**This lab will test the three claims about friction:**

**Claim 1.** The coefficient of friction is independent of the weight of the block and the force of friction is linearly proportional to the weight of the block. µ should not change for different normal forces. The frictional force will change, but µ should be constant.

**Claim 2.** The force of friction depends on the type of surfaces interacting but is independent of the area of contact between them. If this statement is correct you should measure the same force of friction regardless of which of the block's six possible surfaces is being dragged across the table.

**Claim 3.** The coefficient of static friction is typically greater than the coefficient of kinetic friction (µs > µk). Measure µs and compare to your value of µk as measured earlier. If you have uncertainties, you can make a scientific claim as to which coefficient is greater.

**Equipment list (I will provide if needed):**

friction blocks

spring scales

large weight set centigram balance

**Preparation:**  This lab investigates all three of the above statements to varying degrees of thoroughness. But you will need to know how to take measurements with the spring scale and then how to relate those values to the force of friction.

1. Starting with Newton's second law, derive a formula that relates the coefficient of kinetic friction, µk, to the horizontal tension force, FT (measured by the spring scale) when the block moves at constant velocity. This allows you to know the friction force by taking a measurement from the spring scale.
2. Taking measurements with the spring scale. The spring scale has two sets of graduations on it. One set reads mass in grams and the other set reads force in newtons. Make sure the spring scale measurements for the tension force are taken in newtons, not grams.
3. Determining the uncertainty of the spring scale. Using a "rule of thumb" method for the absolute uncertainty of a scale reading (i.e., the absolute uncertainty is equal to half the smallest increment on the scale), record in your lab book the absolute uncertainty associated with a measurement from the scale.

**CONCLUSION:**  On the basis of your results, refute or confirm the above three claims. Defend your results. Percent Error!

**TIPS:**

While pulling the block, the spring scale should be held in a horizontal position so that the scale neither pulls up or down on the block.

Make sure the spring scale reads zero when all the slack is taken up in the spring scale mechanism as you first start to pull on it.

Make sure no dust, grime, or errant matter is between the block and the table.