



# Water education the Project WET Way

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**As much in developed countries as in developing countries, an understanding of how to conserve water resources and protect them from catchment pollution should be an important part of children's education. Project WET, started in the US but also operating internationally, has a number of innovative, fun activities to capture children's interest.**

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Rain, falling on the land surface, can take many paths. However, it is strongly influenced by the uses of the land on which it is falling. For example, rain falling on forests or grassy areas will result in much of it infiltrating or soaking into the soil. Some of the rain will be used by the plants and be returned to the atmosphere, and some will percolate to ground water. In residential areas, rain falling on roads, roof-tops, pavements and driveways may run off to streams or sewers. This leads to a decrease in the amount of water recharging to the ground. It also provides the possibility for degrading the quality of the water, as runoff gathers existing pollutants on the ground as it flows to streams.

Although this information is familiar to WATSAN professionals, it needs to be understood much more widely. Water is a finite source upon which the whole ecosystem depends for its existence. Therefore, it is important to protect the ecological integrity of our natural systems while satisfying the human need for water. How can we develop an understanding of the water cycle that will enable us to make wise interventions, if necessary, in the water cycle for humans and the rest of the natural world? Educating children and adults provides an excellent approach to ensuring responsible behaviour towards our water resources. In particular, teaching children at an early age can provide an awareness of the need for all living things to have clean water, and encourage a lifelong commitment of responsibility to our water resources. Project WET (Water Education for

Teachers) attempts to do this – it is an innovative, hands-on education programme teaching about water resources.

Project WET is committed to global water education implemented at the community level, and it includes an international and national programme. In the United States, there are co-ordinators in every state teaching educator workshops and hosting events using creative and innovative Project WET activities. In New York, Project WET is used widely with a large number of audiences, including: girl and boy scouts; museum operators; home-schooled children; nature centre staff; college students; elementary, secondary and middle school students; high school students; local government officials; and catchment and watershed leaders.

Project WET's water activities also teach more than water education. Most activities are designed to promote critical thinking and help children develop skills in problem solving. Gathering, organizing, analysing and interpreting skills are also taught as the children carry out each activity. Lastly, besides being hands-on and easy to use, Project WET activities are fun.

In this article, three activities will be described from the *Project WET Curriculum and Activity Guide*,<sup>1</sup> which are illustrative of the project's methods. All three impart water-related understanding in catchments:

- the water or hydrological cycle,
- constructing a catchment model, and
- demonstrating non-point or diffuse pollution sources.

## An Incredible Journey

*Incredible Journey* is an activity where students imagine they are water molecules travelling through the water cycle. They have several destinations they can visit on their journey – clouds, plants, animals, rivers, oceans, lakes, ground water, soil and glaciers. Each time they travel to a different place, they keep a journal of the places visited by picking up a coloured bead. A different coloured bead represents each destination. Their 'journal' for keeping a record of the places visited, in the order they were visited, is a pipe cleaner (a flexible, thin wire covered with chenille). At each place, the beads are threaded onto the wire.

To determine where the water molecule next moves, the student tosses a die, and then moves from clouds to plants, for example. At the end of their journey, students have a record of their movements represented by approximately eight to ten coloured beads threaded onto the wire or pipe cleaner. The record is then used to assist them in comparing the movement of water during different seasons and at different locations. Students can discuss together the cycling that occurred for each student (or water molecule) during their return visits. As the students gain understanding of how water travels through the hydrological cycle, activity leaders and teachers are able to introduce a current or recent local problem, such as a flood. Understanding the water movement through the water cycle also can provide an opportunity for students to investigate how water becomes polluted, and how



Students imagine the journey of a water molecule during the New York State's Project WET annual Make-A-Splash Festival.

travelling through the water cycle can clean it. Skills taught to students in this activity are:

- the necessity of organizing their data (beads, in this case)
- identifying paths water can take and their relationships to one another, and
- interpreting and presenting their data.

*Urban Incredible Journey* is a modified alternative to the original *Incredible Journey* activity specifically for students living in urban areas. It was used with fourth, fifth and sixth grade students at the New York State's Project WET annual Make-A-Splash Festival. The festival was particularly timely because of recent flooding in the area, and this provided a useful teaching opportunity for educators. Another opportunity taken made students aware that Binghamton, and other parts of New York, are part of the headwaters for the Chesapeake Bay Watershed

(catchment). The Chesapeake Bay is a critical estuary system threatened by land development. Each of us has a responsibility for keeping the land, thus the water, clean.

### Branching Out

This is an activity that provides understanding of drainage patterns, helps students predict where water will flow, and demonstrates how the flow connects watersheds or catchments. Students build a simple 'model' of a watershed with a piece of light, waxed paper by slightly crumpling the paper in their hands. This forms peaks and valleys in the paper, and becomes their watershed model. Students begin the activity by discussing with the teacher parts of a watershed including ridgelines and where streams will flow, depending on the topography of their model. Students are then asked to draw the streams on their models with washable coloured pens, predicting

where water will flow. Educators may ask older students to site houses or communities in their watershed. Students are then provided with a spray water bottle to test their predictions of flow patterns. This is accomplished by spraying water lightly onto the model watershed. The consequences may be that many potential communities and houses wash away in one or several rain events.

With this activity, educators can also demonstrate the aerial view of water flow as tree branch patterns, with the smaller of the 'twigs' or streams flowing into the main stem of the branches or tributaries, and then to the tree trunk or lake or ocean. *Branching Out* is also used in New York to teach students of all ages about stormwater runoff in urban areas.

### Sum of the Parts

Understanding how each of us contributes to river pollution as it makes its



Students discussing travel records represented by coloured beads in the activity *Incredible Journey*.



Using the *Branching Out* activity, one group's watershed is flooded under the heavy 'rain' administered.

way through a watershed is the goal of this activity.<sup>2</sup> Objectives of the activity are to have students recognize non-point or diffuse pollution sources, and depending on age group, learn management practices to prevent different types of pollution. One lesson learned is that the quality of the body of water is directly attributable to the uses of the land draining into it. For example, if a road runs adjacent to a stream, automotive oil and gasoline from leaking automobile engines and petrol tanks, as well as food wrappers carelessly tossed through the window, may be picked up by water running off the road into the stream. In the case of a new construction along the stream bank, sediment, if not contained by barriers or catch basins, can be carried by runoff into the stream.

The activity *Sum of the Parts* begins by describing to the students a segment of the community, with several parcels of land. The community exists on a slope, with a river running adjacent to the land. In carrying out the activity, each student is provided with a parcel of land to develop in any way he or she wishes. The students then create drawings on a sheet of paper representing how they wish their land to be developed. Some students draw play areas or petting zoos; others draw horse farms, pig farms, gardens and parks and residential areas equipped with swimming pools. The sheets of paper representing parcels are then connected to form the residential community along the river. Starting from the upstream parcel, students determine the type of

pollution each parcel may contribute to the stream, parcel by parcel. Each parcel owner physically contributes an object or objects representative of the type of pollution commonly attributed to that land use. The pollution then moves down the stream which runs adjacent to the connecting parcel. Although each parcel may contribute only a small amount of pollution, the students realize that at the bottom of the slope, at the last parcel, the stream now contains a considerable amount of pollution from the upstream neighbours. The result is the final parcel owner has a polluted stream adjacent to his or her land. The students also recognize that it is not always easy to trace pollution back to its source. Educators can then discuss with the students the challenge of protecting the stream from different land uses, and solicit appropriate management practices for each of the parcel developments.

## Making connections

Sediment, nutrients (nitrogen and phosphorus) and pathogens (disease-causing micro-organisms such as bacteria) are three major pollutants of concern affecting water quality in the United States. Project WET can assist in developing children's understanding and the knowledge necessary to address these sources of pollution. Having high-quality water of sufficient quantity to manage in a sustainable way for a healthy environment is everyone's business.<sup>3</sup>

Currently, Project WET exists in 21 countries. If your organization or

agency is interested in becoming a country sponsor, or if you are interested in more information about the programme and its publications and products, including the *Project WET Curriculum and Activity Guide*, contact Project WET directly via email at [projectwet@montana.edu](mailto:projectwet@montana.edu) or via the Internet <http://www.projectwet.org/>.

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## References

- 1 The Watercourse and the Council for Environmental Education (1995) *Project WET Curriculum and Activity Guide*, Project WET, 201 Culbertson Hall, Montana State University, Bozeman, Montana 59717-0570.
- 2 Dorworth, Leslie and McCormick, Robert, *Impacts of Development on Waterways*, Planning with POWER, Purdue University Cooperative Extension Service, West Lafayette, IN 47907 [www.planningwithpower.org](http://www.planningwithpower.org).
- 3 United Nations Educational, Scientific and Cultural Organization (UNESCO) (2006) *Water, a Shared Responsibility*, United Nations World Water Development Report 2, 7, Place de Fontenoy, 75007 Paris, France and Berghal Books, 150 Broadway, Suite 812, New York, NY 10038, United States of America.