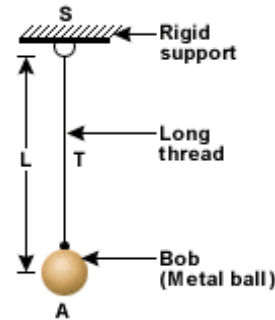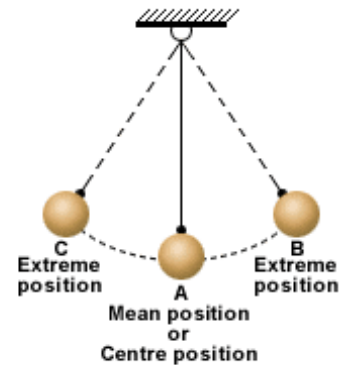# PENDULUMS and PATTERNS (6-8)

## KEY CONCEPTS:

➢ The Law of Conservation of Energy – energy cannot be created or destroyed, only changed or transferred.

➢ A **pendulum** is a weight (or 'bob') hung from a fixed point, so it can swing back and forth freely. It swings back and forth in a pattern.

➢ Each back-and-forth movement is one **vibration**.

➢ The time it takes for one vibration is a **period**.



(a) Simple pendulum     (b) Motion of a simple pendulum

## LITERACY CONNECTION:



Comic book hero Spiderman is also Peter Parker, a brilliant young man with a passion for science and doing good. *The Amazing Spiderman* series by Marvel Comics is a great way to dive into a world of fantasy inspired by real-world science.

## ACTIVITY: PENDULUM

Materials: 1 large paperclip, watch or clock with a second hand, string, masking tape, pencil, ruler, scissors, a penny, paper (graph paper optional)

### PENDULUM INSTRUCTIONS:

1. Use the ruler to measure 25 inches of string.
2. Tie the paperclip (tightly!) to one end of the string.
3. Loop the string around the pencil, and secure it with a piece of tape.
4. Clip a penny onto the paperclip and the pendulum is complete!

### TRACKING the VIBRATIONS:

1. Secure the pendulum over the edge of a table.
   **TIP**: Make sure it sticks out a little so the bob can swing freely
2. Test it: Raise the bob (penny) to one side, and release. One vibration is one trip back *and* forth).
3. Using the second hand on the watch, count how many vibrations the pendulum swings in 30 seconds. Do this 3 times.
4. Record your findings. Do you see a pattern?



**EXPLORE**: Repeat the experiment, but shorten the string and/or add another penny. Is there a difference? **Math extension** – Visit Florida Power & Light's Energy Curriculum for instructions on graphing the vibrations to *see* the wave pattern!

For step-by-step instructions, watch the video at: Pendulum STEM Activity