

Period of a Pendulum

Objective: Explore the relationship between the length of a pendulum and its period by creating a square root equation representing data.

Materials: String, tape, ruler, protractor, graph paper, weight (may vary), timer

Procedure:

1. Assemble a simple pendulum by tying the weight to one end of the string and taping the other end to the end of the table. The string length will be changed so do not over do the tape. The initial length will be 10 cm.
2. Each trial will start at 20° (use protractor). Begin the swing (make sure it swings freely) and allow ten periods to occur. One period occurs when it returns to the starting position. Be sure to time each trial using seconds. Repeat two more times and find the average time for ten periods.
3. Change the length of the string to 15 cm and repeat again. Repeat the procedure for the lengths of 25, 35, 50, 65 centimeters.
4. Create a table similar to the following using paper or an app on ipad:

Length of Pendulum (cm)	Average time for 10 swings (sec)	Period (To find the period, divide your average time by 10)	Period based on Actual Formula

5. Plot your data points (length vs. period) using Desmos and/or on graph paper. (You will need Desmos in order to find the equation later) Make sure you label the axis appropriately.

Analysis

1. Describe how the period changes as the length of the string changes. (Written)
2. Determine the equation (using Desmos) that best fits your data. It will not be exact.
3. Look up the actual formula for the Period of a pendulum and compare how your equation is similar. Evaluate some of your lengths using the actual formula and compare to your data. (Written)
4. Calculate the period if the pendulum was 210 cm. (Show Calculations)
5. How long is the string if the period is 21 seconds? (Show Calculations)

Finished product:

Turn in may be by paper or by Homeroom

- Completed Table
- Graph
- Analysis