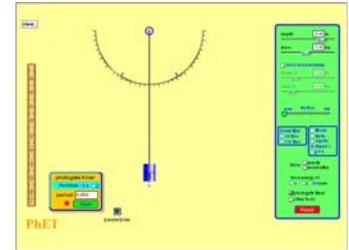


Name: \_\_\_\_\_

### The Pendulum – Exploring the Affects of Gravity on the Period Lab

#### Introduction:

When an astronaut goes to another planet, they can easily determine the gravity on that planet with a piece of string, a rock and a stop watch. In this lab, you will explore this phenomenon.



#### Important Formulas:

$$T = 2\pi\sqrt{\frac{L}{g}}$$

**Procedure:** [http://phet.colorado.edu/sims/pendulum-lab/pendulum-lab\\_en.html](http://phet.colorado.edu/sims/pendulum-lab/pendulum-lab_en.html)

- Take some time and play with the pendulum. Try a few different angles and see if it affects anything.
- Enable the photogate timer by checking the labeled box. Using the timer will measure the time that it takes the pendulum to go from the equilibrium point through an entire cycle and return to the equilibrium point.
- Make sure the gravity indicator is set to earth. Verify the length of the pendulum from the slider at the top of the green box. Based on this, calculate the period of the pendulum on earth. \_\_\_\_\_
- Drag the pendulum back about 20 degrees and release it. Press Start on the photogate timer. Find the period. \_\_\_\_\_
- Calculate the percent error between you calculated period and the measured period \_\_\_\_\_.
- Change the length of the period \_\_\_\_\_.
- Calculate the new period based on the new length \_\_\_\_\_.
- Start the simulation with the new length and check the period against what you calculated. \_\_\_\_\_
- If the pendulum were in outer space, how would you expect the pendulum to behave?



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- Reset the pendulum and change the gravity to g=0. Release the pendulum. Describe what happened.

\_\_\_\_\_

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- Did the behavior match your prediction? \_\_\_\_\_ Explain \_\_\_\_\_

\_\_\_\_\_

- Repeat the experiment and try to determine the acceleration due to gravity (g) on the moon and on Jupiter.

Jupiter  
 $g=24.79\text{m/s}^2$     Period \_\_\_\_\_  
 Calculated Gravity \_\_\_\_\_  
 Percent Error \_\_\_\_\_

Moon  
 $g=1.67\text{ m/s}^2$     Period \_\_\_\_\_  
 Calculated Gravity \_\_\_\_\_  
 Percent Error \_\_\_\_\_

- Reset the pendulum and set the gravity to Planet X.
- Calculate the gravity on Planet X \_\_\_\_\_.