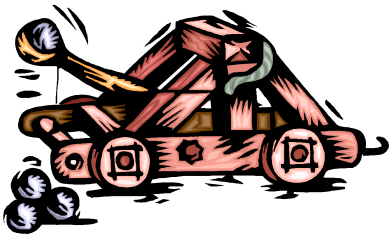
Name: _____ **Date:** _____

Trebuchet Launch Activity – How Far Does It Go? Worksheet

Background



In medieval times, the trebuchet was used as both a weapon and a supply engine because it could launch objects to those in need. The powerful trebuchet has a lever and a pouch attached to hold the objects that will be launched. The object that flies through the air is called a projectile, which travels in a parabolic motion. The formula for the velocity of a flying object is:

Velocity = (the rate of gravity)(the time it takes for a projectile to drop)

The rate of gravity = 32.2 feet/ second

Hypotheses

What object will travel the farthest? Why?

Paper ball because it is the lightest object and lighter objects travel farther than heavier object.

What if the two objects were the same in regards to the variable?

If there were two paper object of the same weight, then the object that was more compact would travel the farthest because of aerodynamics.

Which object would go farther base on shape? Why?

The paper ball will travel the farthest because it is the lightest object.

Predict how far you think each object will travel; label your units used (inches, feet, etc.)

Object	Robot 1	Robot 2 (changed arm length)	Robot 3 (changed arm angle)
Eraser			
Ping pong ball			
Chapstick			
Gum Drop			
Paper Ball			
Tennis Ball			

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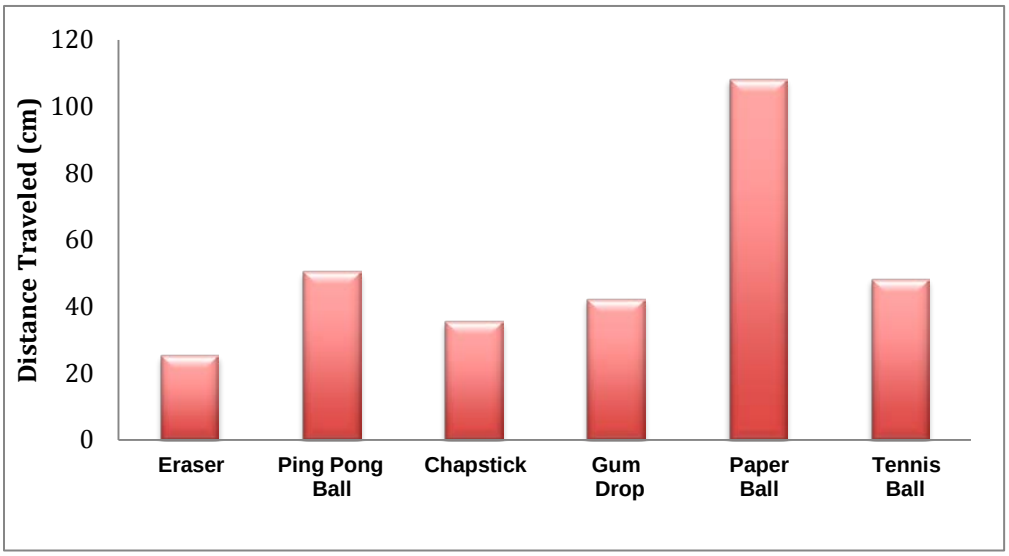
Data Collection

Object	Trial 1	Trial 2	Trial 3	Average
Eraser	23 cm	25 cm	28 cm	25.33333 cm
Ping pong ball	46 cm	52 cm	54 cm	50.66667 cm
Chapstick	35 cm	33 cm	39 cm	35.66667 cm
Gum Drop	40 cm	42 cm	45 cm	42.33333 cm
Paper Ball	100 cm	110 cm	115 cm	108.3333 cm
Tennis Ball	48 cm	50 cm	47 cm	48.33333 cm

Results

Analyze you data by making a bar graph of your results. Label your graph with the objects along the X axis and your distance along the Y axis.



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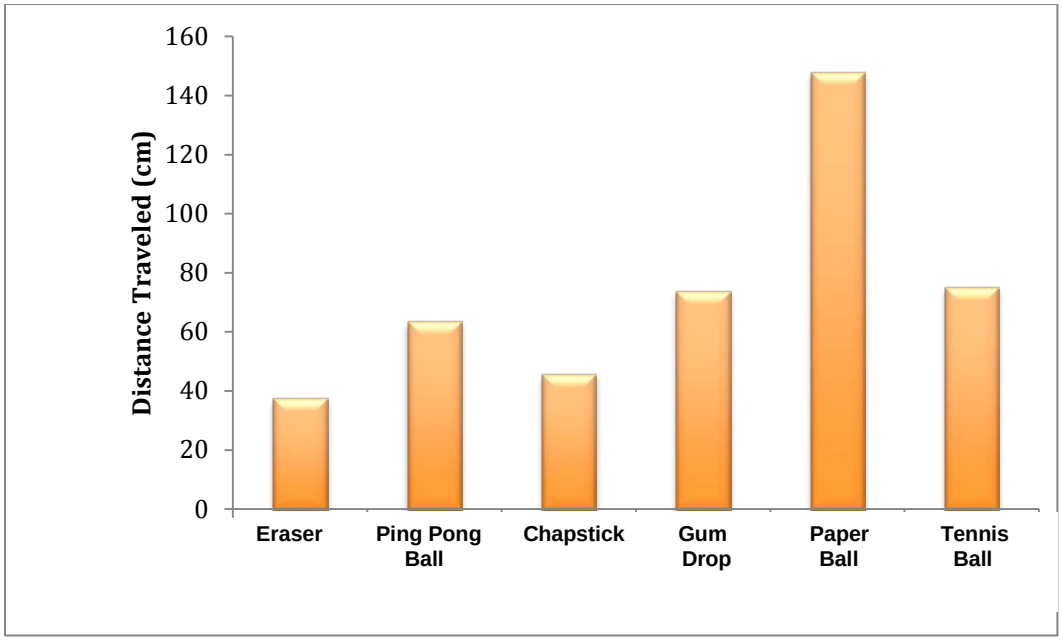
Data Collection 2

Repeat the same experiments with changing the length of the arm.

Object	Trial 1	Trial 2	Trial 3	Average
Eraser	35 cm	40 cm	38 cm	37.66667 cm
Ping pong ball	59 cm	65 cm	67 cm	63.66667 cm
Chapstick	45 cm	43 cm	49 cm	45.66667 cm
Gum Drop	75 cm	70 cm	77 cm	74 cm
Paper Ball	150 cm	130 cm	164 cm	148 cm
Tennis Ball	71 cm	75 cm	79 cm	75 cm

Results 2

Analyze you data by making a bar graph of your results. Label your graph with the objects along the X axis and your distance along the Y axis.



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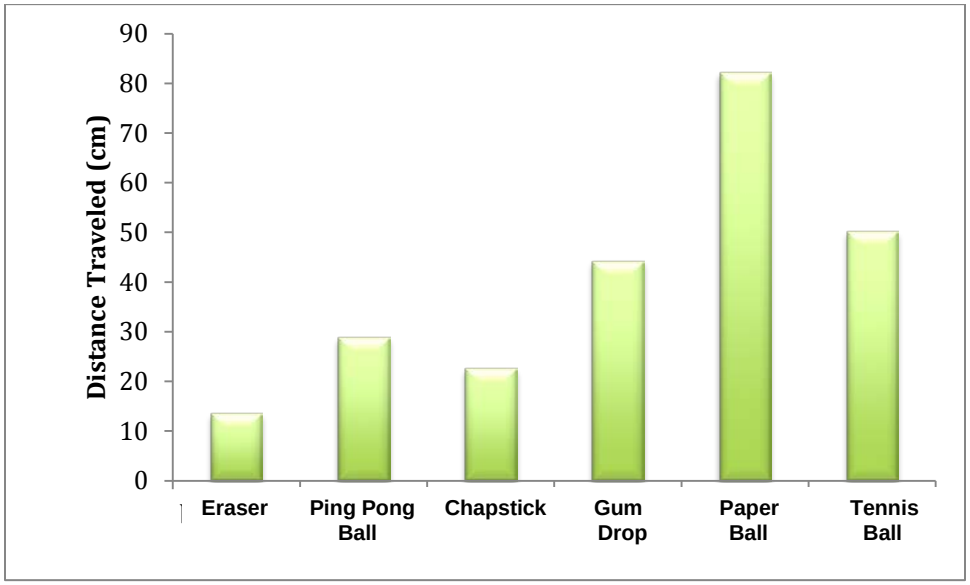
Data Collection 3

Repeat the same experiments changing the angle of the arm.

Object	Trial 1	Trial 2	Trial 3	Average
Eraser	13 cm	12 cm	16 cm	13.66667 cm
Ping pong ball	25 cm	30 cm	32 cm	29 cm
Chapstick	20 cm	23 cm	25 cm	22.66667 cm
Gum Drop	41 cm	45 cm	47 cm	44.33333 cm
Paper Ball	85 cm	80 cm	82 cm	82.33333 cm
Tennis Ball	48 cm	50 cm	53 cm	50.33333cm

Results 3

Analyze you data by making a bar graph of your results. Label your graph with the objects along the X axis and your distance along the Y axis.



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Follow Up Questions / Conclusion

Please explain your results?

What was your hypothesis?

Was your hypothesis correct? Please explain.

How could your experiment be better?

The results show how the weight of the object matters when assessing which object will go the farthest. More specifically, when changing one of the variables, like the length and angles, the resulting distance that the object traveled changes. We were correct in our hypothesis and the experiment may be better if we explored objects with the same weight, but different aerodynamics.