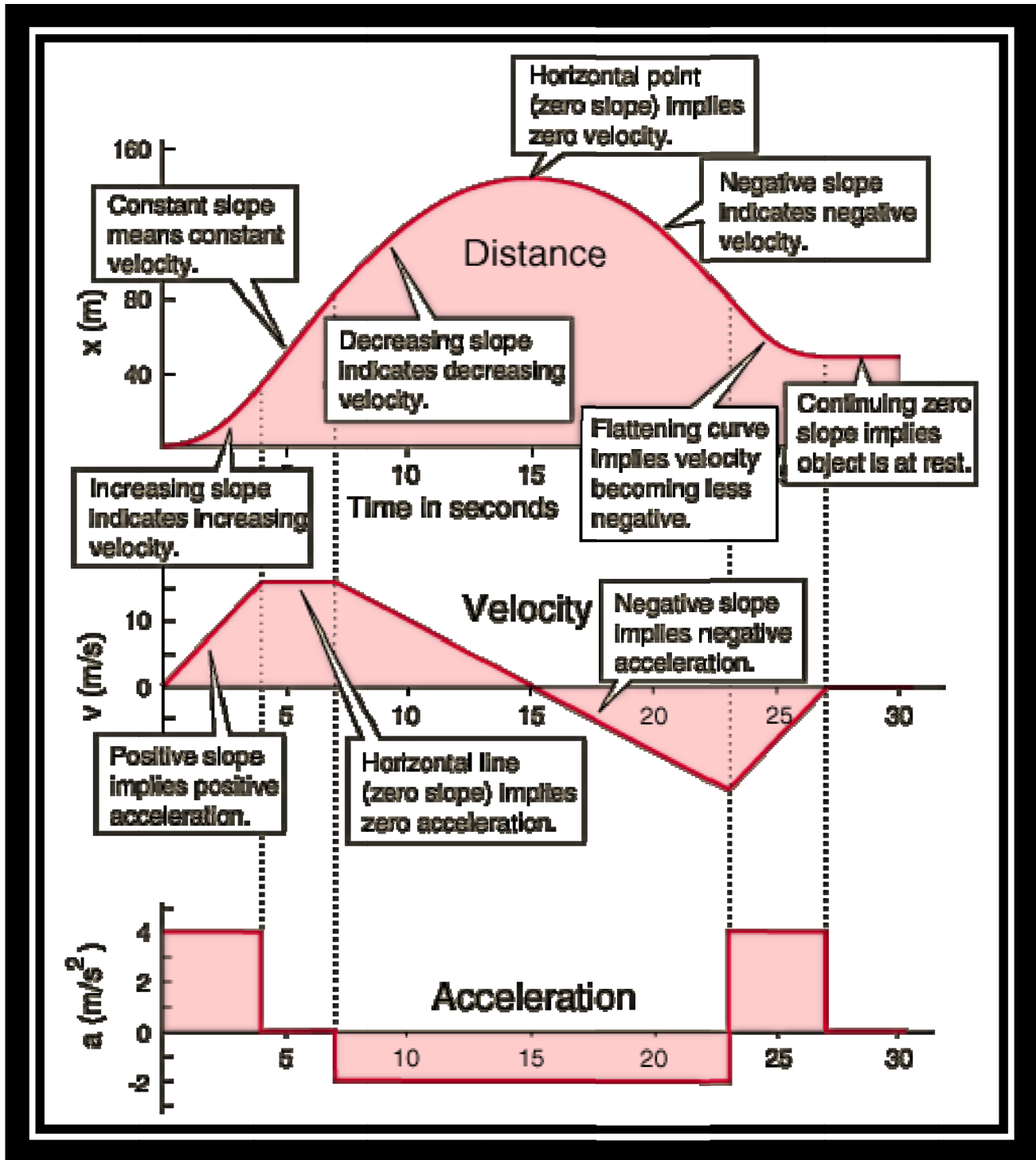


Mr. Ayman's magic physics solver

Memorize the following conversions:

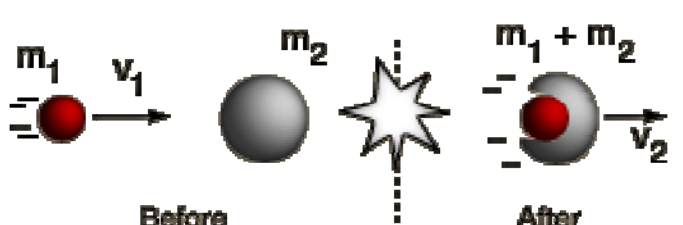
Length / time = speed (velocity) / time = acceleration (gravity) X mass = force X length = work /time = power

The Slopes of Motion Graphs




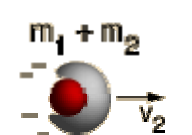
Inelastic Collisions

Perfectly [elastic collisions](#) are those in which no [kinetic energy](#) is lost in the collision. Macroscopic collisions are generally inelastic and do not conserve kinetic energy, though of course the total energy is conserved. The extreme inelastic collision is one in which the colliding objects stick together after the collision, and this case may be analyzed in general terms:



	Before	After	
Momentum	$m_1 v_1$	$(m_1 + m_2)v_2$	<p>Ratio of kinetic energies before and after collision:</p> $\frac{KE_f}{KE_i} = \frac{m_1}{m_1 + m_2}$ <p>Fraction of kinetic energy lost in the collision:</p> $\frac{KE_i - KE_f}{KE_i} = \frac{m_2}{m_1 + m_2}$
Kinetic energy	$\frac{1}{2} m_1 v_1^2$	$\frac{1}{2} (m_1 + m_2)v_2^2$	
From conservation of momentum:			
$m_1 v_1 = (m_1 + m_2)v_2 \Rightarrow v_2 = \frac{m_1}{m_1 + m_2} v_1$			

Inelastic Collision Calculation

 <p>Initial data</p>	 <p>Calculated final values</p>
$m_1 = $ <input type="text" value="1"/> kg $m_2 = $ <input type="text" value="2"/> kg $v_1 = $ <input type="text" value="10"/> m/s Momentum = <input type="text" value="10"/> kg m/s Kinetic energy = <input type="text" value="50"/> J	$v_2 = $ <input type="text" value="3.3333"/> m/s Momentum = <input type="text" value="10"/> kg m/s Kinetic energy = <input type="text" value="16.666"/> J

Amount of kinetic energy lost in the collision = J.