



The Bounciness of Squash Balls

Background:

Many racquet or ball sports are affected by how bouncy the ball is. When bouncy balls get used, they often heat up. Some athletes actually try to heat up the ball for their sport before they begin – such as in squash.

Aim:

To investigate the question:

How will changing the temperature of a rubber ball affect how bouncy it is?

Hypothesis:

Materials:

- Kettle
- Metal tongs
- Stirring rod
- Thermometer
- Ice
- 500ml beaker x1
- Squash ball
- Timer

Method:

1. Using ice and water make up 500ml of water in the 500ml beaker that has a temperature of about 10°C.
2. Place the rubber ball in this water for 3 minutes. Using your metal tongs rod, move the ball around and submerge it so it evenly cools.
3. Set up a measuring tape with 0cm on ground level under a 2m drop point – tape it on the wall with measurements going up the wall
4. Drop the ball from 2-metres high onto a hard surface and record how high it bounces in cm. Record this value in your table.
5. Repeat by dropping the ball again from this height and record the value, then calculate the average.
6. Empty the 500ml baker. Using hot water from the kettle and some water from the tap make up 500ml of water which has a temperature of 20. Drop the ball from 2-meter height after letting it sit for 3 minutes. Drop it twice and record the average.
7. Using hot water from the kettle and water from the tap do the same for at least three more temperatures such as 30°C, 40°C, 50°C, and then 80°C.

Safety:

- Be careful of HOT WATER – use metal tongs to remove ball from hot water.



Results Table:

Temperature (°C)	Height of bounce (cm)		
	Bounce 1	Bounce 2	Average
10			
20			
30			
40			
50			
60			
70			
80			

Discussion and Analysis:

You must make a graph in excel using **temperature** and **average** bounce height.

**hint: you need to make a table in excel with the first column being 'Temperature (°C)' and the second being 'Average bounce height (cm)'.*

- In this experiment what was the:
a) Independent Variable? _____
b) Dependent Variable? _____
c) Controlled Variables (list 3)?
i. _____, ii. _____, iii. _____
- What clear patterns or trends can you see with your data? **(3 marks)**
- Discuss any unexpected results. **(2 marks)**
- Using your graph, and a linear trendline, predict the bounce height at 60°C and 70°C. **(2 marks)**
- What were three possible errors or mistakes that may have affected the reliability of your results? **(3 marks)**
- Suggest two ways you could improve the experiment method to get more accurate results. **(2 marks)**

Conclusion:

- Was your hypothesis supported by your data? Explain. **(2 marks)**
- Explain how your results (findings) might have any real life (sporting) implications? **(2 marks)**
**hint, think of other sports, not just squash.*