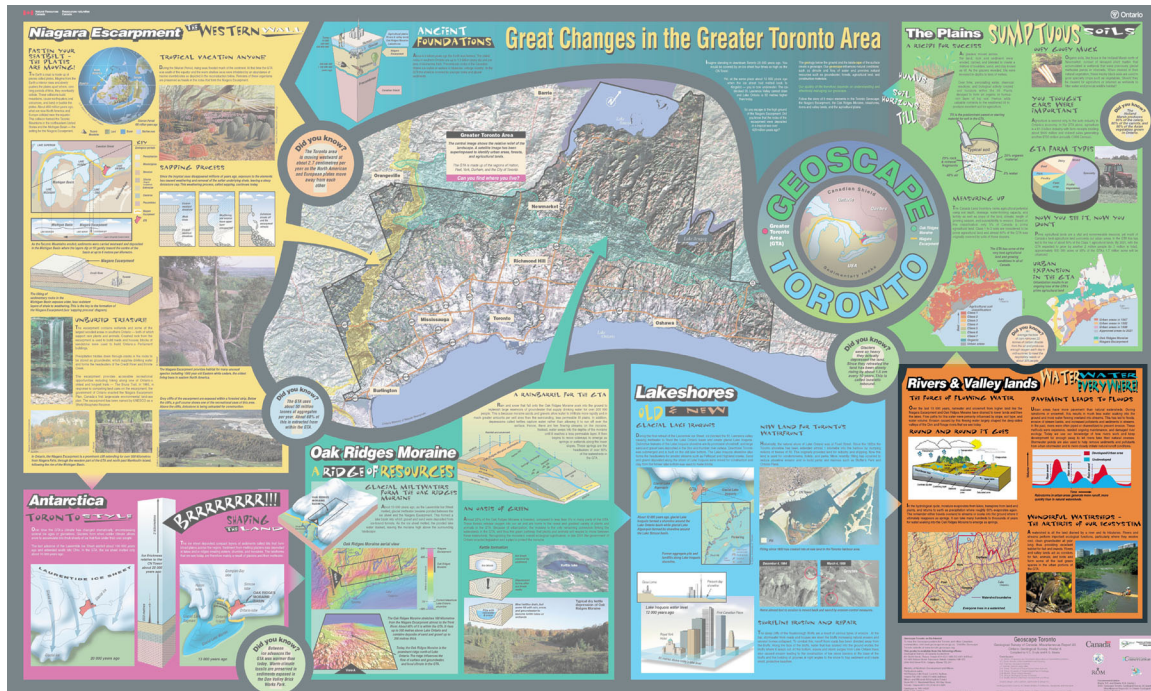


# Rivers and Valley Lands



## Overview

This Geoscape lesson contains four activities that introduce students to the hydrologic cycle, explore watersheds of the Greater Toronto Area (GTA) and investigate how the hydrologic cycle in the GTA has been modified as a result of urban development. As a class, students will brainstorm ideas related to how rivers and watersheds interact with their community and use aerial photographs to investigate the change in land-use over time. Each student will read an information bulletin, answer guiding questions and design a neighbourhood that accommodates human development while reducing potential impacts to a nearby stream. In small groups, students will also complete a research project and deliver a presentation about one watershed in the GTA. Vocabulary is reinforced through the completion of a crossword puzzle.

At the end of this lesson, students will be able to:

- Explain the hydrologic cycle
- Identify watersheds on maps and understand their significance
- Describe the impact of urban development on the hydrologic cycle
- Understand how human activities can impact runoff quality and streams in urban environments

## ***Specific Curriculum Expectations***

<b>Grade</b>	<b>Strand</b>	<b>Expectations</b>
7	Geography	<ul style="list-style-type: none"><li>• Identify and explain how landforms are used to delineate regions</li><li>• Identify patterns in physical geography using thematic maps</li></ul>
	Earth and Space Systems	<ul style="list-style-type: none"><li>• Describe the origin and history of natural features of the local landscape</li></ul>
8	Geography	<ul style="list-style-type: none"><li>• Identify and describe types of land-use</li></ul>
	Earth and Space Systems	<ul style="list-style-type: none"><li>• Identify the various states of water on the Earth's surface and the conditions under which they exist (e.g., glaciers, ice-caps, oceans, lakes, rivers, groundwater)</li><li>• Describe the distribution and circulation of water on Earth</li></ul>
9	Geography of Canada	<ul style="list-style-type: none"><li>• Demonstrate an understanding of how human activities affect the environment</li><li>• Demonstrate an understanding of how natural systems influence cultural and economic activities</li><li>• Explain how the effects of human activity alter the natural environment</li><li>• Explain how the effects of urban growth alter the natural environment</li><li>• Research and report on ways of improving the balance between human needs and natural systems</li></ul>

### ***Duration***

- 80 to 120 minutes

## ***Lesson Instructions***

### **Activity 1**

- Introduce students to the **Geoscape Toronto Poster** and use the **Overhead *Geoscape Toronto Poster - Rivers and Valley Lands Section***
- Find out what the students already know about watersheds using the **Overhead *Brainstorming Web*** to record ideas
- Use the **Overhead *Aerial Photos of an Urban Watershed*** to discuss changes in land-use over time and how the local stream may be impacted by urban development

### **Activity 2**

- Distribute the **Information Bulletin *Rivers and Valley Lands*** and the **Worksheets *The Wonders of Watersheds, The Hydrologic Cycle, Design a Neighbourhood to Manage Stormwater and Stormwater Management Features for Urban Planning*** to the class
- Instruct students to read the **Information Bulletin** and complete the **Worksheets**
- As a class correct and discuss the answers

### **Activity 3**

- Divide students into groups of four
- Distribute the **Worksheet *Watersheds of the GTA*** which contains instructions for the completion of this Web-based research activity
- Schedule each group to deliver a 5-minute presentation about their findings

### **Activity 4**

- Distribute the **Worksheet *Water, Water, Everywhere! Crossword***
- Instruct students to complete the crossword puzzle in class or for homework

## ***Materials Required***

<b>Download lesson materials from the Geoscape Toronto Web site at - <a href="http://www.toronto.geoscape.nrcan.gc.ca">www.toronto.geoscape.nrcan.gc.ca</a></b> (PDF format)	<b>Materials and equipment from the classroom</b>
<b>Activity 1</b>	
<b>Overheads</b> <ul style="list-style-type: none"> <li>• <i>Geoscape Toronto Poster - Rivers and Valley Lands Section</i></li> <li>• <i>Brainstorming Web</i></li> <li>• <i>Aerial Photos of an Urban Watershed</i></li> </ul>	<ul style="list-style-type: none"> <li>• overhead projector</li> </ul>
<b>Activity 2</b>	
<b>Information Bulletin</b> (photocopy a class set) <ul style="list-style-type: none"> <li>• <i>Rivers and Valley Lands</i></li> </ul> <b>Worksheets</b> (photocopy a class set) <ul style="list-style-type: none"> <li>• <i>The Wonders of Watersheds</i></li> <li>• <i>The Hydrologic Cycle</i></li> <li>• <i>Design a Neighbourhood to Manage Stormwater</i></li> <li>• <i>Stormwater Management Features for Urban Planning</i></li> </ul>	<ul style="list-style-type: none"> <li>• coloured pencils</li> <li>• rulers</li> </ul>
<b>Activity 3</b>	
<b>Worksheet</b> (photocopy one per group) <ul style="list-style-type: none"> <li>• <i>Watersheds of the GTA</i></li> </ul>	<ul style="list-style-type: none"> <li>• computers and Internet access</li> </ul>
<b>Activity 4</b>	
<b>Worksheet</b> (photocopy a class set) <ul style="list-style-type: none"> <li>• <i>Water, Water, Everywhere! Crossword</i></li> </ul>	<ul style="list-style-type: none"> <li>• none</li> </ul>

## ***Glossary of Terms***

The activities in this lesson introduce a number of new geologic terms. Teachers may wish to review the use of a glossary and discuss the meaning of the following terms with the students before commencing the activities. Definitions are provided in the **Glossary of Geologic Terms** found on the Geoscape Toronto Web site at [www.toronto.geoscape.nrcan.gc.ca](http://www.toronto.geoscape.nrcan.gc.ca)

New vocabulary in this lesson falls into a number of broad categories as follows:

**Terms related to the water cycle:** atmosphere, base flow, evaporate, discharge, flooding, groundwater, hail, headwater, hydrologic cycle, meandering, precipitation, recharge, river, seep, sleet, spring, transpiration, tributary, watershed

**Geological terms:** erosion, escarpment, moraine, sediment, topography, valley

**Other:** urbanization, floodplain