



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) Alexandra J. Kimball	Project Number J0117
Project Title Science Down the Drain	
Objectives/Goals The objective of this experiment was to determine which variables affect how fast water flows through a pipe. I believe that many variables including the size of the pipe, the height and the pipe path will have an effect.	
Abstract Methods/Materials I built a 6-1/2 foot tall adjustable test stand using two copper pipes mounted vertically into a wooden base. Another piece of wood that could slide up and down on the pipes held one-liter bottles mounted upside down. Different sized vinyl pipes were hot-glued into holes made in the bottle caps. The pipes were squeezed closed with clamps so each bottle could be filled through a hole cut in its bottom. The tests started when the clamp was removed. I used a stopwatch to time how long it took the water level to drop between two lines drawn on the side of the bottle. Each size pipe was tested at three different heights using straight pipes and at one height using angled and zigzagged pipes. Each test was run three times and the average time was used.	
Results The water drained quicker with the larger pipes. The height of the tubes made only a little difference in how fast the water flowed. When the pipe was higher, the water flowed faster. The speed difference was more noticeable with the smaller pipes. The water slowed down when the pipes were bent and slanted but I couldn't predict how much it would slow down. The water flows fastest when the pipe is vertical.	
Conclusions/Discussion The graph of my data shows that when you double the area of a pipe the water will drain twice as fast. My data also showed that water height has a small effect on water flow but bends in the pipe could have a larger effect. With the right data and more accurate tests, it might be possible to write an equation that could predict the exact drain times.	
Summary Statement This experiment tries to determine how fast water drains through pipes.	
Help Received My step dad helped build the test stand and print out the graphs.	