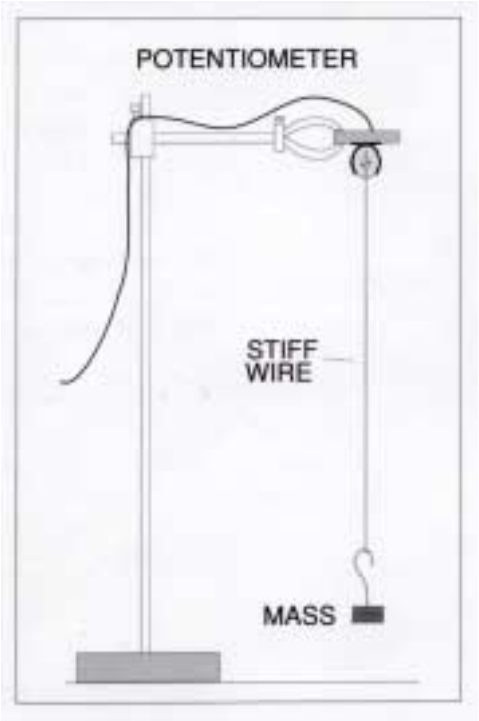
VIBRATIONS

1. HOW IS THE PERIOD OF A PENDULUM AFFECTED BY ITS AMPLITUDE?

Small swing... large swing... Does the time for one complete swing of a pendulum (period) depend upon the size of the swing (amplitude)? How does the speed of the pendulum vary during each swing?



Make a pendulum by suspending a mass from an angle sensor with a piece of stiff wire.

PLAN Discuss the advantages and disadvantages of starting the measurement with small swings or larger swings.

Decide what will be the largest swing you will attempt to use.

Consult you software manual to find out how to calibrate the program so that the largest swing just fills the screen.

APPARATUS

- Position/angle sensor *(held in a clamp on a retort stand)*
- Simple pendulum *(made from mass of about 200g fixed on a stiff wire rod)*

COMPUTER

Inputs:	1. Angle sensor (potentiometer)
Timespan:	10 – 30 seconds
Calibration:	With the pendulum at rest in a vertical position, rotate the angle sensor until the signal level reads about 20% Set maximum signal level to 40%
Axes:	Set limits from –1000 to +1000

DISCUSS AND FIND OUT

Use 'time interval' to measure the period (duration) of each swing. Make a note of several values and look to see if there is a simple pattern in the results.

Use 'gradient' to measure the speed of the pendulum at different points in the swing. Describe how the speed appears to be related to the position of the pendulum.

GOING FURTHER

Plot a graph of the speed of the pendulum (try 'k dy/dt') against time.

Investigate how the period is affected by the mass of the pendulum bob. Think about how you would ensure that you make it a fair test.

How is the period affected by damping the motion? (You can create a damping effect by dipping the pendulum bob in a shallow tray of water.)