

# Experiment 6

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## *Determination of Value of $g$ (acceleration due to gravity)*

Time for activity 40-60 minutes

### Resources

The Virtual Lab [https://phet.colorado.edu/sims/html/pendulum-lab/latest/pendulum-lab\\_en.html](https://phet.colorado.edu/sims/html/pendulum-lab/latest/pendulum-lab_en.html)

Paper. Pencil, Calculator

### Software Requirements

The new HTML5 sims can run on iPads and Chromebooks, as well as PC, Mac, and Linux systems.

#### **iPad:**

iOS 11+ Safari

[iPad compatible sims](#)

#### **Android:**

Not officially supported. If you are using the HTML5 sims on Android, we recommend using the latest version of Google Chrome.

#### **Chromebook:**

Latest version of Google Chrome

The HTML5 and Flash PhET sims are supported on all Chromebooks.

[Chromebook compatible sims](#)

#### **Windows Systems:**

Microsoft Edge and Internet Explorer 11, latest version of Firefox, latest version of Google Chrome.

#### **Macintosh Systems:**

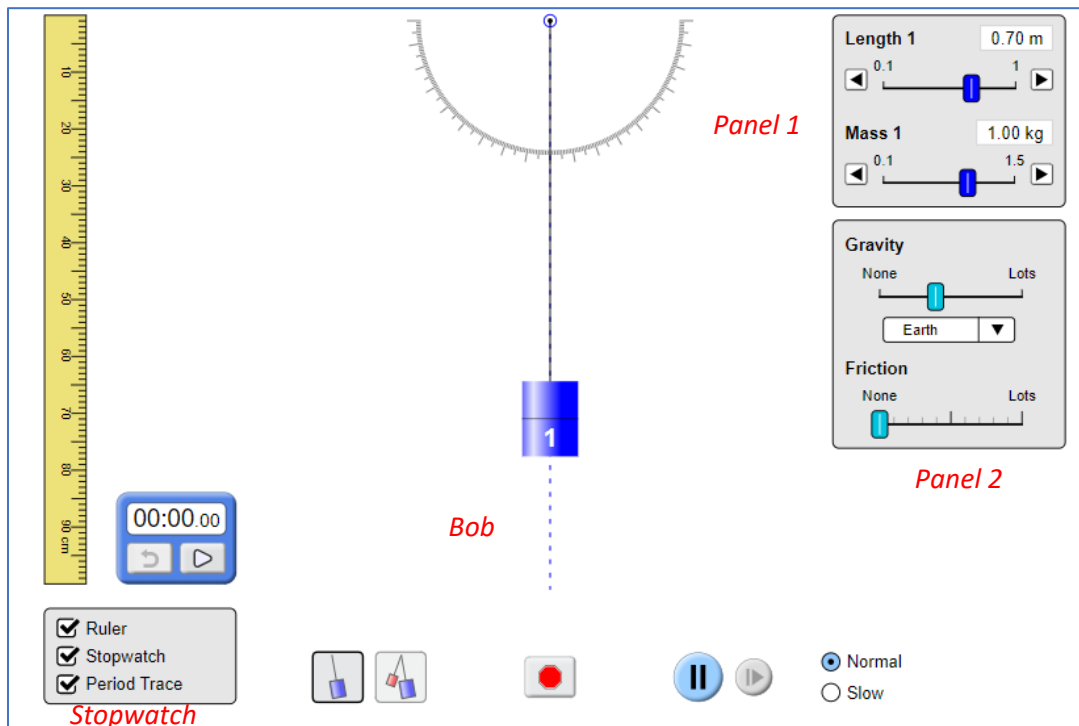
macOS 10.9.5+, Safari 9+, latest version of Chrome.

#### **Linux Systems:**

Not officially supported. Please contact [phethelp@colorado.edu](mailto:phethelp@colorado.edu) with troubleshooting issues.

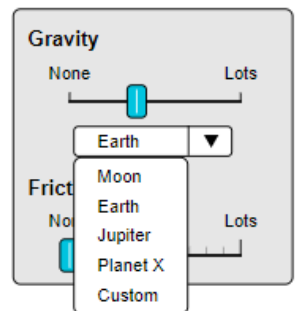
## The Lab Environment

Spend a few minutes to understand/ explore the functionalities of the different tabs/components.



### Instructions

1. Select the length of and the mass of the pendulum from the right length/mass tab (panel 1) and record the measurements in the table (s) below.
2. From the gravity tab, select the Earth from the dropdown menu (panel 2).
3. Check the ruler, stopwatch, and the period trace (panel 3).
4. Set the stopwatch to zero.
5. Drag the bob to its right or left extreme position, and then press the play button.
6. Note down the time for 10 (or 20 vibrations) and record it in the table(s) below.



# Experiment 6

## Determination of Value of g (acceleration due to gravity)

Student's Name \_\_\_\_\_

Grade \_\_\_\_

### Observations

#### Determination of the Value of g (9.81 m/s<sup>2</sup>) (acceleration due to gravity)

Since the time period of the simple pendulum is given by

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

$$T^2 = 4\pi^2 \frac{L}{g}$$

$$g = 4\pi^2 \frac{L}{T^2}$$

Table 3

No. of Obs	Length of Pendulum L (m)	Time for 20 vibrations t (sec)			Time Period T = t / 20	$g = 4\pi^2 \frac{L}{T^2}$
		1	2	Average		
1						
2						
3						

Average Value of g =

Calculating the %age Error:

Calculated Value of  $g =$  \_\_\_\_\_

Actual Value of  $g =$  \_\_\_\_\_

%age Error =  $\frac{| \text{Actual value of } g - \text{Calculated value of } g |}{\text{Actual value of } g} \times 100 =$  \_\_\_\_\_ %

**Note:** If the %age error is less than 5%, its acceptable. Otherwise repeat the experiment.