

# Basic Water Rocket Glider Tutorial

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## 1. First ,What is a Water Rocket glider?

**Ans:** Water Rocket glider is a rocket-cum-glider that uses water as a propellant.

- It gets its thrust from water.
- It is very easy to make a water rocket glider.
- Most of the required materials are available in the scrap room of your house.
- Here, we will show you how to make a rocket out of a 2 litre coke bottle.

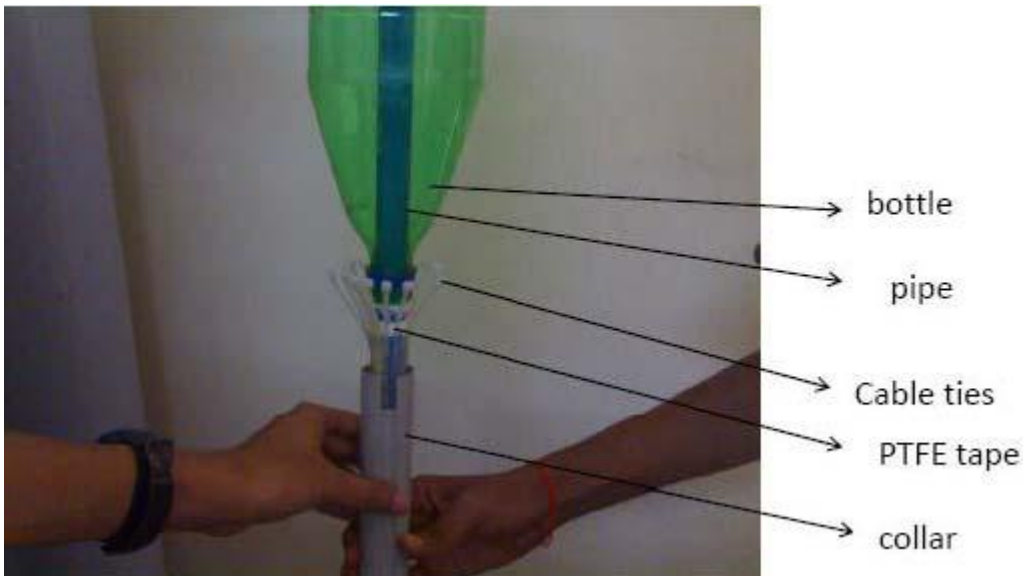
## 2. How does a Water Rocket glider work?

- Water is filled into the bottle up to 1/3rd of total volume.
- Air is filled into the remaining part of the bottle ( you can use a foot pump or a cycle pump to fill air) to increase pressure to a desired limit.
- The mouth of the bottle is then opened suddenly.
- Due to high pressure inside, water rushes out of the bottle at good velocity.
- Now, according to Newton's third law, the bottle gets a thrust in opposite direction.
- And your rocket is launched!!!
- The problem now is to launch it in a defined direction. Let us develop a launch pad for this purpose.

## 3. What are the required materials?

- 2 litre coke bottles
- Cycle valve
- Cork
- Cable Ties
- PTFE type
- A PVC pipe (with outer Diameter equal to the inner diameter of your bottle)
- A PVC pipe with larger Diameter
- Balsa wood
- Bondtite, Bondquick
- cutter, sandpaper etc

#### 4. How to make a water rocket?



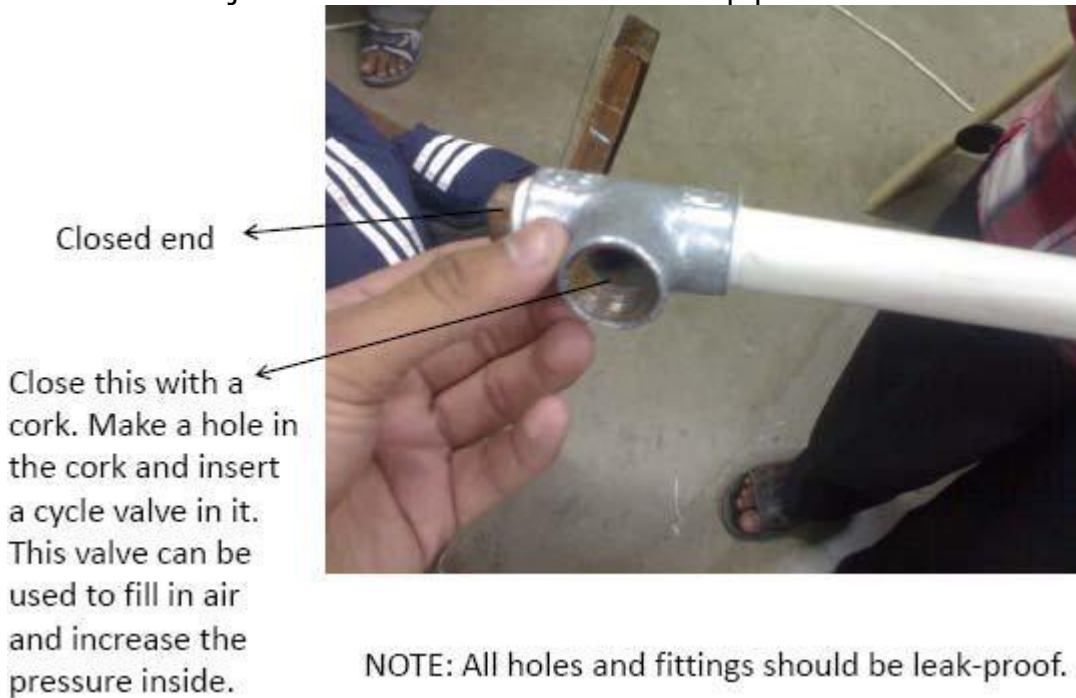
The collar is a pipe that can slide over the inner pipe. When pushed up, it will close the cable ties. (They are in open position in the above pic). When closed, they will hold the bottle and will not allow it to move while pressurizing. The collar is pulled down to release the bottle when desired pressure is reached.

#### 5. How to make a water rocket?

a. Attach the cable ties to the pipe at the desired position.



b. Attach a T- junction to the other end of the pipe and close one of its openings.



- Now, the launch pad is ready.
- After filling water in the bottle, place it in position as shown in the picture in 6th slide, move the collar up, pressurize the bottle by pumping in air, and pull the collar down after desired pressure is reached.
- You can see the bottle go up to a good height.

## 6. What more?

Now, since you have made your rocket and launch pad, it's time to make it more efficient. Chance to use your creativity here. Here are a few tips:

- Try to make the rocket streamlined and try to give 'rocket shape' to the bottle.
- Add weight at positions that
- Add fins to stabilize it.
- You can also add more bottles to make a bigger rocket.

## 7. How to make a Delta type wing and vertical stabilizer for rocket glider ?

- Aspect ratio of delta wing is defined as  $\text{span}^2/\text{area}$ .
- Aspect ratio of water rocket glider is taken from 5 to 8.
- Take a balsa wood and cut it in the shape of isosceles triangle having aspect ratio as given above.
- Now make vertical stabilizer of balsa wood having area equal to  $1/16^{\text{th}}$  of wing area.

## 8. How to convert water rocket to water rocket glider?

With the help of bondtite and bondquick paste the wing to the bottle as shown in picture below.



Now paste the vertical stabilizer to the wing as shown in the picture given below.





# How to launch?



Pressurizing the rocket.





# ALL THE BEST!!

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