

# Module 1 Lab: Rubber Band Blast!

## REPORT SHEETS

YOUR NAME:

### 1. Pre-lab Assignment:

Watch the videos posted in Canvas and read through the rest of the pages in this file before you answer these pre-lab questions.

a) In your own words, define the following:

Dependent variable:

Independent variable:

Controlled (or constant) variable:

Hypothesis:

Accuracy:

Precision:

b) Paula can take big steps or little steps when running. Label each variable as independent, dependent, or controlled:

Speed Paula runs:

How big Paula's steps are:

Which running shoes Paula wears:

## The Rubber Band Blast Experiment:

Your mission today is to figure out how to shoot a rubber band as far as possible from the end of a finger. In other words, the question you are trying to answer today is this: What factors cause a rubber band shot from the end of a finger to travel the greatest distance possible?

### 2. Identify All Possible Variables

Brainstorm possible variables which may affect the distance a rubber band travels.

### 3. Hypothesis

With these variables in mind, write a hypothesis about what will make a rubber band travel the farthest that you can test today.

### 4. Experimental Plan

Fill in the choices you make.

- a) Pick one variable to be your independent (or manipulated) variable.
- b) Identify the dependent (or responding) variable.
- c) Will you have any constant (or control) variables? If so, what are they?

d) How will you test (measure) your independent variable?

e) How will you test (measure) your dependent variable?

f) Will you do any repeat trials?

g) How will your choice of repeat trials affect your precision?

h) How will your choice of repeat trials affect your accuracy?

## 5. Experimental Work

Carry out the experiment and record your data in a table. As you began to collect data, did you find you needed to change anything in your experimental plan?

For the data table: You may already know how to create a data table in your word processing program (MS Word, Google Doc, etc.) or you may write it out on a piece of paper, take a picture of it, and insert it here.

Your Data Table:

## 6. Data Analysis and Visualization

Graph your data. Do you think you can throw any points out? Why? Remember that the independent (manipulated) variable always goes on the  $x$ -axis, while the dependent (responding) variable goes on the  $y$ -axis. Draw a best fit (or trend) line through your data points; ***DO NOT*** “connect the dots.” Ask if you do not know the difference.

How to graph: You may use a graphing program like Excel or Google Sheets, or draw it out on a piece of paper, take a picture, and insert it. Make sure your axes are labeled with units and give a title to your graph. If you don't know how to do this in your graphing program, include a note below your graph indicating what it should be.

## 7. Discussion

- a) Do your experimental results uphold your hypothesis or contradict it?
  
- b) If your experimental results did not fully match your hypothesis, write a new hypothesis.
  
- c) How accurate do you feel your results are (how close to a true value)? Why?
  
- d) How precise do you feel your data are (how close to other measurements)? Why?
  
- e) Do your results allow you to answer the original question about what makes a rubber band travel farthest?
  
- f) Are you ready to write a scientific law or a theory, or do you feel that more experimentation is needed? (Make sure you look up what scientific law versus theory is, if you're not sure.)

## 8. Feedback:

In a sentence or two, what did you learn in this lab? Was this an effective lab about scientific method and measurements? Is there anything you would change about this lab?