

Philosopher's stone

Name of the object	The "philosopher's stone" of Heron
Recommended ages (from...)	12-15
Thematic areas combined (STEAM)	Technology Engineering Physics
Materials needed	<p>The materials we will need are the following:</p> <ol style="list-style-type: none"> Two plastic bottles of at least 30 cm height and with a diameter of the base of at least 8cm  <ol style="list-style-type: none"> A funnel  <ol style="list-style-type: none"> ¼" diameter flexible, clear PVC tube, 1m or more



4. 1/4" diameter inflexible PVC tubing, approx. 20 cm



5. Various tools for cutting the tubes and opening the holes, silicone for hole sealing and a box to use as a box (e.g., Cardboard box)



Instructions step by step

Step 1. Preparing the first bottle

Step 2. Preparing the second bottle

Step 3. Securing the structure

Step 4. Putting it all together and testing it!



The "philosopher's stone" of Heron of Alexandria's is an invention that "changed" one liquid into another, for example, water into wine. It consisted of an airtight vase of water with a tubular opening at the top through which water entered and reached the bottom, and an airtight vase of wine with a siphon-shaped tap in the middle. The two vases were joined by a small tube that entered from the bottom and extended nearly to the top. When a specific amount of water was poured into the first vase, the air inside pushed the wine into the second vase via the intermediate tube.

<https://kotsanas.com/gb/exh.php?exhibit=0301004>

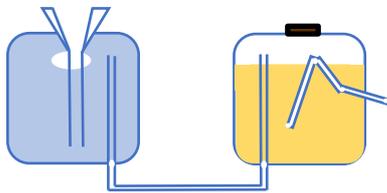


Fig.0. The "philosopher's stone"

Step by step: how to build the "philosopher's stone"

Step 1. Preparing the first bottle

Time needed: 25 minutes

First, we need two plastic bottles of at least 30 cm height and with a diameter of the base of at least 8cm (fig. 1).



Fig. 1

Then we create a hole in the cap of one of the bottles (fig. 2).



Fig. 2

The next step is to fix the inflexible plastic tube to the funnel (fig. 3). You can attach the plastic tube to the funnel with glue or by applying heat to the connection point.



Fig. 3

The next step is to fix the funnel with the attached tube to the cap and then to screw the cap onto the bottle (fig. 4).



Fig. 4



Next, a hole must be made in the bottom of the bottle (fig. 5).



Fig. 5

The clear, flexible tube should be inserted into the bottle through the base, so that it reaches the higher part of the bottle (fig 6). The part of the tube inserted in the bottle should be approximately 20cm and the total length of the tube is approximately 80 cm.



Fig. 6



Step 2. Preparing the second bottle

Time needed: 20 minutes

A hole must be made in the center of the second bottle (fig. 7).



Fig. 7

A part of the clear, flexible tube should be inserted through this hole as seen in fig. 8. One end should be inside the bottle towards its lower part, and the other should end outside the bottle. This will be the exit of the liquid.



Fig. 8

Then the two bottles are as in fig. 9 and the free end of the flexible tube should be inserted into the second bottle.



Fig. 9



Make a hole in the bottom of the second bottle. Then, put about 20cm of the tube which is connected to bottle 1 inside the second bottle (fig. 10).



Fig. 10

The two bottles should be connected as shown in fig 11.



Fig. 11



Step 3. Securing the structure

Time needed: 10 minutes

Use a cardboard box or another base to secure the bottles on top of it. The tube that connects the two bottles is hidden under the top of the box. Fig. 12 shows such a structure. Please keep in mind that the bottles will become heavy once they are filled with some water or another liquid.



Fig 12.

You can also cover the bottles with some white paper or another cover, so that their contents are not visible.

Step 4. Putting it all together and testing it!

Time needed: 5 minutes

Fill the bottle with the cap with some type of colored liquid. Make sure not to cover the tube connected to the second bottle (the one with the funnel).

Start pouring some water into the bottle with the funnel and the colored liquid will start to flow from the other bottle.