



PHYSICS X TIK AP



# WORK AND ENERGY

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# WORK

Work is the transfer of energy that occurs when a force is applied to an object and the object moves in the direction of the force.

**Formula:** Work = force x distance (f x d)

# ENERGY

Energy is the ability to do work or create change. Energy can be transferred from one object to another or transformed from one form to another. It is measured in units called joules (J).

# TYPES OF ENERGY



Kinetic Energy: Kinetic energy is the energy of motion. Every moving thing contains kinetic energy ( $\frac{1}{2} \times \text{mass of object} \times \text{velocity}^2$ ).

Potential Energy: Potential energy is the energy that is stored in an object due to its position. For example; gravitational potential energy (mass  $\times$  gravitational field strength  $\times$  height).

Thermal Energy: Thermal energy is the transfer of thermal from 1 object to another due to the temperature difference and from the movement of its atoms and molecules.

- Chemical Energy: Chemical energy is the energy that is stored in a chemical substance. The energy is released when there is a chemical reaction. Example; batteries and combustion.
- Electrical Energy: Electric energy is the energy that is associated with electric charges. It creates the movement of electrons to power an electrical device.



# TYPES OF ENERGY

# POWER

Power is the rate at which work is done/energy is transferred. It can be defined as the amount of energy consumed or the work done per unit of time. Power is measured in watts.

Formula: Power = work/time ( $P = w/t$ )

# EFFICIENCY

In energy transfer, a proportion of the energy is wasted. Efficiency is how effectively energy is used in the process of transferring energy. Efficiency is measured in percent.

Formula: Useful output energy/Total input energy x 100%

# CONSERVATION OF ENERGY



Conservation of energy is a principle that states that energy can't be created or destroyed, but can be transformed from one form to another with the same amount of total energy. For example, from kinetic energy to potential energy such as when kinetic energy causes a ball to travel upward when it is launched into the air. All of the kinetic energy has been transformed into potential energy by the time it reaches the top of the arc, so there is no more kinetic energy.

Sustainable energy is renewable, clean, and long-term cost-effective energy sources with little negative impact on the environment and society. Examples of sustainable energy are solar power (solar panels) and wind power (wind turbines).

# SUSTAINABLE ENERGY



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**THANK YOU  
FOR READING!**

