



## **WATER LESSON PLAN**

### **HOW DOES WATER MOVE THROUGH A WATERSHED?**

#### **BACKGROUND:**

As rain falls on the ground, one of two things happens to the water. When the ground is already saturated, it moves downhill as runoff, eventually finding its way into larger bodies of water such as rivers, lakes and oceans. If the ground is not saturated, it soaks into the ground. Watersheds are defined as the land area from which surface runoff drains into a stream, channel, lake, reservoir or other body of water. Groundwater is water found in spaces between soil particles below the ground surface.

This activity focuses on watersheds.

Students build a sample landscape to see how water moves through watersheds.

#### **TIME:**

Approximately 1 hour

#### **MATERIALS:**

Each group of 4-5 students should have:

- 4L plastic ice cream pail
- Large sheet of newsprint
- Old newspapers
- Scissors
- Tape
- Spray bottle with water
- Water soluble markers
- Large basin or mop (to catch or clean up water)
- Tables or flat outdoor space to work
- Area map, watershed map or provincial map



## PROCEDURE:

1. Discuss the concept of watersheds. Gather students around the map.
  - Can they show where they are and point out the water in their area? (River systems and lakes, etc.)
  - Where does the water in the watershed come from, and where is it going? E.g. West to East, mountains to water bodies, etc.
  - How do the seasons and weather affect the watershed? Snow in mountains, heavy rains.
  - Water is a good mover. What can it move? Soil, sand, leaves and trees, rocks, etc.
  - Water is a good dissolver. What dissolves in it? Chemicals and nutrients on land that are carried into the water, like pesticides, oils, salts.
2. Who cares about the health of a watershed? Why is a healthy watershed important? Who are the stakeholders? Plants and animals that depend on it for life. People – farmers, people who fish, hunt and trap, forestry workers, people in cities, people who look after landfills and water treatment plants, everyone!
3. Student groups will make their own watershed. It doesn't have to look like the watershed they live in, it can be made up, but include the following parts:
  - Natural area-e.g. rivers, lakes, forests, prairie, wetlands.
  - Agricultural area –e.g. farms, grains or animals.
  - Industrial area – e.g. industry or factory, mining.
  - Residential area – e.g. houses, apartments, parks.
  - Infrastructure – e.g. roads, water or sewer treatment, power generation, landfill.
4. Making the watershed model:
  - On a large piece of paper, groups plan and draw the things that will be in their watershed, including some of the ideas above.
  - Colour the drawings on the watershed with soluble markers. Students can colour code their drawings, if desired, using different colours for agricultural, industrial and natural features.
  - Use the ice cream pail to create a “mountain” or hill form, and crumple newsprint to create other landforms, hills and valleys.
  - Set the watershed drawing over top and tape it into place to hold it and to create the desired topography. Having a slight upstream/downstream slant will help students see how water affects their drawing.
5. Looking at their watershed, can students predict what will happen when it rains and/or floods the landscape?



6. Using the spray bottle, gently rain on the watershed drawing, observing what happens to the different areas, and if water collects in certain places.
7. “Rain” harder on areas of the watershed to see what happens, where does water collect? What happens to roads, water systems, residential areas, farms and landfills?
8. Discuss watershed management and planning. How would students change the watershed plan based on the results?

### **GOING FURTHER:**

1. Adding pollution and nutrients to watershed drawing.
  - During the initial planning and drawing of the watershed, students can add dots of pollution and nutrients from soil near their industrial or agricultural sources. Colour code the dots so you know which represents pollution and which represents soil nutrients.
  - After raining on the watershed, discuss where the ink traveled from pollution spots and nutrient sources. Should this affect industrial planning, or placement of agricultural spaces within a watershed?
2. Including “acid rain.”
  - Tint one spray bottle of water with food colouring to represent acid rain. Observe what happens when acid rain falls on the landscape. How might it affect plants, animals, and people that live in the watershed? How might it affect the water and land area of the watershed?
3. Ground water
  - After raining on the watershed, look at where water collected underneath the paper. Should the location of that ground water affect where industrial or residential sites are developed?
  - Is the ground water coloured? What contaminants or nutrients did it pick up from the surface?
4. Looking at our own watershed
  - Using a map, or an aerial view of the watershed you live in, such as are available on Google Maps, locate where the water is coming from, and flowing towards. At what elevation is your community above sea level (0m), in relation to the elevation of where the water is coming from and going to? For example, the elevation of Edmonton is 668m, Buffalo Narrows is 434m, La Ronge is 379m, and Churchill MB is 0m.
  - What surrounds some of the water bodies in your community and region? Is there bush, cropland, forest, houses, industry, etc?
  - What could be the effect of these features on the water quality in your community and region?
  - What do you know about the quality of this water for drinking, and as



- habitat for the species that call it home? How could you find out more about your water quality?
- Visit a local stream, or water body and find it on a map. Identify stream tributaries to find out its source and ultimate destination (lake, ocean, etc.).

This activity was adapted from "Branching Out!" *Project WET Curriculum and Activity Guide*, 1995.



## CURRICULUM CONNECTIONS

<b>Grade 2 Science: Outcome: AW2.2</b> Assess the importance of air and water for the health and survival of living things, including self, and the environment.
<b>Grade 3 Science: Outcome: ES3.2</b> Analyze the interdependence between soil and living things, including the importance of soil for individuals, society, and all components of the environment.
<b>Grade 4 Science: Outcome: HC4.3</b> Assess the effects of natural and human activities on habitats and communities, and propose actions to maintain or restore habitats.
<b>Grade 5 Science: Outcome: MC5.3</b> Assess how the production, use, and disposal of raw materials and manufactured products affects self, society, and the environment.
<b>Grade 7 Science: Outcome: MS7.2</b> Investigate methods of separating the components of mechanical mixtures and solutions, and analyze the impact of industrial and agricultural applications of those methods.
<b>Grade 8 Science: Outcomes: WS8.1</b> Analyze the impact of natural and human-induced changes to the characteristics and distribution of water in local, regional, and national ecosystems. <b>WS8.2</b> Examine how wind, water, and ice have shaped and continue to shape the Canadian Landscape. <b>WS8.3</b> Analyze natural factors and human practices that affect productivity and species distribution in marine and fresh water environments.
<b>Grade 10 Science: Outcomes: SCI10-CD1</b> Assess the consequences of human actions on the local, regional, and global climate and the sustainability of ecosystems. <b>SCI10-CD3</b> Examine biodiversity through the analysis of interactions among populations within communities. <b>SCI10-CD4</b> Investigate the role of feedback mechanisms in biogeochemical cycles and in maintaining stability in ecosystems.
<b>Northern Lifestyles 10,20,30</b> -Students will focus on preserving, maintaining and enhancing a unique way of life that is still practiced by people in Northern Saskatchewan.