Watershed Model Activity Kit

Core Activity: Watershed Model

Activity Summary:
Investigate the connections between the ground under your feet and the water we drink through this hands-on watershed model exploration. Students will predict how water flows on a watershed, identify major pollution types, and observe how this pollution travels to our water systems.

UNIT: Water Quality

GRADES: Pre-K and up

MATERIALS:
- Enviroscape Watershed Model
- Watering Can or Spray Bottle
- Tub of model figurines
- Tub of pollutions
- Set of Watershed Scenario cards
- Tile and Sponge

TIME REQUIRED: 40 minutes

OBJECTIVES:
Students will be able to:
- Define Watershed
- Predict and observe the flow of water on a watershed
- Define and identify common pollutants
- Identify ways to mitigate pollutions in our water systems.

TEKS CORE CONCEPTS:
- +++

For specific TEKS, see document in Instructor Resources Tab

Introduction (*10 minutes*)

1. Preface that today we are going to talk about "sheds". Get students thinking about what that word means, where they have heard it, and what it has to do with water.
2. Explain that this "shed" has to do with something coming off, like a snake shedding its skin. A watershed is an area of land that water sheds to the lowest point (ie. Into a creek, lake, or river)
3. So when we talk about watersheds all we are talking about is land. EVERYTIME you are on land, you are in a watershed. So when I say "watershed" you say "land" (call and response).
4. Let's build our city of Austin to see how we as people impact our environment

Watershed model (*20 minutes*)

1. Set up the model. Fill watering cans with water, set out figurines, place container below model so water drains into container.
2. Have students gather around the model.
3. Build an Austin community on the watershed model using figurines.
   - Get students to help put figures where they belong
   - Landmarks to consider: Dog park, Zilker park, construction site, neighborhood, fast food restaurant, shopping center/mall, small farm, factory with point source pollution, school.
4. Pass out situation cards to students to read aloud to group. After each card, have a student recap the story and identify the watershed pollutions in each.
5. Before adding the pollution to the model, discuss where the particular pollution would be found within the community.
6. Once all the stories have been read and pollutions placed, predict water flow after a rainstorm.
7. Have students pour or spray down a rainstorm.
   - Display storm drain pictures to illustrate how water flows through storm drains into our creeks. This water is NOT filtered or treated in any way in its journey to the creek.

Pervious and Impervious Cover (*5 minutes)*

1. Discuss the difference between pervious and impervious cover using the sponge and tile as models. Ask for predictions for why each type of material is used for context. *Pervious cover absorbs water like a sponge while impervious cover causes run off like a tile.*
2. Pour water onto each type and observe what happens. Be sure it is in an area that can get wet, as water will run off/drip.
3. Discuss how storm drains and pervious/impervious cover can affect water and pollution flow into creeks, lakes, and river. Ask students for specific examples of each pervious and impervious cover.
4. Talk together about why pervious cover is preferable in a city and can help lessen the effects of water pollution.

Closing (*5 minutes*)

1. Ask the students to share their findings; Anything unusual, surprising, or interesting their learned or observed.
2. Change in Austin starts with individuals and families. Have students brainstorm on how they might change family habits to keep their house and yard pollution free. Below is a chart that highlights Austin's pollution problems and solutions:

Pollution Problem	Potential Solutions
Weed killers-harm amphibians and wildlife in creeks	Hand pull weeds, properly dispose of chemical containers.
Pesticides – Toxins to kill insects can also harm humans and wildlife.	Treat fire ant mounds with hot water. Use organic pest control methods such as predatory insects, diatomaceous earth, or a garlic pepper spray on plants.
Dog Waste/sewage-may carry harmful pathogens that cause diseases in humans and other mammals.	Pick up after your pet.
Fertilizer – nutrient pollution causing algae blooms and low dissolved oxygen	Plant native to reduce the amount of water and fertilizer needed. Use compost or compost tea as a natural fertilizer. Don't over fertilize.
Construction Debris – Dirt and sediment washes into creeks clogging fish gills, killing aquatic plants and insects	Place sediment barriers or tarps over sand and silt piles. Plant rain gardens near street to catch organic pollution and extra sediment.
Car chemicals – car soap, car oil, paint	Wash cars on lawn to filter soap. Use kitty litter to absorb oil then throw away. Recycle oil at a service station.
Toxic household cleaners	Pour dirty water down the sink to be treated at a wastewater facility. Choose non-toxic

	cleaners like vinegar or borax. Take paint and toxic chemical to the hazardous materials recycling center.
Litter	Keep a trash bag in your car, secure garbage bin with lid and bungee cord, clean up yard with guests after a party. Recycle, reuse, reduce.

Next Steps: See Supplemental Activities

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Background Information

ADDITIONAL INFORMATION

- **City of Austin Watershed Finder –** http://www.austintexas.gov/GIS/FindYourWatershed/
- **Maps included:** River basins of Texas, Austin's Watersheds

What is a watershed?

Everyone lives in a watershed, an area of land that drains water into a particular creek, river, or lake. These bodies of water interconnect to form a larger watershed that drains to the ocean. The watershed of the Colorado River begins in San Saba near the Texas/New Mexico border and includes all the land that drains into the Colorado River as it travels down to Matagorda Bay and the Gulf of Mexico. Austin has 66 creek watersheds which drain to Edwards Aquifer/Barton Springs, Lake Travis, Lake Austin, or Town Lake. All these lakes are part of the Colorado River, Austin's source of drinking water. Water in Austin also drains into caves and sinkholes in the recharge zone and flows into the Edwards Aquifer. Groundwater resurfaces at hundreds of springs around Austin and contributes water to our creeks.

Topographic maps are used to define a watershed boundary, along with a walk of the area to observe terrain, changes in water flow due to erosion, man-made changes in the landscape, and unusual storm sewer flow routes. Watershed maps are available from the City of Austin.

Scientists divide the land into watersheds to understand how water flows on land and where it will eventually end up. Gravity pulls water downhill; therefore a watersheds boundary is defined by high points such as peaks and ridges. After it rains, water can either soak in to the ground where there is **pervious cover** (garden, forest, wetland) or run off **impervious cover** (parking lots, roads, buildings) into a storm drain or creek.

Rainwater travels over all the surfaces in a watershed, so water quality is greatly affected by the condition of the land and what is occurring on it. Whatever pollutants are present on land will most certainly make their way to nearby water systems. One of the easiest ways is through the storm drain system, which drains directly to creeks to prevent flooding. This type of pollution is called non-point source because after a rainstorm we cannot tell which part of the watershed the pollution came from. An example of point source pollution would be effluents from a factory draining directly into a river.

It is useful for elementary students to define the boundary of the smaller watershed where they live and go to school. The condition of the body of water in their watershed will be an indicator of the environmental problems facing their neighborhood. Students can relate to the effect of their own behavior and choices and focus efforts on cleaning up pollution sources close to home.
Examples of neighborhood pollution can include:

- **Oil** leak from a car.
- Spraying **pesticides, fertilizers**, and **weed killers** in yard.
- Leaving **litter** on the ground after a party or overflowing trashcans.
- **Detergents** from washing the car or dumping out dirty mop water.
- **Pet waste** from not picking up after pets.
- **Sediment** from construction sites.
- **Paint** and other household chemicals.

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Supplemental Activities

Pre-K – 2nd grades

- Watershed Scavenger Hunt – Found in Instructor Resources Tab.
    - Complete outdoor scavenger hunt to identify what is found on your watershed.

3rd – Adult grades

- Find your Watershed – have students identify which Creek watershed the live in, go to school in, etc. http://www.austintexas.gov/GIS/FindYourWatershed/
- Complete a Litter Cleanup Service Activity. All materials available for free checkout can be found on Keep Austin Beautiful's website.

Tabling for a Fair/Festival

- Set up model on a table and run mini-demonstrations with different pollutions.
- Ask participants to identify a pollution they contribute and brainstorm a solution.

SERVICE ACTIVITIES

- **Litter Cleanup**
- **Seedballs**
- **Storm Drain Marking**