Re-create Heron's Fountain From Water Bottles

by wurx

//www.youtube.com/v/qcskTX46zq4

I originally made this project for a client's website. It's a fun experiment that led to a lot of discussions about perpetual motion and free energy. My version does not exhibit either of these properties, but you may be able to fool people into thinking it does.

This is a really easy build and would be a perfect project for to build with your kids. Maybe you could even sneak in a lesson on fluid dynamics or perpetual motion?

Step 1: What You Need: Supplies

Here is a lit of the items you need for the build. As you can see, it's not a lot. The total cost of build = $2 (you can scavenge the 3 water bottles)

(3) 16.9 FL OZ Water bottles
(1) 9" length of tubing
(1) 11" length of tubing
(1) 15" length of tubing
Small amount of clay

Note: The tubing is for aquariums and is 3/16" thin wall rigid tubing. Almost any tubing would work, even flexible, but the rigid makes it really easy. I was able to pick some up at a local pet supply store for about $0.50 per foot.

Step 2: What You Need: Tools and Equipment

Here is a list of the tools needed for this instructable. All you need are very basic hand tools, and that's about it!

Scissors
Drill (hand or electric powered)
5/32" drill bit (slightly smaller than the tubing diameter)

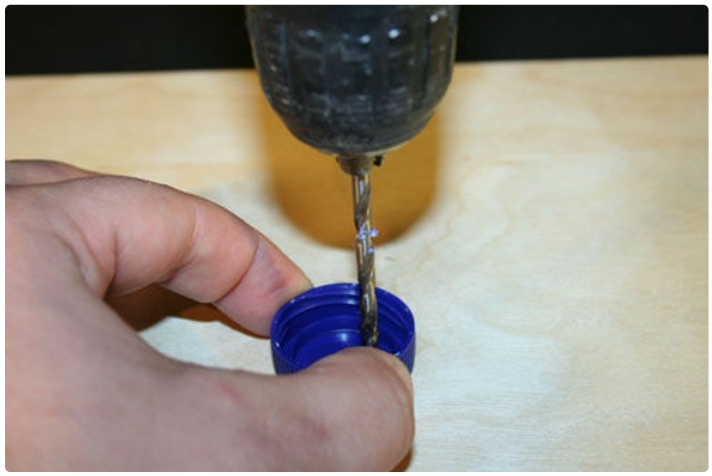
Step 3: Make the Fountains' Reservoir

Cut (1) of the bottles in half as pictured. Keep the bottom of the bottle, you can use it to fill the fountain when we are all done.

Step 4: Drilling the Holes

You are going to need (2) holes in each cap. Start by drilling the (2) holes in (1) cap, use a piece of scrap wood to support the cap.

When you are done with the first cap, use it as a guide to drill (2) holes into the top of the remaining (2) caps. You can place the caps top-to-top when drilling the holes. Now you should have (3) caps, each with (2) holes drilled in about the same location.



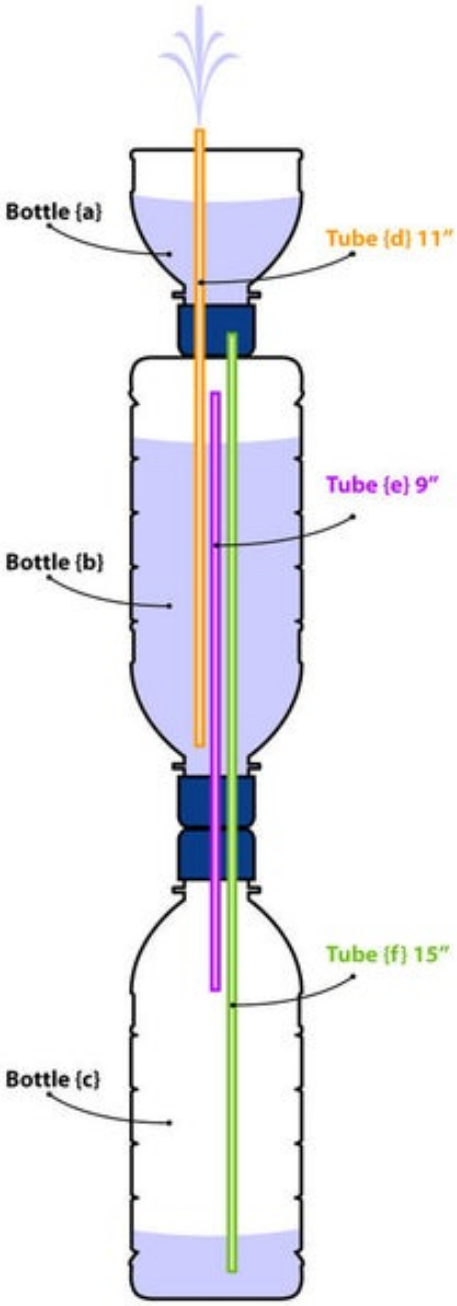
Step 5: Drilling the Holes Part 2

Take one of the caps and use it as a guide to drill (2) holes in the bottom of one of the remaining intact bottles. This will end up being bottle {b} as in the diagram below.

Step 6: Connect the Tubing

Connect the tubing as in the diagram below. All connections should be airtight. If you used the 5/32 drill bit they should be. If not, just add a small amount of modeling clay to seal the openings around the tubing. I had to seal the area between bottle {a} & {b}.

Note: Make sure the tubing is at the proper heights in each bottle. These heights are **Very Important.**



Step 7: Add Water and Enjoy!

Now all you have to do is fill bottle {b} with water and screw the whole system together. To start your fountain, add water to the upper bottle {a}. Enjoy your homemade Heron's Fountain. It will last a surprisingly long time....but unfortunately, not forever!

What is differential or integral equation for this fountain for its longevity ????

Not sure about the math, but since I built it, I'm 100% sure it stops working after a minute os so. Just a fun physics based build.

What is coefficient of free energy in this system

Herons fountain
Siphon
Inverted siphon
Bell siphon
Equation for each and how we found that extra free energy for our work
How much biggest model ever possible under normal conditions so we use the atmosphere pressure for making free energy for many years

All the scientist of all world are invited to solved this problem

No free energy. Just a fun physics based project! There is no free energy, sorry. But I would love to see someone do all the math. That would be really interesting.

How long time this fountain working?

A few minutes. Sadly, not forever! Haha.

Just a few minutes, and it depends on the size of the bottles used.

It runs for about 3 minutes or so.

Unil the middle bottle is emptiedish. Basically, it's powered by water going from the middle to bottom bottle, and once the pressure it too low, it stops.

Yep!

Nope, you got this wrong, water from the top goes to the bottom, pushing air up to the middle bottle, pushing water up and out...

Oh, and also, thanks for the instructable, I had been looking for one of these a few years ago, but couldn't find any cheap designs that didn't use lab-type equipment. Good job, I think I'll build one.

Thanks! Hope you build one!

Thanks! Send me pics if you build your own!

but, this is a perpetual motions ?

100% no. Just cool physics in action.

Nope. Sorry, perpetual motion is not possible....but it's still a fun project. Build it and you'll see what happens after a few minutes. (Hint: It stops!)

THIS IS AWESOME... 5 STARS

Thanks for voting! I appreciate it.

I wonder if would an EXTREMELY large version of this (with a generator) would produce enough energy to add and remove water to keep it running forever.. and possibly generate enough power to run a house or charge an iPod or something ?

if you used the water to run a generator, then yes you would get electrical energy. the problem is, you arnt going to make more energy than is used up adding the water back into the system. the system can be as complex as you need, but with our laws of physics, it is impossible to produce more energy than used. this includes using temperature change, gravity and all forces that arnt part of the actual system as well.

You might want to reconsider- ITS NOT PHYSICS ITS THERMODYNAMICS

Possibly a nitpick, but thermodynamics is a branch of physics...

Zing!

Wait... yo... remember- thermodynamics- energy cannot be created nor destroyed... So having the water pump the water back to the top to reset the cycle would take the same or more energy than it creates... Simply speaking- doing that would be impossible, as you would get awarded for having that happen. Thermodynamics are quite annoying, just have a perpetual motion machine in your homes to create energy- but *NO... THERMODYNAMICS MADE IT SO THAT ITS IMPOSSIBLE!*

Yes, a larger version would produce a larger amount of energy, maybe even enough to harness. However, the energy will eventually be used up. Unfortunately perpetual motion and/or free energy it is not going to happen with this fountain. Sad, but true.

You should make a giant one that is powered by rain.

That's a great idea! I have been thinking of a rain collection system, why not make it fun too!

Think of this! If you put a stopper on the bottom of the bottom bottle, then you can add a lever system that has a bucket on the end, which when the rain fills up the bucket, it will tip, emptying the bucket and the bottom bottle both. Then, a rain catching system where water runs into the middle bottle. It will all be leveled out, but... the pressures will differ when the rain catching system is created... Play around- come up with good ideas for it... An idea would be having an airtight stopper that only opens when a certain pressure is applied to it, so maybe the water pressure can open it, fill it up, then close...

Add a small turbine that can turn whatever water flow there is into electrical flow. This electrical flow can run a small compressor which will add pressure and keep it going forever :)

Can't believe I didn't realize this until after I posted.

We didn't consider the waters' evaporation from the unit. Eliminate that and it'll last muuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuch longer.

Maybe seal the top or something?

Nope, won't help. It's all powered from the pressure in the 2nd bottle. Once that pressure (generated from the gravitational forces on the water) is gone, the shows over. :)

Huh... It is possible to do that- yet you would just need to use energy for the show... So pretty

much, the bottom bottle fills with water as the middle bottle empties. The top bottle stays the same. If you add a compressor, you can add an extra tube that gets water from the bottom bottle up to the middle bottle. However, it is just wasting energy...

uh... Study your thermodynamics more... Energy cannot be created nor destroyed... So it is IMPOSSIBLE for the turbine to create more energy than the compressor will use.

I'm making this for my mom thanks ; D

How long will it last?

After the water goes into the bottom container, and the air in the second, how does it reset, or is that the point where it stops?

I wonder if u could make one that runs forever? (>_<)

That would be awesome.....but it isn't going to happen. Perpetual motion/free energy it is not. Eventually the pressure runs out and the water stops flowing. Although, it does last a surprisingly long time.

water stops running because its viscosiy, if you managed to do that same fountain with liquid air, as it has 0 viscosity, you could make it running forever

Wow, neat!

Hey that is so cool! What if there was a way to drain the lower container without disrupting the system, and use rain water to refill container b (the middle one). Then it could run forever, as long as it rains. I forget the name, but it's this cool little trick cup that when you start drinking out of it, it drains out the bottom onto the lap of the victim. It usually has a structure extending out of the middle of the bottom of the cup (on the inside). Once the top of the structure is exposed to air (after some drinking) little holes at its base let the fluid flow out. I wish I could remember the name of it so I could find out how it works. So basically, something like it would drain at a certain point when the water got to high.

I'm doing this right away! (rated 5 stars*** and favorited!)**

That's great! Please take some pics or a video and post them up online. Oh, and send me a link. I would really appreciate it!!!!

good job! it is quite interesting, considering how simplistic it is. 5*

Thanks. It was a lot of fun to make. Hopefully you you will try it too. It's strange to see it in person. It seems as though it shouldn't work, but I can assure you it does!

It is interesting, green, and classy good job.

Thanks!!!

Enjoy your new voltiac backpack! You have this contest by the NECK...

Thanks for you vote of confidence. There are a lot of great entries, and I am sure a lot more to come.