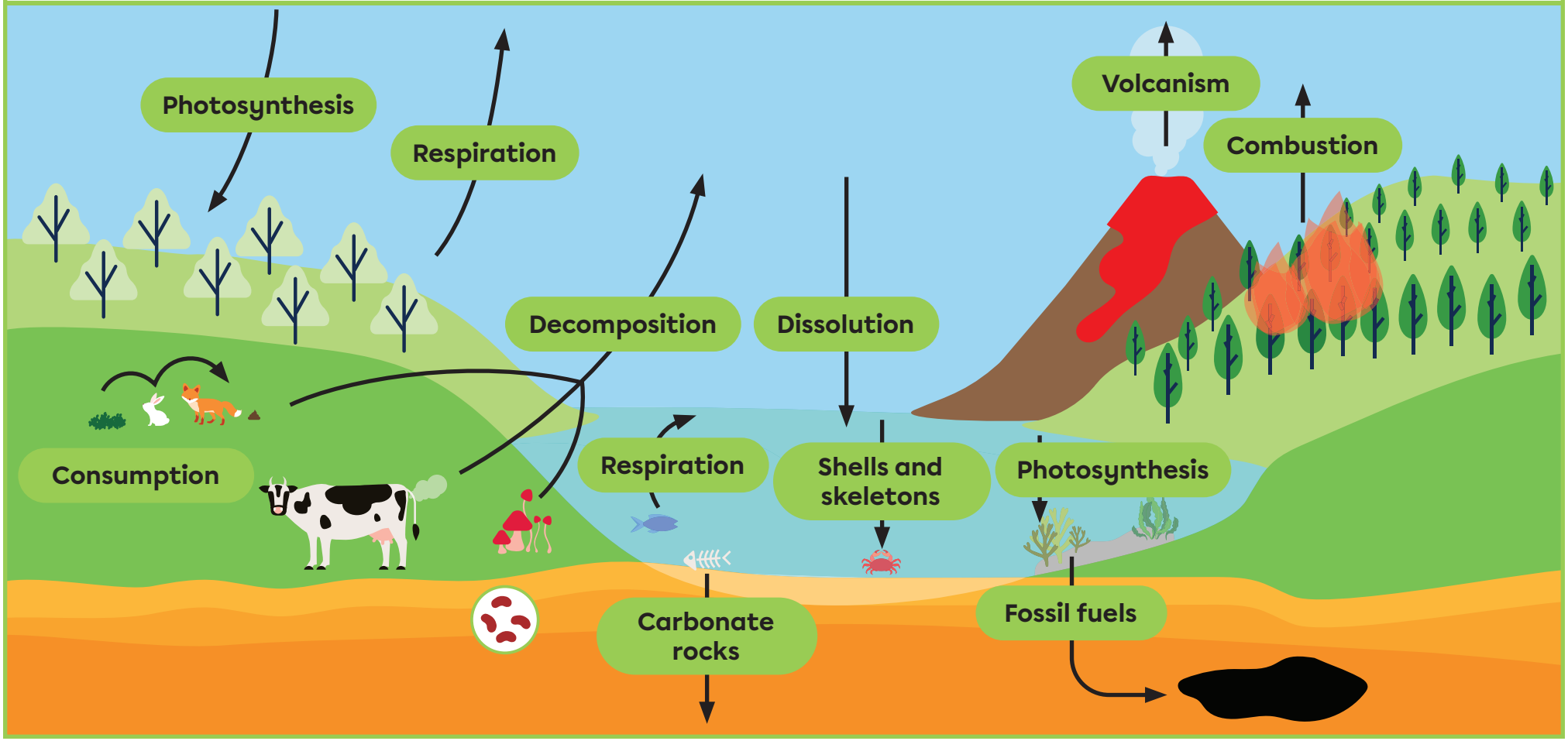
Review the Earth and Space - Science and Technology (ST)

This summary provides a quick overview of all the concepts about the Earth and Space that can be assessed during the ST ministry exam. To explore a topic in more detail, scan its QR code. To see the summary of the Material World and the Technological World, scan the large QR code at the bottom left.

Carbon Cycle

The **carbon cycle** comprises all the transformations that carbon undergoes naturally on Earth. Fossil fuel exploitation, deforestation, and intensive livestock farming disrupt the carbon cycle. These activities increase the amount of atmospheric carbon, mainly in the form of carbon dioxide (CO_2) and methane (CH_4).



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Energy Resources

Resource	Origin	Renewable	GHG emissions
Biomass	Biosphere	Yes	Yes
Fossil fuels	Lithosphere	No	Yes
Uranium	Lithosphere	No	No
Geothermal	Lithosphere	Yes	No
Wind	Atmosphere	Yes	No
Hydroelectricity	Hydrosphere	Yes	No
Solar radiation	Space	Yes	No

Permafrost

Permafrost is soil that is frozen for at least 2 consecutive years.

Consequences of melting permafrost

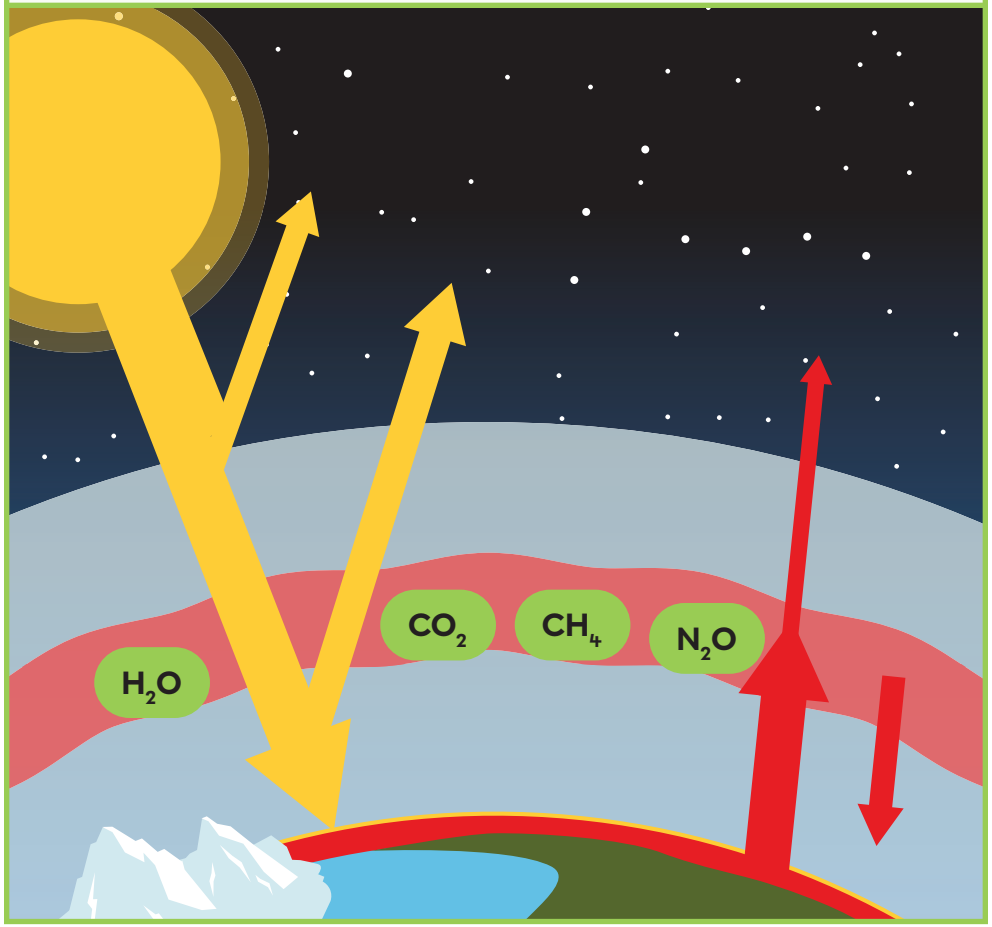
- Release of **GHGs** (CO_2 and CH_4) that disrupt the carbon cycle and intensify the greenhouse effect.
- Soil instability that increases the risk of landslides.
- Ecosystem disruption, such as increased vegetation and the displacement of animal populations.

Greenhouse Effect

The **greenhouse effect** is a natural process that makes it possible to retain some of the heat emitted by the Sun in Earth's atmosphere. The greenhouse effect is **enhanced** due to GHGs released by human activity.

Consequences of the enhanced greenhouse effect

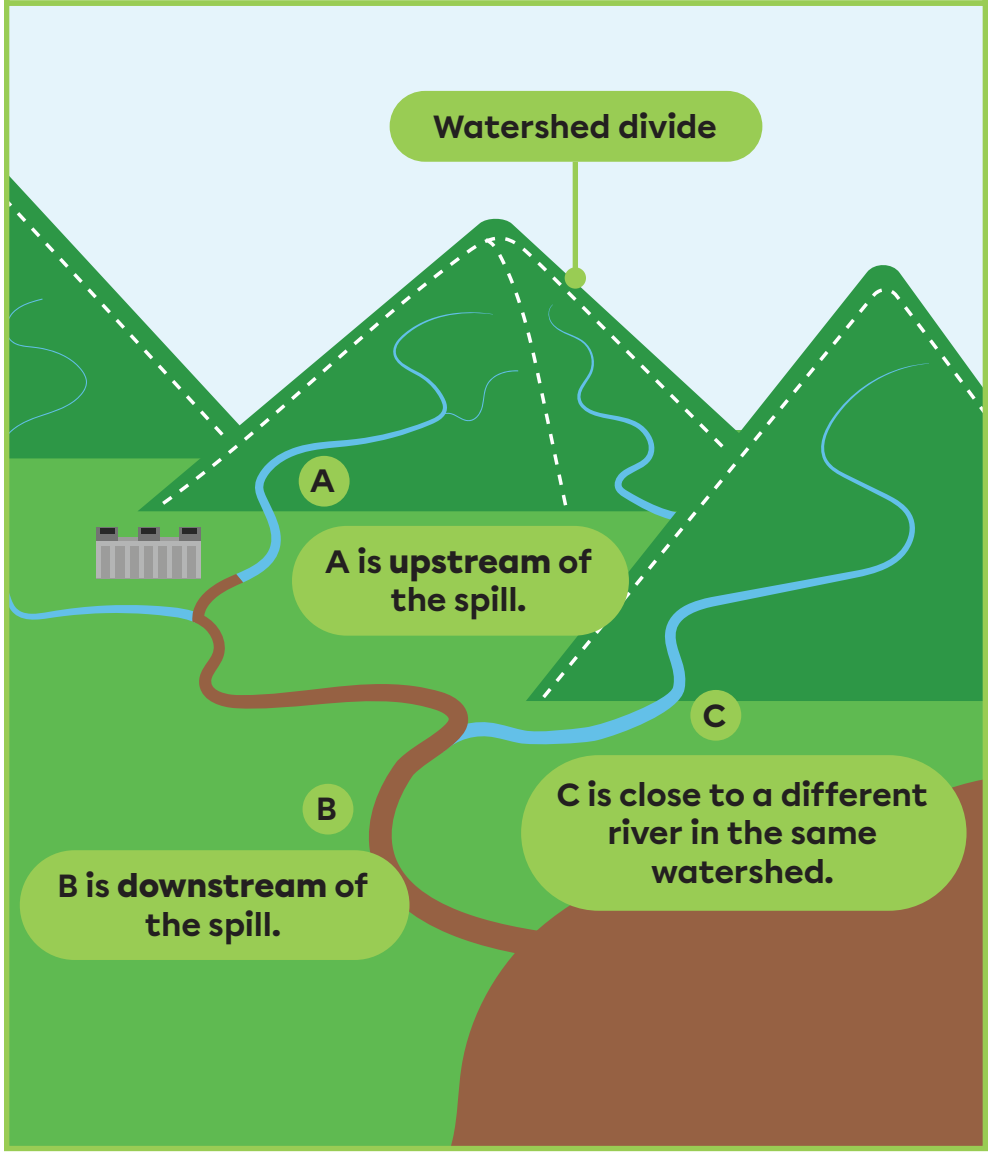
- Global warming
- Melting glaciers and pack ice
- Melting permafrost
- Ecosystem disruption



Watershed

A **watershed** or **catchment area** is a territory defined by boundaries called watershed divides that surround river and stream systems.

Here's the impact of a wastewater discharge on points A, B, and C.



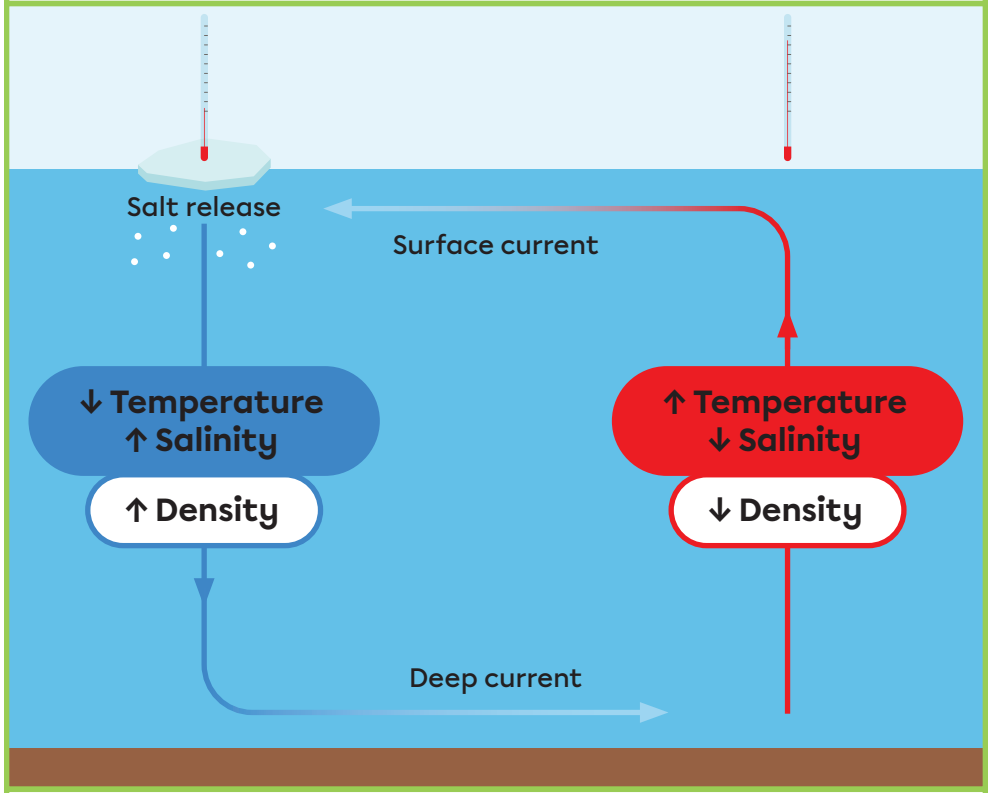
Ocean Circulation

Ocean circulation is the movement of all ocean water on a planetary scale.

Surface currents are caused by winds and the Earth's rotation.

Deep currents are caused by variations in water density.

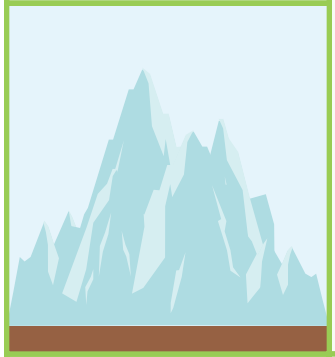
Water's **temperature** and **salinity** affect its density.



Some surface currents + deep currents = **thermohaline circulation**

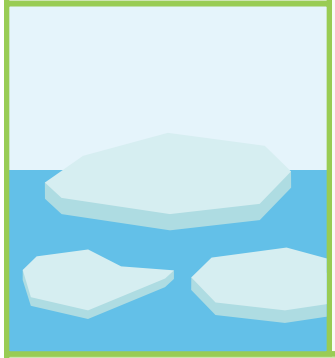
Glaciers and Pack Ice

Glaciers



A mass of ice (**fresh** water) formed by the accumulation and settling of snow on **land**

Pack ice



Large slabs, crowded together, of **floating** ice (**brackish** water)

Consequences of melting glaciers

- Rise in sea levels

Consequences of melting glaciers and pack ice

- Disruption of ocean and thermohaline circulations
- Species displacement and/or extinction
- Changes in navigable waterways
- Reduced ability to reflect solar radiation (albedo effect)