

Technology: Pythagoras Cup!

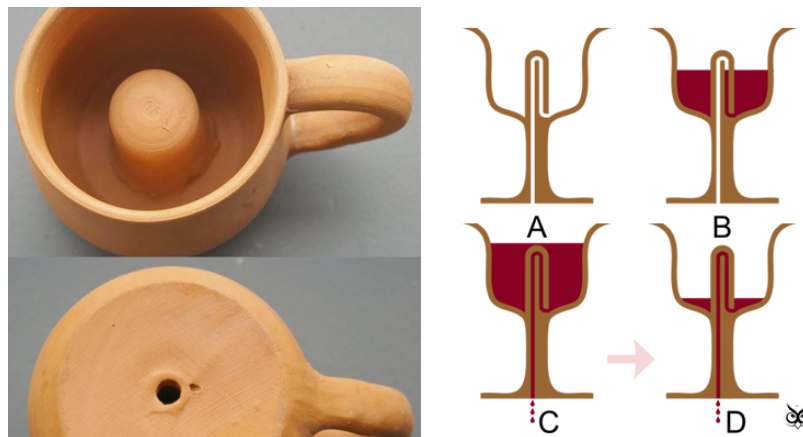
Ages: 7 - 13

Hello everyone. This is Bill from the Okanagan Regional Library System. Welcome to the fun and inventive world of making STEAM projects in your own home. Each week, I will share a fun and interesting project that you can make using materials commonly found in your own home.

Even though we can't be together right now, we can still learn how to make exciting projects each week!

This week's project: How to Make a Pythagoras Cup.

Pythagoras Cup



This strange looking contraption is named after the Greek mathematician Pythagoras, who lived 2000 years ago.

Pythagoras's cup was designed to catch greedy people who tried to take more than their fair share of wine. When filled above a certain point, the cup drains the liquid (in this case, water) through its base. It works because a liquid will always flow from an area of high pressure to an area of low pressure – an effect known as a siphon.

This activity can be a bit complicated, but the results are worth it. Be patient and follow the directions carefully. To make the Pythagoras cup, you will need to use a lot of plastic. Make sure you recycle it once you are finished.

Materials Needed:

- Pencil
- Masking tape
- Bendy Plastic Straw
- Food Colouring
- Cup of water
- Scissors
- Ruler
- Rubber Band
- Adhesive putty
- Coloured Tape
- Plastic Cup
- Plastic Bottle
- Dish



Time: 1 hours

Steps:

1. Cut around the bottle, about 7 cm from the top, and keep the top part. Cover any sharp or uneven parts of the cut edge with the tape.



2. Remove the bottle's cap and use the scissors to make a hole in the middle of it.



3. Press a lump of adhesive putty on top of the cap. With the scissors, make a hole in it, to line with the hole in the cap.



4. Cut about 2 cm off the end of the straw farthest from the bendy end part. Fold the straw at its bendy end part and secure it in place by wrapping it with the rubber band. Make sure that you don't pinch the bend in the straw.



5. Make a hole in the middle of the bottom of the plastic cup.



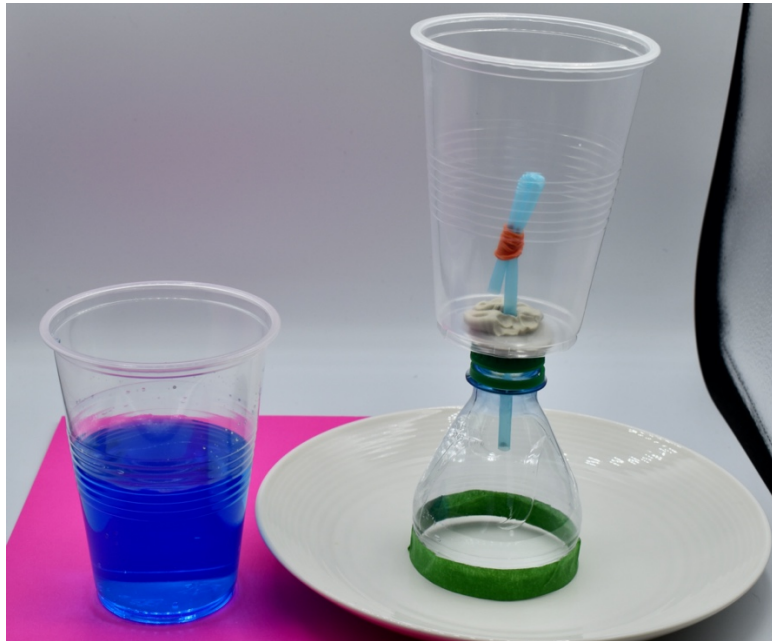
6. Feed the long end of the straw through the hole in the plastic cup, making sure that the folded part is inside the cup.



7. Push the long end of the straw through the hole in the adhesive putty and the bottle cap.



8. Push the adhesive putty on the bottle cap onto the bottom of the plastic cup. Use a pencil to pack some more adhesive putty around the straw on the inside of the plastic cup and the inside of the bottle top.
9. Pour some food colouring into the cup of water. Stand the Pythagoras cup inside the dish. Begin pouring the water into the cup.



10. The cup will fill up until the level of the water reaches above the top of the straw. When it does most of the water will leak out. Test and Tweak.



The Science behind your Pythagoras Cup

When you are filling the cup, water climbs up the straw, pushed by the pressure of the water, which increases as more water is poured in. When the water level in the cup is greater than the height of the straw, the water pressure pushes the water over the top of the bent part of the straw. The water keeps flowing, because the pressure at the bend in the straw remains lower than the pressure at the open part of the straw inside the cup. This effect is known as a siphon.

STEAM

This activity includes everything you need for a comprehensive STEAM project.

Science: Understanding the effects of water pressure.

Technology: Understanding a siphon works.

Engineering and Art: Construction of the Pythagoras Cup.

Math: Measuring water displacement, measuring and cutting out the parts needed to construct the Pythagoras Cup.