



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

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Project Title Bottle Rocket Blast-Off	
Objectives/Goals To demonstrate Newton's third law of motion: That every action has an equal and opposite reaction. Pressurized water & air creates a non-polluting source of transportation by expelling from the vessel they are in and creating powerful propulsion.	
Abstract	
Methods/Materials 1.Fill a 1liter soda bottle 1/5 (a 1:4 ratio of water to air) full of water. 2.Fit onto quick release. 3.Pressurize with bike pump to 35 Pounds Per Square Inch (PSI). 4.Release using string tied to quick release. 5.Monitor height on scale. 6.Repeat with different ratios of water to air & PSIs of 50 & 70. 1.1liter soda bottle; 2.Quick release fittings; 3.5 foot rubber hose; 4.Bike valve; 5.Masonite; 6.PVC pipe; 7.Metal bracket; 8.String; 9.Drill; 10.Screws; 11.Screw driver; 12.Tool bench; 13.Pressure fittings; 14.2 in. by 4 in. wood.	
Results At 35 PSI, a 1:4 water to air ratio launched the rocket the highest, at 4.88 meters. At 50 PSI, a 0:1 water to air ratio launched the rocket the highest, at 5.79 meters. At 70 PSI, a 1:4 water to air ratio launched the rocket the highest, at 8.23 meters. Our hypothesis, that a 1:2 ratio of water to air would launch the rocket highest, was inaccurate. It actually took less water and more air.	
Conclusions/Discussion This data shows us that pressurized water and air, varied amounts suitable to the vessel, can propel the vessel a long distance. It is important to have enough water to propel the vessel with enough force while not having too much water that will weigh the vessel down. The objects of this project were met. We discovered that the best water to air ratio to propel the rocket highest is 1:4. Further experiments could be done by increasing the size of the vessel or the weight being propelled. In order to discover if this method could be used as a means of transportation, the experiments should use a heavier, larger vessel and larger amounts of water. The speed of the vessel should also be observed. If we were to improve the validity of our project, we would use a more precise measuring device, such as launching the rocket at a ninety-degree angle next to a vertical board labeled every meter. Also, video-taping the launch would let us review the experiment and slow it down so we could see the exact height the rocket reached.	
Summary Statement To show how to propel a vessel using fuel and other controls such as size and the amount of fuel and pressure	
Help Received Father helped with materials and construction	