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STEM Activity: School Surfaces Runoff

Type of Teacher Tool: Small Group or Individual/Differentiation
Targeted Grade Level(s): 5th
Targeted Curriculum Areas: Science and Mathematics

Learning Objectives:
The learner will:

1. calculate the amount of runoff caused by impervious surfaces.

Featured National Standards:
Grade 5

1. 5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
2. 5-ESS2-2. Describe and graph the amounts of saltwater and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.

Additional State and National Standards related to the content of our videos listed below for this lesson are also provided on the Educate.Today page where you find the video.

Resources/Materials Needed:

1. Environment 70: A Sewer Runs Through It
2. Infrastructure 3: The Science Behind Sewer Systems
3. Environment 54: Celebrate the Earth with Plants: Stormwater, Pollution, and Plant-Based Solutions
4. Environment 55: How Stormwater Runoff Pollution Affects the Environment.
5. Environment 56: What Is a Watershed?
6. Environment 57: Rainscaping: A Solution to Damaging Stormwater Runoff
7. Environment 61: Are there stormwater solutions that are better for a crowded urban area?
8. Environment 62: How do you set up your own rain catching system?

You will also need:

9. tape measures, yardsticks, calculators, pencils and paper.

Teacher Instructions:

Note: Use any combination of the Educate.Today videos listed above, or excerpts from the videos, to provide context, background, and frame of reference information on the subject of runoff pollution before conducting, or while conducting, the activity. Or use them as

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extension options for students to continue learning on the subject once the activity has been completed.

Necessary formulas:
Area = Length x Width, in square feet
Cubic Feet of Rain = Area in square feet x amount of rain per year in your area in feet
Total Number of Gallons = Cubic Feet of Rain x 7.5 gallons per cubic foot

1. Students should research the typical rainfall for your area.
2. Students should measure the various impervious surfaces at your school, like the parking lot, playground, track and roof.
3. Using the above formula for Area and the measurements of impervious surfaces, students should perform the calculation.
4. Using the above formula for Cubic Feet of Rain and the typical rainfall per year in feet, students should perform the calculation. This will equate to the total volume of rain that falls onto the impervious surfaces annually.
5. To help your students visualize the amount of water that this represents, have them continue their calculations by converting their answers from cubic feet to gallons using the Total Number of Gallons formula. A cubic foot of water equates to about 7.5 gallons of water. This answer represents the number of gallons of rain that would fall on your impervious surfaces in one year.
6. Remind your students that much of this water will runoff into storm drains and not be absorbed into the ground.

Assessment/Evaluation Options:

1. Teacher will check students' calculations for accuracy.