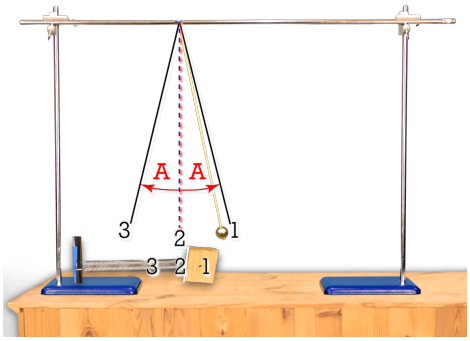
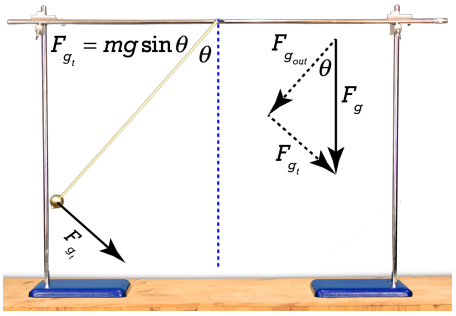
Flipping Physics Lecture Notes:

When is a Pendulum in Simple Harmonic Motion?



Mass-spring systems and pendulums are both in simple harmonic motion. Both oscillate around an equilibrium position and have a restoring force pointed towards the equilibrium position that increases proportionally with displacement from the equilibrium or rest position.

- The displacement from equilibrium position for a pendulum is an *angular* displacement.
  - Units are in degrees or radians.
  - Symbol is theta, θ.
  - Maximum displacement from equilibrium position is still Amplitude, A.



- The restoring force for a pendulum is the force of gravity tangential to the path of the pendulum. This force is:
  - Proportional to displacement from equilibrium position and
  - Directed toward equilibrium position.

Actually, the force of gravity tangential is only considered to be directed toward equilibrium or rest position for "small angles". Typically I consider this to be less than 15°, however, some sources require the angle to be less than 10°. It depends on how much error you are willing to allow. The larger the angle, the larger the error. This is because of the *small angle approximation.*