

Non-obvious controls:

- If you want to do an experiment, **Pause** the sim, set up your experiment, then start it.
- If you want to compare two variables like length, check **Show 2nd Pendulum**, **Pause** the sim, set up your experiment, then start it.
- The **Photogate Timer** operates as a triggered mechanism, which starts when the pendulum crosses the vertical dotted line. The period will be displayed after one cycle.
- Most things are draggable: the timer, stop watch, ruler, tape measure, and energy graph. Also, the entire green control panel is draggable by its border.
- The initial angle is marked by a tick mark the color of the pendulum mass
- There is a zoom feature for all Flash simulations. Right click on the sim and select **Zoom in**. This can be helpful when you are using a projector or writing a lesson where you want a screen shot.

Important modeling notes / simplifications:

- As you move the pendulum, the angles are constrained to be exactly integer number of degrees
- The "Planet X" in this sim is not the same planet as in Masses and Springs. It has a different acceleration of gravity.

Insights into student use / thinking:

- Students may change the mass or length while the experiments are running. It is possible that they may not realize it.
- Students may try to use the formula for pendulum period $T = 2\pi\sqrt{\frac{L}{g}}$. This only works at small angles as stated in textbooks, so the students will have to experiment using Jupiter or the Moon to discover what "small" means or they might be able to find some advice in a literature search. Note that there is no absolutely clear answer to this question. The answer depends on the level of precision maintained.
- If you want to measure the period using the stopwatch, you will need to leave the stopwatch on for many periods and divide by the number of periods to get an precise time.

Suggestions for sim use:

- For tips on using PhET sims with your students see: [Guidelines for Inquiry Contributions](#) and [Using PhET Sims](#)
- The simulations have been used successfully with homework, lectures, in-class activities, or lab activities. Use them for introduction to concepts, learning new concepts, reinforcement of concepts, as visual aids for interactive demonstrations, or with in-class clicker questions. To read more, see [Teaching Physics using PhET Simulations](#)
- For activities and lesson plans written by the PhET team and other teachers, see: [Teacher Ideas & Activities](#)