

## Water Rocket Construction

### Useful construction materials

#### MATERIALS

Low temperature hot melt

glue or duct tape

Balsa, Bass, or **THICK** mounting board

(At least 1/8 -1/4 inch thick)



Use a **LOW** temperature hot melt glue gun. (The higher temperature guns melt the plastic bottles.)



Duct Tape



#### OPTIONAL

Freezer and time

### INSTRUCTIONS

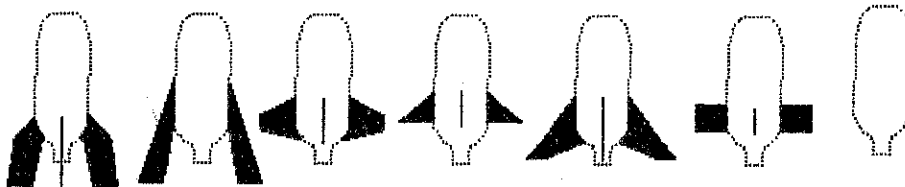
A pressurized bottle makes it easier to attach fins to. There are two ways to pressurize a bottle.

1 Buy a \$3 "fizz keeper." It replaces the top and pumps up the bottle to keep the fizz in soft drinks.

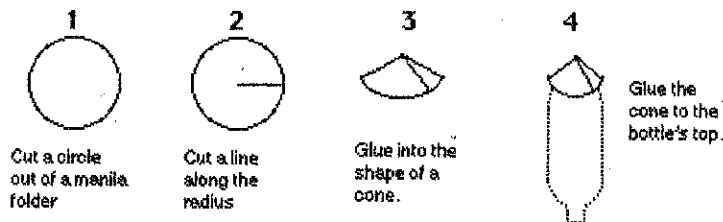
2 Put the bottle with the top off in a freezer or outside if it gets very cold at night. The next morning put the top on **TIGHT** and then bring it inside. As the air inside the bottle warms up, the bottle will become pressurized.

The fins will need to be contoured to fit the lower part of the bottle. This is a profile of the lower part of a 2 liter bottle. Use it for part of the fin pattern. The choice and placement is up to the designer. Below are some fin design possibilities.

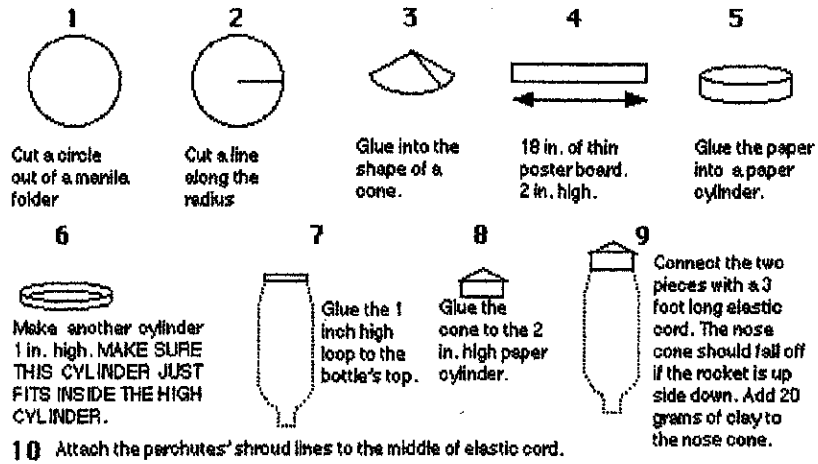
**DESIGN TIP:** The lower the fins are on the rocket, the more stable the rockets flight will be.



### How to Construct a Nose Cone



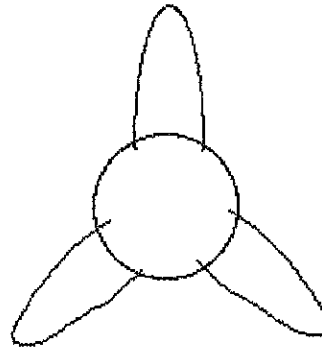
### How to Construct a Nose Cone With a Payload Section



# Parachute Construction

## STEP 1

Cut the parachute out of a VERY thin plastic drop cloth. Cut the circle 16 inches in diameter.

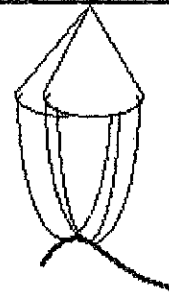


## STEP 2

Cut 6 shroud lines 32 inches in length. Tape the ends to the circle even spaced apart as shown.

## STEP 3

Attach the shroud lines to the middle of the elastic cord as shown.



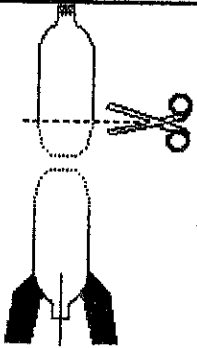
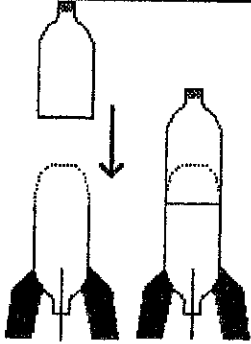
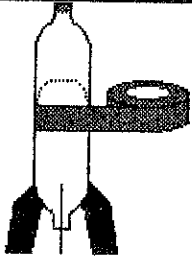
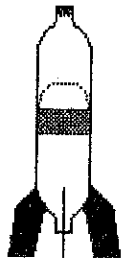
## STEP 4

The parachute could be draped over the top of the bottle. However, during the flight the parachute may slip off and cause a disastrous flight.



Your Rocket

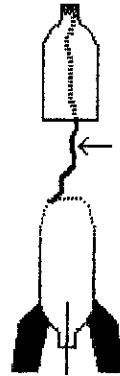
# Rocket Construction Instructions

<p><b>STEP 1</b></p> <p>Cut the bottom off a bottle.</p>	 <p>The diagram shows a plastic bottle with a dashed horizontal line across its lower body. A pair of scissors is positioned to the right, cutting through the bottle. Below this, the bottle is shown again, but the bottom portion has been removed, leaving a neck with a small opening at the base.</p>
<p><b>STEP 2</b></p> <p>Slide the cut bottle down onto the uncut bottle</p>	 <p>The diagram illustrates two stages. In the first, a bottle with its bottom cut off is shown above a bottle with its bottom intact. A downward-pointing arrow indicates the movement. In the second stage, the cut bottle is shown being pushed down onto the neck of the uncut bottle, partially covering it.</p>
<p><b>STEP 3</b></p> <p>Tape or glue the two bottles together.</p>	 <p>The diagram shows the two bottles joined together. A piece of tape is wrapped around the neck of the bottom bottle and the side of the top bottle to secure them together.</p>
<p><b>STEP 4</b></p> <p>For more stability, Add some water, 50-100 ml, to the top bottle. Screw the cap on the top bottle.</p>	 <p>The diagram shows the final assembly. The top bottle is partially filled with water, indicated by a shaded area. The cap is screwed onto the top of the upper bottle.</p>

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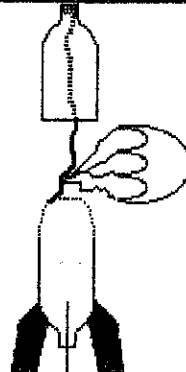
### STEP 1

Cut the bottom off a bottle.



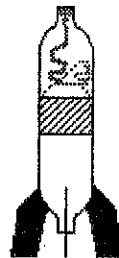
### STEP 2

Attach a parachute to the elastic near the top of the uncut bottle.



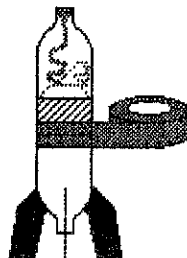
### STEP 3

Tape or glue a heavy paper around the bottles, loosely.

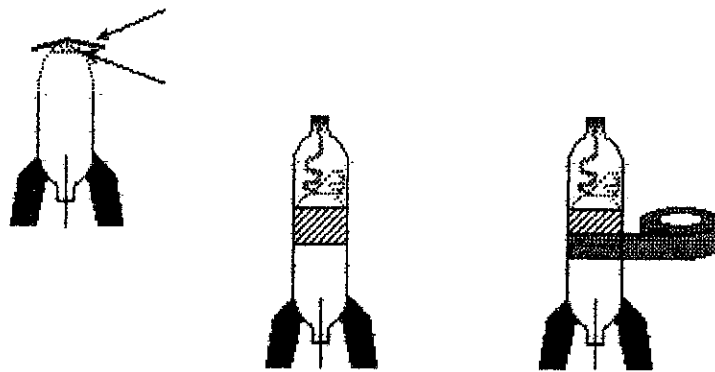


### STEP 4

Tape *ONLY* the bottom of the wrapped paper. This will allow the top bottle to come off. The top should be *VERY* loose. Air pressure will keep it on during ascent.



This method is not the most dependable. It is mentioned here as food for thought.



Make a shallow cone with a small paper plate. The diameter of the cone at the base should be about 1/2 to 1 inch wider than the bottle.

LIGHTLY tape the cone to the bottle top. The idea is on the way up, air will hold the cone down to the bottle. At apogee when the bottle begins to fall, air will catch under the cone top and the top will come off thereby freeing the parachute.

<p>A paper cone is placed on top of the tube. It is NOT glued. Inside of the tube is a parachute. When the rocket begins to fall backwards, after reaching apogee, the air will lift the cone off and release the parachute.</p>	
<p>Here is an idea I got while watching someone else launch a water rocket in a field. Place some weight, like pennies in the tip of the nose for added stability. Unfortunately I was distracted and did not see the whole flight. I did not see the recovery phase of the flight. But it looked cool going up. This could make a good nose cone holding a parachute.</p>	