CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
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Project Number
J2111

Project Title
The Temperature Effects on Various Balls

Abstract

Objectives/Goals
Objective or goal: The purpose of this project is to determine if temperature, construction, and material of a ball affects its bounce height.

Methods/Materials
Materials and methods: To conduct these experiments I used ping pong balls, tennis balls, golf balls, rubber balls, and racquet balls (6 balls of each type). To perform my tests, I took three of each type of ball and placed them in my freezer overnight. The next day I took one ball at a time out of the freezer using tongs. I measured the temperature of the ball using an infrared thermometer and placed it in a wooden stand that had a measuring tape on the back side. I set up my video camera on a tripod and recorded when the ball dropped out of the stand and how high it bounced. I repeated this three times for each ball. To get accurate height, I connected the video camera to my TV and recorded the maximum height on the measuring tape.
I repeated this experiment three times.
To measure the bounce height of warm balls, I built a heater using a styrofoam cooler, a hair dryer, and duct tape. I placed three balls of each type in the heater and turned on the hair dryer. I repeated the bounce measurement methods for these warm balls. I also repeated the experiment using three balls of each type that had been sitting at room temperature.

Results
Results: The results of my experiment show that the hotter the ball, the higher it will bounce, with a gradual increase in bounce height with a mean of 31.43" for cold balls , 38.64" for warm balls, and 40.3" for hot balls. The balls of different construction (hollow or solid) also acted the same with increase bounce height when temperature rises. When material changed from rubber to plastic or a rubber-plastic combination, the balls did not follow the expected bounce pattern.

Conclusions/Discussion
Conclusions/discussion: My hypothesis before the experiments was that the warmer the ball the higher it will bounce regardless of material and construction. After results it indicated that I was correct on construction and temperature, but the data for type of material did not support my hypothesis. In the future I would like to repeat this experiment using a larger number of balls made from materials other than rubber.

Summary Statement
The temperature effects on bounce height of various balls of diffrent material and construction (hollow or solid)

Help Received
Mother helped suppy all materials needed to do my project; My Father helped build wooden measuring stand, heater and also helped out in test conduction; Science teacher Mrs. Griffith who overlooked my project to give me tips and edits on project data and writing.