

## Percolation Perambulation – 40 minutes

### The Living South River is related to the Living Cave by Water!

The Percolator (host of this station) is a combination guide, timekeeper, and integrator of the park stations. Set a friendly and casual tone, and enjoy the interaction! The main content goals of this station are:

1. Students will hear a definition of percolation and play a game example for the process of water percolation, and extend it to a metaphor for idea percolation.
2. Students will be exposed to a soils map and have the opportunity to assess the soil by using augers and color/texture analysis.
3. Students will have an opportunity to see varied land use as it relates to a watershed, including historical use, both point and non-point source pollution potential.
3. Students may have a pair of binoculars to observe bird and water life, and will hear about the ongoing bird/mercury research on the South River, as we pass by the research nest boxes. You can carry a bird call listener and Identifier, if you like.

***Meet at the initial sign for the trail (you will be traveling counterclockwise in a loop from in between the pool and maintenance department back to watershed golf), and greet your group.***

**History of the hike area:** This old road bed was a major highway to the ford on the river (right at the chemistry station). There is a grain mill on the other side, and there was a lime kiln on this side. People were hauling heavy loads in wagons all the time through here. (An old fashioned industrial park!) (Mercury history, if appropriate - It was new-fashioned industry that added so much mercury to the river – in the 1940's and even before. People just thought that mercury would get buried in the sediment and not cause a problem, but instead, it is still there, and it moves up the food chain as each predator eats the smaller plant or animal below it. Big predator fish have enough mercury in their meat so that we shouldn't eat very many of them. DuPont is no longer located here, but they continue to pay for research and invest in cleanup for the mercury...that's what the bird research is about) Notice the new industrial park across the river, with the steps down to the river to test the water outflow from the plastic wrap company.

**Natural History:** Lots of invasive species have arrived, but the river also brings seeds to the flood plain of native trees and wildflowers, which thrive in the silty soil. There are lots of Virginia bluebells in the spring, columbine, persimmons, box

elders... It's a great place for migratory birds to visit, and the ephemeral ponds are good for salamanders, frogs, turtles.

### **Soils Portion of the Hike – 10 minutes**

Stop with your students at a flagged area and gather them on the tarp with the soils maps and posters. Kneeling is good. Help them find Grand Caverns on the map, and locate the soils numbers along the river, about where we are. Read just a few sentences on the back of the map about those soils, and ask the students if they would like to “ground truth” this, given that there are 100 kinds of soils in Augusta County. Demonstrate auger use, and send them out to bring back some samples. Line them up on the tarp as they dig deeper in the same holes, and exclaim over the size/color, etc. Let them use the color match, casually measure the rock sizes and test for texture between your fingers. Call them back in to the tarp, and evaluate what they found. Ask them if this would be a good place to build a hotel...notice that the soils description even says this wouldn't work. This can be a good segue to water movement through soil!

#### **Percolation Game Instructions**

(Place flags about 25 yards apart on the trail in advance for the boundaries)

Be sure that students get the idea of percolation – like water through coffee grounds, or soaking into the ground – always on its way to the river – even if it's in groundwater.

The Percolator stops and gathers students and chaperones around, saying “We're going to play a percolation game”. Hand out the water droplets to at least 3 students who have some blue in their clothing, and place them a little to the side while you begin to assign the soil particle sizes: “Ah-hah, you are a perfect silt particle! Silt is a medium size particle, and in this game, you can only use one arm out to stop a water particle.” (Hold out one arm to demonstrate). “And you could certainly be clay with your orange shirt. Clay is a tiny particle, but it has great water stopping power. You get to hold out both arms in this game.” “We'll need some sand – the largest particle. In this game, you keep both arms by your side...water can percolate easily around sand.” Continue until everyone, including adults, has a role, and then say: “Water droplets need to stay here with me, and all soil particles need to go on the trail between the two flags and work on a strategy for stopping the water particles from getting to the last flag. Remember, soil particles can't move their feet once they are in place (that's an erosion foul!), and sand has no arms, silt has one arm and clay has two arms to tag a passing water particle. All you need to do is lightly tag a water particle to stop them. Now go strategize until you hear the storm begin, and the water particles start moving!

Secretly tell the water particles that they don't have to follow any rules – water goes where it wants to, even off into the woods.

Shake the bells and announce that you hear thunder, and the storm is about to begin. Send the water particles running towards the flag, and stay involved to call fouls and cheer. Usually the water particles totally bypass all the soil particles, who get mad!

Remind everyone that water goes where it can, and give the soil particles another try at strategizing. Bring the water particles back to the beginning and repeat.

With lots of laughter, get help gathering up the laminated particles and droplets, and gather everyone around to make the connection between groundwater, surface water, soils. Since the students will be exposed to a non-point source demonstration and cleanup with a forest buffer or wetland, (and a bypass to a sinkhole), it's a good time to mention that pollutants can travel with the percolating water...just like coffee!

It's a good time to make a further metaphor to IDEA PERCOLATION. Tell the students that ideas percolate through people...like fashion for example. Some new fashion like cool sunglasses will be in a magazine. The "sand" people will rush to adopt it, so they can be cool too. The "silt" type people will probably wait until more of their friends have them, and they go on sale, and then they'll buy a pair. The "clay" type people may say they don't want any new-fangled sunglasses, and they are cool anyway.

Sometimes new ideas like energy savings or new ways to produce energy show up, and people do the same thing. Some people jump right in and try the new things, like solar power or a hybrid car. (They're more like sand, with new ideas flowing right through). Some are more like silt – waiting until the price goes down and the technology is perfected. And ... some are like clay- who say they don't believe in solar power!

At the Free Choice Station, student will have a chance to try out old-fashioned laundry, and some new-fangled energy devices. Encourage them to help those ideas percolate!

Drop your students off at Watershed Golf, pointing out their free choices. They will have 40 minutes to play golf if they wish, to examine and try out the alternative energy/old fashioned wash day equipment, or go to the gift shop/restroom.

Meet your next scheduled group!

There is a lunch break at the picnic shelters for all students and teachers, which you are welcome to join. There is a restroom in the gift shop. Thank you so much for Percolating!