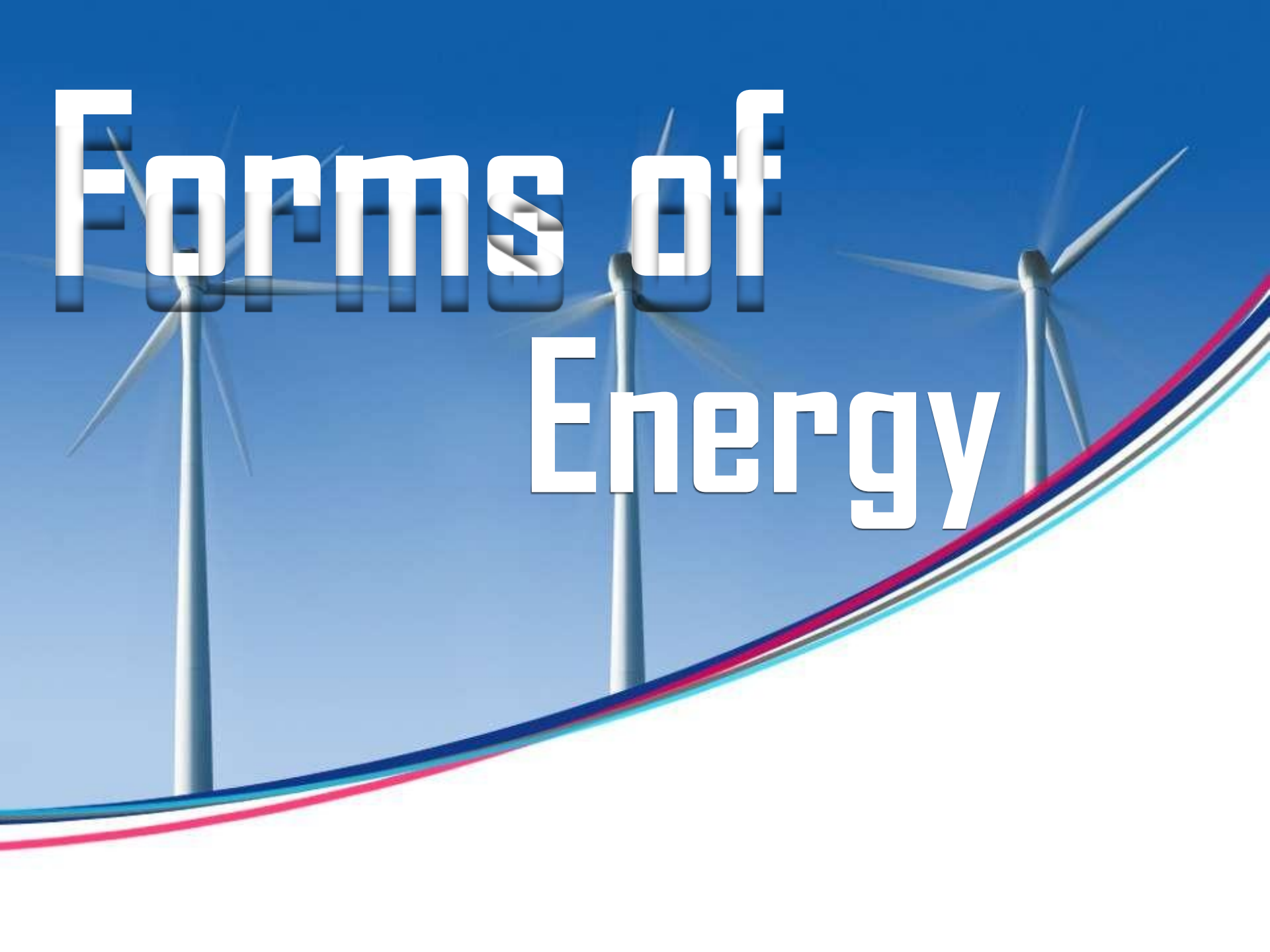

Forms of
Energy

Different Forms of Energy

- *Energy cannot be created or destroyed, it can only be changed from one form to another.*
- Energy comes in six forms: **chemical energy**, **electromagnetic energy**, **radiant energy**, **mechanical energy**, **nuclear energy** and **thermal energy**.
- These six forms of energy are all related. Each form can be converted or changed into the other forms. For example, when wood burns, its chemical energy changes into thermal (heat) energy and radiant (light) energy.

FORMS OF ENERGY

MECHANICAL



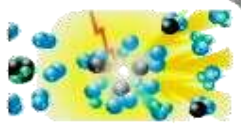
SOUND
Wave Motion



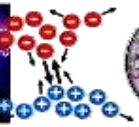
CHEMICAL







ELECTRICAL

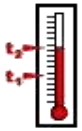
LIGHT
Radiant

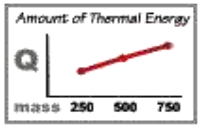





HEAT
Thermal

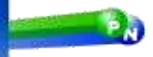


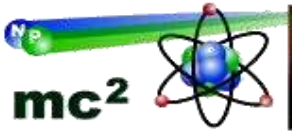


NUCLEAR

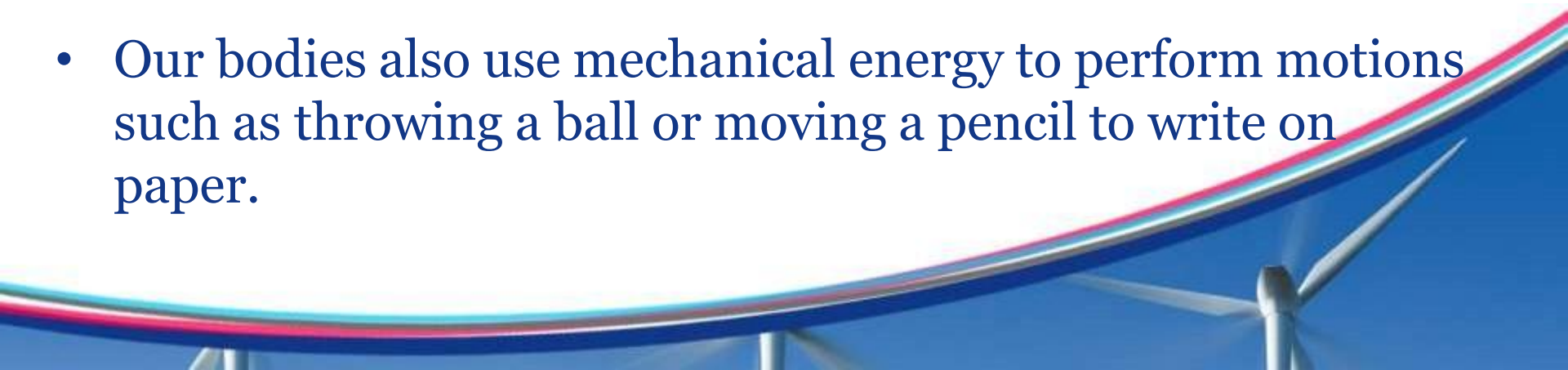


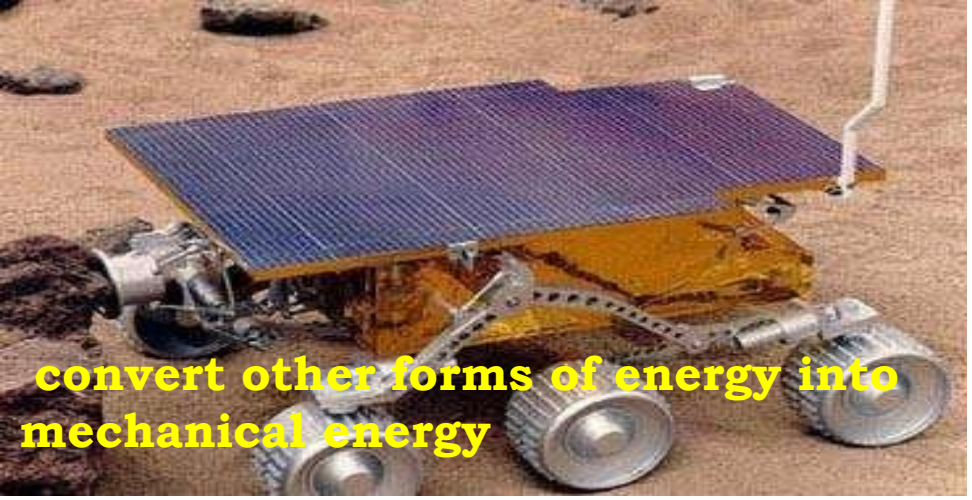




MECHANICAL ENERGY

- Mechanical Energy is the energy a substance or system has because of its motion(K.E.) and position(P.E).
- The Mechanical energy stays alive along with both the kinetic energy and the potential energy which is available in the system.
- Every moving object has mechanical energy, whether it is a hammer driving a nail, a leaf falling from a tree, or a rocket flying in space. Mechanical energy pulls, pushes, twists, turns and throws.
- Our bodies also use mechanical energy to perform motions such as throwing a ball or moving a pencil to write on paper.

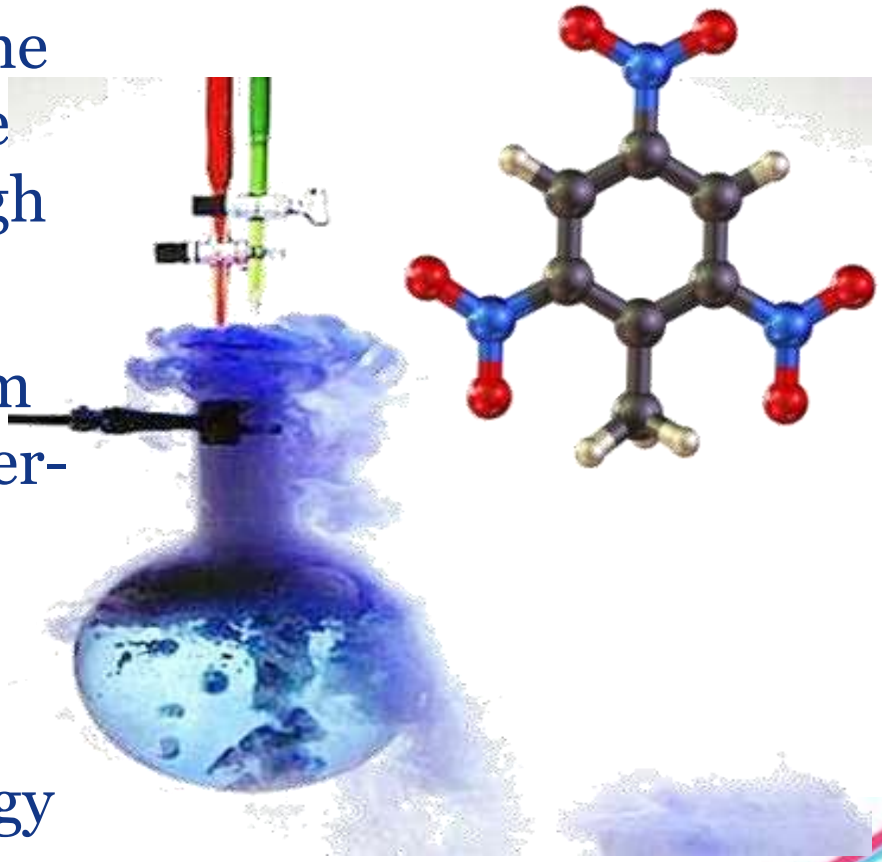




MECHANICAL ENERGY

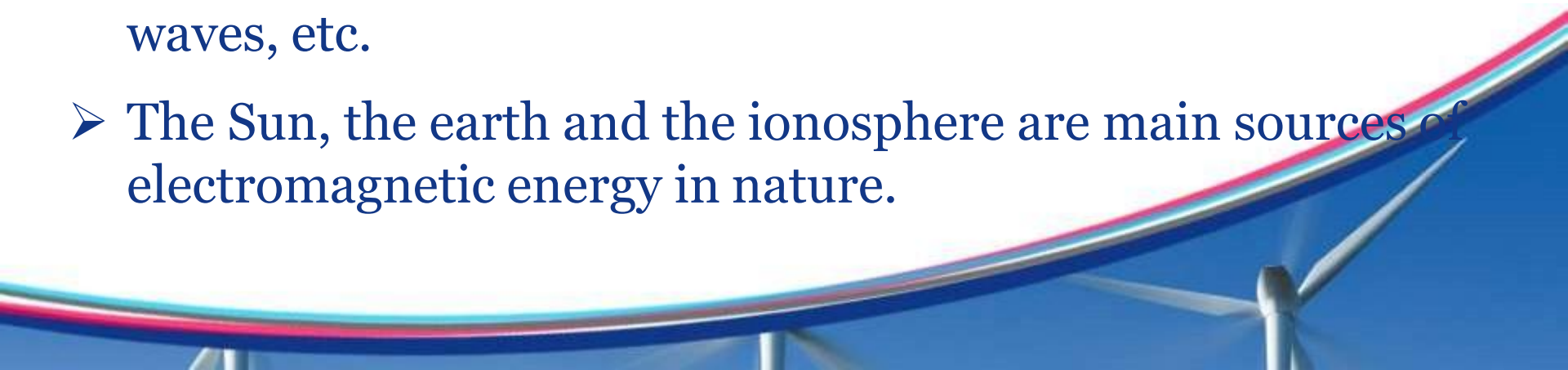
CHEMICAL ENERGY

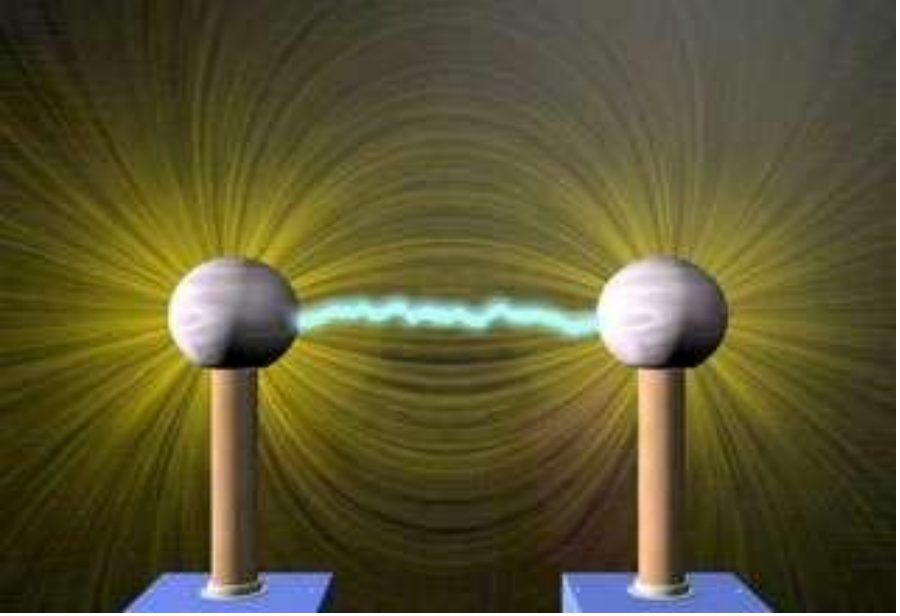
- The motive force that powers the human body, is provided by the chemical energy derived through the process of respiration.
- Chemical energy is derived from the making and breaking of inter-atomic bonds in molecules.
- Through molecular rearrangements, the biological world derives energy. The energy derived from gasoline is an example of chemical energy utilization.



ELECTROMAGNETIC ENERGY

- Energy from a magnetic field that is produced by the motion of electric charges such as electric current.
- Electromagnetic radiation exists in the form of particles called photons. Each particle or photon is an extremely small grain of energy - an energy packet.
- Electromagnetic energy is said to be the type of energy which comes from electromagnetic waves. These radiation travels with the speed of light and can be composed of radio waves, TV waves, radar waves, heat, light, X-rays, visible waves, etc.
- The Sun, the earth and the ionosphere are main sources of electromagnetic energy in nature.

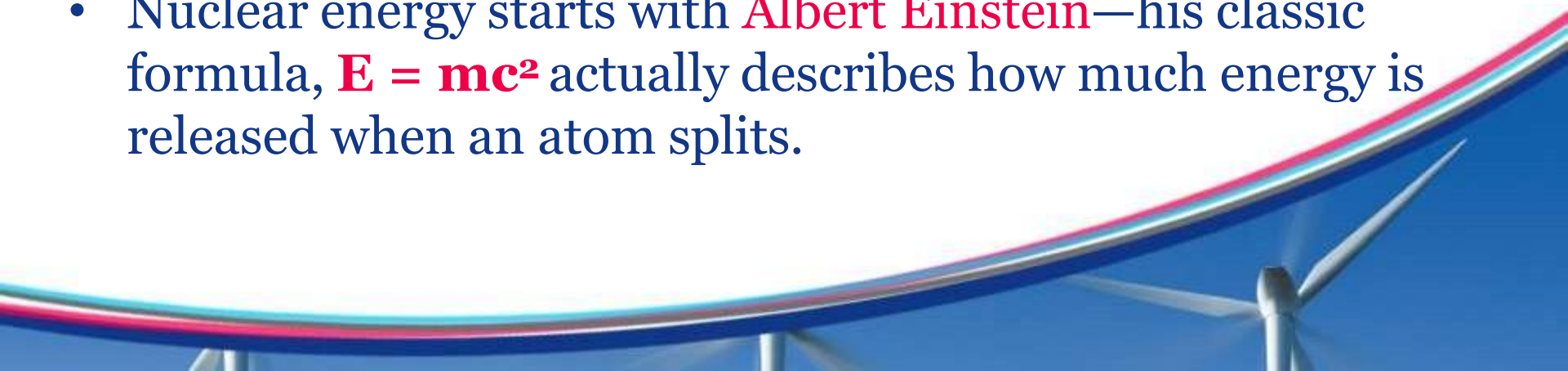




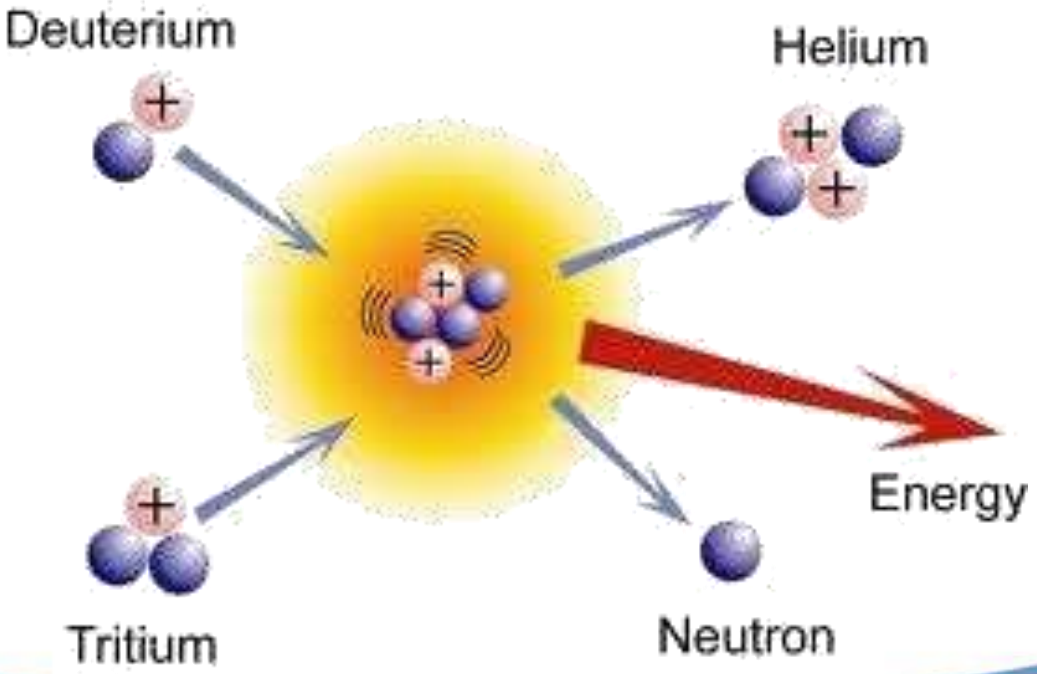
Electromagnetic Energy

NUCLEAR ENERGY

- Nuclear energy originates from the splitting of uranium atoms in a process called fission..
- When the nucleus splits (fission), nuclear energy is released in the form of heat energy and light energy.
- Nuclear energy is also released when nuclei collide at high speeds and join (fuse).
- The sun's energy is produced from a nuclear fusion reaction in which hydrogen nuclei fuse to form helium nuclei.
- Nuclear energy starts with Albert Einstein—his classic formula, $\mathbf{E = mc^2}$ actually describes how much energy is released when an atom splits.



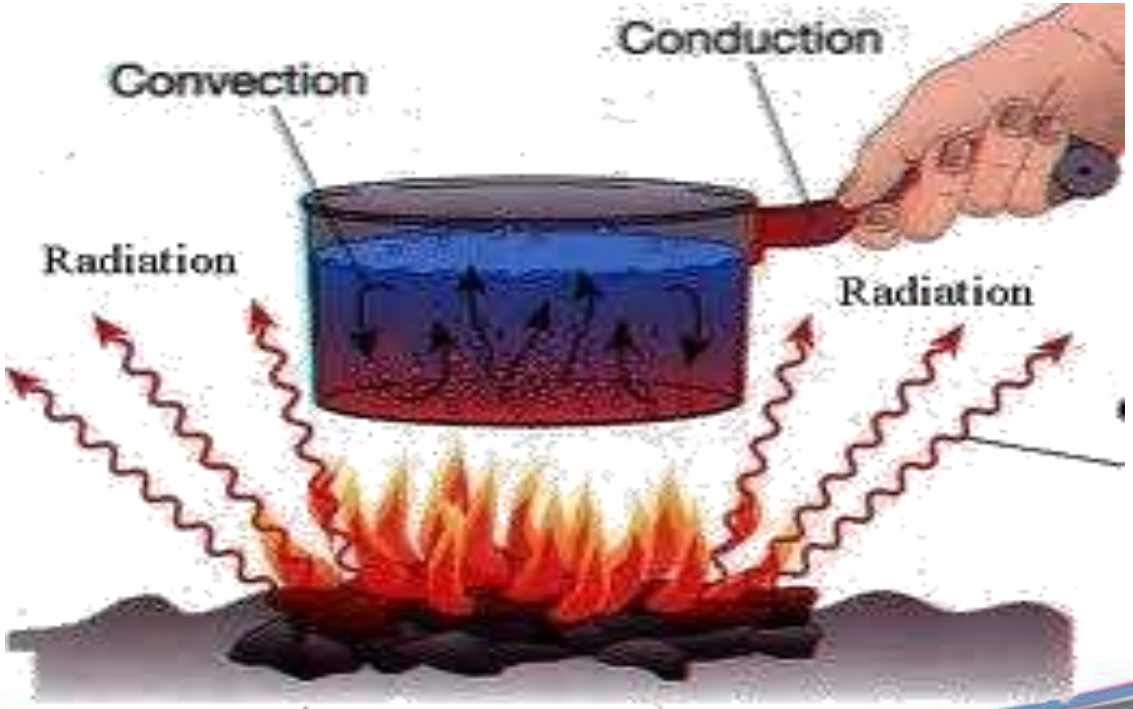
NUCLEAR Energy



THERMAL ENERGY

- Thermal Energy is a form of internal energy possessed by all material matter due to random motion of atoms and minute particles(kinetic molecular model of matter), and the amount depends on the temperature of the material region.
- Thermal Energy is transferred only when there is a difference in temperature.
- Thermal Energy always flows from a region of higher temperature to a region of lower temperature.

THERMAL ENERGY



ENERGY TRANSFER

Sound (mechanical)

Electrical

Thermal

Mechanical

Electrical

Chemical

Electrical

Light (Electromagnetic)

ENERGY CONVERSIONS IN MOTORS

- Electric motors, which convert **electrical energy** to **mechanical energy.**
- Magnetism is the basis for all electric motor operation. It produces the force required to run the motor.
- When current passes through a coil of wire, magnetic field is produced.
- Electric motors operate through the interaction f magnetic field and current - carrying conductors to generate force.

ENERGY CONVERSIONS IN GENERATORS

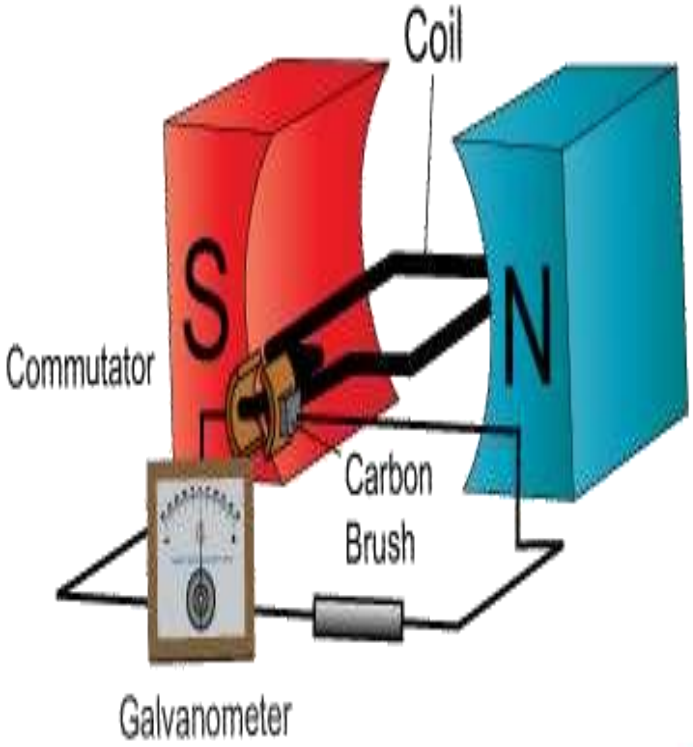
Mechanical Energy →  → Electrical Energy

- **Electric generator** is a device that converts mechanical energy to electrical energy.

- A generator forces electric charge (usually carried by electrons) to flow through an external electrical circuit.

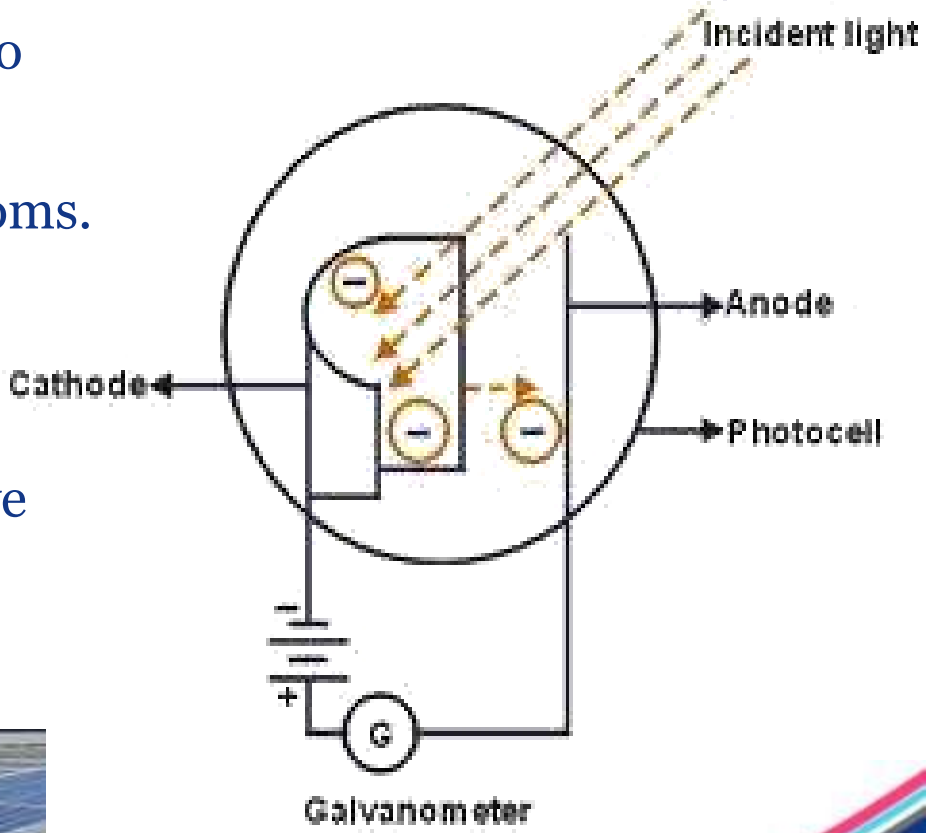
ENERGY CONVERSIONS IN GENERATORS

- The generator is based on the principle of "electromagnetic induction".
- An electric conductor is moved through a magnetic field, electric current will flow in the conductor.
- So the mechanical energy of the moving wire is converted into the electric energy of the current that flows in the wire.
- In a generator The energy conversion occurs when a coil of conducting wire is rotated between two different poles of two permanent magnets.



Energy Conversions in Photocells

- Photocells convert light energy into electrical energy.
- Most photocells contain silicon atoms. As long as a light shines on the photocell, electrons gain enough energy to move between atoms.
- The electrons are then able to move though a wire to provide electrical energy to a device, such as a calculator.



End of Presentation

Thanking You