

Exercise walk-through

7.6

Reduction of Air Pollutants

AP Environmental Science

What we will cover

- 1 Types of pollutants
- 2 Photochemical smog
- 3 Thermal inversion
- 4 CO₂ and indoor air
- 5 Acid rain
- 6 Reducing pollution



Atmospheric CO₂ and particulates

the source

rising atmospheric CO₂ comes from burning fossil fuels

the effect

it enhances the greenhouse effect and warms the climate

particulate matter

tiny solid or liquid particles suspended in air

its sources

combustion, industry, road dust and wildfires

its effect

respiratory and cardiovascular disease – and PM_{2.5} penetrates deepest

and on climate

particulates can cool by reflecting sunlight, which is the opposite sign to CO₂

The two act in opposite directions, which is why cleaning up particulate pollution can unmask warming that was already there.

Exam tips

- Distinguish **primary** pollutants (emitted directly: CO, NO_x, SO₂, particulates) from **secondary** (form in the air: ground-level ozone).
- Ground-level ozone is a **pollutant**, but the ozone **layer** high up is protective – do not confuse them.
- Explain how a **thermal inversion** traps pollution near the ground.
- **Acid rain** (from SO₂ and NO_x) often falls **far downwind**, making it an international problem.
- Link control methods to pollutants (catalytic converters, scrubbers, cleaner fuels, emission laws).

Exercises 2.1-2.3

2.1 What does a catalytic converter reduce? [1]

2.2 What does a scrubber remove from smokestack gases? [1]

2.3 What is the purpose of emission standards? [1]

Exercises 2.1-2.3

2.1 What does a catalytic converter reduce? [1]

2.1

- CO, NO_x, and unburned hydrocarbons from car exhaust
-

2.2 What does a scrubber remove from smokestack gases? [1]

2.2

- SO₂ (sulfur dioxide)
-

2.3 What is the purpose of emission standards? [1]

2.3

- To limit how much pollution sources may release

Exercise 3.1

3.1 A device that removes SO_2 from a smokestack is a

[1]

☐

A catalytic converter

B scrubber

C wind turbine

D solar panel

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3.1 B

- a scrubber

Exercise 3.2 (a)

3.2 A coal power plant must reduce its emissions.

(a) Name one technology to remove particulates and one to remove SO₂.

[2]

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[2]

(a)

- Particulates: electrostatic precipitator/filter; SO_2 : scrubber

Exercise 3.2 (b)

3.2 A coal power plant must reduce its emissions.

(b) Explain how emission standards force cleaner operation.

[2]

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(b) Explain how emission standards force cleaner operation.

[2]

(b)

- They set legal limits, so plants must install control technology or reduce output to comply

Exercise 3.3

3.3 Explain why preventing pollution at the source is often better than cleaning it up afterward. [2]

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3.3

- Prevention avoids creating the pollutant at all (saving cleanup costs and avoiding leaks), while control devices only capture some of it after it forms