

Exercise walk-through

Stratospheric Ozone Depletion ■ 9.1

eXercise

You must be able to

- explain how **CFCs** 氯氟烃 destroy stratospheric **ozone** 臭氧
- distinguish “good” (stratospheric) from “bad” (ground-level) ozone
- describe the effects of ozone loss

Method — Good vs bad ozone

- **Stratospheric (“good”) ozone** shields Earth from UV.
- **Ground-level (“bad”) ozone** is a pollutant in smog that harms lungs.

This subtopic is about **depletion of the good, stratospheric** ozone.

Method — How CFCs destroy ozone

CFCs (once used in aerosols, refrigerants) drift up to the stratosphere, where UV breaks them apart to release **chlorine**. Each chlorine atom destroys **many** ozone molecules in a chain reaction.

Method — The ozone hole

Depletion is worst over **Antarctica** (the “ozone hole”), where cold conditions speed the reactions.

Method — Effects

Less ozone lets more harmful **UV** reach the surface, increasing **skin cancer**, cataracts, and harming crops and plankton.

Practice 2.1 ■ 1 mark

Which chemicals are the main cause of ozone depletion?

Solution 2.1

Worked steps

CFCs (chlorofluorocarbons) **B1**.

Practice 2.2 ■ 1 mark

What atom released from CFCs destroys ozone?

Solution 2.2

Method: How CFCs destroy ozone

Worked steps

Chlorine **B1**.

Practice 2.3 ■ 1 mark

State one effect of increased UV from ozone loss.

Solution 2.3

Worked steps

Any one: skin cancer, cataracts, crop/plankton damage **B1**.

Exam-style 3.1 ■ 1 mark

Stratospheric ozone is important because it

- A** causes smog
- B** absorbs harmful UV radiation
- C** warms the ground
- D** is a greenhouse gas only

Solution 3.1

Method: Good vs bad ozone

- A causes smog
- B absorbs harmful UV radiation
- C warms the ground
- D is a greenhouse gas only



Worked steps

B — absorbs harmful UV radiation.

Exam-style 3.2 ■ 3 marks

CFCs from old refrigerators reach the stratosphere.

- (a) Explain how they destroy ozone.
- (b) State one health effect of the resulting UV increase.

Solution 3.2

Method: How CFCs destroy ozone

Worked steps

(a) CFCs rise to the stratosphere; UV breaks them, releasing chlorine; each chlorine atom destroys many ozone molecules in a chain reaction **M1** **M1** **A1**. (b) Skin cancer (or cataracts) **B1**.

Exam-style 3.3 ■ 2 marks

Distinguish “good” stratospheric ozone from “bad” ground-level ozone.

Solution 3.3

Method: Good vs bad ozone

Worked steps

Good ozone is in the stratosphere and shields Earth from UV; bad ozone is at ground level, a smog pollutant that harms lungs **M1** **A1**.