

3.1 ENERGY

Meaning of Energy

Energy refers to the capacity that enables organisms and objects to perform activities. Living things depend on energy for survival and daily biological functions.

Role of Energy in Organisms

Cells require energy to support growth, repair damaged tissues, transport substances, and maintain body processes. Muscle movement and nerve activities also depend on a steady energy supply.

Main Source of Energy

Sunlight provides the primary energy for ecosystems. Green plants absorb solar radiation and convert it into food substances through photosynthesis.

Energy in Food

Carbohydrates, fats, and proteins contain stored chemical energy. During digestion and respiration, organisms release this energy for cellular activities.

ATP Molecule

ATP is a special compound that temporarily stores usable energy inside cells. It transfers energy to different parts of the cell whenever needed.

Energy Conversion

Biological systems continuously change energy from one form to another. Plants transform light into chemical compounds, while animals convert food energy into movement and heat.

Energy Loss

During energy transfer, part of the energy escapes as heat. For this reason, organisms must continuously obtain energy from food or sunlight.

Importance in Ecosystems

Energy flow connects producers, consumers, and decomposers. Without energy transfer, food chains and ecological balance could not exist.

Important Concepts

Term	Description
Producer	Organism that prepares food using sunlight
Consumer	Organism that feeds on other organisms
ATP	Molecule responsible for energy transfer
Photosynthesis	Formation of food using light energy
Respiration	Breakdown of food to release energy

Summary

Energy supports every activity performed by living organisms. Plants capture sunlight to manufacture food, while animals obtain energy through feeding. Cells use ATP to distribute energy efficiently. Continuous energy transfer maintains life and ecosystem stability.

Questions and Answers

Define energy.

Energy is the ability to carry out work or biological activities.

Which organisms first capture solar energy?

Green plants capture solar energy.

What is the function of ATP?

ATP stores and transports usable cellular energy.

Why do organisms need food?

Food supplies chemical energy for body functions.

What happens during respiration?

Energy is released from food substances.

Study Notes

- Energy enables living organisms to survive and function.
- Sunlight drives most biological energy processes.
- Plants are the main producers in ecosystems.

- ATP carries usable energy inside cells.
- Respiration releases energy from nutrients.
- Heat energy is lost during energy transfer.
- Ecosystems depend on continuous energy flow.
- Food chains show movement of energy between organisms.