

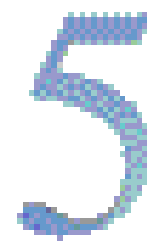
# Nature of Energy



Living organisms need energy for growth and movement.

# Forms of Energy

- The five main forms of energy are:
  - Heat
  - Chemical
  - Electromagnetic
  - Nuclear
  - Mechanical



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# Nuclear Energy



The sun's energy is produced from a nuclear fusion reaction in which hydrogen nuclei fuse to form helium nuclei.

# Electromagnetic Energy

- Light is a form of electromagnetic energy.
- Each color of light (Roy G Bv) represents a different amount of electromagnetic energy.
- Electromagnetic Energy is also carried by X-rays, radio waves, and laser light.



# Chemical Energy

- Chemical Energy is required to bond atoms together.
- And when bonds are broken, energy is released.

# Chemical Energy

- Fuel and food are forms of stored chemical energy.



# Mechanical Energy

- When work is done to an object, it acquires energy. The energy it acquires is known as mechanical energy.

# Energy Conversion

- Energy can be changed from one form to another. Changes in the form of energy are called energy conversions.

# Energy conversions

- All forms of energy can be converted into other forms.
  - The sun's energy through solar cells can be converted directly into electricity.
  - Green plants convert the sun's energy (electromagnetic) into starches and sugars (chemical energy).

# The Law of Conservation of Energy or the 1<sup>st</sup> Law of Thermodynamics

- Energy can be neither created nor destroyed by ordinary means.
  - It can only be converted from one form to another.

# The 2<sup>nd</sup> Law of Conservation of Energy

- In any energy conversion, the quality of the energy decreases.

# The Conversion of sunlight to chemical energy.

- During the growing seasons, tropical & temperate regions receive approximately 8,000 to 10,000 kcal/m<sup>2</sup> each day. Of this energy, only a small amount (1 -3 percent in the most productive zones) will be trapped by green plants through the process of photosynthesis.

# Measuring productivity in a community.

- Biomass – mass of biological material.
- Primary productivity – mass of producers in a community.
- Net primary productivity – Difference between the primary productivity and the amount used in respiration.
- Gross primary productivity – mass of both producers and all consumers in a community – amount loss in respiration.