

[Greenhouse gases]

Q1.a).(2018)

Maximum three marks from:

idea that energy/heat/light or radiation from the Sun reaches the (surface of the) Earth ✓

idea that energy/heat/light or radiation is absorbed by the (surface of the) Earth or warms up the (surface of the) Earth ✓

BUT

energy/heat/light or radiation from the Sun is absorbed by the (surface of the) Earth or warms up the (surface of the) Earth ✓✓

idea that energy/heat or infrared (radiation) emitted by the (surface of the) Earth ✓

idea that some energy/heat or infrared (radiation) go back into space ✓

AND at least one mark from:

idea that some energy/heat or infrared (radiation) is absorbed/trapped by greenhouse gas (molecules) in the (Earth's) atmosphere ✓

idea that energy/heat or infrared (radiation) from greenhouse gas (molecules) returns to Earth warming the (surface of the) Earth ✓

4

4 x 1.1

IGNORE rays throughout

IGNORE

bounce back/reflected/refracted/deflect throughout

ALLOW named greenhouse gases

ALLOW named greenhouse gases

DO NOT ALLOW absorbed or emitted by ozone

Q1.b).(2018)

Evidence to support increased temperature of the Earth

As carbon dioxide levels have increased so has the temperature of the Earth ✓

Evidence for a natural cycle

idea that Earth's temperature goes up and down/fluctuates/erratic (over the years 1880 to 1920) and carbon dioxide levels are (slowly) rising ✓

2

2 x 2.1

ALLOW (the lines on) both graphs increase/go up

Q2.(2019)

A

Q3.(2020)

idea that some of the heat from the Sun is reflected off the Earth's surface (and back into the atmosphere) ✓

1

1.1

ALLOW answers based upon IR radiation/energy.

idea that this heat is trapped /absorbed in the Earth's atmosphere by greenhouse gases ✓

1

1.1

ALLOW named greenhouse gases such as carbon dioxide etc.

Q4.(2020)

(more) carbon dioxide released (into the atmosphere) ✓	1	2.1	if activity given does not relate to gas named then maximum 1 mark. ALLOW (human activity) is increasing amount of greenhouse gases in the atmosphere for the 1 st mark only.
from use of fossil fuels ✓	1	2.1	ALLOW specific references to specific examples of burning fossil fuels e.g. cars use petrol
OR more methane released (into the atmosphere) ✓			
from increased farming of rice/cattle OR increase in landfill sites ✓			
OR Less carbon dioxide absorbed (by plants) ✓			
Due to deforestation ✓			IGNORE references to increases in temperature and more heat being trapped in the atmosphere.

Q5.(2020)

idea that electric cars will reduce the amount of (fossil) fuels burnt / don't use (fossil) fuels ✓	1	2.1	ALLOW answers based upon ideas that electric cars reduce the amount of carbon dioxide / greenhouse gases produced / don't produce carbon dioxide/greenhouses gases
idea that electricity for (charging) electric vehicles may come from burning fossil fuels ✓	1	2.1	ALLOW ideas that the increased use of electric cars may be so small that the reduction in burning fossil fuels/production of carbon dioxide would be so small compared with all other activities. IGNORE production of electric vehicles

Q6.(2021)

B ✓

Q7.(2022)

B ✓

Q8.(2022)

A ✓

Q9.a).(2024)

As carbon dioxide emissions increase, carbon dioxide in atmosphere increases ✓	2	2 x 3.1a	IGNORE positive correlation
(Carbon dioxide) emissions have risen faster (than atmospheric carbon dioxide) in the last 100 years ✓			ALLOW last 80 - 120 years

Q9.b).(2024)

Idea that the rise in carbon dioxide emissions is due to an increase in use of fossil fuels ✓	1	1.1a	ALLOW ideas such as more industry / more people have (petrol/diesel) cars / higher population
--	---	------	--

Q9.c).(2024)

Carbon dioxide traps heat in atmosphere ✓	2	2 x 1.1	ALLOW carbon dioxide absorbs infrared radiation/reemits absorbed heat DO NOT ALLOW ozone layer
Increase in trapped heat increases (global) temperature ✓			Answer must refer to both ideas of increasing IGNORE increases global warming

Q9.d).(2024)

Reduce use of fossil fuels / use biofuels / use renewable energy sources / idea of carbon capture ✓	1	1.1	ALLOW answer based upon specific examples e.g., use more solar energy/walk rather than use cars IGNORE plant more trees/cut down less trees
---	---	-----	--