



The Effect Of Temperature On The Bounce Of A Tennis Ball

By Vishnu Guha



Goals and Hypothesis

Goals: To figure out how dropping a tennis ball from a height of five feet at five different temperatures affects the bounce of the ball in each situation.

Hypothesis: My hypothesis is that, the colder the ball gets, the lower it will bounce when dropped from five feet. My reasoning is that, heating molecules in an atom makes them move around faster and disperse more. This is why gases are less dense than solids, because the molecules disperse more and move faster in a gas than in a solid. Therefore, the molecules in a tennis ball would bounce higher in a hotter environment because the molecules in the ball would be moving faster, causing the ball to bounce higher. Meanwhile, if a tennis ball gets colder, the molecules in the tennis ball will begin to move more slowly, causing the tennis ball to not bounce as high. Therefore, this is why I think that the tennis ball will not bounce as high the colder the ball gets.



Variables

There are several variables which are important to be identified. First of all, several controlled variables included the temperature of the freezer, which will remain constant throughout the experiment. Other controlled variables include the size and weight of the tennis balls. The independent variable in this experiment is the amount of time the tennis balls are in the freezer, because this will vary depending on the tennis ball. The dependent variable is the amount the tennis ball will bounce, because this is what will be affected by the temperature in the freezer.



Materials

- One standard tennis ball
- One tape measure extending at least five feet
- One freezer
- 3 ft poster board with inch markings written on
- Pencil



Methods

1. Set up a video camera showing the area where the ball will be dropped.
2. Use a ruler or a tape measure to draw all the inch markings up to thirty inches on the poster board. Place this board directly parallel to the wall in the infinity room.
3. Drop a tennis ball which has been left at room temperature for a minimum of 24 hours from a height of three feet above the ground in the infinity room. The ball must be within a distance of one foot of the poster board.
4. Use the poster board with the inch markings to note down the height of the ball right before the ball begins its descent
5. Repeat it two more times to make sure that the results stay accurate.
6. Repeat this process with the three tennis balls after (a) two minutes in the freezer(b) five minutes in the freezer(c) ten minutes in the freezer and(d) thirty minutes in the freezer. Make sure to give the ball at least 24 hours in room temperature after each experiment.

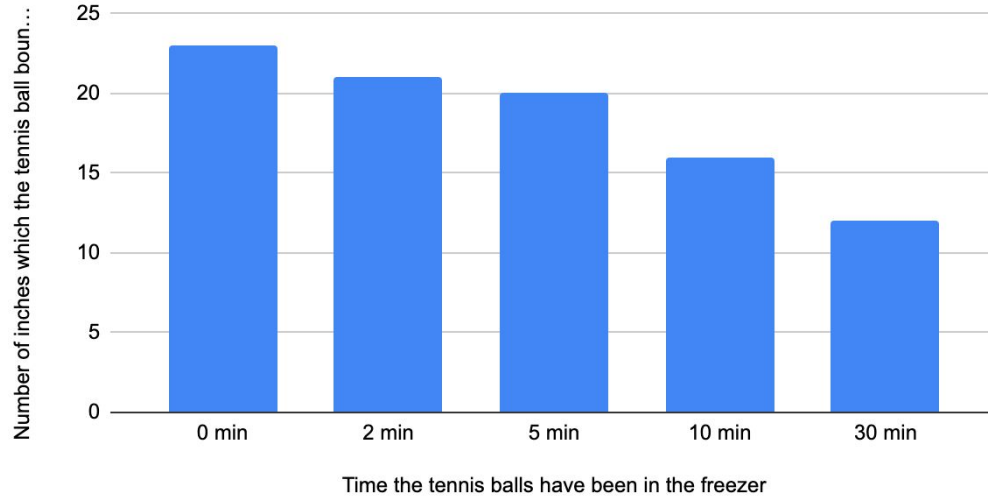


Data

| Time the tennis ball has been in the freezer | Number of inches in bounce when dropped from three feet. |
|--|--|
| 0 min | 22,22,23 = average of 68/3 |
| 2 min | 21,21,21 = average of 21 |
| 5 min | 19,20,19 = average of 59/3 |
| 10 min | 16,17,15 = average of 16 |
| 30 min | 12,12,13 average of 38/3 |

Data Analysis

Number of inches which the tennis ball bounces vs. Time the tennis balls have been in the freezer





Summary Of The Project

The final results of the project were that the tennis ball bounce lower the longer the tennis ball was left in the freezer. Therefore, my hypothesis was proven correct by this experiment.



Changes I would make in the future

There are several changes I would make if I redid the project. First of all, I would try to use a wider variety of temperatures. I could not get a conclusive answer to when the ball would lose all of its bounce after how long in the freezer. Therefore, in the future, I would try keeping the tennis balls in the freezer for longer periods. Secondly, another change which I could make in the future would be that I would