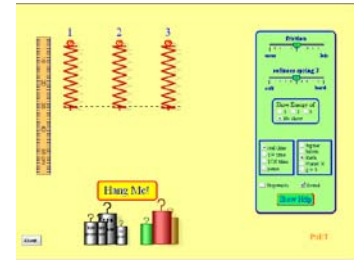


Name: _____

Hanging Masses – Intro to Energy and Work PhET Lab

Introduction:

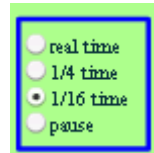
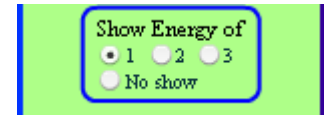
When springs bounce energy is converted from gravitational potential to kinetic to elastic potential. In this lab you will take time to simulate a spring bounce and then find the spring constants of springs, the amount of mass added to a spring and then the gravity on Planet X.



Important Formulas: $KE = \frac{1}{2}mv^2$ $PE = mgh$

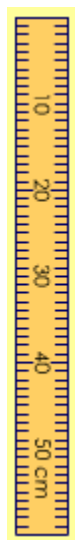
Procedure: http://phet.colorado.edu/sims/mass-spring-lab/mass-spring-lab_en.html

- Take some time and play with the springs and the various masses.
 - Click on the buttons to show the energy graphs. These graphs show the conversion between *kinetic energy (green)*, *gravitational potential energy (dark blue)* and *elastic potential energy (light blue)*.
 - Reset the simulation (right click on the simulation and select the play option from the menu. Turn off friction by moving the slider to none. Turn on the Energy bars for spring 1.
 - Place the 250 g mass on spring 1 by putting the cursor over the mass drag it to the end of the first spring and then releasing the mouse button. You may wish to change the speed of the spring or pause it. You can do this using the time menu. As the spring bounces descends his kinetic energy (green) is highest when the spring is _____, the gravitational potential energy (blue) is highest when the spring is _____ and the elastic potential energy is greatest when the spring is _____. The total energy is always equal to _____.
 - Change the mass on the first spring. Is the law of conservation of energy affected by the mass? ____ Explain.
-
-



Remove the mass from spring one and place the 250 g mass on spring 2.

- Drag the scale over to the spring and measure the entire distance the spring travels. _____ m
- Measure the distance between the highest point and the point at which the kinetic energy is the maximum. _____ m
- Measure the distance between when the kinetic energy is at its maximum and the elastic potential energy is at its maximum. _____ m
- What is the maximum gravitational potential energy of the mass? _____ J What is maximum elastic potential energy? _____ J What is the gravitational potential energy when elastic potential energy is at its maximum? _____ J
- Calculate the spring constant of spring 2. _____ N/m Show all calculations in your homework notebook.
- Calculate the speed of the mass when the kinetic energy is at its maximum. _____ m/s Show all calculations in your homework notebook.



Remove the 250 g mass from spring 2 and replace it with the red mass.

- Using the previously calculated spring constant calculate the mass of the red mass _____ kg Show all your calculations in your homework notebook.

Now change the planet to Planet X.

- Using the spring 2 spring constant as well as other gathered information, calculate the gravitational acceleration on Planet X. _____ m/s^2 Show all calculations in your homework notebook.

