



## Vocabulary: Moment of Inertia



### Vocabulary

- Angular velocity – the angle through which an object rotates in a given time.
  - The symbol for angular velocity is  $\omega$  (omega).
  - Units of angular velocity may be radians per second (rad/s) or degrees per second ( $^{\circ}$ /s).
- Linear velocity – the speed and direction of an object.
  - The symbol for linear velocity is  $v$ .
  - Linear velocity is also simply called “velocity.”
- Moment of inertia – a measurement of an object’s resistance to changes in rotation.
  - Moment of inertia is represented by the symbol  $I$ .
  - The SI unit of moment of inertia is the kilogram meter squared ( $\text{kg}\cdot\text{m}^2$ ).
  - Moment of inertia plays the same role in most equations about rotational motion as mass does in equations about linear motion.
- Rotational kinetic energy – kinetic energy due to rotation.
  - Symbols for rotational kinetic energy include  $RKE$  and  $KE_{Rot}$ .
  - For a rotating object, the formula for rotational kinetic energy is:

$$RKE = \frac{1}{2} I\omega^2$$

In this equation,  $I$  represents moment of inertia and  $\omega$  represents angular velocity.

- Translational kinetic energy – kinetic energy due to linear motion.
  - Symbols for translational kinetic energy include  $TKE$  and  $KE_{Trans}$ .
  - For a moving object, the formula for translational kinetic energy is:

$$TKE = \frac{1}{2} mv^2$$

In this equation,  $m$  represents mass and  $v$  represents velocity.

