

Power and Energy Conservation

POWER always refers to a rate of energy transfer or conversion in units of J/s or Watts. For example, the POWER of an engine is the rate at which the engine does mechanical work, *i.e.* the rate at which it converts some internal energy or electric energy to mechanical energy.

The work done by a NONCONSERVATIVE FORCE always changes the amount of mechanical energy in a system of objects.

Gravity is a CONSERVATIVE FORCE; work done by gravity does not change the amount of mechanical energy in a system.

The work done by a conservative force on an object is independent of the actual path of the object in question.

Let W_{nc} represent the total amount of work done by all the nonconservative forces acting on an object during a given displacement; then $W_{nc} = \Delta E_{mech}$ is a statement of the principle of CONSERVATION OF TOTAL ENERGY -- the total energy in a closed system never changes. Energy is never created or destroyed, only converted from one form to another or transferred from one object to another.