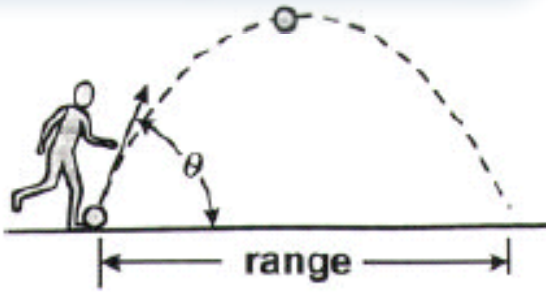
Range Vs. Launch Angle Lab

Name_____**Date**_____**Group**_____**Period**___



By using the marble launcher to launch marbles at different angles we will determine the relationship between the range of the marble and the launch angle,θ (theta).
Problem: When launching a projectile like a marble, what **specific** launch angle of the marble, will result in the maximum distance (range) for the marble?

Hypothesis :If_____

_____

Variables: By the time you finish this experiment, you will need to identify the different types of variables present in this investigation. Consult your notes for definitions of the types of variables.
Independent Variables: _____

_____

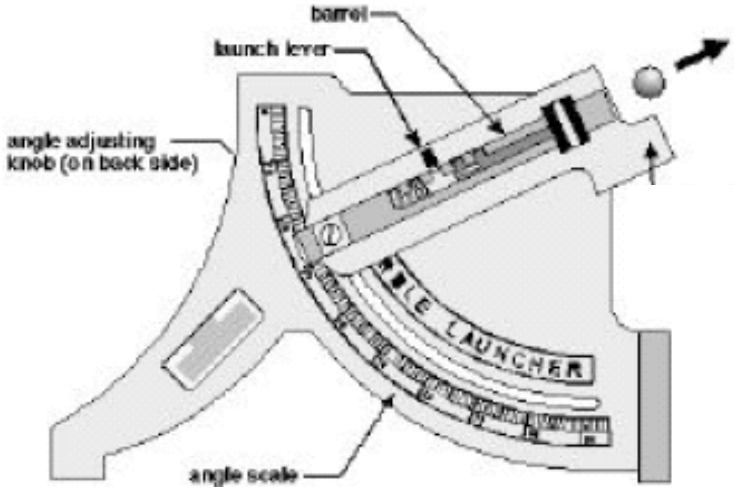
Dependent Variables:_____

_____

Controlled Variables:_____

_____

Equipment: Marble launcher,plastic marble, tape measure
SAFETY RULES:
1 Never Launch Marbles at People.
2. Have A Clear Field Before Launch
3. Retrieve Marbles Promptly To Prevent Slipping



Procedures:
1-Pull the launching lever back and slip it sideways into notch **four**. For this experiment you will use notch **four** and use it for **all** the launches.

2-Place the start of a tape measure against the front edge of the launcher and carefully extend the tape across the room.

3-A minimum of two people are needed per Launcher. One person fires the Launcher and the other watches where the marble lands. A few launches should be done at each angle to be sure that the data is accurate. It also takes a few times to accurately find the spot where the marble lands. Standing to the side of where it lands helps you in measuring.

4-Put a marble in the end of the barrel and the Marble Launcher is ready to launch.

5- Hold your hand onto the top of the launcher so it doesn't move during launching.

6- Use a pencil to flick the launch pin. **Do not use your finger!**

7- Record the distance the marble traveled to the point of impact. Launch three times per angle setting.

Launch Angle (degrees)	Range to nearest cm	Range to nearest cm	Range to nearest cm	**Average** Range to nearest cm	**Launch Angle (degrees)**	Range to nearest cm	Range to nearest cm	Range to nearest cm	**Average** Range to nearest cm
10					**50**				
15					**55**				
20					**60**				
25					**65**				
30					**70**				
35					**75**				
40					**80**				
45					**85**				

Question 1. Based just on your graph, what specific angle gives the maximum range?_____

Question 2. Suppose you set the Marble launcher to 62 degrees. From looking carefully at just your graph, make a prediction (interpolation) of how far the marble would probably go and write your distance in the space provided.

_____

Setting up your graph: USE PENCIL ONLY!!!!

1. Remember to plot your independent variable along the x-axis and the dependent variable along the y-axis.

2. For this graph, both the x and y axis' begin at zero.

3. For the x-axis the tick marks are multiples of 5.

4. For the y-axis the tick marks are multiples of 100.

5. Number your x and y axis using this information.

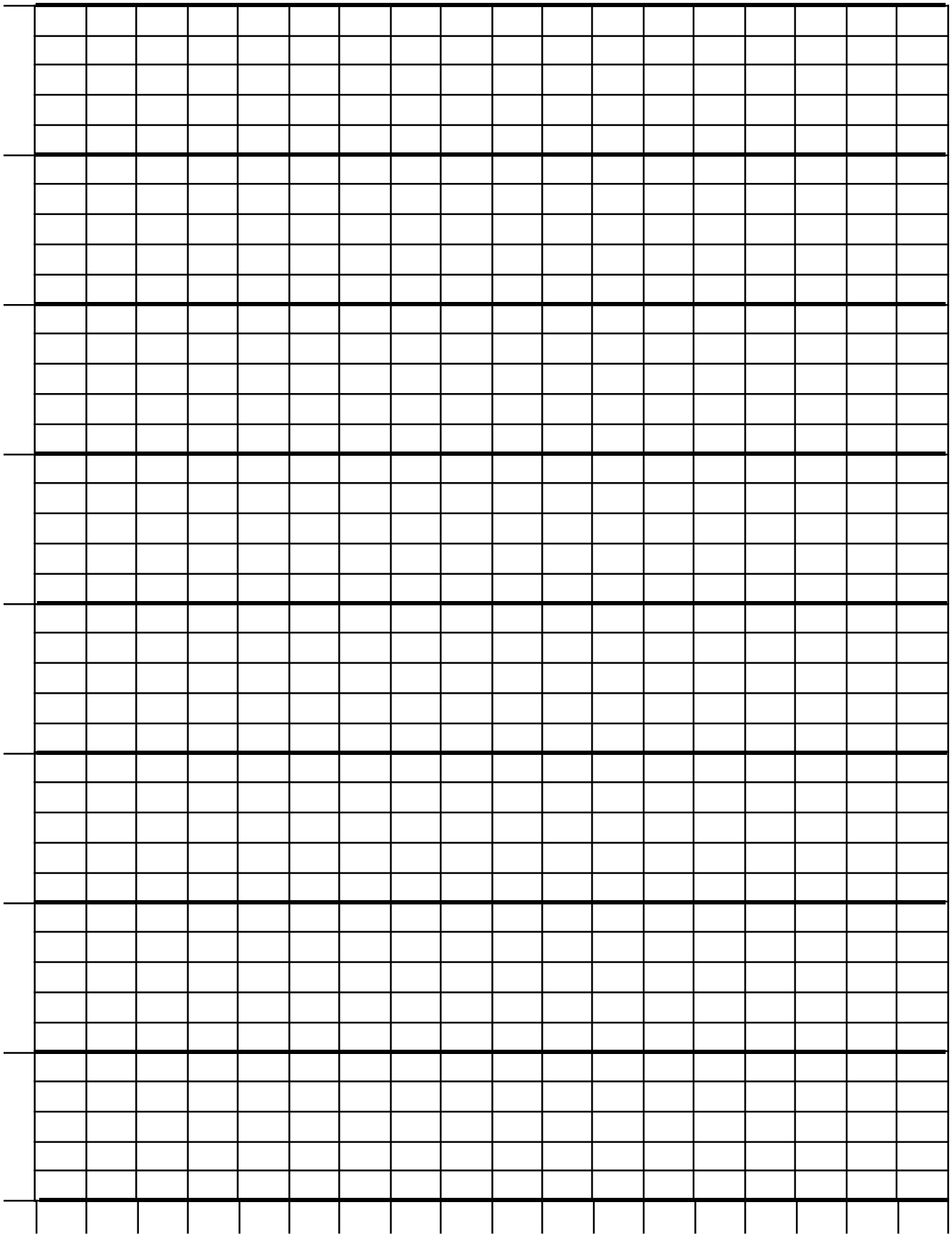
6. Now label each axis with what your independent and dependent variables were for this lab. Include the correct units.

Do NOT create a straight best fit line this time!

Create a line this time that curves through your points.

Make small points for your graph with a small circle around each point like this: ⊙

Title _____



Overall Conclusion: 1-State if your original hypothesis was correct or incorrect. This should be based on the best information collected from the experiment. 2-If it was incorrect, give the correct answer, again based on the best information collected from the experiment. 3-Include a brief numerical summary and comparison of the data collected during the experiment telling how it supports your answer for the hypothesis.

Sources of Error: Identify two things that people may have done incorrectly that would have caused them to get totally different answers from the rest of the class. These errors must be unique, in other words they have not been applicable in previous labs. They must be **new** sources of error. Be **specific** about what might have been done.