

# Exercise walk-through

## Atmospheric CO<sub>2</sub> and Particulates ■ 7.4

eXercise

## You must be able to

- explain rising **CO<sub>2</sub>** and its climate link
- describe **particulate matter (PM)** 颗粒物 and its health effects
- distinguish their different impacts

## Method — Rising CO

Burning fossil fuels raises atmospheric **CO<sub>2</sub>**, a **greenhouse gas** that traps heat and drives climate change. CO<sub>2</sub> is not directly toxic to breathe at these levels but is a major climate concern.

## Method — Particulate matter

**Particulate matter (PM)** is tiny solid/liquid particles (soot, dust). **PM2.5** (very fine) is most dangerous — it lodges deep in the lungs, causing respiratory and heart disease.

## Method — Different impacts

- **CO<sub>2</sub>** → mainly a **climate** problem (global).
- **PM** → mainly a **health** problem (local air quality).

## Method — A worked distinction

A diesel truck emits both CO<sub>2</sub> (adding to climate change) and PM (harming the lungs of nearby people) — two different kinds of impact.

## Practice 2.1 ■ 1 mark

Why is rising CO<sub>2</sub> a concern?

## Solution 2.1

Method: Rising CO

### Worked steps

It is a greenhouse gas that traps heat and drives climate change **B1**.

## Practice 2.2 ■ 1 mark

What is particulate matter?

## Solution 2.2

Method: Particulate matter

### Worked steps

Tiny solid or liquid particles (soot, dust) in the air **B1**.

## Practice 2.3 ■ 1 mark

Which is mainly a health problem: CO<sub>2</sub> or PM?

## Solution 2.3

Method: Different impacts

### Worked steps

PM **B1**.

## Exam-style 3.1 ■ 1 mark

The most dangerous particulate matter for health is

- A** large dust only
- B** fine PM<sub>2.5</sub> that lodges deep in the lungs
- C** carbon dioxide
- D** oxygen

## Solution 3.1

Method: Particulate matter

- A large dust only
- B fine PM2.5 that lodges deep in the lungs** 
- C carbon dioxide
- D oxygen

### Worked steps

**B** — fine PM2.5 that lodges deep in the lungs.

## Exam-style 3.2 ■ 2 marks

A city has high levels of both CO<sub>2</sub> and PM2.5.

- (a) State the main impact of each.
- (b) Explain why PM2.5 is especially harmful to health.

## Solution 3.2

Method: A worked distinction

### Worked steps

(a)  $\text{CO}_2 \rightarrow$  climate change;  $\text{PM}_{2.5} \rightarrow$  respiratory/heart disease **B1** **B1**. (b) It is fine enough to lodge deep in the lungs and enter the bloodstream, causing serious respiratory and heart problems **M1** **A1**.

## Exam-style 3.3 ■ 2 marks

Explain why CO<sub>2</sub> is described as a global problem while PM is more local.

## Solution 3.3

Method: Different impacts

### Worked steps

CO<sub>2</sub> mixes throughout the atmosphere and warms the whole planet (global), while PM settles out near its source, so its worst effects are on local air quality **M1** **A1**.