Exercise walk-through

6.3
Climate change: mitigation and adaptation

International Baccalaureate · IB Diploma · Environmental Systems and Societies · SL

Independent lines of evidence

Instruments and change

Stations, satellites, oceans, glaciers and biological timing.

Sea level: thermal expansion and land-ice loss; floating sea ice has little direct effect.

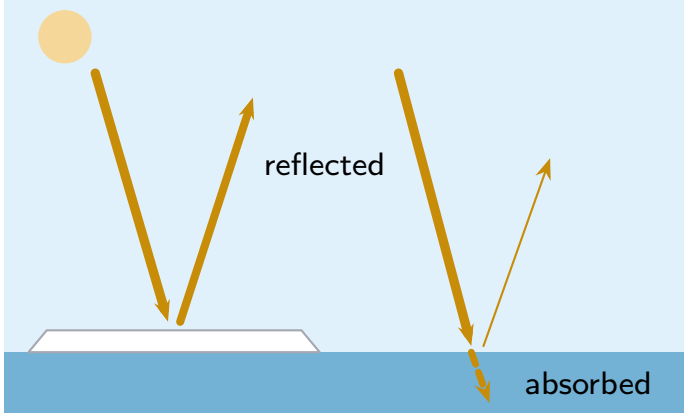
Past climates

Ice-core bubbles preserve ancient air; isotopes provide temperature-related proxies.

Tree rings, pollen and sediments require calibration and dating; not all directly measure CO_2.

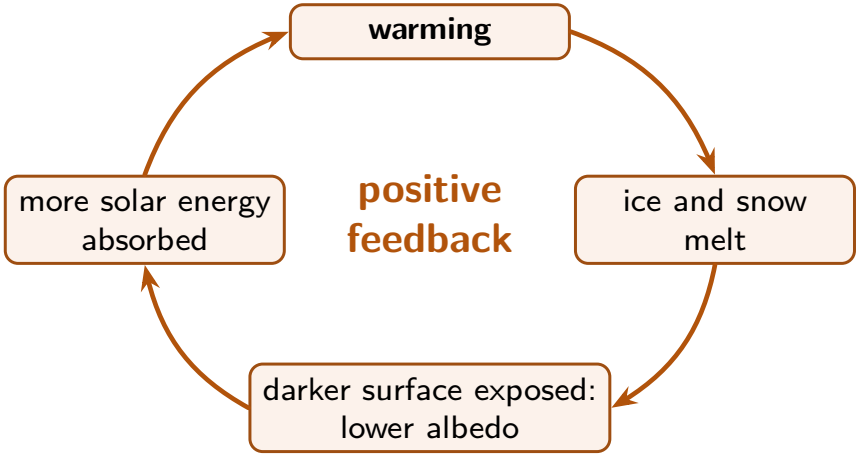
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Ice-albedo amplification



ice and snow
high albedo:
most sunlight reflected

open water
low albedo:
most sunlight absorbed



amplifies the change;
not a beneficial outcome

Positive means amplifying, not beneficial; a feedback alone does not locate a tipping threshold.

Mitigation and adaptation

Mitigation

Reduce emissions or increase net atmospheric removal.

Clean energy, methane-leak reduction and protecting carbon stores.

Adaptation

Reduce exposure or vulnerability to impacts.

Flood defences, warnings and changed planting dates; some actions do both.

Exercises 2.1·2.2

2.1 Distinguish between climate change mitigation and adaptation, giving **one** example of each. [2]



solar panels



sea wall

2.2 Classify each action as mitigation (M) or adaptation (A): sea wall; solar farm; drought-resistant maize; carbon tax; planting forests; flood early-warning system. [3]

sea wall	solar farm	drought maize
carbon tax	planting forests	flood warning

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solar panels



sea wall

2.1

mitigation: reducing greenhouse gas emissions or removing them from the air, e.g. solar power, reforestation; adaptation: changing how we live to reduce harm from climate change, e.g. sea walls, drought-resistant crops

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sea wall	solar farm	drought maize
carbon tax	planting forests	flood warning

2.2

award [1] for every two correct: M: solar farm, carbon tax, planting forests; A: sea wall, drought-resistant maize, flood early-warning system

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Exercise 3.1 (a)

3.1 A government introduces a carbon tax of \$50 per tonne of CO_2.

(a) Explain how a carbon tax reduces emissions. [2]



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(a) burning fossil fuels becomes more expensive; so firms and consumers switch to low-carbon energy, use less energy and invest in efficiency

Exercise 3.1 (b)

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(b) Outline **two** reasons why some people oppose a carbon tax. [2]

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(b) any two: raises prices of fuel and goods, hitting poorer households hardest; firms may move to countries without the tax (carbon leakage); job losses in coal and heavy industry

Exercise 3.2 (a)

3.2 Bangladesh has a large, low-lying delta with many people living near the coast.

(a) Suggest **two** adaptation strategies for people in the delta. [2]

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(a) any two: raised houses or homes on stilts; embankments and cyclone shelters; flood and cyclone warning systems; salt-tolerant rice; floating gardens

Exercise 3.2 (b)

3.2 Bangladesh has a large, low-lying delta with many people living near the coast.

(b) Explain why adaptation alone is not enough to deal with climate change. [3]



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(b) adaptation does not reduce the cause, so warming and its impacts keep growing; there are limits, e.g. walls cannot hold back very high sea levels and some land will be lost; adaptation is costly and poorer countries cannot afford enough of it, so emissions must also be cut (mitigation)