

Units of Energy

Base Unit

Unit used to measure a single quantity of matter.

3.00 m rope

Quantity Unit Label

m is the base unit for length

Derived Unit

Unit created by combining base units together

$$V = \frac{m}{s} \leftarrow \begin{array}{l} \text{meter} \\ \text{second} \end{array}$$

(Velocity)

Imperial vs. Metric Units

Imperial Units

United States units

Volume: cups, quarts, gal

Temperature: °F

Length: Feet, yd, mile

Metric Units

Science Units

Volume: Liter (L)

Temperature: °C

Length Meter (m)

Base Units

Meter m length

Second s time

Mol mol amount

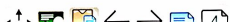
Ampere Amp electrical current

kelvin K Particle Speed

Atmosphere atm Pressure

Candela Cd Brightness

kilogram kg Mass
gram g



Energy of Movement : Joule (J) - Derived Unit

Kinetic Energy

Energy of Movement

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

$$m = \text{kg} \quad v = \text{m/s}$$

Potential Energy

Energy that could be used

$$PE = m g h$$

$$m = \text{kg} \quad g = \text{m/s}^2 \quad h = \text{m (height)}$$



Joule (J) - $\frac{\text{kg} \cdot \text{m}^2}{\text{s}^2}$ kg: mass
m: length s: time

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Kinetic Energy (KE)
Energy of movement

$$\frac{1}{2} m \cdot v^2$$

$$m = \text{kg}$$

$$v = \frac{\text{m}}{\text{s}}$$

$$KE = \frac{1}{2} \cdot \text{kg} \cdot \left(\frac{\text{m}}{\text{s}}\right)^2$$

$$= \frac{1}{2} \cdot \text{kg} \cdot \frac{\text{m}}{\text{s}} \cdot \frac{\text{m}}{\text{s}}$$

$$= \frac{1}{2} \cdot \frac{\text{kg} \cdot \text{m} \cdot \text{m}}{\text{s} \cdot \text{s}}$$

$$= \text{kg} \cdot \text{m}^2 / \text{s}^2 = \text{Joule (J)}$$

