Build a Watershed: Just Add water!

Objectives
Participating young people and adults will:
1. Build a model watershed
2. Describe a drainage basin
3. Describe factors about the landscape which influence the path water takes on its path down the "mountain."
4. Explain what is meant by statement "We all live downstream."
5. Describe how land use can influence aquatic habitats.

Youth Development Objectives
Participating young people will:
1. Develop analytical skills
2. Observe and acquire information about model and analyze
3. Problem solving
4. Build and use models

Roles for Teen and Junior Leaders
1. Assist with organizing materials and setting up activity.
2. Photographer or recorder of events.
3. Assist with clean up.

Potential Parental Involvement
1. See "Roles for Teen and Junior Leaders" above.
2. Review maps to identify major rivers in or near community.
3. Review maps to identify the watershed in which the family resides.
4. Identify activities within the watershed that may influence water quality.

Evaluation Activities/Suggestions
1. Have youth describe why the water gathers collects and moves down the watershed.
2. Ask youth to describe how the water cycle influences aquatic habitats.
3. Have youth review map of local area and identify nearest river and stream.
4. Ask youth to describe how the landscape influences the waterways in a watershed.

Best Time: Anytime. However this should serve as an introductory activity. This activity introduces a very important "foundation concept" that is other lessons build on this one.

Best Location: outdoors or indoors

Time Required: 10-20 minutes

Equipment/Materials
Newspaper
large black garbage bag or landscape plastic
two or more spray bottles
water
Kool-Aid or similar powder drink mix without sugar (optional)

Safety Considerations
caution should be used with the spray bottles and resulting spills should be cleaned up

References
Caduto, M. J., 1985, *Pond and Brook: a Guide to Nature in Freshwater Environments*, Prentice Hall, Englewood Cliffs NJ
ISBN 0-87451-509-2

Schmidt, B, 1991, *Sportfishing and Aquatic Resources Handbook*, pp 43-44, 48-55, 72-73, Kendall Hunt Publishing, Dubuque IA
ISBN 0-8403-6599-3

Schmidt, B, 1997, *Advanced Sportfishing and Aquatic Resources Handbook*, pp 99-101,107-108, Kendall Hunt Publishing, Dubuque IA. ISBN 0-7872-3544-x

Lesson Outline

Application

Preparation

1. Fill spray bottles with water; use at least two or more.
2. Find a nice level spot that can get wet or is easily cleaned up, preferably outside.

Presentation

I What's a watershed
    A. Definitions
    B. Examples of watersheds

Ask youth to **BRAINSTORM** definitions of the word watershed. **LIST** their responses on a blackboard, easel pad. **EXPLAIN** that sometimes models are used to teach and we are going to build a model of a watershed. **BRAINSTORM** list of nearby waters and watersheds.

II. Water cycle
    1. Precipitation
    2. Evaporation & transpiration
    3. Percolation (soaking in)
    4. Condensation (forming clouds)
    5. Run off

Ask youth to **BRAINSTORM** sources of water we fish . Likely they will say precipitation, from upstream or underground.. **EXPLAIN** that group will be building a watershed and demonstrating what happens when it rains

Crumple newspaper sheets and form a pile. Use at least six sheets; use more to make a larger watershed. Cover the pile with a large white plastic bag. This is the watershed

III. Land: its influence on water's path
    1. Topography–lay of the land
    2. Climate–how much precipitation
    3. Ground/bedrock–how much can soak in
    4. Human activity

Youth with spray bottles **SIMULATE** "precipitation" over the watershed by spraying the plastic with the spray bottles. (Setting should be set to mist).

Youth should **OBSERVE** and **DESCRIBE** how water gathers and flows, due to gravity to lower end of watershed especially the paths run-off takes (simulated streams and rivers). If necessary **SHOW** how small streams gather and collect other streams and how these larger streams gather others forming "rivers."

ASK youth to **ANALYZE** what they **OBSERVED** and relate that to places they fish**.** Then **ASK** what things in the model influence this model and the path water takes as it move through.
The should identify factors like climate, slope of land, composition of the ground, amount of rain. **USE** probing questions like: "what do you think would happen if...
Flattened or raised 'hill', used a garden hose, used newspaper instead of plastic.

SIMULATE human disturbances (such as pollution or erosion) with kool-aid or other power drink mix. **ASK** youth to **OBSERVE** what happens to water downstream of this 'spill.' **ASK** youth to **DESCRIBE** what they **OBSERVE** and how activity in the watershed can effect downstream habitats.

ASK youth to **DESCRIBE** activities in their own watersheds that might impact the water they drink and/or fish in.

CLOSE the activity by **ASKING** youth to define: watershed, the factors that influence path water takes as it moves through a watershed and what is meant by "we all live downstream."

Summary Activity
1. Do a quiet reflection and ask youth to visualize their favorite river or stream (or for saltwater habitats the inlets and outlets of bays etc.). Have them list in their journals or on separate paper the things that influence the path that water takes. Have them describe in their own words how humans use the land, and how those activities can influence the watershed.

Background :
Precipitation that falls on land either **soaks into the ground or runs off.** Water that does not soak in runs off into streams. Streams usually follow well-defined **paths or channels**. Channels then converge into a river. These small streams, channels and rivers are draining a particularly well-defined land area. This area is commonly known as a watershed.

A watershed is the land area drained by these particular bodies of water. The land area of a watershed is defined by elevated lands, primarily hills and mountains. Elevated lands separate watersheds from one another by causing precipitation run-off to run in different directions -- down one side or the other.

All watersheds eventually empty their waters into larger bodies of water (such as the Mississippi River or the Delaware Bay or Pacific Ocean). These larger bodies of water then transport their waters to the seas and oceans. Watersheds can be enormous or quite small. Large, well-established watersheds supporting major rivers are known as river or drainage basins.

Understanding what a watershed is and how it functions helps one to comprehend "connectedness." Some of the precipitation that falls in your backyard runs off to ditches, storm sewers and brooks. Eventually, it flows into a creek, lake, or river. This body of water is then used by others for drinking, swimming, fishing, and other activities. Wildlife, too, are dependent upon these waters.

Exhibit or Sharing Suggestions
1. Draw maps of watersheds
2. Build more detailed models
3. Write essay or short narrative on path of a single raindrop beginning as it falls and moves through the watershed.

Community Service and "Giving Back" Activities
1. Label street storm drains with message reminding citizens where water goes. Example: *This water goes to the _____ river.*

Extensions or Ways of Learning More
1. Talk a walk along a stream or river noting tributaries, land use. Maps or written descriptions can be prepared from this information.
2. More detailed scale models can be built using modeling clay and paint trays.
3. Contact the local extension office, conservation district, water authority and natural resource agency. Find out what they do to protect watersheds.
6. Add food coloring to one of the bottles. This bottle can then represent some disturbance in the natural system such as acid precipitation. Now see what happens when this mist falls. Compare to a real watershed.

Links to Other Programs
Using the models or maps prepared, identify potential fishing hotspots.