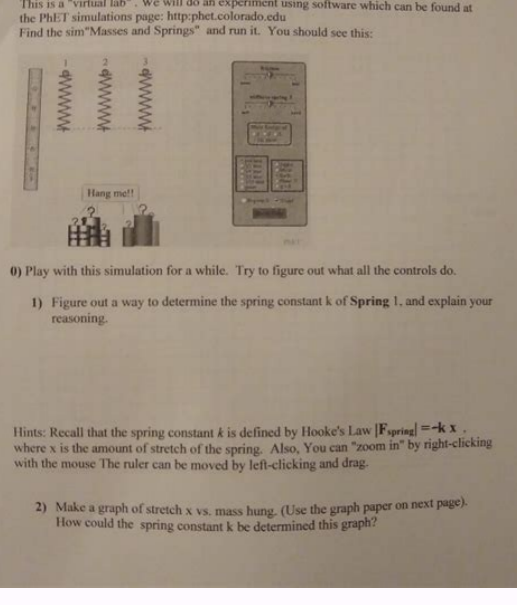


Continue





**PhET Masses and Springs** [Microsimulations](#)

- Try it for yourself**
- Stretch the spring. Students will need to turn on the microsimulator using the button in the right corner.
  - Click on the different tabs at the top of the simulation. The tabs are designed to help teachers differentiate or tailor lessons and appropriately using this simulation.
  - Click on **Stretch** tab and then use **Stretch** to experimentally measure.

- Important teaching notes/clarifications**
- This activity specifically targets conceptual learning objectives related to change in potential energy and work. In addition, it also includes conceptualizations for momentum, forces, and energy. These objectives are listed below the simulation.
  - Microsimulator about the different tabs:**
    - The **Stretch** tab is designed to be used by students. The first objective is to use the simulation to experimentally measure the spring constant.
    - The **Energy** tab is designed to be used by students. The first objective is to use the simulation to experimentally measure the spring constant.
    - The **Work** tab is designed to be used by students. The first objective is to use the simulation to experimentally measure the spring constant.
    - The **Force** tab is designed to be used by students. The first objective is to use the simulation to experimentally measure the spring constant.
    - The **Momentum** tab is designed to be used by students. The first objective is to use the simulation to experimentally measure the spring constant.
  - Experiment:** This is a guided activity where students are asked to measure the spring constant for three different spring levels. The first objective is to use the simulation to experimentally measure the spring constant.

- Insights into student use (Thinking)**
- Students generally do not understand that microsimulators have a variety of objectives and purposes. They often use the simulation to experimentally measure the spring constant.
  - Learning on the microsimulator's is the current design philosophy for it to use. Practice and the underlying being objectives.

- Suggestions for activities**
- For high school/college students use [Qualitative Inquiry, Conceptual Change, and Inquiry/PhET Lab](#).
  - The simulation has been used successfully with homework, in-class activities, or lab activities. For example, students can use the simulation to experimentally measure the spring constant, or use it as a tool for interactive demonstrations, or with multiple choice questions. For more ideas, see [Teaching with PhET: A Guide for Teachers](#).
  - For activities and lessons about the PhET Masses and Springs, see [Teacher Ideas & Activities](#).
  - Related work:** [Masses and Springs](#) provides many measurements and conceptualizations for ideal gases.

Authors: [Carl Wieman](#) and [Patricia Kline Shier](#) (last updated July 2011)

Physics Online Lab- masses and springs Name: \_\_\_\_\_ date: \_\_\_\_\_  
<http://www.colorado.edu/physics/phetsimulations/massspringlab/MassSpringLab2.swf>  
 Background information:

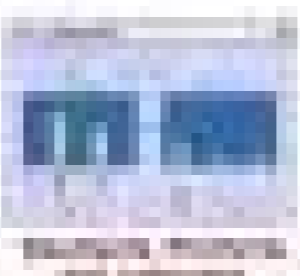
- list all the things you can manipulate and measure in this lab:
- Carefully hang a 50 gram mass on the first spring and wait for it to stop bouncing. Measure the distance it is from equilibrium and record on your data table.
- Lift the mass to the equilibrium height and release. Use the stopwatch to determine the time for 5 oscillations. Divide this number by 5 and record on your data table.
- Repeat the previous steps with all the different masses and record on your data table.
- Do all three springs have the same spring constant? How do you know?

Mass	Force (N)	X (m)	"T"	P.E.
50 grams				
100 grams				
250 grams				
Red=				
Green=				
Gold=				

- Make a graph showing force vs. stretch (use entire graph paper and label correctly).
- Find the slope of the graph and record here with units: \_\_\_\_\_
- This slope represents what variable of a spring? \_\_\_\_\_
- Go back to your table and calculate the mass of the unknowns (Red, Green, Gold)
- Go back to your table and calculate the potential energy of each trial.
- Right now, the stiffness (k) of the spring is on level 5 of 10. Using the GREEN mass on spring 3, determine the value of the spring constant for as many settings as you can by adjusting the spring level. Please show all work below.

**Masses and Springs Phet Lab**

**Introduction:**  
In this lab you will investigate the relationship between mass and spring constant. You will use a mass-spring system and a force sensor to measure the spring constant of a spring. You will also use a mass-spring system to measure the period of a mass-spring system. You will compare your experimental results to the theoretical results.



**Learning Objectives:**  
1. Determine the spring constant of a spring.  
2. Determine the period of a mass-spring system.

**Materials:**  
1. Spring  
2. Mass  
3. Force sensor  
4. Computer

**Procedure:**  
1. Attach the spring to a fixed support.  
2. Attach the mass to the other end of the spring.

**Results:**  
1. Spring constant:  $k = 100 \text{ N/m}$   
2. Period:  $T = 0.63 \text{ s}$

**Conclusion:**  
The spring constant of the spring is  $100 \text{ N/m}$ . The period of a mass-spring system is  $0.63 \text{ s}$ .

**Discussion:**  
The experimental results are in good agreement with the theoretical results.

**References:**  
1. Phet simulation: [https://phet.colorado.edu/en/simulation/masses-and-springs](#)

**Post-Lab Writing Prompt:**  
Write a paragraph describing your lab results and what you learned from this lab.



**Print & Study Questions**

**Phet Lab**

When you open this page, you will see a PDF document. The document contains the lab instructions and questions. You can download the PDF or print it. The PDF is titled "Masses and Springs Phet Lab".

File Name	Size
Masses and Springs Phet Lab.pdf	1.2 MB



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