

Energy and Power

PHYSICAL SCIENCE

CHAPTER 4

Intro Q

What is energy?

Where does energy come from?

Intro Q

What ways do you use energy?

Energy

- ▶ The ability to cause change or do work
- ▶ When an object does work on another object some of that object's energy is transferred to the object being moved
- ▶ Work can be thought of as a transfer of energy
- ▶ Since work requires energy and energy is used to do work, they both have the same units joules (J)
- ▶ Energy can neither be created nor consumed or destroyed
 - ▶ Law of conservation

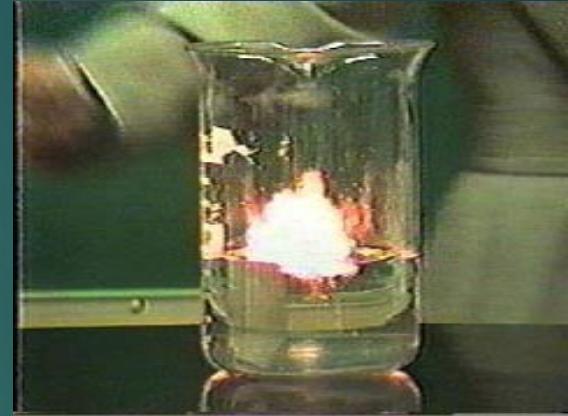
Intro Q

Are these types of energy? Why or why not?



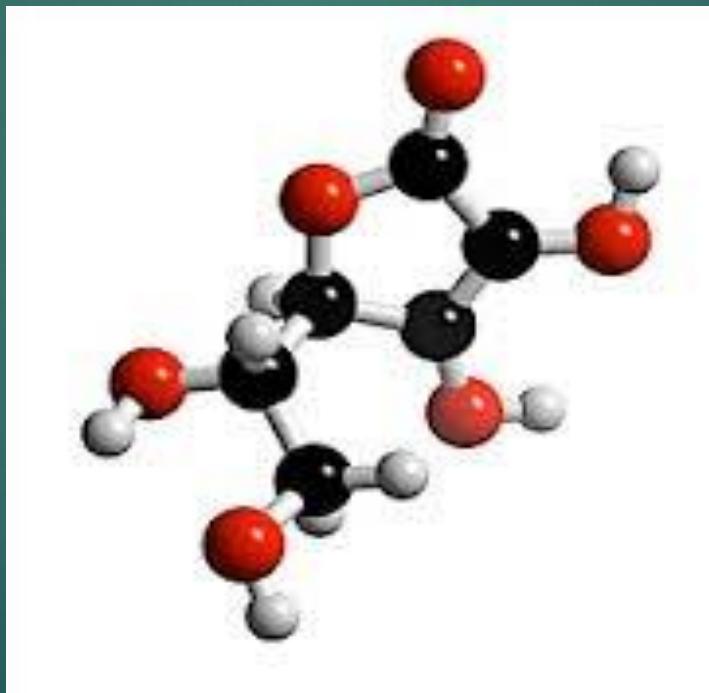
Different Forms of Energy

- ▶ **C**hemical Energy
- ▶ **E**lectrical Energy
- ▶ **M**echanical Energy
- ▶ **E**lectromagnetic Energy
- ▶ **N**uclear Energy
- ▶ **T**hermal Energy



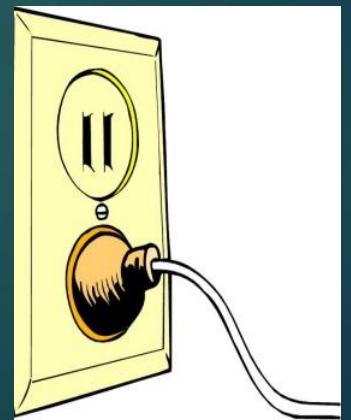
Question

What type of energy is shown here?



Different Forms of Energy

- ▶ **Chemical energy**
 - ▶ Energy in the chemical bonds of materials
 - ▶ Example
 - ▶ foods, coal, matches
- ▶ **Electrical Energy**
 - ▶ Energy produced by moving electrical charges
 - ▶ Examples
 - ▶ Energy used to power electronics, lightning, electricity



Question

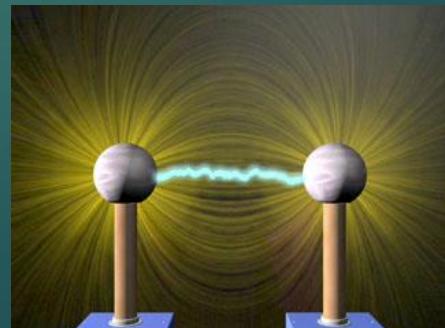
What type of energy is shown here?



Different Forms of Energy

- ▶ **Mechanical Energy**
 - ▶ Energy usually found in machines due to the motion or position of an object

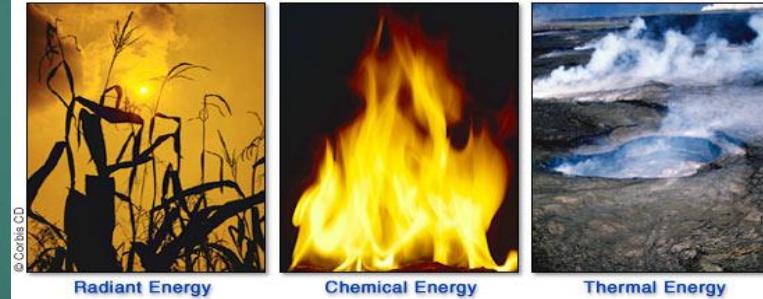
- ▶ **Electromagnetic energy (radian)**
 - ▶ Energy which travels in the form of waves
 - ▶ The only energy type that can travel through space
 - ▶ Example
 - ▶ Heat, light, microwaves



Different Forms of Energy

► Nuclear Energy

- The energy found stored in the nucleus of atoms (which may be split or joined together)
 - **Fusion** – joining together of atomic nuclei (sun and stars)
 - **Fission** – splitting of atomic nuclei (atomic bombs)



► Thermal Energy

- The energy contained inside a material due to the motion of its atoms
- This can usually be associated with the temperature of the object