
ACTIVITY: MODELING A WATERSHED

This activity is intended for 4th-5th grade but can be easily adjusted to your children's grade level and abilities. In fact, we encourage it! Have fun!

INTRODUCTION:

Comprehension of the critical role played by water in support of all life on Earth is an essential foundational element of the Inland Empire Resource Conservation District's (IERCD's) Water Conservation program. This activity is being provided to increase awareness of water uses and benefits.

BACKGROUND:

We live in the Santa Ana Watershed. A watershed is an area or region that separates waters flowing to different rivers, basins, or seas. Our main river within our watershed is the Santa Ana River, hence the name. The Santa Ana River is the largest watershed drainage south of the Sierra. The Santa Ana River is about 100 miles long with more than 50 tributaries. The river spans parts of San Bernardino, Riverside, and Orange counties as it drains 2,840 square miles of land out into the Pacific Ocean.

SUMMARY:

This activity demonstrates the process of erosion from rain and snowmelt and how stormwater runoff flows down a watershed through storm drains in cities and neighborhoods.

MATERIALS:

- | | |
|---|---|
| • Large aluminum pan or plastic container | Aluminum Foil |
| • Newspaper (building material) | Pieces of styrofoam (building material) |
| • Pieces of cardboard (building material) | Paper towels (building material) |
| • Soil/Sand | Gravel |
| • Cotton Balls | Sponge |
| • Food coloring (at least two different colors) | Spray bottles |
| • Water | |

DIRECTIONS:

This may be an individual activity or a full family project:

First, soak cotton balls in bowls with different food coloring and about 2 tablespoons of water. Set aside.

1. Fill one-third of the large aluminum pan or plastic container on one end with "Building Materials" in an irregular manner to mimic the Earth's surface.
2. Press a layer of aluminum foil over the ground surface.
3. Using a spray bottle, spray small amounts of water on the foil and notice how it flows downhill in watersheds. Have children record what they observe; the direction of flow, pooling, etc.
4. Cover the majority of the foil with a thin layer of soil, sand, and gravel (in any pattern you like until the pan or container is two thirds full. Do not completely cover the foil) to simulate various soil textures. *Leave areas of the model (at various elevations) with the foil still exposed to simulate paved portions of the watershed.*
5. Take a few cotton balls (one color) and place them, strategically, in areas where water may normally flow; top of hills and creases of mountains. This will allow water to be visible (Yellow works well for this part).
6. Spray water in increasing amounts onto the soil. Children record observations. Does the water move certain "soils" more than others? Does this depend on the slope of the watershed or the quantity of water? Does more water flow from the foil (paved) area than the soil area?
7. Place small amounts of different colored cotton balls around your landscape model to represent solid pollutant sources (e.g., animal waste, fertilizers, and pesticides). Place a few drops of food colorings at other places to represent liquid pollutant sources (e.g., soap from a car wash, oil from a leaky car, and sewage from a damaged septic system).
8. Place a small strip of carpet below pollutants placed on the pavement (i.e., directly on the foil) to model a strip of vegetation that will slow runoff and pick up pollutants such as oils and solids.
9. Wetland: Form a small depression in the soil and place a piece of felt or sponge in it to model a small wetland. The "wetland" can be placed below an area approximating a farm field with fertilizer and pesticide or a factory with various industrial pollutants.
10. *Erosion Control Barrier: Erosion control barriers such as fiber blankets or crimped straw tubes (called waddles) are placed on disturbed soil at construction sites to minimize erosion of bare soil before plant or pavement is in place.* Place a strip of paper towel "erosion control barrier" over an area of loose soil to minimize the erosion caused by the "rain" from the spray bottle as it hits the soil and runs downhill. Children can brainstorm additional ideas for pollutant controls that could be modeled as well, such as ponds, straw bales, vegetated swales, etc.
11. Have children predict how the various pollutants will be transported through the watershed.
12. Spray small amounts of water on your "pollutants" and observe results. Does the water pick up the substances and transport them as stormwater pollution? Does sandy soil filter out some pollutants, while gravel did not? Did your erosion control barriers, buffer strips or wetlands slow or stop the flow of stormwater pollution? Does more of the pollutant run off of the paved areas than the soil areas? Have students record their results.

Questions for Review, Discussion, or Conclusion:

- What is stormwater pollution?
- During a rainstorm, does more water flow off the grass or the streets? Is there more grass or pavement in the city and in your neighborhood?
- What is a watershed and why do we care?
- Can you think of any other pollutants that flow through your neighborhood? What are their sources?
- Did any of your treatments (paper towel, cloth or carpet) affect the flow of the polluted runoff?
- What else might you try to slow or stop the flow of pollution?
- Is it easier to prevent the release of pollution or clean it up afterward? Why?

EXTENSION:

Have children research and answer the questions listed below with a partner.

Questions:

1. What does erosion have to do with stormwater pollution?
2. What measures are being done in your area to prevent stormwater pollution?
3. Where does stormwater in your area end up?

References:

- Project WET (Water Education for Teachers) www.projectwet.org
- Educating Young People about Water - Water Curricula Database <http://www.uwex.edu/erc/ey paw>

Examples of Basic Watershed Models:

