

Blueprint for Archimedes Screw

Name of the object	Archimedes Screw
Recommended ages (from...)	Starting from age 10-15 – intermediate level difficulty
Thematic areas combined (STEAM)	Engineering This machine is used for transferring water from a low-lying body of water into irrigation ditches.
Materials needed	<ol style="list-style-type: none"> 1. PVC pipe, 1.27cm inner diameter, 60.96cm length 2. Clear vinyl tubing 3. Strong and sticky tape, such as Gorilla tape or duct tape 4. Permanent marker 5. Retractable blade knife or strong scissors 6. Liquid measuring cup 7. Spoon 8. Water 9. Food colouring (optional) 10. Bowls, 355 ml (2); plastic, glass, or ceramic 11. Books of various thickness or pieces of plywood board or extra container for elevation
Instructions step by step	<p>Step 1. Setting up all the materials and looking at the instructions and models.</p> <p>Step 2. Wrapping the tube around the pipe in a spiral.</p> <p>Step 3. Placing the water containers on two sides (the right container should be elevated).</p>

Step 4. Rotating the screw to enable water to enter one side and come out from the other side.

Step by step: how to build the “Archimedes Screw”

Step 1

Time needed: 5 minutes

Set up all the materials and look at the instructions and models.

Cut the PVC to the appropriate dimension (if bigger than instructed).

The clear vinyl tubing should be cut beforehand.

All the pieces should be ready to mount.

Throughout the whole process, ensure that you have an adult that will help you use scissors to cut off any extra tubing.

These are the materials needed:

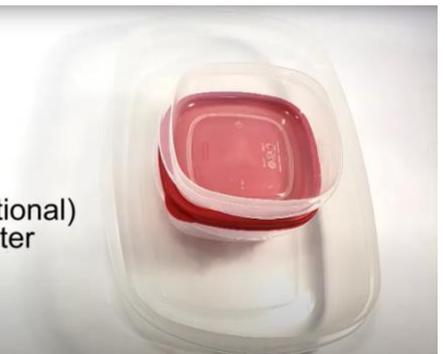
Materials:

PVC pipe
clear vinyl tubing
duct tape
scissors



Materials:

PVC pipe
clear vinyl tubing
duct tape
scissors
food coloring (optional)
containers for water



[Source](#)



Step 2

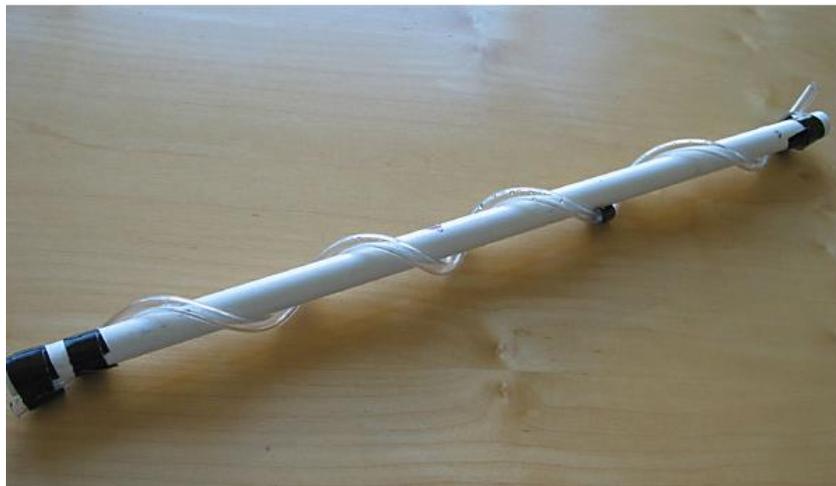
Time needed: 5-10 minutes

Take the PVC pipe and the vinyl tubing, take a piece of strong tape and tape one end of the tubing to the outside of one end of the pipe so that the length of the tubing is hanging off the end.

Carefully wrap the tubing around the pipe in a spiral (in regular intervals) until you reach the other end of the tube. From that point, add some length and mark that spot on the vinyl tubing with a permanent marker. This is where you will cut the remaining tubing. Cut the extra tubing and tape it.

Make sure that the opening to the tubing is open (and not blocked by the tape).

This step should look like this:



[Source](#)



Step 3

Time needed: 5 minutes

In a liquid measuring cup, mix some drops of food colouring in 1 cup of water. This makes the water more visible.

Set up two bowls, one on the left surface and one on the right, slightly elevated with books, another container, or a plywood board. You can determine what slope works best for you to run your trials.

Add the water in the left bowl which is not elevated.



[Source](#)

Step 4

Time needed: 5-10 minutes

Now you will be ready to test your screw. Place your Archimedes screw across the two bowls. Make sure that the extra tubing hanging off the end is in the water bowl on the



table. Turn the screw so that every time the end of the tube goes into the water it scoops up some of the water.

The other end should be close to the elevated bowl so that the water pours into it. Make sure that as you turn the screw, the water doesn't fall back out of the screw. If the water falls out, adjust the tilt of the screw, the placement of the bowls or the height of the elevated bowl.

Turn the screw a few times to make sure that the water is travelling through the tubing. You can change your speed and see how the water moves through the tube depending on the speed.

To finish your trial, hold the screw vertically and empty all of the water from the tubing and the discharge bowl back into the bowl on the left.

Watch the video below from 01:12 to see how the screw is rotated to transfer the water: <https://www.youtube.com/watch?v=PszGCm1PqSo>

Sources

- Finion, B. (2019) "Lift Water with an Archimedes Screw", *Scientific American*, <https://www.scientificamerican.com/article/lift-water-with-an-archimedes-screw/>
- Science Buddies (2021) "Moving water with the Archimedes Screw Pump", Science Project, https://www.sciencebuddies.org/science-fair-projects/project-ideas/ApMech_p039/mechanical-engineering/build-archimedes-screw-pump?from=YouTube#summary
- YouTube, Science Buddies (2019) "How to make an Archimedes Screw – STEM Activity", https://www.sciencebuddies.org/science-fair-projects/project-ideas/ApMech_p039/mechanical-engineering/build-archimedes-screw-pump?from=YouTube#summary