

System Types

open system	can gain and lose mass and energy
closed system	a system that does not gain nor lose mass
Isolated system	a system that does not exchange mass nor energy

Momentum and Impulse

impulse (I)	$I \text{ or } \Delta P = F\Delta t$
impulse unit	N.s
Location on a graph	under the Force - Time curve
Momentum	$P = mv$
Law of Conservation Of Momentum	$m_1v_1 + m_2v_2 = (m_1+m_2)v$
<i>in any closed or isolated system, the momentum is conserved</i>	
<i>impulse is the change in momentum, so $I = \Delta P$</i>	

Kinetic Energy

KE Formula	$KE = (1/2)mv^2$
work-energy theorem	work is equal to the change in KE ($W = KE_f - KE_i$)

Potential Energy

Gravitational Potential Energy	energy stored as a result of the gravitational attraction of the earth on the object
Formula	$PE = mgh$
Elastic Potential Energy	the energy stored in elastic materials as a result of their stretching or compressing

Machines

Simple Machine	a machine that makes work easier by changing the value of force or its direction
compound machine	a device that uses multiple simple machines
Mechanical advantage	F_r / F_e (resistance force / effort force)
Ideal Mechanical Advantage	d_e / d_r (effort displacement / resistance displacement)
Compound Mechanical Advantage	the product of the MA of its simple machine components
Efficiency	$(W_{\text{output}} / W_{\text{input}}) \times 100\%$ or $(MA / IMA) \times 100\%$

Machines (cont)

Types of simple machines	pulley - lever - wedge - incline plane - screw
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Collision Types

Inelastic collision	the kinetic energy after the collision is less than it originally was
elastic collision	the kinetic energy remains the same after the collision
super elastic collision	the kinetic energy increases after the collision
<i>kinetic energy decreases when the objects stick together</i>	

Work

Work	the translation of energy in mechanical ways
Work Formula	$Fd\cos(\theta)$
Work Unit	J
Location on graph	under the force - displacement curve
Work done by Friction	$-f_k \times d$
Work done by Gravity	mgd
Work = 0	when the force is perpendicular to the displacement (90 degrees)
W is positive	if the work is done on the system
W is negative	if the work is done by the system

Mechanical Energy

mechanical energy	the sum of the potential and kinetic energies
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Power

Power	$P = W/t$
Power Unit	Watt = $\text{kg} \cdot \text{m}^2/\text{s}^3$

