

Name: _____

Date: _____

Class: _____

IB ESS

7.2 Climate Change – Causes and Impacts

Significant ideas:

Climate change has been a normal feature of the Earth's history, but human activity has contributed to recent changes.

There has been significant debate about the causes of climate change.

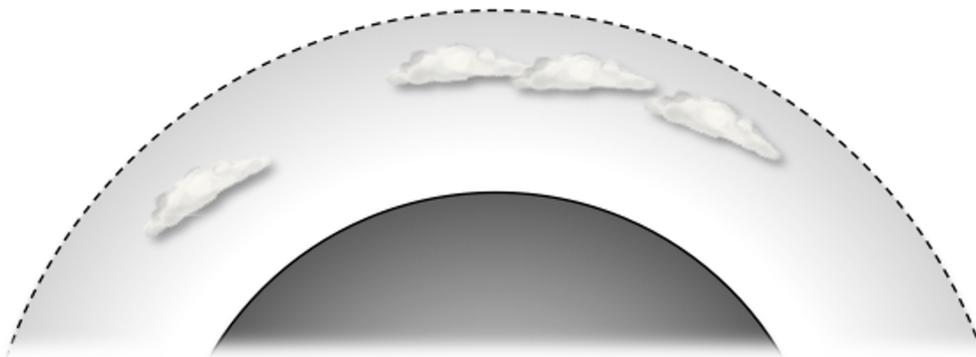
Climate change causes widespread and significant impacts.



The Greenhouse Effect

1. Complete the diagram below to describe the greenhouse effect. Include the following labels (notice that some phrases are present twice):

longwave radiation shortwave radiation reflected reflected absorbed
re-emitted atmosphere Earth's surface Sun



Climate Change and Greenhouse Gases

1. Compare "greenhouse effect" and "global warming".

2.

a) List the human activities that are increasing levels of greenhouse gases.

b) Using the headings as a guide, outline the potential effects of increased greenhouse gas levels

Global mean temperature

Extreme weather

Long term climate change

Sea level



3. Compare "weather" and "climate"

4.

a) Outline the potential impacts of global climate change, using the headings to guide your answer.

Biomes

Crop-growing land

Biodiversity

Ecosystem services

Coastal flooding

Ocean acidification

Damage to human health



b) Many of the points listed above are negative. However, some of the factors *may* be positive. State and explain which factors may be beneficial in some way.



Feedback Mechanisms

1. Define:

i) Negative feedback

ii) Positive feedback

2. Draw flow diagrams (or similar) to represent these feedback mechanisms.

NEGATIVE FEEDBACK MECHANISMS

i) Rates of photosynthesis may increase in response to increased CO₂ levels

ii) Increased atmospheric CO₂ will result in increased absorption by the oceans (Le Chatelier's principle)



POSITIVE FEEDBACK MECHANISMS

i) Increased snow melt reduces the Earth's albedo.

ii) Increased melting of permafrost releases methane, a greenhouse gas.



Climate Modeling

1. Explain how improvements in technology have improved our ability to predict the future weather and climate

2. Climate models, known as AOGCMs, are an essential tool in predicting future changes in the climate

a) What does AOGCM stand for?

b) What evidence is there to suggest that AOGCMs are reliable?

c) Climate models are **not** completely accurate. Give reasons for this.



