Science 10

Unit D: Energy flow in global systems

Solar energy and life

One energy source for many systems

- Sunlight supplies energy for photosynthesis and heats Earth's surface unevenly.
- Uneven heating drives atmospheric and hydrologic processes that shape climate.



Solar radiation drives photosynthesis, weather, and climate

Two paths from sunlight

- Photosynthesis stores energy from light in chemical compounds.
- The same sunlight can warm the ground, move air, and drive phase changes.
- The Sun powers most surface climate and most food webs. Heat from inside Earth and the tides are the exceptions.

Key terms

solar radiation

Electromagnetic energy emitted by the Sun.

photosynthesis

Process that uses light energy to form energy-rich molecules from carbon dioxide and water.

climate

Long-term patterns and ranges of weather conditions.

adaptation

A heritable structural, physiological, or behavioural trait that improves survival or reproduction.

Climate and life

- Climate is the long-term pattern of weather over decades.
- People and other species meet extremes with shelter, insulation, water storage, or seasonal movement.
- A trait passed on in a population is different from one animal coping for a single week.
- Housing, fur, and behaviour are responses you can point to in a specific climate.



Solar radiation drives photosynthesis, weather, and climate

Solar source

- One afternoon of sunshine can grow grain and also start a breeze.
- Follow chemical energy from a plant to an animal, and follow heating into moving air.
- Sunlight drives most of the climate at Earth's surface and most food webs. Tides and heat from inside Earth are separate sources.
- The carbon in a leaf came from carbon dioxide; light supplied only the energy.



Solar connections

- Trace solar energy through one living system and one climate process.
- A complete answer traces a physically plausible chain and separates energy transfer from matter cycling.



Solar radiation drives photosynthesis, weather, and climate

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