

# Sydney Girls High School Astronomy Club

## Rocketry Workshop



### Rockets

The Chinese were the first to use rockets as simple firecrackers around 200 BC. From these humble beginnings technological advancements have led to rockets capable of carrying 100 tonnes into orbit and then out of the solar system.



### Basic Principles

Newton's 3rd law states: "To every action there is an equal, and oppositely directed, reaction". A force (the action) is exerted out of the nozzle at the bottom of a rocket and an equal and opposite force (the reaction) acts to accelerate the rocket upwards.

### Design

Some design considerations are shown in the diagram below and your design can be as creative or simple as you like. The one requirement is that sharp and hard edges are minimised for safety reasons.

Are you a techno girl who really wants to have the coolest rocket? You can go to the link at the bottom of the page and download water rocket design software. You can then use this to test the design of your water rocket and tune it for optimal performance.

### Example Water Rocket

**Parameters to Consider**

**Nose**

- Smooth
- Streamlined
- Rugged
- Optimal Mass

**Body**

- Smooth
- Holds Pressure
- Optimal Length

**Fins**

- Smooth and Thin
- Light & Stiff
- Optimal Shape

**Stability**

- High Center of Mass (CM)
- Low Center of Pressure (CP)
- Use of Launch Tube

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## Construction

In our next meeting we will hold a rocket building workshop and construct our rockets. You will need to bring the raw materials to build your rocket and below is a list of some suggested materials.

- One or more PET soft drink bottles for the body of the rocket.
- Thick corrugated cardboard or corrugated plastic for tail fins.
- Thin cardboard, ice cream container or part of a PET bottle for a nose cone.
- Various pens, markers and stickers etc to decorate your rocket.
- Other? ...

## Launch

In the meeting following our rocket building we will hold a launch (weather permitting) in the lowers and prizes will be given for many categories (highest flight, best presented, best design, etc).

Design Notes: