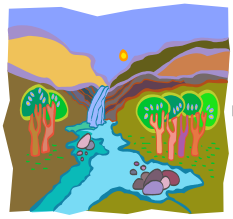

Green Classroom

Soak In/Runoff Model

TEKS Science: 5.1(A, B), 5.2(B,C,D,F), 5.3(A,D), 5.9(C), 5.10(A)
Social Studies: 9(A, B)
Reading: Students learn academic vocabulary in meaningful context, 5.27(A), 5.28, 5.29

AISD Essential Science Vocabulary
hypothesis, erosion, experiment, variables, results, conclusion, pollution, flow

Concept

Surface runoff vs. infiltration in an urban watershed and its effects on water quality.

Objective - Students will:

1) identify four common land uses found in a city watershed: streets, lawns, gardens, and construction sites;
2) recognize the positive effects of infiltration on water quality;
3) recognize land uses where chemicals could be present;
4) hypothesize the water quality of groundwater and surface runoff for each type of land use based on prior knowledge;
5) evaluate results and personal choices for water quality.

Time

20 minutes

Materials: Provided at the Green Classroom

- “Soak In and Run Off model
- 4 student watering cans
- red food coloring
- 8 empty jars to catch runoff and groundwater for each land type.

GREEN CLASSROOM LESSON - Soak In / Runoff Model

Introduction : The Bouldin Creek watershed is a city watershed. There are many streets, homes, lawns and gardens, and some construction in the area that drains to Bouldin Creek. These four land uses are represented in the Soak In/Runoff Model.

ENGAGE

1. **"**What's better – Water soaking in the land or running off? Why?
   (Water that has soaked in to the ground slowly moves through the soil and into a creek, allowing for filtration to take place. Water that runs off has not traveled through the entire plant/soil filter.)

2. Forming a Hypothesis: "Which land use in the model best imitates a natural watershed and will provide the best water filtration through the plants and soil? (native yard) Could the non-native yard (St. Augustine grass) also provide water filtration through the plants and soil?

Native Yard: "Are lawn chemicals used on a native lawn or garden? (no)"

St. Augustine Lawn: "Could provide filtration through the plants and soil. However, what chemicals are often put on this type of lawn to get it to grow in Austin's dry rocky soil? (fertilizers and weed killers)" Put red food coloring on the lawn to represent these chemicals. "Do you think the soil and grass will filter all the chemicals just put on the lawn? (any reasonable answer)"

Street: "Will any water soak into the street? (no) Is there any filtration for the runoff? (no)
Are there harmful chemicals on the road? (yes) What are they? (oil, gas, etc.)"
Put red food coloring on the street to represent these chemicals.

Construction Site: "Have you seen any construction going on in Austin? (yes, everywhere) Is the construction site a natural filter? (no, it has soil but no vegetation)
What could be carried away or eroded with the rainwater running over bare soil? (dirt)"

EXPLORE

- Ask four students to use a watering can to water each of the four different types of land.
- Refill the watering cans and do a second watering or however many it takes for all students to get a turn.
- Observe the amount of groundwater and surface water and presence of red food coloring (pollution) from each land type.

EXPLAIN

Variables: "What variables were the same in this experiment? (size of land, pipe for runoff, pipe for soak in, watering can size and type) What variables were tested? (land surface type and pollution)

Results: "Which water sample is the most polluted? (Street and lawn have chemicals in the form of red food coloring. Construction site has muddy water.) Which land use had the most surface runoff? (The street: lots of streets and buildings can cause flooding because it prevents soaking in.) Which land use had the cleanest water sample? (Native vegetation: the water has a tea color from organic materials, but it is clear.) Native plants have the longest roots, providing the longest amount of filtration."

Conclusions: **"**Changing the land use in your own yard can improve water quality. You can choose native plants, use compost instead of fertilizer on non-native yards, pull weeds and identify bugs."