

Swinging Pendulum Activity – Swinging Pendulum Worksheet

Data

1. Measure the mass of your weight.
2. Measure the distance from the ceiling to your weight.
3. Place two pieces of tape on the wall/other surface that are 50 cm apart with your weight in the middle.
4. Measure the height from the floor to the bottom of the weight when it is at equilibrium and again when the bottom is at one of the pieces of tape.
5. Record the time it takes for the weight to swing to the piece of tape on the other side (t_1).
6. Record the time it takes for the weight to swing to the other side and back again (t_2).
7. Perform three trials of this experiment.

Mass of Weight (kg)	Ceiling to Weight (m)	Floor to Weight At Equilibrium (m)	Floor to Weight At Tape (m)	t_1 (s)	t_2 (s)

8. Perform the same procedures as before, except adjust the pieces of tape to be 80 cm apart.

Mass of Weight (kg)	Ceiling to Weight (m)	Floor to Weight At Equilibrium (m)	Floor to Weight At Tape (m)	t_1 (s)	t_2 (s)

Calculations and Results

Name: _____ Date: _____

1. Subtract t_2 from t_1 and calculate the average value for both set of trials.

Tape Separation: 50 cm

$t_2 - t_1$ (s)
Avg:

Tape Separation: 80 cm

$t_2 - t_1$ (s)
Avg:

2. Calculate the Potential Energy (PE) of the weight at the initial piece of tape for the two different tape separation values.

3. Calculate the Kinetic Energy (KE) and theoretical velocity of the weight at the bottom of its swing for the two tape separation values.

Name: _____ Date: _____

4. Calculate the measured velocity of the weight and compare it with the theoretical velocity by using percent error.

Tape Separation: 50 cm

Potential Energy (Joules)	Kinetic Energy (Joules)	Theoretical Velocity (m/s)	Measured Velocity (m/s)	Percent Error

Tape Separation: 80 cm

Potential Energy (Joules)	Kinetic Energy (Joules)	Theoretical Velocity (m/s)	Measured Velocity (m/s)	Percent Error

5. Calculate the Theoretical period of the pendulum. Why do you only have to perform this calculation once and not for both of sets of trials.

Name: _____ Date: _____

6. What was the measured period for each set of trials and what was the percent error for each case?

Theoretical Period (s)	Measured Period – 1st set (s)	Measured Period – 2nd set (s)	Percent Error – 1st set	Percent Error – 2nd set

Further Learning

7. Account for the percent error between your measured periods and your theoretical periods.

8. Calculate how long you would have to make a pendulum so that it would have a period of one second.

