

EarthCaching

Water Cycle



A Raindrop's Journey

Background

Water is constantly changing over the surface of the Earth. The water cycle involves both a cycling of matter and a flow of energy. Sunlight is the energy source that transfers into heat energy and drives the water cycle. When water is heated, it evaporates and when the water vapor rises it cools and releases heat into the atmosphere.

Unless it's cold, water will either be liquid or gaseous and it will transform between the two according to the temperature and pressure around it. A puddle of water will evaporate into vapor, then condense into clouds as it gets cooler. The clouds will eventually gather too much water and gravity will pull water molecules down as precipitation, flowing through streams, lakes, oceans, and underground into the water table. Eventually, the cycle repeats as water gathers into another pool where it can soak up energy and evaporate again.

Because this process happens everywhere on Earth and involves common compounds, we hardly think about the enormous masses and powerful amounts of energy that are in constant flux around us. In this exercise we'll ask you to think about these concepts from a vantage point that lets you see the various stages.

Know Before You Go!

- **Prepare for the Weather:** This EarthCache involves a walk up a hill in grassy terrain. This can get slick when wet, and also be aware of ticks and bugs that may live in the tall grass.
- **Safety Warning:** Be careful crossing roads and use crosswalks where present.
- **Plan for an Hour:** This EarthCache should take under an hour to complete once you are at the site, though this time will vary for each participant.
- **Seasonal Differences:** The grass height will change drastically depending on the season. Keep this in mind when picturing the area and its interaction with the water cycle.

Things to Bring

- A **GPS unit** or **smartphone** with a map program (such as Google Maps) is essential.
- **Compasses** (optional) are good to have to get your bearings.
- A **camera** (optional) will let you take pictures to submit along with your answers.

Bluffs

Go to the coordinates listed below. They are located on the west side of campus, a short walk past Bluff Hall, near a grave marker on a hill (pictured to the right).

$38^{\circ} 47' 20.76''\text{N}, 90^{\circ} 0' 33.3''\text{W}$
 $38.78910^{\circ}, -90.00925^{\circ}$

An alternative location that does not involve so much walking is at the following location.

$38^{\circ} 47' 17.5''\text{N}, 90^{\circ} 0' 31.25''\text{W}$
 $38.78819^{\circ}, -90.00868^{\circ}$

1. The slope ahead of you is an example of a bluff, a steep bank formed by river erosion, which leads down to a flat floodplain beyond. Looking out over this slope, list the ways you can think of for water to travel from where you are standing out beyond Stadium Drive below you.
2. You may or may not have listed water traveling underground through the spaces in the dirt beneath your feet. Looking around you, where would it be difficult for the water to move into the ground and down to the floodplain? Where would it be easy for the water to move into the ground?
3. Water can also move across the ground instead of through it. Looking around, where would the water travel more easily on top of the ground than through it?
4. This site is surrounded by areas of different vegetation types. Next to the grave marker there is thick, high grass, while to the north is a forested area. Near the road is a mowed lawn. Do you think the area of high grass holds water better or worse than the forested area? Does it hold water better or worse than the lawn? Why are these questions important for a discussion of the water cycle?



5. In an untouched setting, the floodplain would likely slope gently but constantly toward the river off to the west. This area has been landscaped including leveling out the playing fields below. Water that flows from your position out onto the playing fields will get “stuck” in big puddles. What would happen to it at that point?

6. If the water makes it across the fields it will flow into Cahokia Creek beyond the line of trees on the far side of the playing fields. What will happen to it then?

7. Depending on the day, you might see a few clouds or a lot of clouds. These clouds hanging over the field have water droplets that came from somewhere. Where do these clouds get their water from?

8. Briefly describe or draw the pathway of a raindrop that falls right where you are standing. Where do you think it would flow and where would it end up? You might imagine a few different paths. There are near-infinite possibilities so do not write them all out!