Energy Definitions

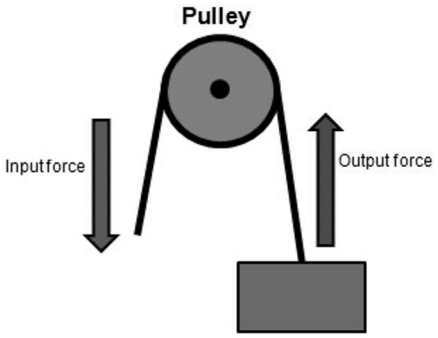
Energy

A measurement of matter based on the capacity for matter to perform tasks (apply a *force*) to other forms of matter

Force and Work

A ***Force*** is the push or pull on an object that allows the object to impact, or change the direction of another object.

Work is the ability to change the movement (*displacement*) of one object relative to other objects in space



A downward **force** is applied to the box, doing work on the box, allowing the box to rise against the pull of gravity (*pulling the box down*)

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Energy Definitions

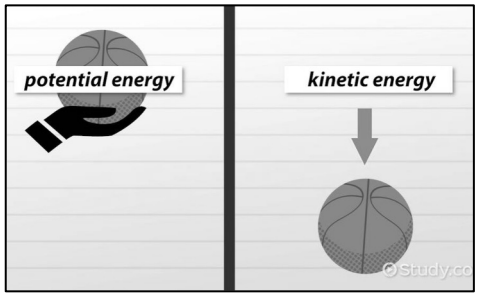
Kinetic Energy

The energy matter based on the movement of matter in space as *heat* or *speed* (velocity)

Potential Energy

The stored energy of matter based on the physical connections, location, or interaction with other forms of matter

Potential Energy is *stored*, and is later *released* as kinetic energy



Picking up a basketball raises the balls **potential energy**. The higher it is raised the more **kinetic energy** is released.

Potential Energy = Kinetic Energy

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Forms of Energy

Thermal Energy

Heat, the energy given off due to the interaction of different forms matter, which causes a change in speed (*i.e. temperature*)

Heat and Temperature

Thermal energy is often known as *heat*. Heat causes a system to change speed (*temperature*). High heat gives a particle more speed and increases temperature of the system.

This vehicle on the 60 freeway in Jurupa Valley is demonstrating both **thermal**, **radiant**, and **light energy** after is caught fire during an accident on May 5, 2025

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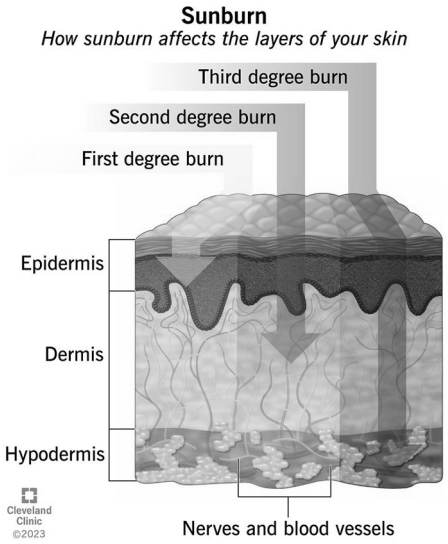
Forms of Energy

Light Energy

Packets of energy transferred in wave like patterns through space. High energy radiation (*such as x-rays*) can do damage to biological tissues in a body

Radiant Energy

Visible energy due to light produced through a chemical process (*like combustion*) releasing energy.



Sunburns caused by light energy

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Forms of Energy

Chemical Energy

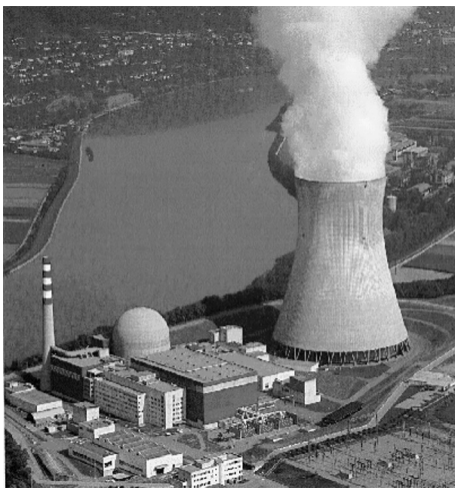
Energy given off due to the change of the physical connections/structure of matter.

Nuclear Energy

Energy given off due to the breakdown of atoms themselves, the smallest form of matter

Electrical Energy

Energy flow due to the movement of electrons, the smallest fundamental parts of an atom



Steam being released as part of the cooling of nuclear fuel during nuclear energy production.

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Forms of Energy

Gravitational Energy

Energy given off by the interaction of mass with the spin/rotation of the earth

Mechanical Energy

Energy flow due to the movement and interaction (*collisions*) of particles directly with each other

Vehicles are often involved in violent high energy collisions that occur when large amounts of **mechanical energy** are transferred between a vehicle and another object. Large **forces** are done on the vehicle due to the **work** of the other object on the vehicle

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