

Kinetic energy (KE) is energy of motion.

$$KE = \frac{1}{2} m v^2$$

$$\left[\text{kg} \cdot \frac{\text{m}^2}{\text{s}^2} \right] = [\text{J}] = \text{joule}$$

m = MASS OF THE SYSTEM.

v = VELOCITY OF THE SYSTEM.

IF $v=0$, $KE=0$

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WEST

EAST

$$KE_A = KE_B \quad m_A = m_B = 20 \text{ kg}$$

$$KE_A = 1,000 \text{ J}$$

$$KE_B = 1,000 \text{ J}$$

- Kinetic energy is a scalar.
- It is always positive.
- The smallest amount of KE is zero.

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2. What happens to the KE if we double the mass?

$$KE_1 = \frac{1}{2} m v^2$$

$$KE_2 = \frac{1}{2} (2m) v^2 = m v^2$$

RATIO $\frac{KE_2}{KE_1}$

$$\frac{KE_2}{KE_1} = \frac{m v^2}{\frac{1}{2} m v^2} = 2$$

KE doubles.

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3. What happens to the KE if we double the velocity?

$$KE_1 = \frac{1}{2} m v^2$$

$$KE_2 = \frac{1}{2} m (2v)^2 = \frac{1}{2} m 4v^2 = 2 m v^2$$

$$\frac{KE_2}{KE_1} = \frac{2 m v^2}{\frac{1}{2} m v^2} = 4$$

KE quadruples.

KE is more sensitive to velocity!

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