Phone: 417.374.7431
Fax: 417.374.7442
Toll Free: 888.756.4592
service@gosciencecrazy.com
2076 James River Court
Nixa, Missouri 65714

# #4-80810 Hooke's Law

**Warning:**

- **Not a toy; use only in a laboratory or educational setting.**
- **California Proposition 65 Warning: This product can expose you to chemicals including lead and nickel, which are known to the State of California to cause cancer, birth defects, or other reproductive harm. For more information go to www.P65Warnings.ca.gov.**


## Introduction

An English physicist by the name of Robert Hooke (1635-1703) discovered that the elasticity of matter follows specific proportional rules. Rules that govern the amount of distortion in matter that is in relationship to the force applied to it. From this idea, Hooke's Law was created which states that the amount of elongation or bending of a spring is directly proportional to the force that is applied. This unit makes understanding this law easy. The springs length is measured by a scale that lies next to it. As weights are added the springs length can be compared to the force that caused the deformation.

In simpler terms, an elastic body (one which returns to its original condition when the force is removed), will be distorted to a particular degree when a force is applied. This distortion could be squashing, stretching, bending or twisting. Regardless of the form, the situation occurs in a linear fashion, with the distortion proportional to the amount of force applied. So if twice as much force is encountered there will be twice as much distortion. if three times as much force is applied there will be three times as much distortion. However, this rule only holds true up to a point. There is a point of stress called the *elastic limit,* that when exceeded, will cause permanent distortion of an elastic matter. *Stress* is the term used to define the force of the elastic matter that tried to restore itself to its original shape. Continuing to apply force past the elastic limit results in reaching the *breaking stress*, where the body is ruptured. *Strain* is a unit of measure that determines the amount of deformation that occurs in a body when a specific force is applied. This measurement is based on a percentage of distortion as compared to the body's original shape.

## What's Included

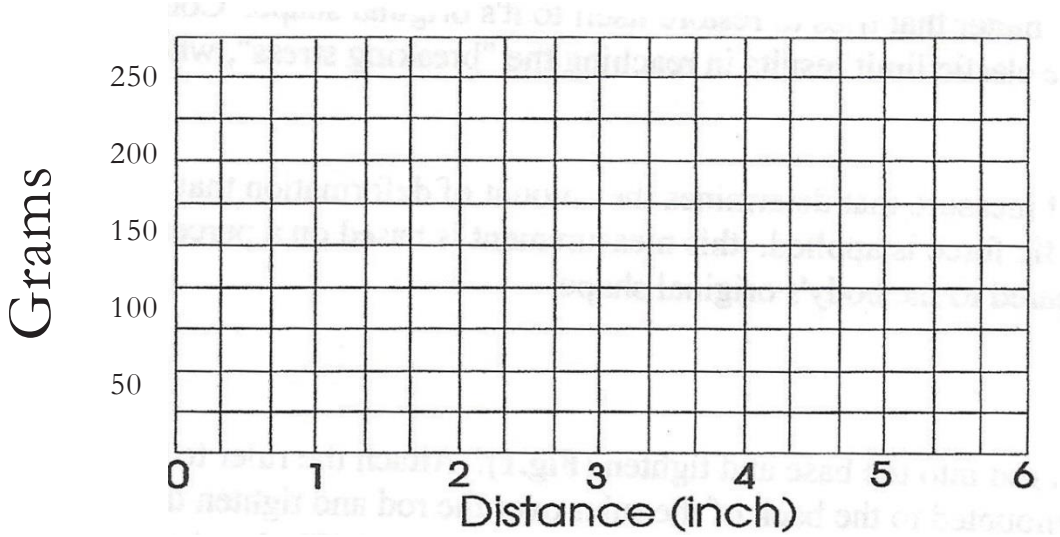
Included in this kit is a cast iron base, a screw in rod, a spring, a metal scale, an indicator needle, and a set of slotted weights (9 50-gram weights).

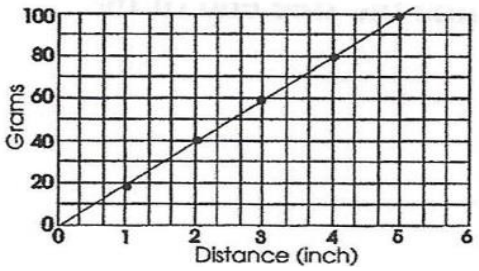
## Experiment

Using the chart below, fill in the information. Begin with the weight hanger empty and wtire down where the pointer starts on the scale. As each weight is added, transfer the information to the chart. Do this for 50, 100, 150, 200, and 250 grams of weight.

| | Empty | 50 gr | 100 gr | 150 gr | 200 gr | 250 gr |
|---|---|---|---|---|---|---|
| Scale Reading | | | | | | |

Now transfer the information to the graph below. Place a point at every location that represents a corresponding point on the graph. With this done, using a ruler, draw a line connecting every point. You should have a graph similar to the completed graph at the bottom of the page. This shows the amount of deformation of the spring is linearly proportional to the amount of weight added. Hooke's Law is put to good use in spring balances and other weighing devices. It is also utilized in equipment for measuring forces and determining material strength.




(What your graph should resemble).