Water Rockets

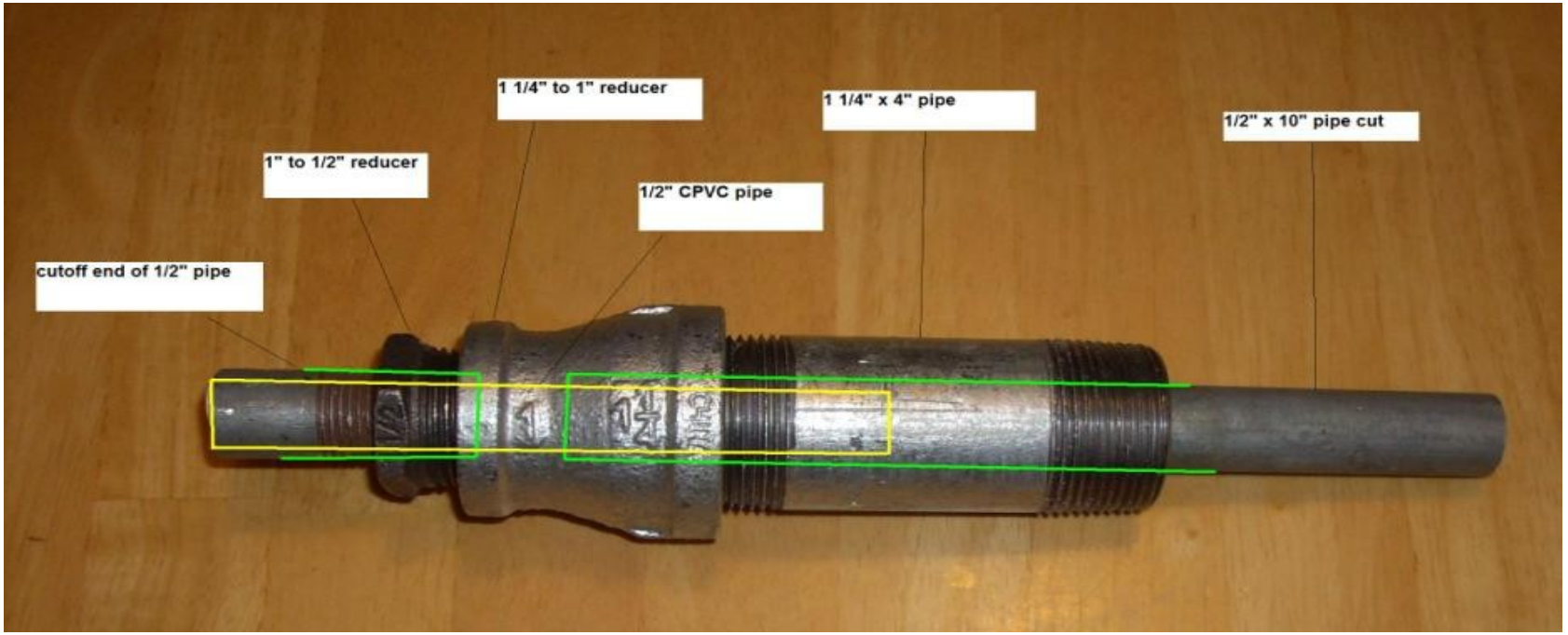
Containment Vessels

- 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



http://www.waterrocketpop.com/ftc_assembly1.htm

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.

http://www.waterrocketpop.com/images/ftc/CustomMold17.JPG

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

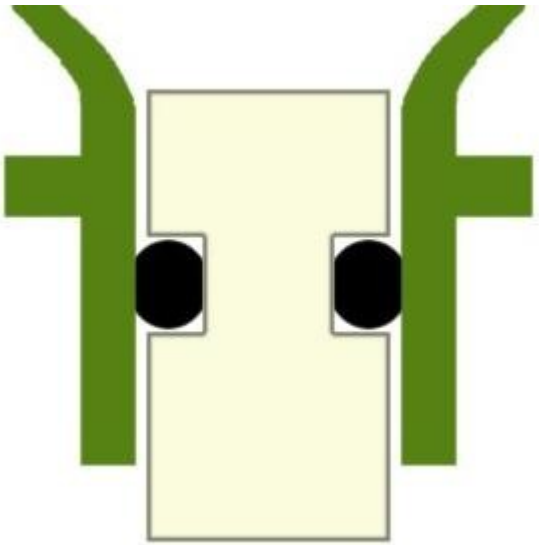
Splicing Pop Bottles

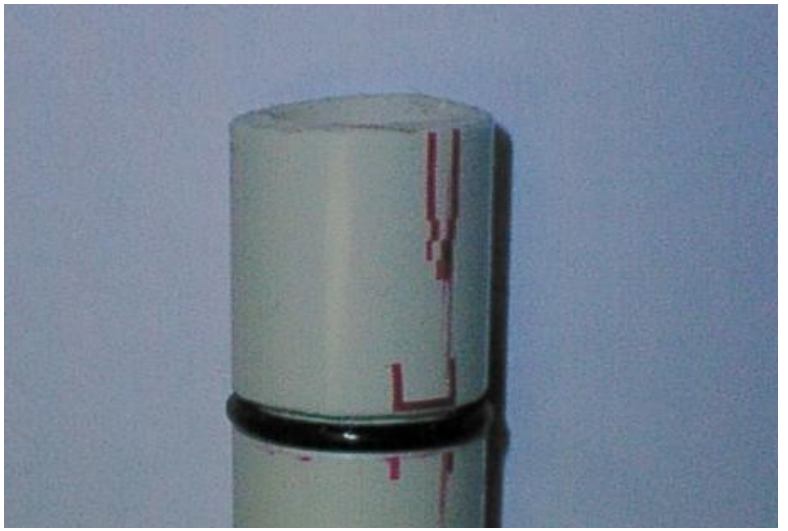
- Cut two bottles in half and butt join them
- Reinforce with sleeve from a third bottle

Launch Rod O-ring Groove

- O-ring seals the nozzle against the launch rod

Bottle on Launcher
Cross Section



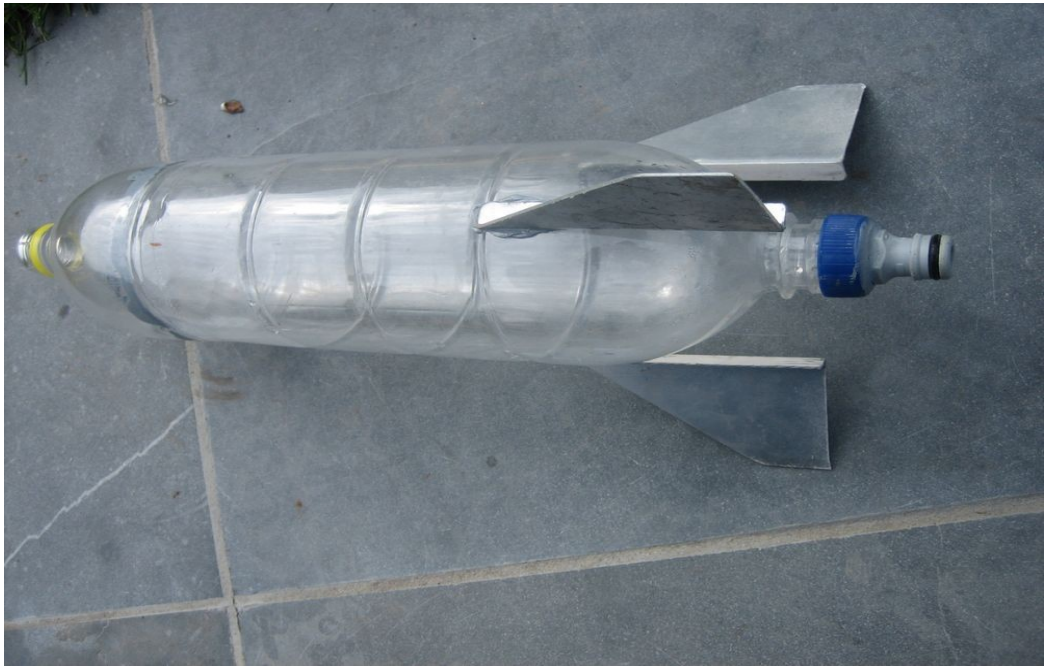


Clark Cable “Cable Tie” Launcher

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

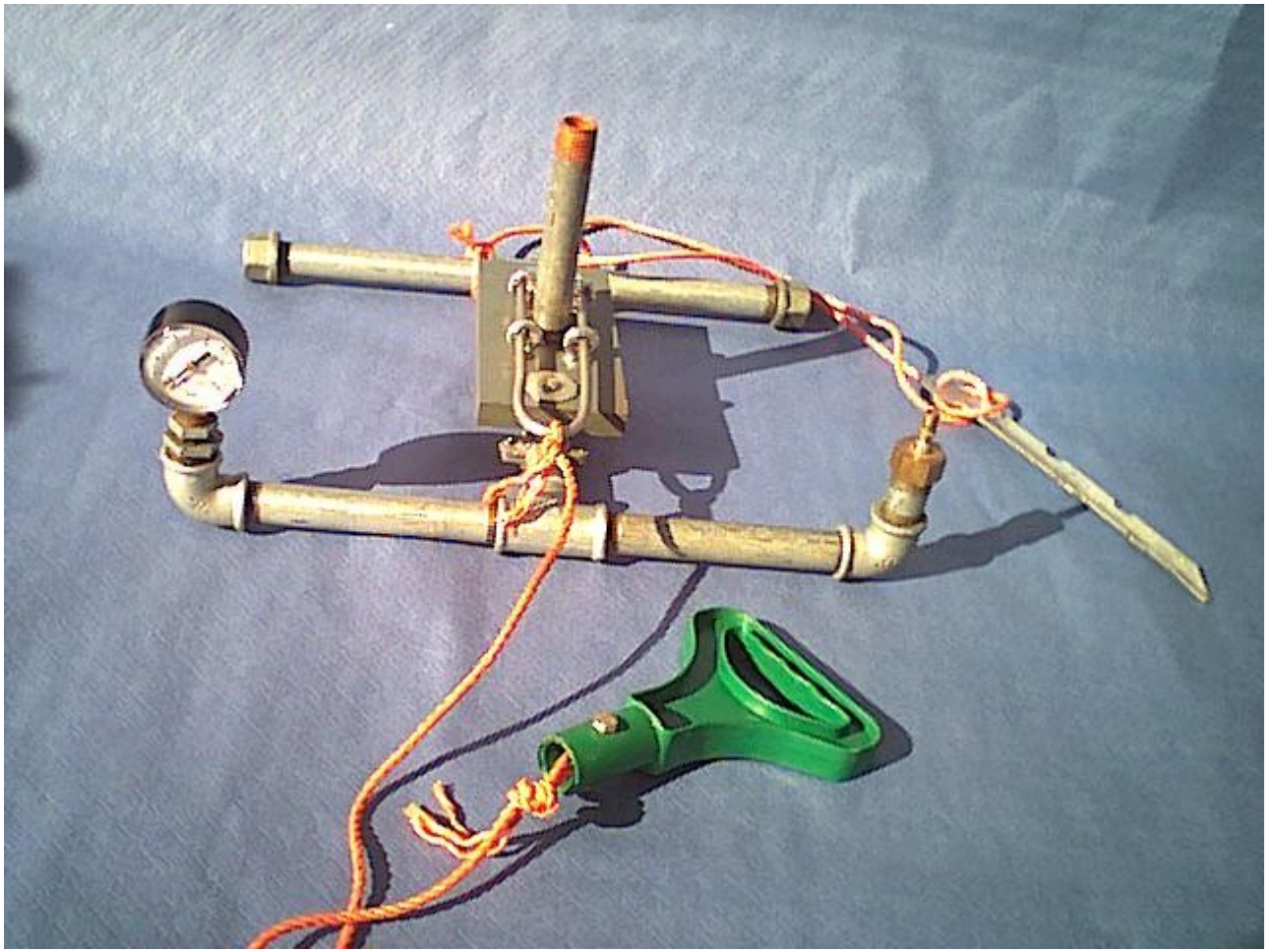
Clark Gable “Cable Tie” Launcher

Garden Hose Quick Release Launcher



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

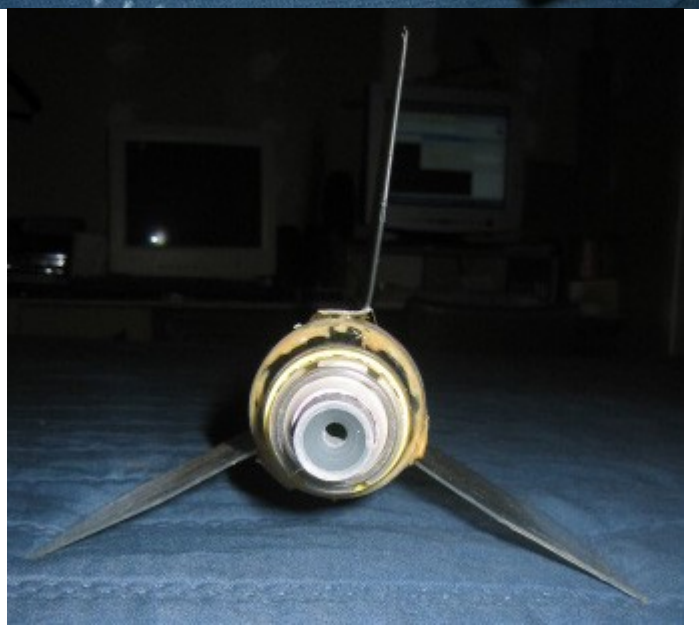
U Pin Launcher



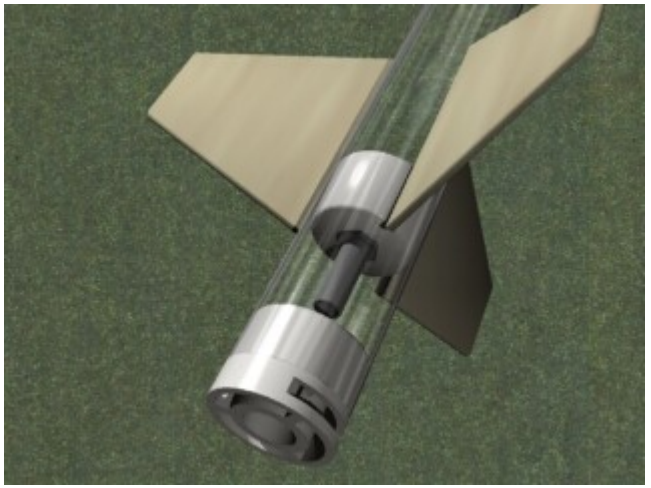
http://users.skynet.be/willaert/WR/launcher_2.htm

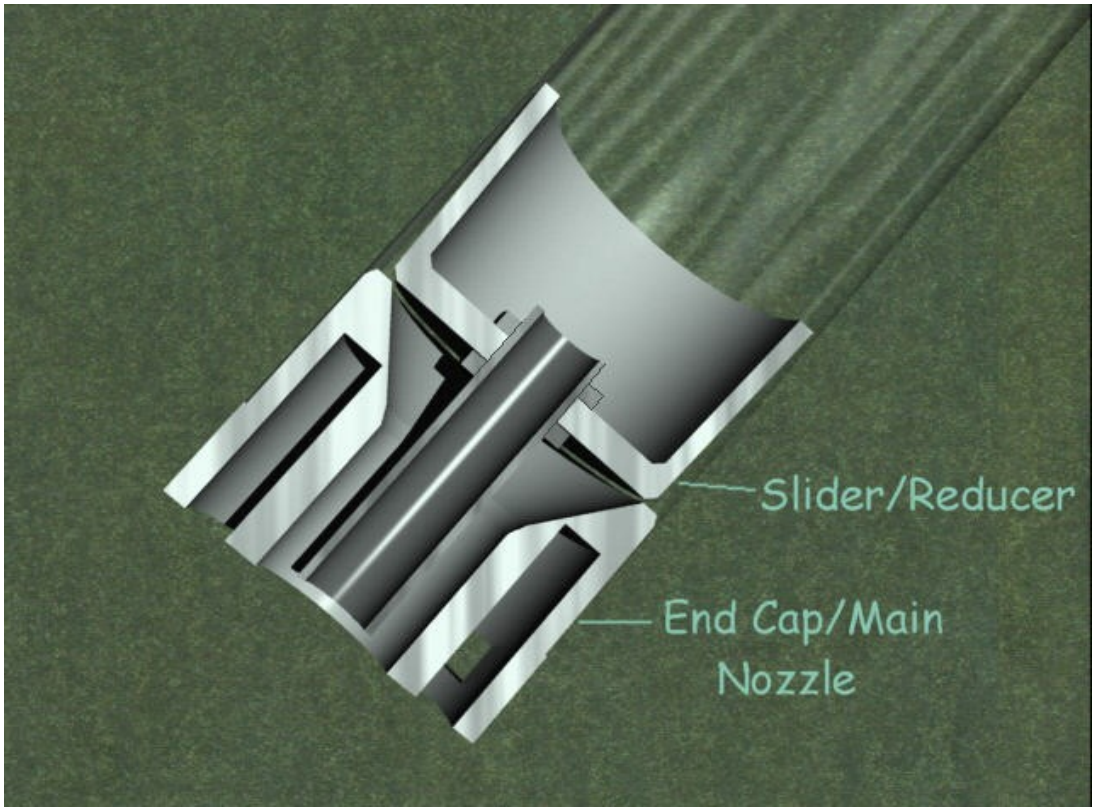
Tee Nozzle

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



Tee Nozzle



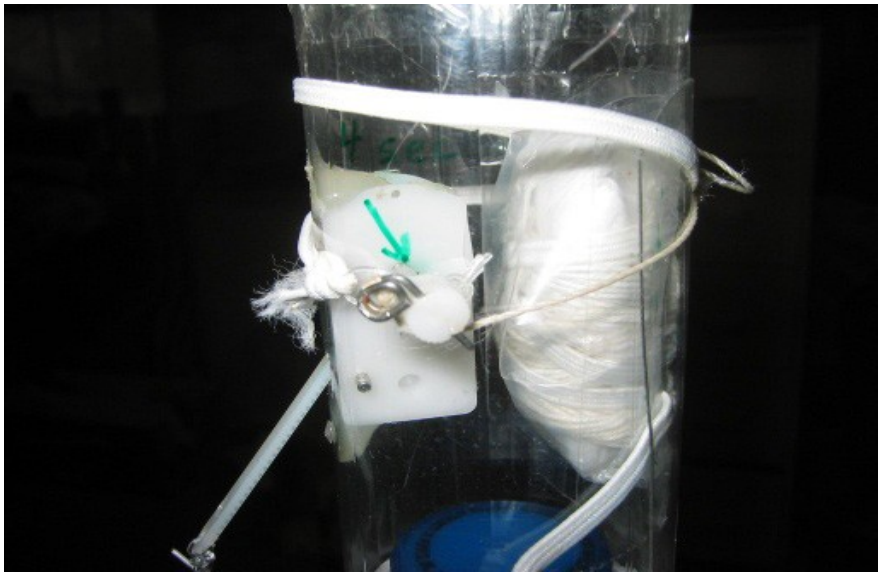


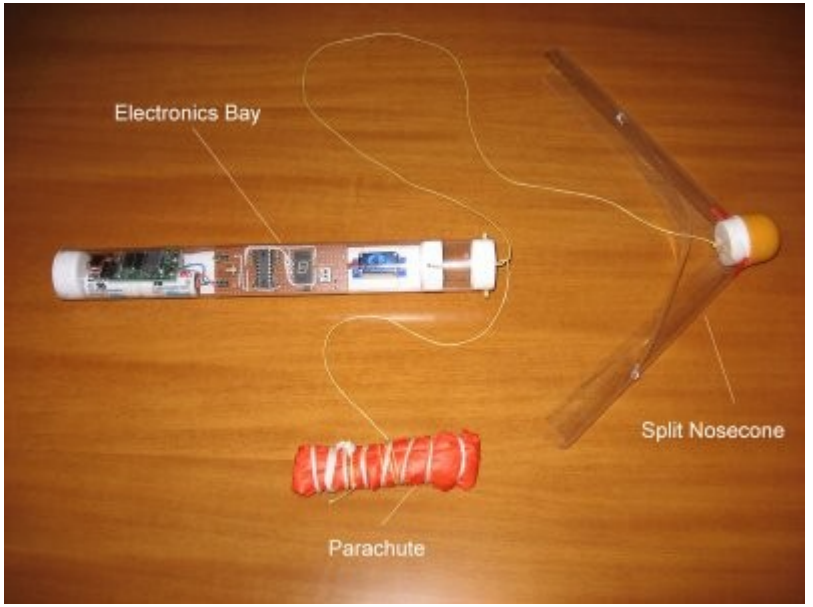
Recovery Methods

- Backsliding

  simple, works well on long FTC rockets
- Parachute

  use Tomy Timer air speed flap release mechanism
- Electronic altimeter + deployment mechanism



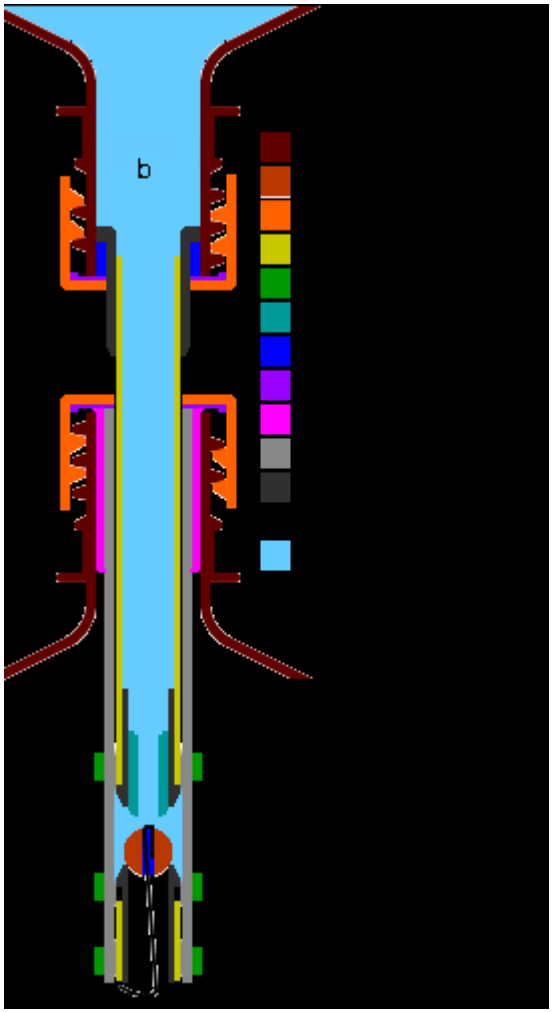


Two Stage Mechanisms

- Crushing Sleeve Mechanism
- Electromechanical Staging
- Katz Stager

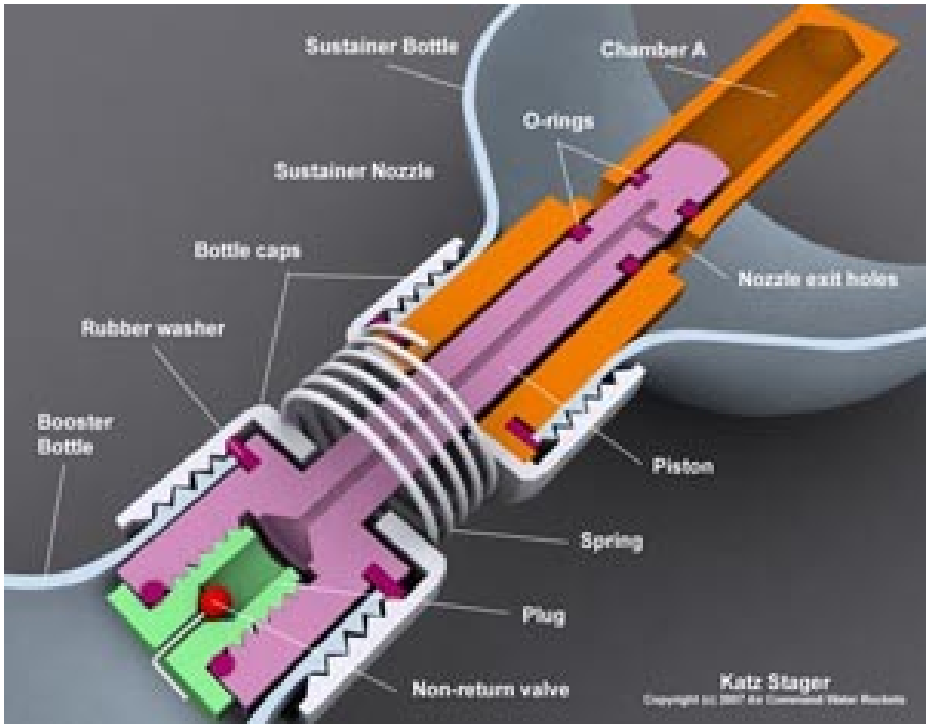
Crushing Sleeve

- See link for details including parts labels



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

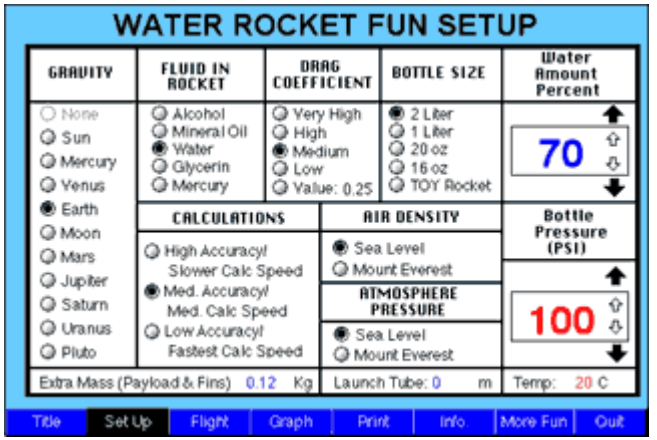
Katz Stager

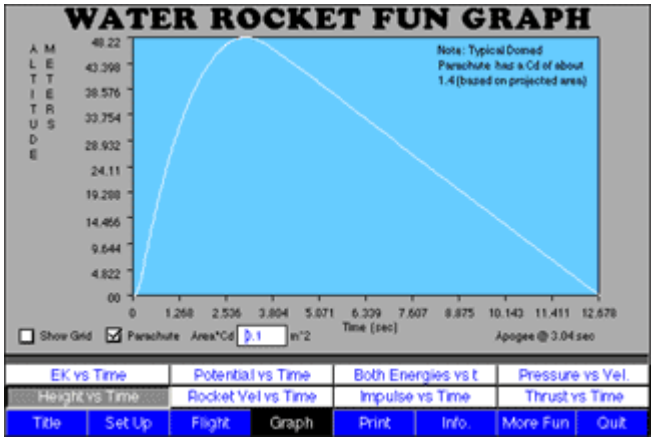


http://www.aircommandrockets.com/day51.htm

Simulators

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





Water Rocket References

- Water Rocket Association