# IM1 LAB 03 – What is the Relationship between Springs and Weights?

Objective: To find a linear function that fits a set of real world data.

Procedure:

❖ Set up the apparatus as pictured.
❖ Measure the original length of the spring (no weights added).
❖ Add the first weight and record its mass. Measure the length of the spring and determine the extension. Record this information in the data table.
❖ Add a different weight and once again, measure the length in order to determine the extension on the spring. Record this information.
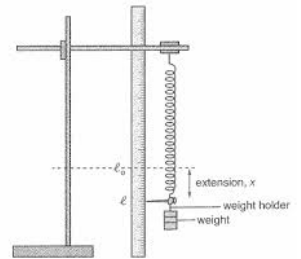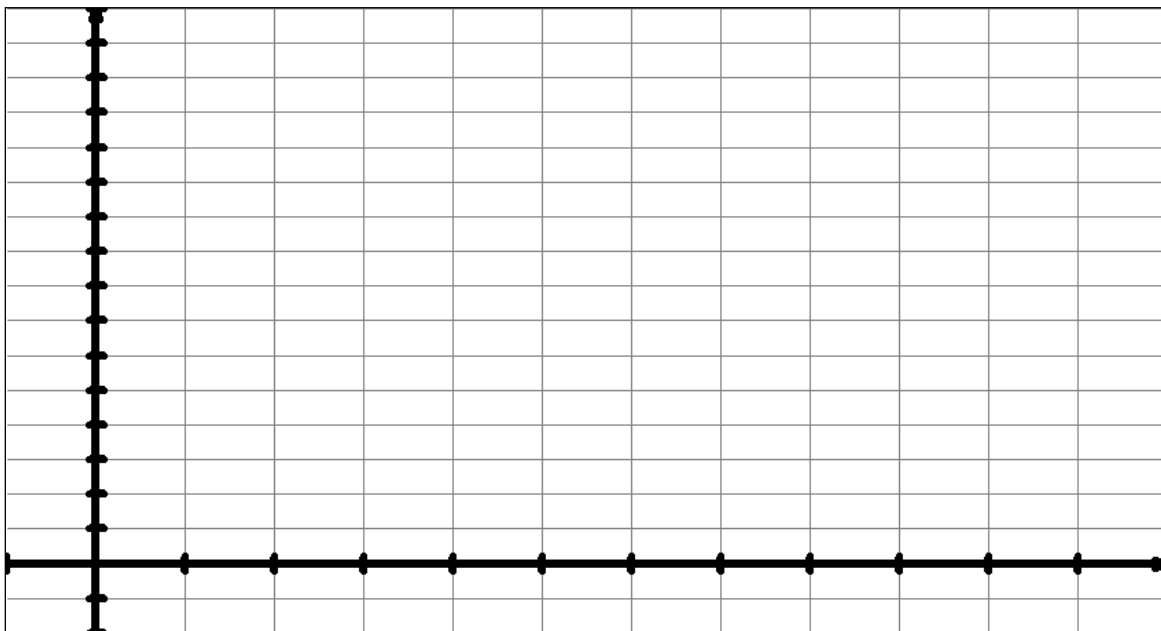
Data Table and Exploration:

1. Complete the table below based upon your experiments.

Weight Added	Extension of the Spring

2. Create a graphical display for your data, with appropriate labels and indicate the independent and dependent variables. 4M

3. Is your data linear? Justify your response in at least two ways. **2M**

4. Suppose the data does have a linear relationship (*regardless of your answer in question 2*).

   a. Determine the equation of the line for this data. **2M**

   b. What is the slope of this line? Comment on what this value means realistically. **2M**

   c. What is the y-intercept of this line? Comment on what this value means realistically. **2M**

   d. Using your linear model, what extension would result from a mass of 150g added? Show/explain your answer. **2M**

   e. Using your linear model, what mass would produce an extension of 25 cm? Show/explain your answer. **2M**

5. If your group had decided to use stronger spring instead of the small ones, describe how you think the linear model would change. **3M**

6. Aisha's group also conducted this experiment of the spring – weights relationship and her group drew this graph from their investigation.

   a. How would this graph differ if your group had used a lighter spring instead of the springs we used? Sketch the graph that would result from your experiment. Aisha's original data is shown in the reference graph. Explain your reasoning. **3M**
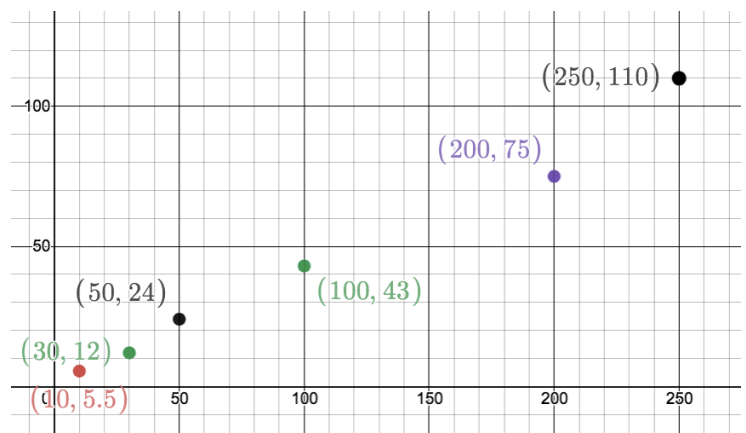
   b. How would the graph differ if her group had still used the same spring, but heavier masses? Sketch the graph that would result. Again, Olivia's original graph is shown in the reference graph. Explain your reasoning. **3M**