

Pendulum Explorations

On what does the period of a pendulum depend?

Materials:

Washers
String
Scissors
Stop watch
Metric ruler/measuring tape
Protractor
Tape
Pencil
Graph paper

To Do and Notice:

1. Tie a length of string to a washer to create a simple pendulum.
2. Take the pencil to the table so that the eraser end is perpendicular to the edge of the table. Tie the string of the pendulum to the pencil to create a stable base from which it can swing.
3. Demonstrate the motion of your sample pendulum, explaining the definition of the pendulum's period – the amount of time it takes for the washer to go to and fro once.
4. Brainstorm variables that could possibly affect the pendulum's period.
5. Examine the list of variables, deciding which are possible to test in your classroom. Cross out those that cannot be tested.
6. Choose experimental groups based on interest in testing each of the remaining variables. Be sure your list includes the following:
length of string
mass of "bob"
release angle
7. Design an experiment to test *one* of the pendulum variables. Decide how you will control the other variables. For example, you may choose to create a "basic pendulum" with a fixed length, a single washer, and a fixed release angle.
8. It's important to discuss how to measure the length of the pendulum, and how to time the period. Technically, the length of the pendulum should be measured from the fulcrum to the center of mass of the bob. When measuring anything small (like the time for the period of the pendulum), it's easier to measure multiples (e.g. 10 periods) and then divide by your multiplier.
9. Record your results and prepare to share with the larger group.
10. The group discussion may include some ideas about measurement error, and what is reasonable. The data should show that the period of the pendulum depends on its length.

11. Graph this data, with the length on the x-axis, and the period on the y-axis.

What's Going On?

The group discussion may include some ideas about measurement error, and what is reasonable. The data should show that the period of the pendulum depends on its length. Graph this data, with the length on the x-axis, and the period on the y-axis.

There is a pendulum write up on Paul Doherty's web page:
<http://www.exo.net/~pauld/activities/pendulums/pendulums.html>