

Name _____

Date _____

Lab: Force and Motion - The Ball and Ramp

Problem: Does the height of a ramp affect the force of a ball rolling down the ramp?

Hypothesis: If a ramp is higher then a ball rolling down will have more/less force because _____

Materials: List all materials to be used in your experiment. _____

Variables: Dependent variable (unknown information) _____

Independent variable (known information) _____

Constants (things kept the same for accuracy) _____

Procedure: Follow the steps below to conduct your experiment. Be sure to record all data and any observations during the experiment. Follow all SAFETY rules.

1. Collect and assemble all equipment needed. Draw a diagram of your apparatus below.

2. Calculate the mass of the golf ball and record result in the data table.

3. Place the golf ball on the 30cm mark on the ruler and release it for trial one.

4. In the data table record the distance that the cup moved.

5. Roll the golf ball from the 30 cm mark for two more trials and record each distance.

6. Now release the golf ball from the 20cm mark and record the distance the cup moves. Do this for three trials.

7. Now release the golf ball from the 10cm mark and record the distance the cup moves. Do this for three trials.

8. Repeat steps 2 through 6 for another type of ball. Be sure to record your results.

9. Graph your results.

10. Write your conclusion and summary.

Data:

<u>Mass of ball (g)</u>	<u>Ball Type</u>	<u>Release Height (cm)</u>	<u>Trial</u>	<u>Distance Cup Moved (cm)</u>	<u>Average distance of trials (cm)</u>
	Golf ball	30 cm	1		
	Golf ball	30 cm	2		
	Golf ball	30 cm	3		
	Golf ball	20 cm	1		
	Golf ball	20 cm	2		
	Golf ball	20 cm	3		
	Golf ball	10 cm	1		
	Golf ball	10 cm	2		
	Golf ball	10 cm	3		
		30 cm	1		
		30 cm	2		
		30 cm	3		
		20 cm	1		
		20 cm	2		
		20 cm	3		
		10 cm	1		
		10 cm	2		
		10 cm	3		

Thought Questions:

1. Which release point causes the cup to move the most? _____

2. Did both balls move the cup the most when released from 30cm.? _____

3. Why does the cup move more when the release point is higher? _____

4. How is the answer to question # 3 related to Newton's laws of motion? _____

5. Which ball made the cup move the most? _____ Explain why this ball makes the cup move more than the other ball does. _____

6. According to Newton's Second Law ($F = m \times a$), if the mass of the object is increased, what should happen to the force observed? Write a sample calculation to prove your point. _____

Conclusion: Write a conclusion statement that states: 1. if your hypothesis was correct or not, (support what you say with an example from your data), and 2. what you learned by doing this experiment.

Summary: Write a 3 paragraph summary of the lab using our standard format.