



# Greek Water Clock

Ancient Greek society did not have clocks like we do today. Instead, they used clepsydras, or water clocks, to time important events. Create a clock that uses the movement of water to keep time!

## TEKS:

MATH 4.8 C: The student is expected to solve problems that deal with measurements of length, intervals of time, liquid volumes, mass, and money using addition, subtraction, multiplication, or division as appropriate.

MATH 6/7/8.1 A: The student is expected to apply mathematics to problems arising in everyday life, society, and the workplace.

## Materials:

- Cup, glass, or pitcher (for pouring ~2 cups of water)
- 2 empty plastic bottles (they should be the same size)
- Funnel (optional)
- Masking tape
- Permanent marker (ultra-fine tip works best)
- Scissors or utility knife
- Thumbtack or push pin
- Timer
- Water

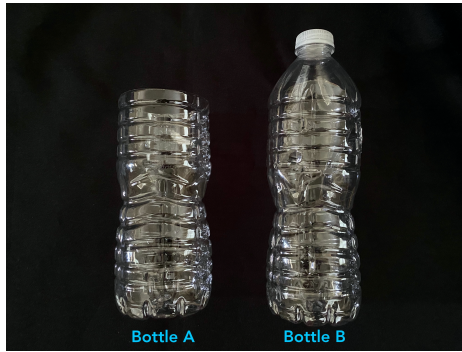
## Experiment/How To:

1. Use scissors or a utility knife to cut the top off of one plastic bottle. Use the photo below as a guide. This will be "bottle A." (**Safety: An adult should assist when using scissors or a utility knife to cut the plastic bottle.**)

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2. Turn the second bottle over and push a thumbtack through the bottom of the bottle to make a small hole. This will be "bottle B." (**Safety: An adult should assist when using a thumbtack to make a small hole in the plastic bottle.**)
3. Stick a piece of masking tape vertically along the side of bottle A.
4. Now, fill bottle A  $\frac{3}{4}$  of the way with water and pour this water into a separate cup, glass, or pitcher.
5. Place bottle B on top of bottle A, making sure the top of bottle B is facing up. Put a funnel into the top of bottle A, if available. This will make it easier to avoid water spills.
6. Now, grab your timer and get ready to record! Pour the water that you prepared in your cup, glass, or pitcher into the funnel and start your timer. Water should begin slowly draining through bottle B into bottle A.
7. After one minute has passed, use a permanent marker to make a small mark on the masking tape at the water line on bottle A.
8. Continue to make marks as additional minutes pass until the water has completely emptied from the bottle B into bottle A.
9. Now you can use your bottles to keep time! Empty bottle A, pour water through the top of bottle B, and watch the time pass using the marks on the masking tape!



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## STEM Connection:

Ancient Greek society definitely did not have electricity, and the first mechanical clock wasn't invented until the early 14<sup>th</sup> century—over 1,000 years after Greek civilization. However, they still needed a way to keep time. Sundials were very popular with many ancient civilizations; however, they were not much use at night. Another popular method of time measurement that worked during all hours of the day was the water clock. Water clocks are one of the oldest time-measuring instruments, and the earliest known example is from Egyptian civilization, over 3,500 years ago!

The Greeks began to use this method of timekeeping around 325 BC and called their water clock device a clepsydra, or “water thief.” Composed of stone, copper, or pottery, Greeks used water clocks to measure the length of speeches, plays, and work shifts. Some towns even constructed giant public water clocks so that everyone in the area could keep track of time.

Water clocks can have two methods of timekeeping: inflow or outflow. An outflow water clock consists of just one container in which water leaks out at a steady pace. Measurements on the side of this container tell the observer how much time has passed based on the decreasing water level. Inflow water clocks use two containers and time is measured based on how much water drips from one container into the other. What type of water clock did you just create?

## Career:

*Mathematicians* do research to develop and understand mathematical principles. They are concerned with numbers, data, quantity, structure, time, space, models, and change. They analyze all kinds of measurements and types of data and use mathematical techniques to help solve problems in the world. They often work with teams of scientists and engineers.

## Resources:

<http://deceptivelyeducational.blogspot.com/2014/04/how-to-make-water-clock.html>

<https://www.ancient-origins.net/ancient-technology/ancient-invention-water-clock-001818>

<https://www.ancientworldmagazine.com/articles/water-clocks/>

<https://www.ancient.eu/Timekeeping/>

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