AQUARION
Water Company

WEAR-AWAY AND WANDERING WATER

This lesson will allow students to:

- Understand that water can move soil/materials
- Soil erosion can over time if not checked shorten the life span of dams and reservoirs, clog navigation channels and affect the quantity and quality of water delivered to towns and cities.
- Allowing water to not be contained and recaptured properly into the water cycle can cause reductions in useable water supply
- Water usually travels around objects in its path and follows the path of least resistance
- The courses of rivers and streams are created by obstacles and obstructions that water cannot dissolve or move
- What happens to these paths when there is little or no rain
- Conservation/Protection methods that should be used to ensure that the natural paths of the water supply are protected and safe.

PROCESS SKILLS: reading, following instructions, team building, observing, testing, analyzing results, writing, and discussion

NATIONAL SCIENCE STANDARDS:

S1.1 Demonstrates inquisitive behavior about his/her surroundings and environment.
S1.2 Uses simple scientific instruments to make observations and draw conclusions.
S1.3 Makes observations about the natural environment.
S1.4 Compares similarities and differences.
S1.6 Makes predictions about what will happen as a result of interactions.
S1.7 Makes inferences based on physical evidence.

KEY VOCABULARY:

Erosion the wearing-down or washing away of the soil and land surface by the action of water, wind, or ice.

Obstacle is something that impedes progress or achievement (an object that gets in the path of flowing water stopping its movement)

Displace to move physically out of position (a floating object *displaces* water, soil erosion displaces water from a river)

Runoff is the water that forms streams and rivers. The amount of runoff depends on the area of the watershed, how much it rains or snows, and whether the ground is steep and rocky or sloping and porous. Wetlands - marshes, swamps, and bogs - absorb large amounts of runoff and slow down the rate of flow. These areas also release water for a long time after a rainstorm, helping to keep rivers flowing in times of drought.

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Groundwater is the water below the earth's surface that fills all the pore spaces between soil particles or cracks and crevices in rocks. The areas where there is a large amount of groundwater are called aquifers. Groundwater, wetlands, and surface water are all connected. In low areas, groundwater may move into the open water areas and again become part of surface runoff in rivers and streams.

MATERIALS:

Paper cups Metal (tin) roasting pan Plastic tray
Paper towels Soil 1-gallon plastic jug, filled with tap water
(HAVE ENOUGH SET UPS FOR 4 TO 5 GROUPS)

PROCEDURE AND DISCUSSION:

1. Spread a thin layer of soil over the plastic tray.
2. Have the students press down on the soil to compress it – keeping it within the tray.
3. Lay the plastic tray with one short end in the Tin Roasting Pan and the other sticking out. This will allow the pan to act as a basin for any water running off the tray.
4. Take a plastic glass filled with water and have one student gently pour the water in one spot at the top of the plastic tray (this is the end not laying in the tin pan).
5. Discuss with the students the process they observed happening (erosion, underground water, changes in the soil)
6. Have students place one rock (obstacle) each in and around the original path of the water.
7. Again have a student pour the water in the same spot at the same speed as the original cup.
8. Discuss the change in the path, how the obstacles changed the path and what happened to the erosion
9. Now change the quantity of water poured in the same spot at the first two cups of water. (Water has more power because the volume is greater.)
10. Discuss how fast run-off effects land and rivers. Look at the amount of erosion now occurring.
11. Have one student hold up the one end of the plastic tray sticking out from the tin pan about 2 inches above the pan. While a fourth cup of water is poured at the same rate as the first two have the students observe the intensity with which the erosion and run-off is happening. (Water has more power because it is traveling at a greater speed- the angle is greater)

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12. Discuss the angle of the land changing and the force of the water thereby changing the amount of erosion that is occurring. If riverbanks are eroded does rain fall and run-off move faster or slower into the river.

13. For the last cup have the student continue to hold the Plastic Tray above the tin pan. Have the quantity of the water increase so that now you have both angle and volume affecting the strength of the run-off and the amount of the erosion.

These questions can be interspersed during each round of water pouring. Final discussion should include what happens to the aquatic life in a river with erosion and fast run-off. What life is affected by aquatic life dieing? (Bug population grows, small animals need to migrate to find food, food source for humans diminished) What land formations did you see created as the various cups of water were poured? (Use a map of the USA or the world to discuss all the land formations in the world.) How do you think we can prevent erosion and the run-off from moving so fast? Are waterways are altered by immovable obstacles like the rocks on the sheet?

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Handout

Student Name: _____

Answer the following Questions:

1. What happened to the soil on the plastic tray when the first cup of water was poured?

2. What is this process called?

3. What happened when the rocks were placed on the plastic tray?

4. Did all the rocks cause change the path of the water?

5. Is this how inland waterways were formed?

6. What could change the route of a stream today?

7. What happened when we tipped the plastic tray higher?

8. What is a real-life example of erosion?

9. Can erosion be stopped? Slowed?

10. If erosion goes unchecked what will happen to the overall water supply?

11. How can conservation/protection methods of water supplies help keep the overall supply of water safe?