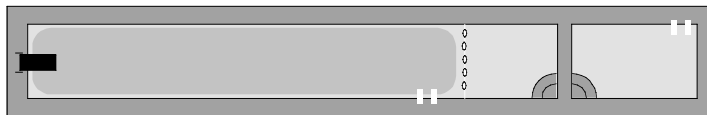


PHYZLAB SPRINGBOARD: THE WEIGHT

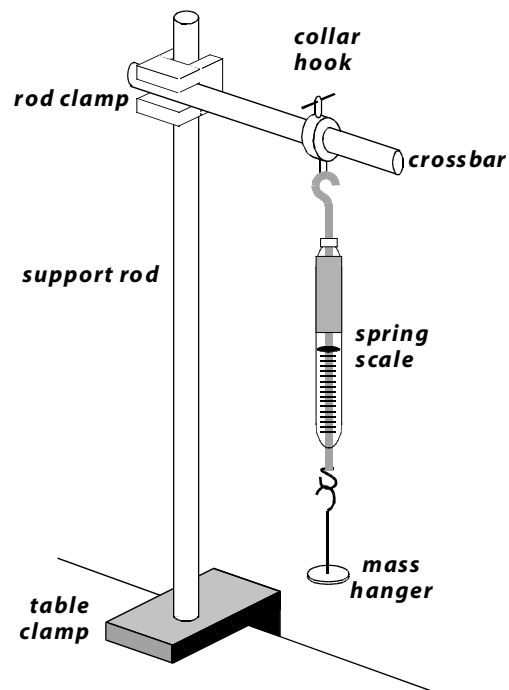
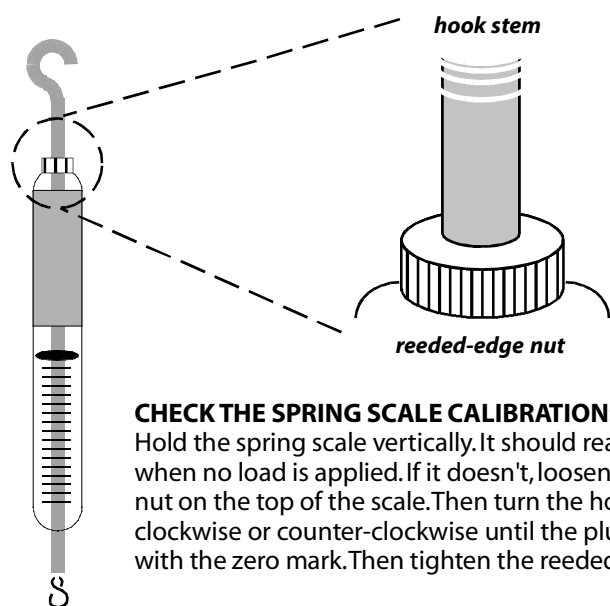


• Purpose •

In this activity, you will investigate the relationship between weight and mass.

• Apparatus •

- ___ spring scale
- ___ slotted masses (100 g, two 200 g, 500 g)
- ___ mass hanger ($m =$ _____ g)
- ___ table clamp
- ___ support rod
- ___ rod clamp
- ___ crossbar (short rod)
- ___ collar hook



• Procedure •

1. Check the spring scale calibration and adjust it as necessary. **Do this before attaching any load to it.**
2. Arrange the apparatus as shown above to the right.
3. Record the mass (in grams) and weight (in newtons—as shown on the scale) of the mass hanger on the data table.
4. Add 100 g of **slotted mass** to the mass hanger. Record the **total** mass and weight on the data table,
5. Repeat the previous step with 200 g, 300 g, 400 g, 500 g, 600 g, 700 g, and 800 g of mass added to the mass hanger.

• Analysis •

1. Convert the mass values to kilograms ($1 \text{ kg} = 1000 \text{ g}$); record the values on the data table.
2. Make a graph of weight vs. mass. (Use the mass in **kilograms**.) As is always the case, the first variable listed in the title of the graph constitutes the vertical axis and the second variable is the horizontal axis. Generally speaking, the first variable listed is the **dependent variable** (the one that was measured) and the second is the **independent variable** (the one you controlled during the experiment). Be sure to title the graph, label the axes (quantity, symbol, units, and scale).

• Data •

Total hanging mass m (g)	Total hanging mass m (kg)	Weight of mass W (N)
0	0	0

• Graph •

3. The plotted data should form a line with a fairly constant slope. Draw a straight line of best fit on the graph.

4. Determine the value of the slope. (Don't forget the correct **units**.) Show your method and/or calculation in the space below.

5. What is the meaning of the slope of this graph? (Hint: the slope is a ratio of unlike quantities. Consult *Springboard: Ratios* to assist in developing a verbal description of the meaning of this ratio.)

6. a. Under what conditions—if any—would the line of best fit have a steeper slope? (Describe the *environmental conditions*, not the *meaning* of the steeper slope.)

b. Under what conditions—if any—would the line of best fit have a shallower slope?

c. Under what conditions—if any—would the line of best fit have zero slope?

d. Under what conditions—if any—would the line of best fit have undefined (infinite) slope?