# Tension Lab

Name:
Period:
Mr. Z's Physics Class
11/16/06

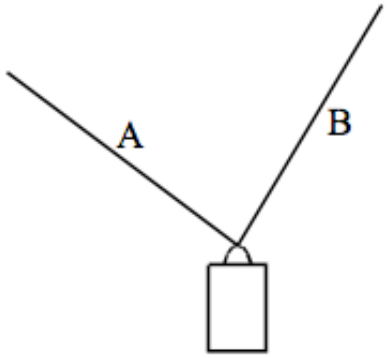
In this lab, your goal is to measure the forces involved in several different situations, and verify that the forces on each object sum to zero. In order to get very accurate results, we can set up each situation by hanging the spring scales from thumbtacks pushed into the wall. That way you know the scales won't move while you are trying to record all your measurements. You will need:

- Two weights of different sizes
- Two strings (each with three loops to connect to the object and scales)
- Three spring scales (two 5 N and one 10 N should work).
- A spot on the wall in which to work, and two thumbtacks from which to hang your scales

Be sure to "zero" your scales before you start, holding the scale from the top to see where the marker will naturally hang, and then sliding the face of the scale so that that point is at the zero mark.

1. What is the $\vec{F_g}$ of each weight, as a force vector?

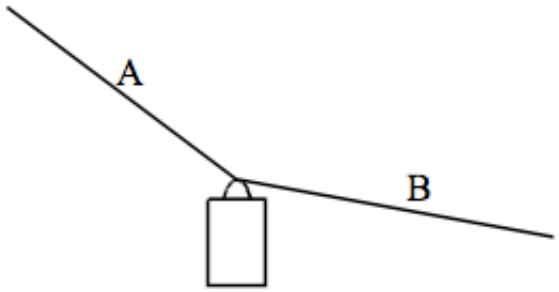
2. a) Pick either weight to set up the situation below, and draw the force diagram.




b) In which string should the force be larger?

c) Set up that situation, measure the angle of each string, and record the scale measurements. Give the vector form of each force. Then, find the net force. It should be nearly zero (within about .5 in each coordinate).

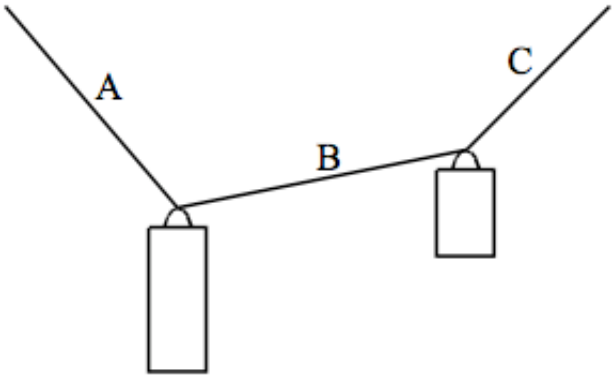
3. a) Draw the force diagram for the object in the situation below.




b) In which string should the force be larger?

c) Set up that situation, measure the angle of each string, and record the scale measurements. Give the vector form of each force. Then, find the net force. It should be nearly zero (within about .5 in each coordinate).

4. a) In this situation, there are two objects. Draw the force diagram for each object. There should be three forces acting on each.




b) Here, it is difficult to measure the force in the middle string. So, instead, we'll treat both objects as one single object. Its weight will be their combined weights, and it will have just the two outside tension forces acting on it.

Find the vector form of each force, and from that find the net force.

c) **Extra Credit:** Find the tension force the middle string exerts on each weight.