

Greenhouse effect · supported focus

Supported focus · HL

Supported scope

- Supported HL focus. First assessment 2025; full Physics guide acquired (84 PDF pages). Remaining guide, assessment and practical requirements retain their recorded holds.
- State model conditions and distinguish fictional data from measurements.

Ess Climate · 1.1

Reasoning

One cold day does not disprove a warming climate. Weather describes short-term conditions; climate describes distributions over longer times and regions. Start with a prediction. State the quantities or features you would compare, then decide what evidence could distinguish two explanations.

Ess Climate · 2.1

Reasoning

The Earth energy balance includes incoming solar radiation, reflection, absorption and outgoing infrared radiation. Greenhouse gases absorb and emit infrared radiation. Feedback can alter the response to an initial forcing. mitigation : Actions addressing causes of environmental change; adaptation : Actions reducing harm from environmental impacts.

Ess Climate · 3.1

Reasoning

Distinguish mitigation, which addresses drivers, from adaptation, which reduces harm from impacts. A policy assessment needs evidence about effectiveness, cost, equity and uncertainty; one criterion is not the entire decision. Compare multi-year data using consistent baselines. State the region, timescale and uncertainty. At HL, connect a management decision to law, economics and ethics rather than treating these lenses as extra definitions only.

Ess Climate · 4.1

Reasoning

State the known values and their units. Choose the relation because its assumptions fit this case, then rearrange before substitution. Known: a surface receives 200 power units and reflects 50. Absorbed input = incoming-reflected = $200 - 50 = 150$. Reflected fraction = $50/200 = 0.25 = 25\%$. A change in reflectivity alters the absorbed budget under this model.

Ess Climate · 4.2

Reasoning

Incoming energy is 240 units and reflected energy 72. Find reflected percentage. Use the same sequence: known quantities $\rightarrow$ model $\rightarrow$ relation $\rightarrow$ substitution $\rightarrow$ unit and interpretation.

Ess Climate · 5.1

Reasoning

The greenhouse effect is not the same process as ozone depletion. A carbon footprint estimate depends on its system boundary. Return to the original observation. Explain what the result supports, which conditions it assumes, and one way to test a competing explanation.

Ess Climate · 5.2

Reasoning

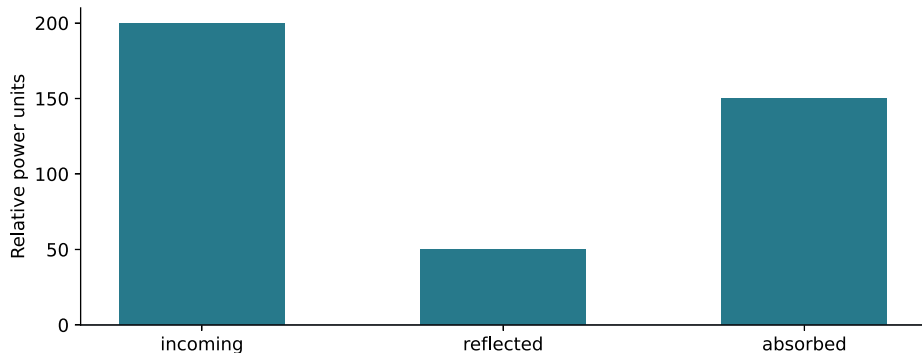
One local weather observation establishes a global climate trend. This claim is false:
The greenhouse effect is not the same process as ozone depletion. A carbon footprint estimate depends on its system boundary.

Ess Climate · 5.3

Reasoning

Climate evidence, energy budgets and policy: Distinguish mitigation, which addresses drivers, from adaptation, which reduces harm from impacts. A policy assessment needs evidence about effectiveness, cost, equity and uncertainty; one criterion is not the entire decision.

Ess Climate · diagram



- Original teaching diagram: Climate evidence, energy budgets and policy
- Use the labels and the stated model together.

Ess Climate · original transfer

Your turn

Two fictional surfaces each receive 240 W/m^2 and reflect 60 and 96 W/m^2 . Compare absorbed inputs. Could this alone predict their equilibrium temperatures?

Ess Climate · transfer reasoning

Method and interpretation

Absorbed inputs 180 and 144 W/m². The first absorbs 36 more. Emission, transport and other boundary conditions are also needed for equilibrium temperatures; mitigation/adaptation judgements require additional evidence.

Check yourself

- Explain mitigation using the stated model.
- Explain adaptation using the stated model.
- Change one value in the original transfer; explain which assumption still matters.