

## A Pendulum Experiment

Complete this experiment with a partner. You will need about 1 m of string, a small object such as a key or a washer, some tape, a tape measure or metre stick, and a watch that indicates times in tenths of a second.

1. Start a table to record the length of each pendulum you will make, and the time it takes the pendulum to swing back and forth 5 times.

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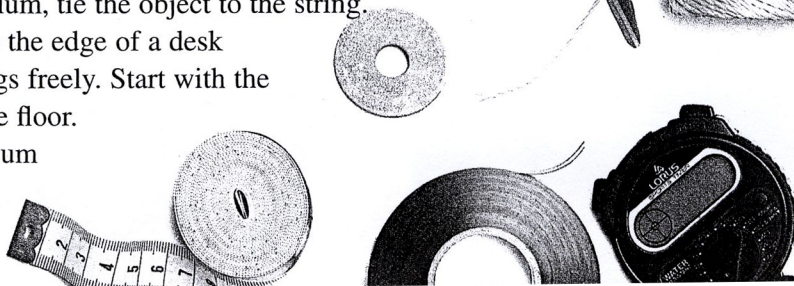
Length of pendulum (cm)	Time for 5 swings (s)
70	
60	
50	
40	
30	
20	
10	



2. To make a pendulum, tie the object to the string.

Tape the string to the edge of a desk so the object hangs freely. Start with the object close to the floor.

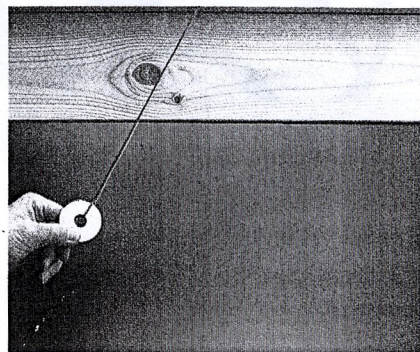
Swing the pendulum gently to ensure it has a clear path.



3. a) Measure and record the length of the pendulum.

- b) Pull the object to an angle of about  $30^\circ$  from the rest position. Release the weight. Measure and record the time it takes the pendulum to swing back and forth 5 times.

Be sure to pull the object so the string remains taut. One partner should count the swings while the other partner records the time.



4. Repeat exercise 3 for shorter and shorter lengths of the pendulum. To shorten the length, lift the tape at the top and pull the string up. Try to get measurements for at least six different lengths, including very short lengths.
5. See worksheet #2.
6. Describe the relationship between the length of the pendulum and the time required for it to swing 5 times.
7. Describe a way to predict how long it would take a 45-cm pendulum to swing back and forth 5 times. Justify your method.
8. Describe how the graph would change if you were to repeat this experiment but measured the time for a number of swings that is:
  - a) greater than 5
  - b) less than 5