease due to fall in plant plankton / food **or** decrease as eaten by (basking) sharks

allow decrease as eaten by predators / animals / fish

1

(d) fall due to use / intake by plant (plankton)

ignore ref to no change section of graph

for fall allow March / April

ignore May / February

1

increase due to decay / decomposition / breakdown

for increase allow any month in range August to November

ignore December

1

of dead (plant / animal) plankton

allow of dead organisms / waste

1

[8]

10

(a) (i) (compost produced) quicker / faster / takes less time

it = tumbler bin

*answers should be comparative eg **only** 6 weeks = 1 mark*

6 weeks = 0 marks

1

(ii) any **two** from:

- takes less space
- cheaper (to buy)
- don't need to turn / rotate it
it = fixed bin
references to space and cost should be comparative
*do **not** accept unqualified data*

2

(b) (i) any **two** from:

- faster rise (in tumbler)
- higher (in tumbler) **or** 2 correct number readings
- levels off (in tumbler) **or** continues to rise in fixed
it = tumbler bin
ignore eg faster compost

2

(ii) microorganisms / microbes / decomposers

allow bacteria / fungi / detritus feeders / worms / other named
examples of detritus feeders / mould

1

aerobic

allow air(y)

allow oxygen(ated)

1

(iii) faster respiration / decay / **or** microorganisms / microbes / decomposers work faster (in tumbler)

allow converse

allow bacteria / fungi / mould

1

so more heat produced (in tumbler)

ignore heat produced by friction

OR

more air / more oxygen(ation) (in tumbler) (1)

so more respiration / faster decay / bacteria work faster (in tumbler) (1)

1

[9]