Simple Harmonic Motion

Unit: Simple Harmonic Motion

MA Curriculum Frameworks (2016): N/A
MA Curriculum Frameworks (2006): 4.1

Mastery Objective(s): (Students will be able to...)
- Describe simple harmonic motion and explain the behaviors of oscillating systems such as springs & pendulums.

Success Criteria:
- Explanations are sufficient to predict the observed behavior.

Tier 2 Vocabulary: simple, harmonic

Language Objectives:
- Explain why oscillating systems move back and forth by themselves.

Labs, Activities & Demonstrations:
- Show & tell with springs & pendulums.

Notes:
simple harmonic motion: motion consisting of regular, periodic back-and-forth oscillation.

Requirements:
- The acceleration is always in the opposite direction from the displacement. This means the acceleration always slows down the motion and reverses the direction.
- In an ideal system (no friction), once simple harmonic motion is started, it would continue forever.
- A graph of displacement vs. time will result in the trigonometric function sine or cosine.

Use this space for summary and/or additional notes:
Examples of Simple Harmonic Motion

- **Springs**: as the spring compresses or stretches, the spring force accelerates it back toward its equilibrium position.

- **Pendulums**: as the pendulum swings, gravity accelerates it back toward its equilibrium position.

Use this space for summary and/or additional notes:
- **Waves**: waves passing through some medium (such as water or air) cause the medium to oscillate up and down, like a duck sitting on the water as waves pass by.

- **Uniform circular motion**: as an object moves around a circle, its vertical position (y-position) is continuously oscillating between $+r$ and $-r$. 

Use this space for summary and/or additional notes: