



BUILD YOUR OWN WATER CLOCK



WELCOME TO THE WORLD OF HOROLOGY THE SCIENCE OF MEASURING TIME!

Water clocks are one of the oldest time-measuring instruments in the world. They were made popular by the Ancient Greeks in 325 BC, but the world's oldest known water clock was discovered in the tomb of an Egyptian pharaoh in 1500 BC!



YOUR CHALLENGE!

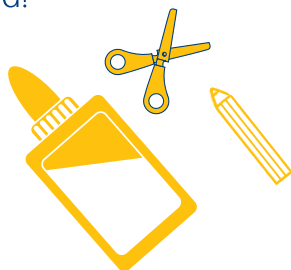
Using cups and a variety of other household materials, can you create a water clock that times exactly one minute, using 200ml of water?

YOU WILL NEED:

- Several plastic / paper cups
- Stopwatch
- 200ml water
- Scissors
- Tape

SUGGESTED EXTRAS:

- Straws
- Plasticine
- String
- Drawing pins
- Stapler
- Other liquids such as honey, cooking oil, ketchup or even custard!



WHAT TO DO:

1. Start with just two cups, and make a hole in the bottom of one of them.
2. Using string, straws (or anything else you want to try) fix the cup with the hole in above the other one.
3. Pour 200ml of water into the top cup and time how long it takes to pass through to the bottom cup - can you get it to take exactly one minute?
4. Add extra cups and change the size or position of the holes until your water clock times exactly 60 seconds to pour.





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EXPLORE FURTHER

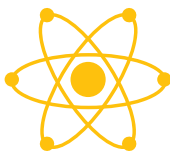
For more resources and videos search for the following:

- What is Viscosity? (in one minute!).
- Ted-Ed: Why is ketchup so hard to pour?

Do other liquids take the same time to pass through your clock? Why / why not?

How could you change your design so the other liquids also take a minute to pour through?

What happens if you change the temperature of the liquids?



AND NOW FOR THE SCIENCE...

Water clocks work because liquids flow at predictable rates.

Different liquids flow at different rates because of their viscosity.

Thick, sticky liquids like honey have high viscosity, which makes them flow more slowly. Liquids with lower viscosity are runnier and flow more quickly.

Some liquids, become runnier (less viscous) if you heat them up - we call these non-newtonian liquids.

IN THE REAL WORLD:

A liquid's viscosity is important in lots of real-world scenarios:

- Syrups are used in the food industry to stick ingredients together, like cereal mixes or sauces. Do they have high or low viscosity?
- In the cosmetics industry, viscosity is important when designing the feel and flow of cosmetics - you wouldn't want lipstick to run straight off!



COMPETITION TIME!

- Complete 4 challenges and submit an entry to our poster competition to be in with a chance of winning an EDT Experience Day at your school.
- For funded schools, you have the opportunity to receive the Industrial Cadets Challenger Award - click [here](#) for full details.
- Share a photo or video of your experiment with us on social media and use the hashtag #STEAMstars

