7TH GRADE

STEAM & SOCIAL STUDIES

GET YOUR DEPOSIT BACK

Driving Question:
How can changes be made in and around town to help control erosion, deposition and watershed contamination?

Materials Needed:
Examples of debris that might be found in watersheds such as plastic straws, Styrofoam, a bag of lawn fertilizer and pet waste, science notebook, sketchbook, writing utensil, ways to test prototypes such as access to a downspout or water pumps, prototyping materials such as filters, device for research

In this lesson, students will:

- recognize the effects of poor erosion control and come up with a comprehensive plan to help prevent erosion, deposition and watershed contamination.

TEKS:
Science: 7.8(B)(C)
Math: 7.1(A)(B)
Social Studies: 7.10(A)
Art MS 2: 1(A)(B); 2(A)(C); 4(A)(B)

SPINNING THE COCOON

Show students examples of debris that might be found in watersheds and ask for ideas of what they may all have in common. Explain that all of these items are things that might eventually end up in local or even global waterways through rain and wind. Define watershed and tell students that items such as plastic bags and Styrofoam that don't quite make it into trashcans are blown or washed through watersheds until they reach our local waterways. Excess lawn chemicals and pet waste travel in the same way and eventually contaminate our local watersheds.

In most parts of Texas, rapid population growth and development is occurring. Show students images of piles of earth and other materials displaced by construction and ask students what will happen if we get one of the heavy torrential downpours for which we are known. Students should be able to identify that the soil will be quickly washed away because there are no plant roots to hold it down. As a class, discuss where all of this eroded material goes and what effect it has on local waterways. Explain that this is fairly large-scale, and ask for examples of how erosion might be occurring in their own yard at home. Ask students what measures they think should be taken to prevent both small- and large-scale erosion and note their ideas on the board.

Further discuss the effects of watershed contamination, erosion and deposition on not only the local watershed, but also on the rivers and streams that eventually lead into the ocean.

KERNEL OF KNOWLEDGE

Land along the Texas coast is sinking and the seas are rising, leading to rapid erosion. Annual erosion rates can run as high as 35 to 40 feet near the Louisiana border and 10 to 15 feet on South Padre Island and Galveston Island.

METAMORPHOSIS

Students will create and design some mechanism to prevent and control erosion or to capture items and chemicals before they are deposited in the watershed. Students may test different plant and foliage types near downspouts to help maintain soil quality as well as provide a habitat for organisms. They may also choose to create a city plan and budget to install more waste receptacles to prevent more plastics from entering watersheds. Students will create a comprehensive report identifying the problem (erosion, deposition of chemicals, deposition of substances, etc.), how they have chosen to address it, and what their experimentation shows the outcome of their plan will be.

THROUGH THE LENS

Share with students the following question: "How does Texas government go about controlling erosion and deposition?" Have students research this and explain in a Flipgrid video how the Texas government addresses erosion and deposition issues.

UPCYCLE

Discuss the following with students: While humans modify their environment in unnatural ways (e.g., building massive dams, deforestation and infrastructure) some modifications of the environment are natural. For instance, mountains erode over time from wind, water, snow and glaciers. Additionally, rivers can form canyons and deposit sediments downstream called deposition. Why then would a government want to put control measures on erosion and deposition?

Students can research this topic individually and share answers, or students can brainstorm and share out ideas in a group or class discussion. They should understand that erosion and deposition hurts human consumption. It causes damage to land that is privately and government owned as well as buildup in lakes that are created by dams. It also clogs up water filtration systems, causes rocks to slide into roads from mountains, and can result in devastating landslides.

eARTh

While erosion can have a negative impact on the earth, the effects from the energy of water can be quite beautiful on objects. Show your students some images of the effects of erosion on rocks. If you google this topic, a number of great images will come up. Have them look closely at the images, using an artist's eye, and discuss what they see. One of the most stunning features is, often the varying lines that form from the erosion. Also, multiple types of textures might form or strong variations in value. Focus the discussion on the elements of art that are present in the images.

Next, perform an erosion experiment with your students. Give each student, or pair of students, three types of candy. They should be varying degrees of hardness. The students should take a close-up photograph of each. Next, provide the pairs with three small glass jars with lids. Fill them about three-quarters full with water and place one candy in each jar. The students will then take turns shaking the jars to see the effects that the force has on the candy. After a few minutes of shaking, the students should stop, take the candy out and take another close-up photograph. They should have at least four photos of each candy by the end. After some time, the candy may dissolve or completely break up.

Once they have finished, the students will review their photos and pay close attention to how the shape, size and color of the candy changed in each one. The students will now recreate these images in a painting or drawing. Using four small squares of white paper, have them recreate each stage on a separate square and mount them all on one big sheet of paper when they have finished. They should present their work to the class and talk about what they observed in the process, how their candy changed, and how this is reflected in their use of line, color, shape and size.

Community Garden
Take your students on a walk around your school or community. Look for places where erosion might be having a negative effect. Are there areas that seem to have excessive runoff? Is this having an effect on the surrounding soil? Choose some of these locations and work together to solve the problem. You could plant some grass or flowers or create a small cover for the affected area.

CAREER CONNECTION

Civil Engineer - Civil engineers plan, design, construct and maintain city infrastructure projects. They are responsible for nearly everything you see in the city, from roadways to sewer systems. Civil engineering requires a bachelor's degree.

Water Quality Inspector - Water quality inspectors use their knowledge of water-quality standards and legislation to ensure the safety of our water and compliance with local and federal laws. Water quality inspectors require classes in earth and water science, as well as many certifications and experience in the field.

CAREER HIGHLIGHT

Prior to the scientific discoveries made by James Hutton in the mid-1700s, humans erroneously thought the world was much younger. Hutton formulated the theory of uniformitarianism, which said that processes such as erosion create uniform layers of rock and sediment which can give us invaluable information about the past.