CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
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Project Number
S1917

Project Title
Detecting the Coriolis Effect in a Hose

Abstract

Objectives/Goals
The objective is to determine if the Coriolis effect can be detected by its influence on water flowing through a coiled hose in a rotating frame of reference.

Methods/Materials
Trials were conducted with a 30 meter hose coiled in a clockwise direction and with it coiled in a counterclockwise direction. For each configuration, it was put in three frames of reference: rotating clockwise, rotating counterclockwise, and stationary. Water was siphoned through the hose, with siphon head consistent for all trials, for 810 seconds for each combination of coil direction and frame of reference. The amount of water siphoned during the 810 seconds was used to calculate the siphon rate and evaluate its dependence on the interaction between coil direction and rotating frame of reference.

Results
When the rotation was such that the Coriolis force was in the direction to accelerate the water in the same direction as the hose was coiled, the siphon rate increased by approximately 8.7% over the no rotation case. When the Coriolis force was in the opposing direction, the siphon rate decreased by about 4.6% from the no rotation case. Results were consistent for both hose coil directions.

Conclusions/Discussion
The Coriolis effect is one of the most important factors affecting weather on Earth. However, most phenomena affected by the Coriolis effect from Earth#s rotation are on a scale of kilometers, making measurement difficult on a small scale. This experiment showed that by greatly increasing the rate of rotation of the frame of reference, the Coriolis effect can be significant on a much smaller scale. It was shown that under these conditions, the Coriolis effect can increase the flow of water through a coiled hose as it steers the water in the direction of the hose.

Summary Statement
This project evaluates if the Coriolis effect can be detected by its influence on water flowing through a coiled hose in a rotating frame of reference.

Help Received
My dad helped with the set-up, measurement and analysis.