Name_____ per____

Pendulums: Period and Frequency - due Thursday 1/16

In this activity, we will be using a pendulum to model period and frequency. We can measure these properties in both waves and pendulums. They move in a very similar way. This is called *simple harmonic motion*.

C. Data collection

1. Work together to collect data for the period of your pendulum
   1. MEASURE THE LENGTH OF YOUR PENDULUM FROM THE PIVOT TO THE CENTER OF THE BOB. *Measure length to the tenths (ex: 17.4 cm)*
   2. Pull back the washer to about 30 degrees.
   3. Time how long it takes for 10 periods (use a timer). A period is one complete cycle from where you let go. *Measure time to the hundredths (ex: 21.34 seconds)*
   4. Divide your number by 10 to get the time for 1 period. Record your data in the data table.

$$Period\ (T) = \frac{10\ periods}{10}$$

   5. Test 3 times and take the average
   6. To find the frequency of the pendulum: $Frequency = \frac{1}{Period\ (T)}$
   7. Increase the height of the structure.
   8. Lengthen the pendulum about 10 cm and collect data for the second length.

Length of Pendulum (cm)	Period (T) Trial 1	Period (T) Trial 2	Period (T) Trial 3	Period (T) Average	Frequency
20.3 cm	.90 s	.88 s	.90 s		
24.4 cm	.96 s	.99 s	.98 s		
39.4 cm	1.27 s	1.27 s	1.27 s		

Properties of a pendulum (not required)

Compare the properties of a pendulum to the properties of a wave. Try to measure the amplitude of your pendulum (not in degrees).

Structure redesign (not required)

1. Redesign your structure to hang off a table on it's own with a pendulum attached. Lengthen the pendulum about 20 cm and collect data (3rd row on the table).

Clean-up (required)

1. Take the pendulum apart and return the pieces to the
2. Cut the string and the washer from the structure. Keep string attached to the washer.
3. Check the floor for pieces.

Analysis (required)

1. Explain how you helped your group accomplish the task.

2. What happened to the period and the frequency as the pendulum got longer? Explain using data from the lab.

2 learning targets for this assignment.

1. I can use visual and mathematical representations to model the properties of waves.
2. Science and Engineering Practices: Modeling

Highly Proficient (4)	Proficient (3)	Close to Proficient (2)	Developing (1)
Science Practices ❏ An effective pendulum is built by the group. ❏ Accurate period data is collected. ❏ Frequency is calculated correctly. ❏ Student is a productive member of the group.	Science Practices. ❏ Pendulum is mostly built. ❏ Data is collected. ❏ Lab is complete (including analysis). ❏ Frequency is attempted.	Science Practices ❏ Pendulum is not attempted or mostly incomplete. ❏ Student is not a productive member of the group. ❏ Work is incomplete.	Science Practices ❏ No group data was collected. ❏ No evidence of project ❏ No participation