AP ENVIRONMENTAL SCIENCE • EXERCISE SHEET

9.1 Stratospheric Ozone Depletion

Name: _____ Class: _____ Date: _____ **Total: 10 marks**

Objective

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

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

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.

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.

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.

The ozone hole

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

Effects

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

2 Practice

Now apply the methods above.

2.1 Which chemicals are the main cause of ozone depletion? [1]

2.2 What atom released from CFCs destroys ozone? [1]

2.3 State one effect of increased UV from ozone loss. [1]

3 Exam-style questions

3.1 Stratospheric ozone is important because it [1]

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

3.2 CFCs from old refrigerators reach the stratosphere.

(a) Explain how they destroy ozone. [3]

(b) State one health effect of the resulting UV increase. [1]

3.3 Distinguish ”good” stratospheric ozone from ”bad” ground-level ozone. [2]

4 Go further

You are now ready for the real exam questions on this subtopic:

- work through the **9.1 Stratospheric Ozone Depletion** lesson on the **Learn** page;
- read the **Stratospheric Ozone Depletion** section of the AP Environmental Science handout on the **Know** page.

Solutions

2.1 CFCs (chlorofluorocarbons).

2.2 Chlorine.

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

3.1 B —absorbs harmful UV radiation.

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

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