Name(s)

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Project Number

J0107

Project Title

Pythagoras, Power, and Pennies

Abstract

Objectives/Goals

My objective is to prove the lateral components of force and the Pythagorean Theory by using common items such as a fan and a skateboard. My hypothesis is the following: that when the fan is at 90 degrees it will be exerting the most force and pounds of pressure, when it is at 45 degrees it will be exerting .707 times the force at 90 degrees because the Pythagorean Theory is in effect, and when the fan is at 0 degrees it will not be exerting any force or pounds of pressure.

Methods/Materials

I made the skateboard-fan apparatus first. Then I attached fishing wire to the back of the skateboard and tied the other end of the wire to a plastic water bottle cut in half that was filled with pennies which was hung over the edge of a table. When I turned on the fan and it did not go forwards or backwards then I weighed that wire, half bottle, and pennies. That provided the pounds of pressure at 90 degrees and I did the math from those figures.

Results

The results were superior. They worked just as planned. At 90 degrees, the skateboard lifted 3 ounces, or 33 pennies, at 60 degrees it lifted 2.6 ounces or 28 pennies, at 30 degrees it lifted 1.5 ounces or 16 pennies, and at 45 degrees it lifted 2.12 ounces, or 23 pennies. The multiplication is as follows, 3 x .707 =2.12 and 33 x .707 =c. 23, 3 x .866=2.6 and 33 x .866= c. 28, and 3 x .5=1.5 and 33 x .5=c. 16.

Conclusions/Discussion

My experiment worked out how I thought it would and it also proved the Pythagorean Theory. My data supports my hypothesis because everything in my hypothesis corresponds to everything that turned out to be the results of the experiment. I can understand everything, except for that I still do not fully understand how at 45 degrees it can be .707 times 90 degrees, but since I proved it with math and in the actual experiment, it worked. To better my understanding, I could use the same skateboard-fan, but have a spring tied to the back of the skateboard and a wall, and do a very complicated math problem to figure out the force exerted.

Summary Statement

My summary is to prove the Pythagorean Theory and the lateral components of force by using common items such as a skateboard and a fan.

Help Received

My father helped me build the skateboard-fan; Dr. CDR Hamilton reminded me of the Pythagorean Theory.