

OBJECTIVES: to create a water rocket that can go at least 100 m (300 feet!)

Materials needed

- Empty, rinsed out 2-liter bottle **with cap**.
- At least 3 cut out fins: cardboard works well, look at your recycling - no need to purchase material for fins
- Nosecone - bday hat, funnel, or shape a manilla folder into a cone
- mass inside nosecone: this can be a bag of pennies/coins, sand, rice, clay, or just good ol rocks and dirt if you want. Put it into a plastic bag to contain it.
- Duct tape to attach parts - any kind works fine.

CONSTRUCTION REQUIREMENTS:

1. Your rocket's body will be made out of a **2-Liter** plastic bottle.

Keep the cap. Cheap soda bottles don't work the best (fit/pressure problems). They can blow up under pressure/cheap plastic. The green bottles sometimes do not fit on the launcher - they sometimes have a slightly smaller bottle opening diameter that doesn't fit on my launcher. Although a good quality like 7up and Sprite are fine. It should be 2 Liters - nothing less. **SO** check the volume amount. So, avoid the cheap green bottles (7up and sprite are ok) and any bottles that cost way less than a dollar. If you don't drink soda, you can get Hawaiian punch or a seltzer water of some sort.

2. The materials you use for the fins and nose cone can come from your recycling.
3. Your rocket **MUST** have at least 3 **fins** for stability. **BE CREATIVE!** Any shape is fine. Look up a fin design online. Cardboard is fine. Cut three fins and attach to your rocket with a good amount of duct tape. You want to make sure that the fins don't fly off when launching.
4. Nose Cone - use a funnel or a bday hat, or manipulate a folder to make a cone. Before attaching the nose cone with duct tape, you must put mass inside your nose cone.
5. If you don't put a substantial amount of mass in the nose cone, your rocket will lack momentum. It needs the mass to maintain momentum to fly 100 meters. If you do not put mass in nose cone, your rocket will go about 30 feet max (10). meters. Put about a cup or so of mass - it will feel awkwardly heavy. Like a handful of coins, or a cup of clay/rocks. Put the mass into a sandwich sized Ziploc and put it into your nose cone. Make sure the mass is stabilized - not shaking around. Duct tape it into the nose cone to stabilize your payload (mass)..
6. Once the mass is in the nose cone, duct tape your nosecone onto your rocket. Make sure it points straight so it flies straight. I will record and send a video of your rocket.

The tricky part is how much mass??? (too heavy wont fly, too light wont fly) hmmm...

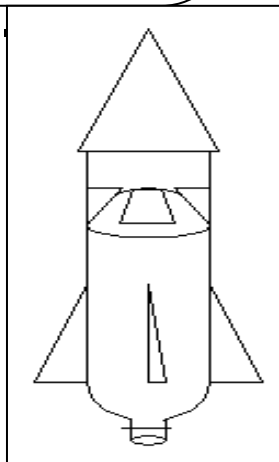
7. **Mass** in nose cone not too heavy, but not too light - must maintain **MOMENTUM**.

Building a Water Rocket: Quality plastic, not too much duct tape!

1. Cut out fins of any shape secure them to the tube. You choose the number, shape, and material. Do not puncture plastic bottle!
 2. Put mass for nosecone in a Ziploc bag and place it inside the nose cone (modeling clay, paperclips, beans, etc.)
 3. Duct tape nosecone to the bottle - points straight.
 4. Tape fins and nosecone - sturdy! You do NOT want it to fall off.
- ***NOSECONE LIMIT < 20 cm/less than about 10 inches.



Make Sure that you leave the bottom 3 inches Of the bottle where the opening is completely Free of duct tape and fins. Do not let your Fins extend too close the opening of the bottle I need to be able to see the bottle opening and Attach it to launcher ***** like this diagram***



Hot glue will melt your bottle!!

Do not spray paint your rocket!!

Email me your address now so I know who is interested. Email me questions too. I will come pick up your rockets - depending on when you guys have them ready. You need to have your first and last name on your rocket so I know whose it is. I'm hoping some of you will build now and some of you will build in a week and some of you will build in two weeks, so it kinda staggers, but whatever - we will see how this works. I will record a video of your rocket. I will share the video with you too. I will also return your rocket with your data on it (distance and time). I have pictures of the rocket launcher. It is called and aquaport and I set it launch at 45 degree angle. I fill it half full with water and apply 90 psi air pressure - which is a lot for a bottle considering a car tire is about 35 psi (psi stands for pounds per square inch). I have a generator and an air compressor attached to the launcher so I can just turn on the air and wait for pressure to build. Yes, I made this a permanent modification for my launcher. It is usually set up for a bicycle pump, but that is just too much work for me lol.

So, let me know if you are interested, and next, you will let me know when to pick it up.

I will work on specific dates over the next week or so.

Remember this is just an enrichment project. I cannot make it an essential assignment because not everyone has access to all of the supplies needed to build a rocket.

Good luck - I really hope this will work - lets go the distance kids!!