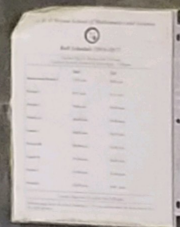


Collisions

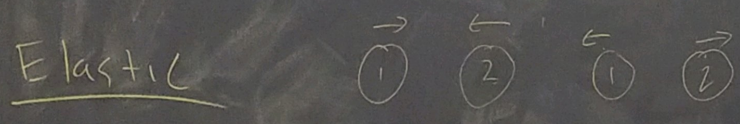
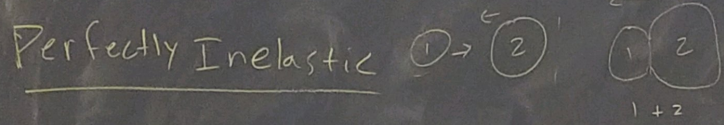
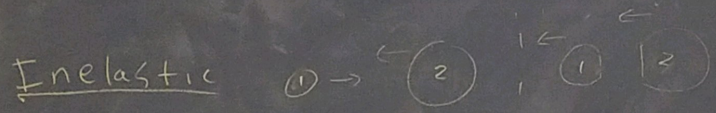
Inelastic collision - A collision where momentum is conserved but kinetic energy is not conserved

Perfectly inelastic collision - An inelastic collision where the objects stick together after colliding

Elastic collision - A collision where momentum and kinetic energy are conserved.



Most collisions are inelastic

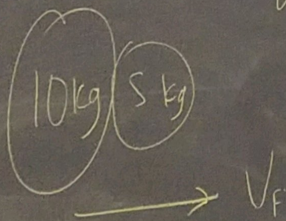
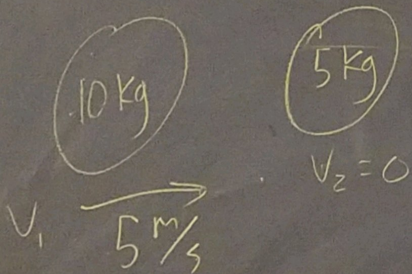


The two objects deform during the collision so that the total kinetic energy decreases, but the objects move separately after the collision.

The two objects stick together after the collision so that their final velocities are the same.

The two objects bounce after the collision so that they move separately. Kinetic energy also conserved.

example



They stick together

$$p_o = p_f$$

$$m_1 v_1 + m_2 v_2 = m_1 v_f + m_2 v_f$$

$$m_1 v_1 + m_2 v_2 = (m_1 + m_2) v_f$$

$$(10 \text{ kg})(5 \text{ m/s}) + (5 \text{ kg})(0 \text{ m/s}) = (10 \text{ kg} + 5 \text{ kg}) v_f$$

$$50 \text{ kg m/s} + 0 \text{ kg m/s} = (15 \text{ kg}) v_f$$

$$v_f = \frac{50 \text{ kg m/s}}{15 \text{ kg}} = \boxed{3.33 \text{ m/s}}$$

