7-MS-ESS2-4 Is groundwater clean water? Assessment

Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.

A group of students were planting a tree on their school campus during Earth Day. As they were digging a hole to place the tree into, they noticed water slowly pooling into the hole from the surrounding soil. They asked their teacher where the water was coming from. Their teacher, Mrs. Caesar replied "its groundwater, and probably was a few inches below the top of the ground. Remember it rained a few days ago."

The students finished planting the tree, but asked their teacher if they could collect some of the groundwater for further study. She quickly agreed and told the students that soil are great water purifiers and represent the largest natural filter on earth! They noticed upon returning the classroom that the water they collected was relatively "clear" of particles.

Mrs. Caesar asked the students to set up water filtration system using natural materials from their playground to see how clean they could get "dirty water". The students collected several different types of soil from the playground by taking samples from a depth of 6 inches, 1 foot, and 18 inches. The sample of soil at 6 inches was mainly topsoil. The sample at 1 foot was a mix of topsoil with sand, and the deepest sample(18 in) was pretty much all sandy material.

The team decided to test each sample for ability to clean the water by pouring grape kool aid into cups with a small hole at the bottom. Each cup then dripped its liquid through the hole at the bottom into a reservoir container(cup). The students examined the "filtered" kool aid and recorded their results.

The students made this table to help organize their results of the investigation.

Soil Samples	**Amount of Original Kool aid**	**Amount of liquid in Reservoir cup after 1 minute**	**Color of liquid in Reservoir cup after 5 minutes**
6 inch depth-Topsoil	25 ml	22 ml	Clear
12 inch depth-Topsoil/sand mix	25 ml	24 ml	Somewhat clear with a slight pink tint
18 inch depth-sandy	25 ml	25 ml	Slight purplish tint

1. What general conclusive statement might the team of students make about the results of their investigation?

2. What are <u>two ways</u> that the students could improve their investigation to more accurately test their dirty water filtration system?

3. How is gravity a part of the cycle that helps move ground water and also helps to filter it?

ANSWER KEY

7-MS-ESS2-4 Is groundwater clean water? Assessment

Item SA #1 *Topsoil is the best filter out of the three soil samples tested in removing particles that make the water unclean*.

Item #2 *Students could test other substances to see if contaminants can be filtered either chemically or physically from the soil samples(or trapped) so that only clean water passes through.*

Students might increase the types of soils that are tested and collect samples from a wider area of the playground.

Students might test multiple samples of the same types to see if the results are repeatable and yield similar findings.

Item #3 *Gravity is the reason that ground water moves downward through inches of topsoil, mixed soil, sandy soil, clay and other materials. As water moves through the soil, chemical and physical filters help mitigate the effects of contaminants.*