

GCSE Combined Science: Trilogy

Worksheet: Properties and effects of atmospheric pollutants

TIME 25 min	TOTAL 24 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Properties and effects of atmospheric pollutants

NAME _____ **CLASS** _____ **DATE** _____

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

0 1

0 1 . 1 Which pollutant causes global dimming?

Tick (✓) **one** box.

Carbon monoxide

☐

Particulates

☐

Sulfur dioxide

☐

Water vapour

☐

[1 mark]

0 1 . 2 Why is carbon monoxide difficult to detect?

.....

.....

[1 mark]

0 1 . 3 Name **two** pollutants that cause acid rain.

.....

.....

.....

.....

[2 marks]

0 2

0 2 . 1

Which pollutant is most closely associated with 'global dimming'?

Tick (✓) **one** box.

Carbon monoxide

☐

Particulates

☐

Oxides of nitrogen

☐

Carbon dioxide

☐

[1 mark]

0 2 . 2

Carbon monoxide is colourless and odourless.

Explain why this makes carbon monoxide particularly dangerous.

.....

.....

[1 mark]

0 3

Sulfur dioxide and oxides of nitrogen are released when fuels are burned.

0 3 . 1

Describe how sulfur dioxide causes acid rain.

.....

.....

.....

.....

[2 marks]

0 3 . 2

Give **two** effects of acid rain.

.....

.....

.....

.....

[2 marks]

0 3 . 3

Give **one** effect of sulfur dioxide and oxides of nitrogen on human health.

[1 mark]

0 4

People are advised to fit carbon monoxide detectors in homes that have gas boilers.

0 4 . 1

Explain why carbon monoxide is dangerous.

[2 marks]

0 4 . 2

Suggest how a faulty gas boiler could produce carbon monoxide.

[1 mark]

0 4 . 3

Particulates are another pollutant from burning fuels.
Describe the problems caused by particulates.

[2 marks]

0 5

0 5 . 1

Explain why ‘global dimming’ caused by particulates can partly hide the effect of global warming caused by greenhouse gases.

.....

.....

.....

.....

[2 marks]

0 6

Table 1 shows the mean daily particulate concentration and the number of hospital admissions for asthma in a city over four months.

Table 1

Month	Mean particulate concentration in $\mu\text{g}/\text{m}^3$	Asthma hospital admissions
1	18	42
2	35	68
3	52	95
4	22	48

0 6 . 1

Describe the relationship shown between particulate concentration and asthma hospital admissions.

.....

.....

[1 mark]

0 6 . 2

Explain why this data does not, on its own, prove that particulates directly cause asthma attacks requiring hospital admission.

[2 marks]

0 7

A limestone statue in a city with high levels of air pollution has visibly eroded over the last 50 years, more than a similar statue in a rural area with cleaner air.

0 7 . 1

Explain why acid rain causes limestone to erode.

[2 marks]

0 7 . 2

Suggest why the statue in the city eroded more than the one in the rural area.

[1 mark]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Combined Science: Trilogy · Worksheet: Properties and effects of atmospheric pollutants · 24 marks

Question 1 (4 marks)

01.1 [1 mark]

Correct: Particulates

01.2 [1 mark]

- it is colourless and odourless (1)

Notes: Both properties are needed.

01.3 [2 marks]

- sulfur dioxide (1)
 - oxides of nitrogen / nitrogen dioxide (1)
-
-

Question 2 (2 marks)

02.1 [1 mark]

Correct: Particulates

02.2 [1 mark]

- people cannot see or smell it, so they may breathe it in without knowing it is there (a detector is needed) (1)
-

Question 3 (5 marks)

03.1 [2 marks]

- sulfur dioxide dissolves in water droplets in clouds / in rain water (1)
- forming an acidic solution (1)

Notes: Allow 'forms sulfuric acid' for the second mark.

03.2 [2 marks]

- damages buildings and statues (especially limestone) / corrodes metal structures (1)
- damages or kills trees and other plants (1)
- makes lakes and rivers acidic, harming fish and other aquatic life (1)

Any 2 of the points above.

03.3 [1 mark]

- respiratory problems (e.g. asthma attacks, breathing difficulties) (1)
-

Question 4 (5 marks)

04.1 [2 marks]

- it is toxic / poisonous (1)
- it is colourless and odourless so it is not easily detected (1)

Notes: Allow 'it reduces the amount of oxygen the blood can carry' for the first mark.

04.2 [1 mark]

- not enough air / oxygen reaches the flame so the gas undergoes incomplete combustion (1)
-

04.3 [2 marks]

- global dimming (they reflect sunlight, so less reaches the Earth's surface) (1)
 - health problems for humans (e.g. damage to the lungs when breathed in) (1)
-

Question 5 (2 marks)

05.1 [2 marks]

- particulates reflect some sunlight back into space, reducing the amount reaching and warming the Earth's surface (1)
 - this cooling effect can partially offset / mask the warming effect of increased greenhouse gases, making the net temperature change smaller than the greenhouse effect alone would cause (1)
-

Question 6 (3 marks)

06.1 [1 mark]

- as the particulate concentration increases, the number of asthma hospital admissions also increases (a positive correlation) (1)

06.2 [2 marks]

- a correlation does not prove causation; other factors that also vary month to month (e.g. temperature, pollen levels, rates of respiratory infections) could affect both variables (1)
- a controlled study, or evidence of a biological mechanism, would be needed to establish a direct causal link (1)

Question 7 (3 marks)

07.1 [2 marks]

- acid rain contains dissolved sulfur dioxide and oxides of nitrogen, making it acidic (1)
- limestone (calcium carbonate) reacts with acids, gradually dissolving / wearing away the stone (1)

07.2 [1 mark]

- the city has higher concentrations of the pollutants (sulfur dioxide, oxides of nitrogen) that cause acid rain, e.g. from vehicles and industry, than the cleaner rural area (1)
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