

**Learning Goals:**

- Students will be able to explain how the mass of an object is determined using spring balances.
- Then they will be able to use the spring balance to determine the mass of an unknown object.

**Tasks:** 1. Verify Hooke's Law.

2. Find the masses of the unknown weights.

a. Download the files - *Mass\_and\_Spring\_Sim.jar* and *hookes\_law\_data.xlsx* from <http://physicsk78.weebly.com/sim-hookes-law.html>

b. Hooke's Law states that when an elastic object - such as a spring - is stretched, the increased length is called its extension.

***The extension of an elastic object is directly proportional to the force applied to it.***

$$F=kX$$

*F=force (N)*

*X=extension (m)*

*k=spring constant (N/m)*

**Experiment 1 - Verify Hooke's Law:**

1. Hooke's law states: The extension of an elastic object is directly proportional to the force applied to it.
2. Write a research question **using** the word "affect":
3. Identify the **independent variable** in your question:
4. Identify the **dependent variable** in your question:
5. Identify the **controlled variable(s)**:
6. Write a hypothesis using an ***If..., then*** statement:
7. **Materials**
8. **Procedure or Method:**  
Design an investigation to test your hypothesis.  
Write the steps of the procedure in order.
9. Use the *hookes\_law\_data.xlsx* data table to record your observations.
10. **Analyse** your data by **graphing** it and describing any patterns or relationships.
11. Write a **conclusion** to your experiment.
12. **Suggest how the experiment can be improved.**  
What questions remain to be answered?  
Outline, briefly, further experiments that could be carried out.

**Experiment 2 – Use Hooke's law to find the unknown masses (*green, brown, red*).**