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7th Grade Science
Science Fair Logbook

Logbook

Title:

- "Pump It Up": How ball air pressure affects the distance a volleyball is served.

Objective:

- In this experiment I will test how various air pressures in a volleyball affect the distance it travels when it is served.

Statement of the Problem:

- Volleyball players play with balls that vary in internal pressure. This can easily be determined by how hard or soft the balls feel when you squeeze the ball. The purpose of this experiment is that it will help volleyball players determine which volleyball pressure is ideal for speed and distance. I want to do this experiment because I play school and travel volleyball and I want a competitive edge when playing and have the confidence that the ball I am playing with will perform as expected.

Dependent and Independent Variable:

- Independent- The amount of air pressure pumped into the volleyball
- Dependent- The distance the ball travels
- Control- The same size or the type of ball that it used. Same Volleyball server, Same type of volleyball serve, Same maximum effort, Same starting position, Same location of start, Same environment conditions- no wind,

Hypothesis:

- My hypothesis is that a volleyball with more air pressure will travel farther when it is served because a harder ball does not squish as much when it is hit so more of the hit makes the ball move forward.

Materials:

- 1 Volleyball (official size 5 volleyball made of synthetic leather), air pump, pressure gauge, tape measure,paper, pencil, a volleyball court, and a net

Procedures:

1. Pump ball to 3.4 psi
2. Serve ball overhand over the net
3. Measure the distance from the net perpendicular to where the ball hits the ground; record the distance
4. Serve the ball and measure the distance four more times
5. Pump ball to 3.8 psi
6. Repeat steps 2-4
7. Pump ball to 4.2 psi
8. Repeat steps 2-4
9. Pump ball to 4.6 psi
10. Repeat steps 2-4
11. Pump ball to 5.4 psi
12. Repeat steps 2-4
13. Find the average of the distances at 3.4 psi; record the average distance
14. Find the average of the distances at 4.2 psi; record the average distance
15. Find the average of the distances at 4.6 psi; record the average distance
16. Find the average of the distances at 5.4 psi; record the average distance
17. Identify the average that is the longest distance over all

Results:

The results of this experiment showed the averages of the distance of the ball with different air pressures.

- 3.4 PSI: 45 ft, 50 ft, 44 ft, 57 ft, 59 ft

  Average: 51 ft.

- 4.2 PSI: 46 ft, 51 ft, 57 ft, 59 ft, 54 ft

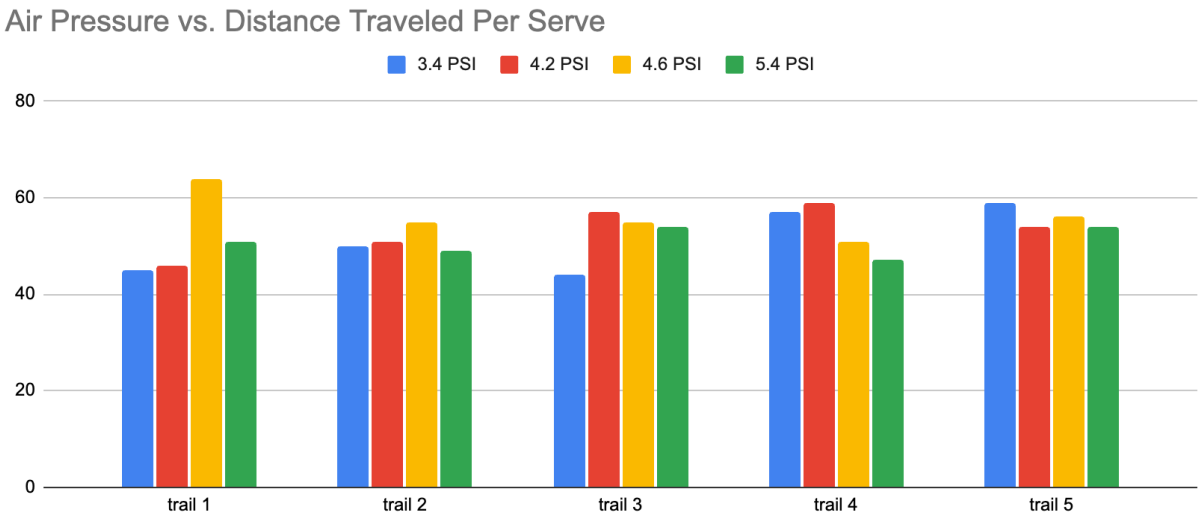
  Average: 53 ft.

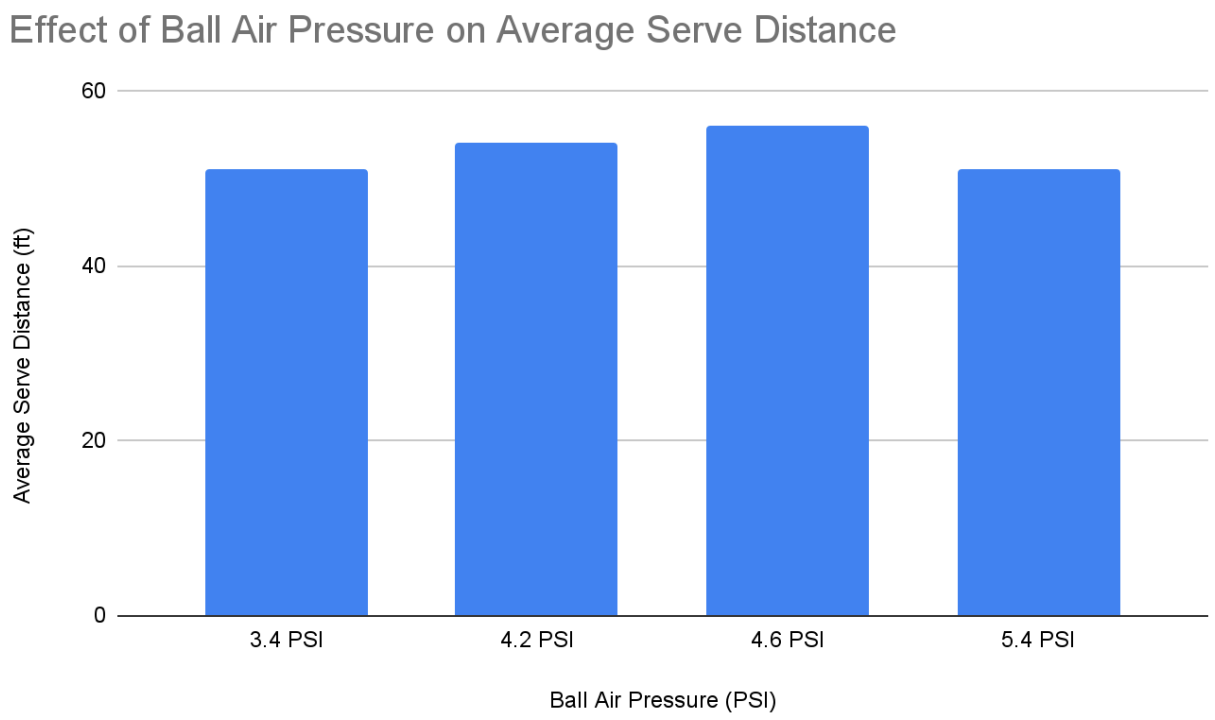
- 4.6 PSI: 64 ft, 55 ft, 55 ft, 51 ft, 56 ft

  Average: 56 ft.

- 5.4 PSI: 51 ft, 49 ft, 54 ft, 47 ft, 54 ft

  Average: 51 ft.





Conclusion:

The objective of this experiment was to find out the effects of air pressure on distance when served. Yes, I did accomplish this objective by putting different air pressures in a volleyball and serving it. My hypothesis for this experiment was that if I increased the air pressure in the ball, then the ball will go farther when hit. The data showed that the relationship between air pressure and distance was not linear but rather bell curved. Less distance was seen on the extreme low and high pressures and the furthest distance was seen in the middle pressures. So my hypothesis was incorrect. The results of this experiment told me that the pressure recommendations on the ball are better with distance when served. The only thing I would have done differently would have been taking longer breaks for my arm to rest. This may have affected my results.