

# Circular Motion

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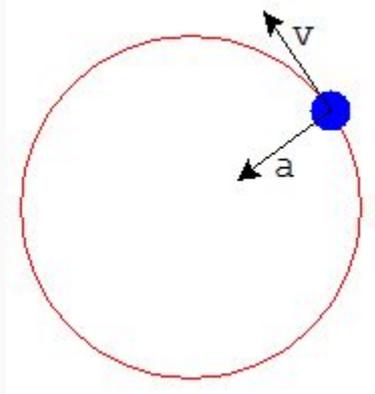


How do objects move in a circle?

# Uniform Circular Motion

There are two essential parts that are required to move an object in a circle.

- Center of rotation
- Tangential Velocity



# Building Blocks of Circular Motion

- **Centripetal Force**

This describes how the object remains the same distance from the center point.

- **Tangential Velocity**

This describes the object's speed as it moves perpendicular to the center point.

# Visualizing Velocity:

Think about a maypole...

When you run around, you don't face the pole, you face sideways to the pole.

-Your running provides the tangential velocity

#velocity



# Understanding Velocity...

-Period (seconds per revolution)

*If a child runs at a certain speed, how many seconds does it take to make one revolution?*

-Frequency (revolutions per second)

*If a child runs at a certain speed, how many revolutions does it make in one second?*

#velocity

# Visualizing Force:

Leaning your weight on the ribbon, the force of tension keeps you at a certain distance.  
-The ribbon's tension provides a center-seeking force.



# Equations

Essential parts to Centripetal Forces:

-Mass ( $m$ )

-Length of String ( $r$ )

-Tangential Velocity ( $v^2$ )

$$F_c = mv^2/r$$

Need to know the how fast a spinning object is going? #velocity

$$v = 2\pi r/T$$

# Common Mistakes and Misconceptions

Confusing centripetal force and centrifugal force for each other

Switching period and frequency

Not properly identifying centripetal forces

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## Free Response Strategy

- Check that the units being used match those in the formula
- Isolate important information provided in the problem
- Bring in formulas from other units if applicable
- Check if gravity plays a role

You swing a ball horizontally on a 5 m string at 15 km/hr and with a force of 2.5 N. How much does the ball weigh?