

Water Rockets



Containment Vessels

- 2L pop bottle (or similar)
- FTC Tube (fluorescent tube cover)
- Fiberglass HPR airframes



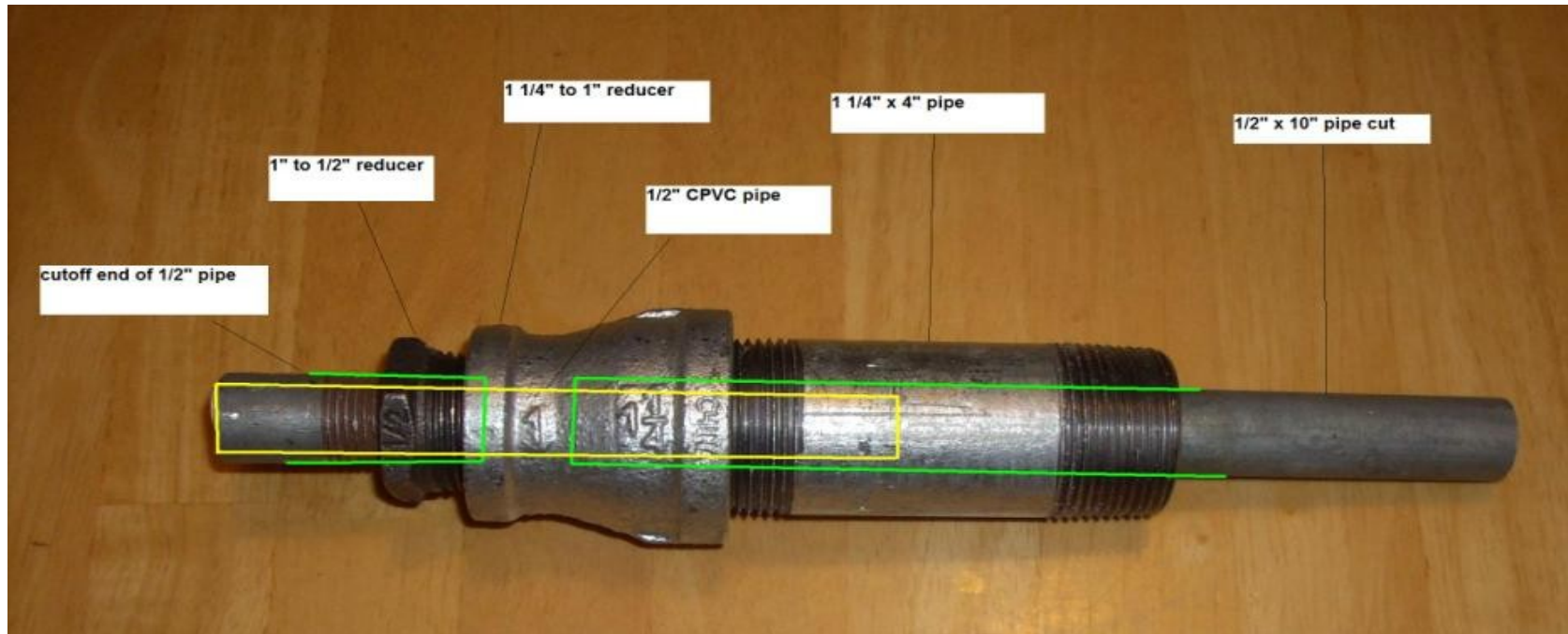
FTC Construction Method

Creating a Mandrel

- Shrink the nozzle of a pop bottle over a mandrel to fit the ID or OD of an FTC
- Use 1/2" Sch40 PVC to center the nozzle



FTC Construction Method Mandrel #2



Creating a Mandrel- Casting

- Plaster of Paris



http://cullytechnologies.com/demo/h2orockets/ftc_mould.php

PVC Mandrel

- 3/4" coupler + 3/4" to 1/2" PVC reducer



Gluing the Endcap into the FTC

- Glue: PLP Premium Construction Adhesive
- Install both endcaps at once and use a piece of 1/2" PVC to center them.



Finished FTC Endcap

- Pop Bottle Nozzle Shrunk and glued onto OD of FTC
- Glue is PLP Premium Construction Adhesive



Spliced Water Rockets

- Connect Two or more bottles end to end



Splicing Pop Bottles

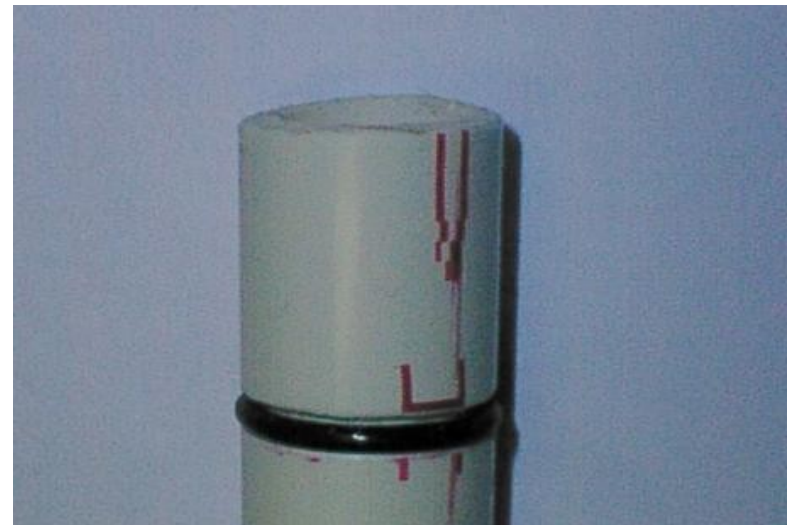
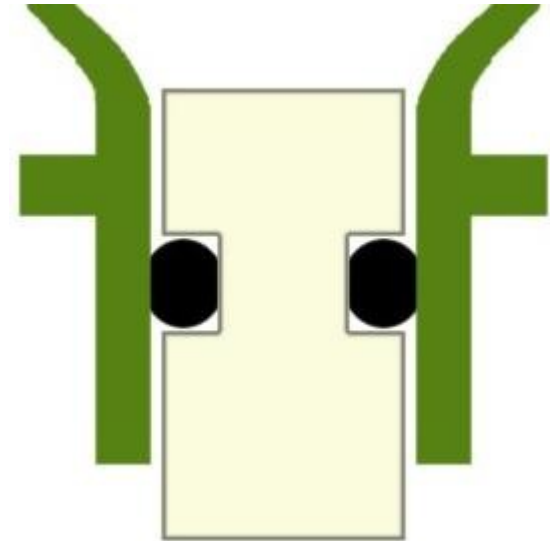
- Cut two bottles in half and butt join them
- Reinforce with sleeve from a third bottle



Launch Rod O-ring Groove

- O-ring seals the nozzle against the launch rod

Bottle on Launcher
Cross Section



Clark Cable “Cable Tie” Launcher

- Cable Tie Head secures the lip of the pop bottle
- Cable Ties restrained by a moveable collar



Clark Gable "Cable Tie" Launcher



Kevin's H2O Rockets

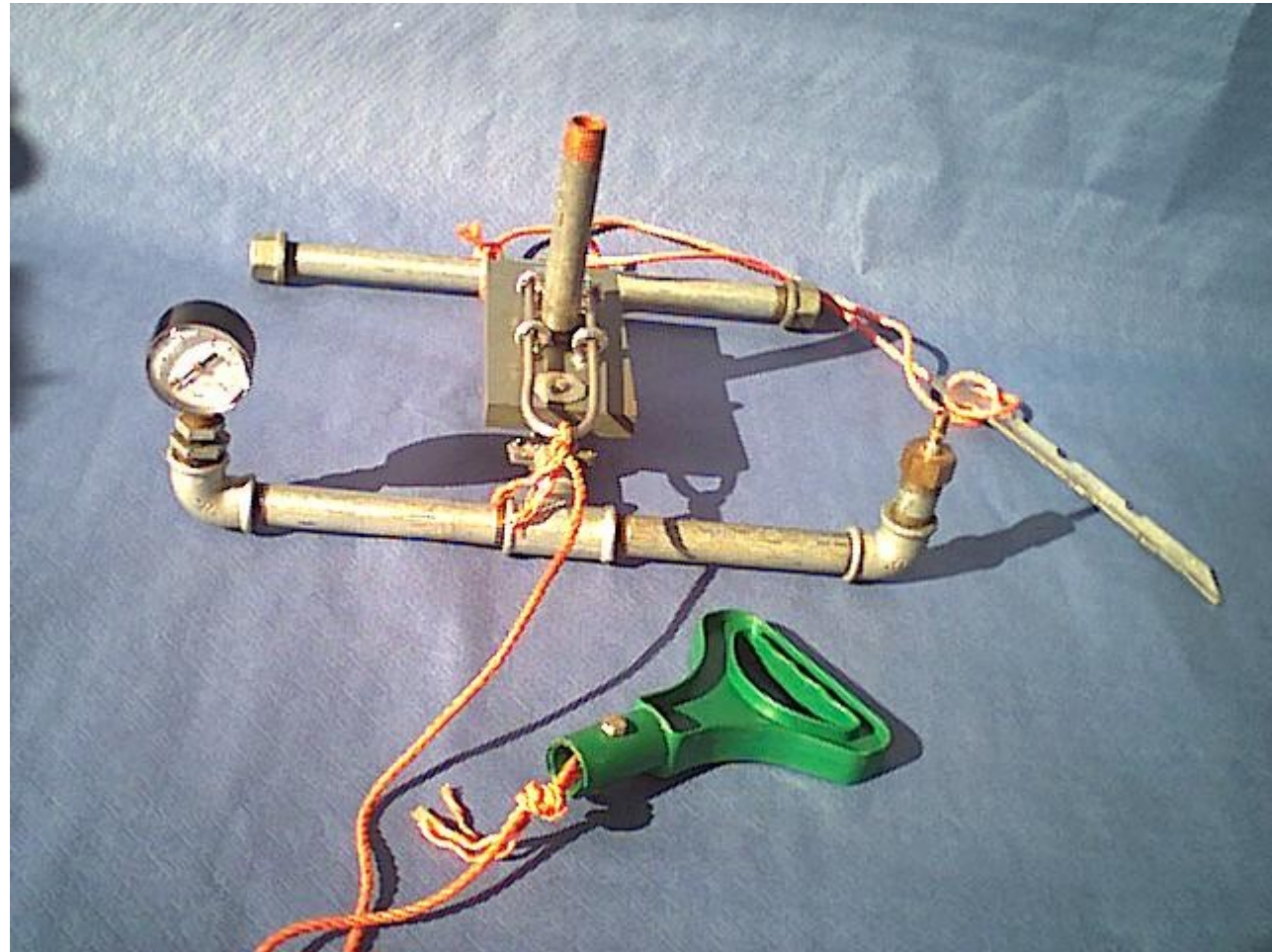


Kevin's H2O Rockets

Garden Hose Quick Release Launcher



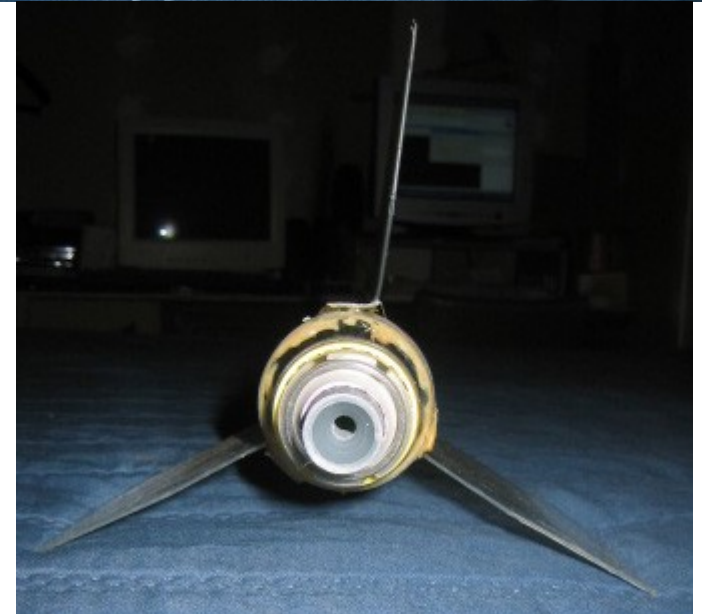
U Pin Launcher



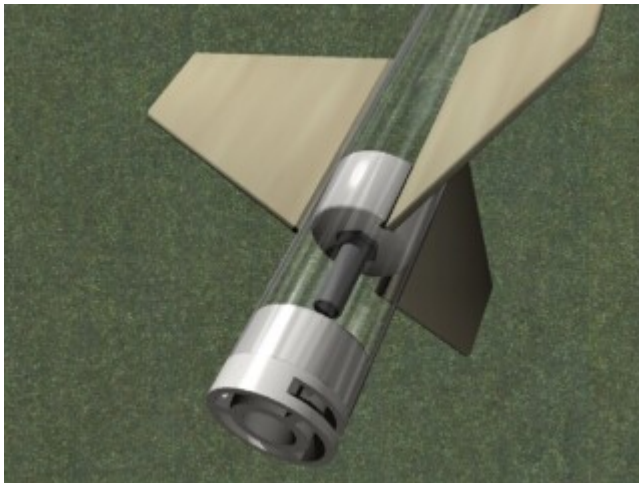
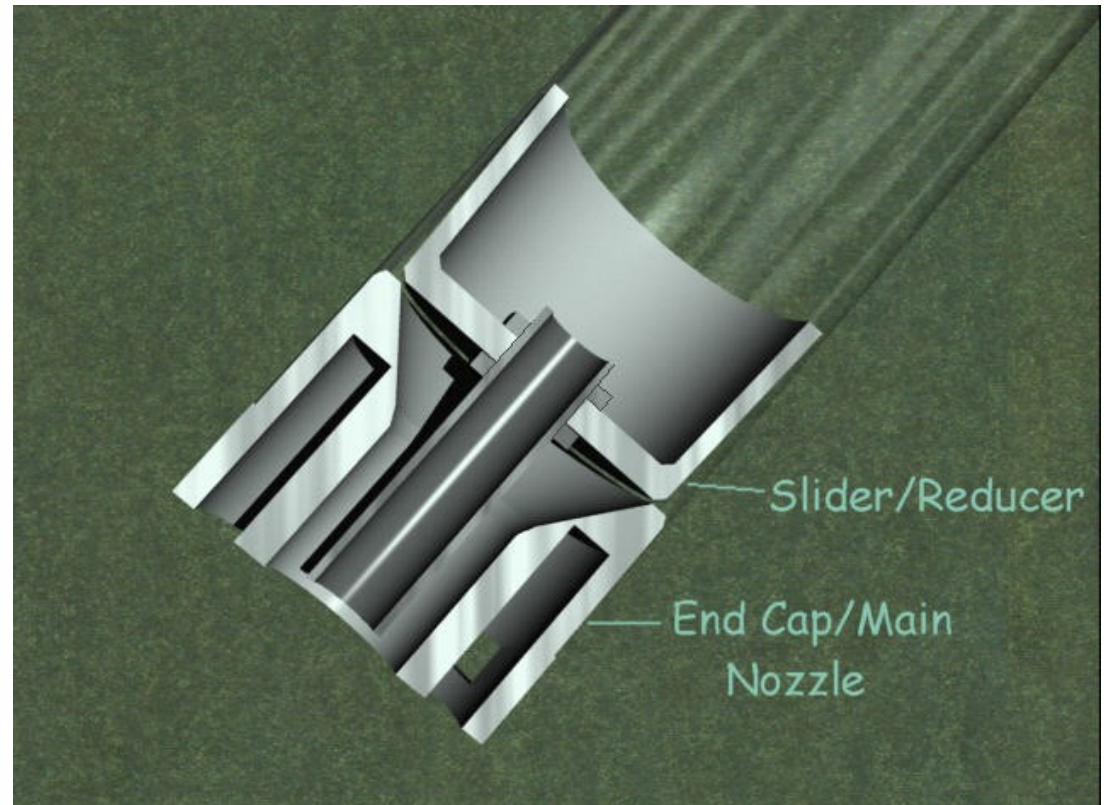
http://users.skynet.be/willaert/WR/launcher_2.htm

Tee Nozzle

- Tee nozzle slides down into pop bottle endcap and reduces effective nozzle diameter
- Increased Impulse

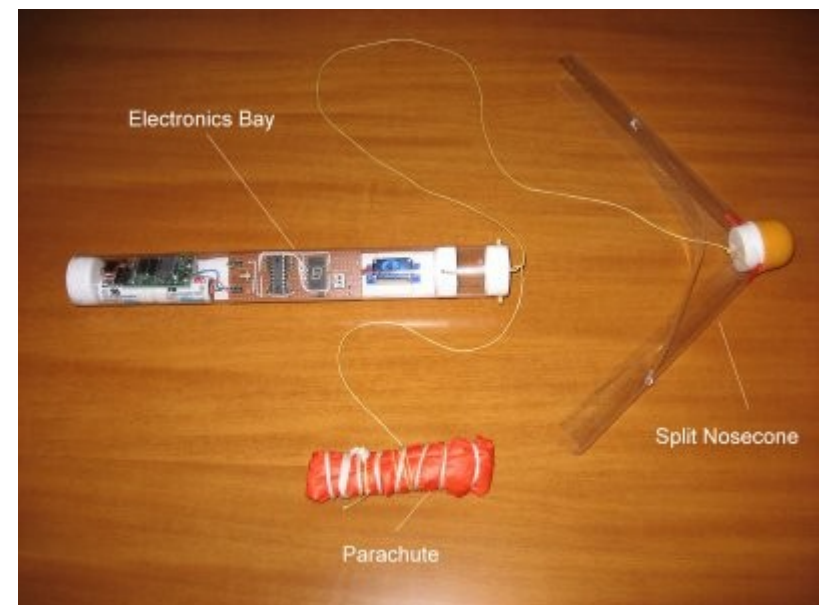
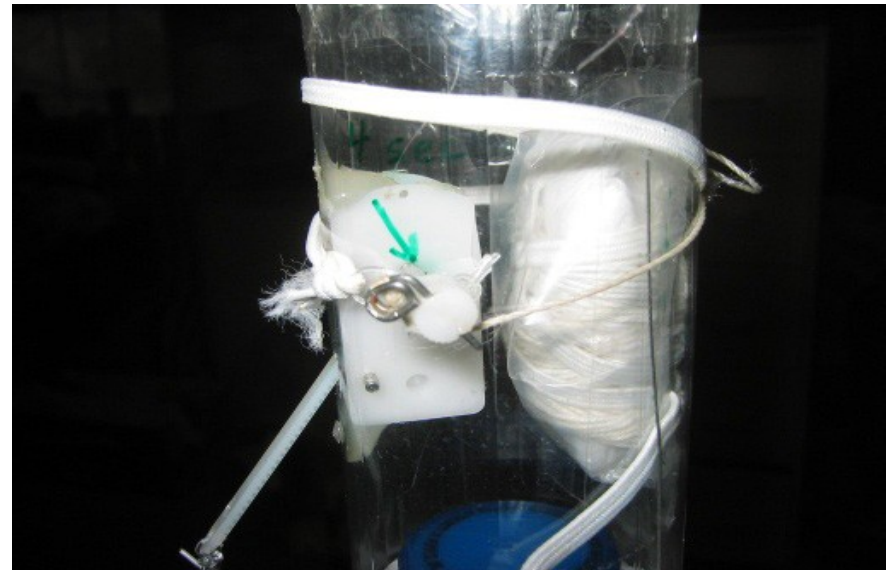


Tee Nozzle



Recovery Methods

- Backsliding
simple, works well on long FTC rockets
- Parachute
use Tomy Timer air speed flap release mechanism
- Electronic altimeter + deployment mechanism



Two Stage Mechanisms

- Crushing Sleeve Mechanism
- Electromechanical Staging
- Katz Stager



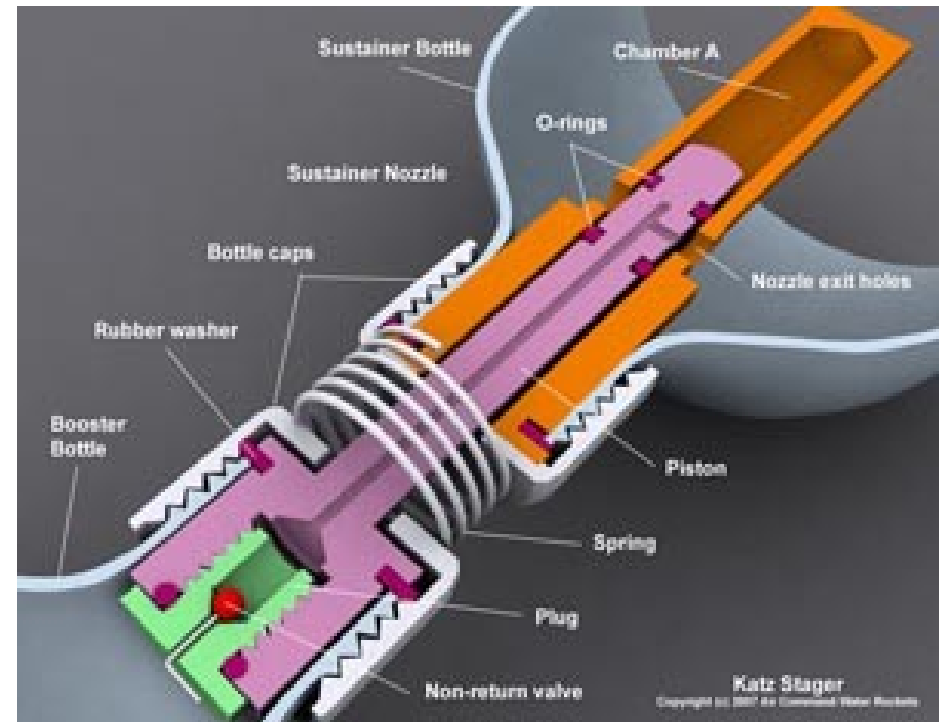
Crushing Sleeve

- See link for details including parts labels



<http://grosse.is-a-geek.com/paul/wrhelp44/2stsc.html>

Katz Stager

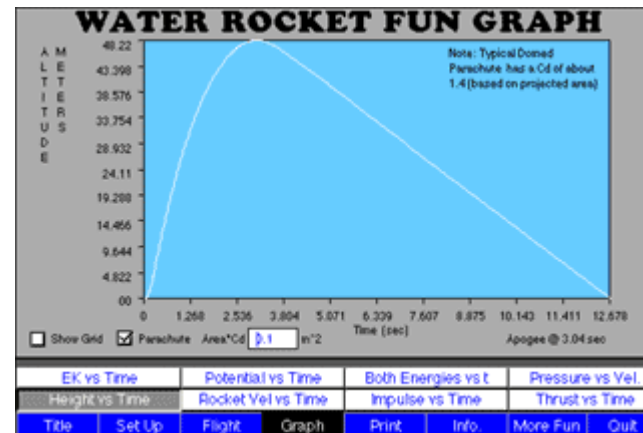


<http://www.aircommandrockets.com/day51.htm>

Simulators

- Clifford Heath Simulator
- Dean's Benchtop Simulator
- Seeds Simulator

WATER ROCKET FUN SETUP				
GRAVITY <input type="radio"/> None <input type="radio"/> Sun <input type="radio"/> Mercury <input type="radio"/> Venus <input checked="" type="radio"/> Earth <input type="radio"/> Moon <input type="radio"/> Mars <input type="radio"/> Jupiter <input type="radio"/> Saturn <input type="radio"/> Uranus <input type="radio"/> Pluto	FLUID IN ROCKET <input type="radio"/> Alcohol <input type="radio"/> Mineral Oil <input checked="" type="radio"/> Water <input type="radio"/> Glycerin <input type="radio"/> Mercury	DRAW COEFFICIENT <input type="radio"/> Very High <input type="radio"/> High <input checked="" type="radio"/> Medium <input type="radio"/> Low Value: 0.25	BOTTLE SIZE <input checked="" type="radio"/> 2 Liter <input type="radio"/> 1 Liter <input type="radio"/> 20 oz <input type="radio"/> 16 oz <input type="radio"/> TOY Rocket	Water Amount Percent 70
CALCULATIONS <input type="radio"/> High Accuracy! Slower Calc Speed <input checked="" type="radio"/> Med. Accuracy! Med. Calc Speed <input type="radio"/> Low Accuracy! Fastest Calc Speed		AIR DENSITY <input checked="" type="radio"/> Sea Level <input type="radio"/> Mount Everest		Bottle Pressure (PSI) 100
ATMOSPHERE PRESSURE <input checked="" type="radio"/> Sea Level <input type="radio"/> Mount Everest		Extra Mass (Payload & Fins) 0.12 Kg Launch Tube: 0 m Temp: 20 C		
Title Set Up Flight Graph Print Info More Fun Out				



Water Rocket References

- Water Rocket Association

