Exercise walk-through

Global Climate Change ▪ 9.5

eXercise

You must be able to

- describe effects (rising temperatures, sea level, extreme weather)
- explain **positive feedback loops** 正反馈 (ice-albedo, permafrost)
- distinguish weather from climate

Method — Weather vs climate

Weather is short-term (today's conditions); **climate** is the long-term average pattern. Climate change is a shift in the long-term averages.

Method — Effects of climate change

- **Rising temperatures** and heatwaves.
- **Sea-level rise** (melting ice + thermal expansion).
- **More extreme weather** (stronger storms, droughts, floods).
- **Shifting species ranges** and ecosystem disruption.

Method — Positive feedback loops

Feedbacks **amplify** warming:

- **Ice-albedo** — melting ice exposes dark ground/water that absorbs more heat, melting more ice.
- **Permafrost** — thawing releases methane/CO_2, causing more warming.

Method — A worked feedback

As Arctic ice melts, the dark ocean beneath absorbs more sunlight (less is reflected), warming the water and melting still more ice — a positive feedback.

Practice 2.1 ▪ 1 mark

Distinguish weather from climate.

Solution 2.1

Worked steps

Weather is short-term conditions; climate is the long-term average B1.

Practice 2.2 ▪ 2 marks

Name two effects of climate change.

Solution 2.2

Method: Effects of climate change

Worked steps

Any two: rising temperatures, sea-level rise, extreme weather, shifting species **B1** **B1**.

Practice 2.3 ▪ 1 mark

What does a positive feedback loop do to warming?

Solution 2.3

Worked steps

It amplifies (increases) it B1.

Exam-style 3.1 ▪ 1 mark

The ice-albedo feedback amplifies warming because melting ice exposes surfaces that

A reflect more sunlight

B absorb more sunlight

C produce ice

D cool the ocean

Solution 3.1

Method: Positive feedback loops

A reflect more sunlight

B absorb more sunlight ✓

C produce ice

D cool the ocean

Worked steps

B — absorb more sunlight.

Exam-style 3.2 ▪ 2 marks

Sea levels are rising globally.
(a) State two causes of sea-level rise.
(b) Explain the permafrost feedback loop.

Solution 3.2

Method: Effects of climate change

Worked steps

(a) Melting land ice and thermal expansion of warming seawater **B1** **B1**. (b) Thawing permafrost releases methane and CO_2, which cause more warming, which thaws more permafrost — a positive feedback **M1** **A1**.

Exam-style 3.3 ▪ 2 marks

Explain why a single cold day does not disprove climate change.

Solution 3.3

Worked steps

Climate is a long-term average; a single cold day is weather, and short-term variation does not change the long-term warming trend M1 A1.