ANGULAR MOMENTUM OF A POINT MASS

● A Point Mass in a circular path has *rotational* speed **(w)** and a *linear equivalent* **(v_{TAN}),** but only ONE type of motion**.**

- Note that Linear Momentum and Rotational Momentum are NOT equivalents of each other**.**
- This is because Linear Momentum is ***absolute***, and Angular Momentum is ***relative*** **–** it depends on the Axis**!**
- So if you calculate Linear and Angular *Momenta* for a Point Mass, you get different equations and numbers**:**

EXAMPLE**:** A small 2-kg object spins horizontally around a vertical axis at a rate of 3 rad/s, maintaining a constant distance of 4 m to the axis. Calculate the object's **(a)** linear momentum**,** and **(b)** angular momentum about its central axis**.**

→ **L = _________** is also used for Angular Momentum of an object in LINEAR motion, about an axis of rotation **(**more soon**)**

PRACTICE: ANGULAR MOMENTUM / EARTH

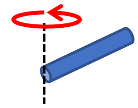
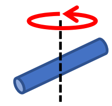
PRACTICE**:** The Earth has mass 5.97×10^{24} kg, radius 6.37×10^{6} m. The Earth-Sun distance is 1.5×10^{11} m. Calculate its angular momentum as it spins around itself. Treat the Earth as a solid sphere of uniform mass distribution**.**

→ BONUS 1**:** Treating the Earth as a point mass, calculate its angular momentum as it spins around the Sun**.**

→ BONUS 2**:** Does the Earth have ***linear momentum*** as it spins around **(i)** itself**; (ii)** the Sun**?**

PRACTICE: ANGULAR MOMENTUM / ROD WITH MASSES

PRACTICE: A system is made of two small, 3 kg masses attached to the ends of a 5 kg, 4 m long, thin rod. The system rotates with 180 RPM about an axis perpendicular to the rod and through one of its ends, as shown. Calculate the system's angular momentum about its axis.

Common Moments of Inertia	
End of Rod 	$I = \frac{1}{3}mL^2$
Center of Rod 	$I = \frac{1}{12}mL^2$