

9.2 Reducing Ozone Depletion

Name: _____ Class: _____ Date: _____ **Total: 9 marks**

KEY WORDS montreal protocol 蒙特利尔议定书 • greenhouse gases 温室气体 • cfc 氯氟烃
• ozone layer 臭氧层 • the ozone hole 臭氧洞

Objective

Build the skills to answer exam questions on **reducing ozone depletion**.

You must be able to:

- describe the **Montreal Protocol** 蒙特利尔议定书
- explain the switch from CFCs to substitutes
- evaluate the recovery of the ozone layer

1 Worked examples

Study these first. Each one shows the method for a question type used later — follow the steps and you can do the Practice and Exam-style questions yourself.

■ The Montreal Protocol

The **Montreal Protocol** (1987) was an international agreement to **phase out CFCs** and other ozone-depleting substances. It is often called the most successful environmental treaty.

■ Substitutes

CFCs were replaced with **HCFCs** and then **HFCs**, which do far less (or no) ozone damage. (Some HFCs are strong greenhouse gases, now also being phased down.)

■ Recovery

Because CFCs persist, the ozone layer recovers slowly, but the ozone hole is now **shrinking** and is expected to heal over decades — showing global cooperation can work.

■ A worked evaluation

The Montreal Protocol shows that a coordinated global ban on a harmful chemical can reverse an environmental problem, given time for the long-lived pollutant to decline.

2 Practice

Now apply the methods above.

2.1 What did the Montreal Protocol do? [1]

2.2 What replaced CFCs? [1]

2.3 Is the ozone layer recovering? [1]

3 Exam-style questions

3.1 The Montreal Protocol is considered successful because it [1]

- **A** increased CFC use
- **B** phased out ozone-depleting substances globally
- **C** banned all refrigerators
- **D** had no effect

3.2 After the Montreal Protocol, CFC use fell sharply.

(a) Explain why the ozone layer still took decades to recover. [2]

(b) State one lesson this treaty offers for other global problems. [1]

3.3 Explain one drawback of some CFC substitutes (HFCs). [2]

Solutions

2.1 Phased out CFCs and other ozone-depleting substances.

2.2 HCFCs / HFCs.

2.3 Yes (slowly).

3.1 B — phased out ozone-depleting substances globally.

3.2 (a) CFCs are persistent, so those already in the atmosphere kept destroying ozone for decades before declining. (b) Global cooperation can solve a shared environmental problem.

3.3 Some HFCs, though ozone-safe, are potent greenhouse gases that contribute to climate change.