

Inquiry Lab

Design Your Own

OBJECTIVES

- **Construct** simple pendulums, and find their periods.
- **Calculate** the value for a_g , the free-fall acceleration.
- **Examine** the relationships between length, mass, and period for different pendulums.

MATERIALS LIST

- balance
- cord
- meterstick
- pendulum bobs
- pendulum clamp
- protractor
- stopwatch
- support stand

Simple Harmonic Motion of a Pendulum

The period of a pendulum is the time required for the pendulum to complete one cycle. In this lab, you will construct models of a simple pendulum using different masses and lengths of cord. You will design an experiment to measure the period of each model and to determine how the period depends on length and mass. Your experiment should include several trials at a constant mass but at different lengths, and several more trials at constant length but with different masses. In the Analysis, you will also use the period and the length of the cord for each trial to calculate the free-fall acceleration, a_g , at your geographical location.

SAFETY



- **Tie back long hair, secure loose clothing, and remove loose jewelry to prevent their getting caught in moving parts or pulleys. Put on goggles.**
- **Attach masses to the thread and the thread to clamps securely. Swing masses in areas free of people and obstacles. Swinging or dropped masses can cause serious injury.**

PROCEDURE

1. Study the materials provided, and design an experiment to meet the goals stated above.
2. Write out your lab procedure, including a detailed description of the measurements to take during each step and the number of trials to perform. You may use **Figure 1** as a guide to a possible setup. You should keep the amplitude of the swing less than 15° in each trial.
3. Ask your teacher to approve your procedure.
4. Follow all steps of your procedure.
5. Clean up your work area. Put equipment away safely so that it is ready to be used again.