CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
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Project Number
J0102

Project Title
Guilty of Turbulence!

Abstract

Objectives/Goals
The purpose of my project was to determine whether or not pipes with different geometrical shapes, yet with identical cross-section areas will conduct water at the same rate.
I hypothesized that my different geometrical shapes will cause different turbulence patterns in my pipes, therefore affecting the flow rate of the water.

Methods/Materials
I equipped the bottoms of 5 identical water containers with 5 drainage pipes of different geometrical shapes, with a constant cross-section area.
My setup allowed me to pour the same volume of water under the same conditions into each of my 5 containers, and measure the time it took for the different pipes to drain the water.

Results
My circular pipe conducted the water the fastest. The second fastest was my star-shaped pipe, followed by my square and my rectangular pipes. The slowest drainage occurred through my triangular pipe.

Conclusions/Discussion
I observed that the polygon with most sides conducted the water the fastest, my circle being considered a polygon with an infinite number of sides.
And the flow rate decreased with the decreasing number of sides of my shapes.

Summary Statement
How will the cross-section shape of a pipe affect the flow rate of water through it?

Help Received
My father helped me cut the plexiglass to built the different geometrical shaped pipes.