

Introduction to Watershed Processes  
Grades 4-8

Enduring Understandings

1. Understand what a watershed is both literally and conceptually (including the mapped representation of a watershed and the issue of scale).
2. Understand the components and processes of a watershed including runoff, soil, geology, geography, permeability, storage, land cover, land use, vegetation, precipitation, stream flow, flooding, drought (climate), fire, drainage patterns, erosion, deposition and population.
3. Understand a watershed as a system (e.g. a change in one area will affect the dynamics of the entire system) and how that system functions.
4. Understand that watershed management is complex because of culture, economics, politics, social constructs, scientific studies and aesthetics. Some water users include urban, rural, agricultural, business & industry, energy, recreation, fish and wildlife and earth systems.
5. Understand that watersheds change over time both naturally (e.g. flooding, fire) and due to anthropogenic causes (e.g. damming a river, water rights, water withdrawals).
6. Know some of the issues facing the watershed managers of the Colorado River Watershed as well as other Southwestern Watersheds.

Enduring Understanding(s)	Concepts	Activities	Arizona Education Standards	Materials Needed
1	<p>Create a watershed and understand how it functions</p> <p>Describe drainage patterns in watersheds</p> <p>Predict where water will flow in a watershed</p>	<p>Branching Out – Adapted version (Project WET Curriculum &amp; Activity Guide)</p>	<p><b>Science</b> Strand 6: Concepts 1, 2</p> <p><b>Social Studies</b> 3SS-E1, E2, E7</p>	<p>Provided in kit: Spray bottles Washable Markers Transparency of <i>Branching Patterns</i></p> <p>Provided by school/class: Paper Scotch Tape Water</p>
1, 2, 3	<p>Locate the main stem, tributaries, and headwaters of a watershed.</p> <p>Outline the boundary of a watershed.</p> <p>Apply this skill to a more detailed map.</p> <p>Demonstrate the movement of water through a watershed.</p> <p>Compare and contrast the branching patterns of a watershed river system with branching patterns found in nature and the constructed world.</p>	<p>Seeing Watersheds and Blue Beads (Discover a Watershed: The Colorado Educators Guide)</p>	<p><b>Science</b> Strand 6: Concepts 1, 2</p> <p><b>Math</b> Strand 2: Concepts 1, 4</p> <p><b>Social Studies</b> 3SS-E1, E3, E4, E5</p>	<p><b>Seeing Watersheds</b> Provided in kit: Transparency of Verde River Watershed, Oak Creek Watershed, Arizona Drainage and Relief Maps</p> <p>Provided by school/class: Blue, red, green, orange, and purple markers Copies of <i>Seeing Watersheds Student Copy Page</i> (one per student)</p> <p><b>Blue Beads</b> Provided in kit: Plastic tokens</p>

	Describe the major components of a watershed.			5 - 1 quart containers  Provided by school/class: Large ball of string or yarn One copy of <i>Forming Watersheds Teacher Copy Page</i>
1, 2, 3, 4	Describe the water cycle.  Identify water users in the Colorado Watershed.  Identify the states of water as it moves through the water cycle.	Incredible Journey of the Colorado River (Discover a Watershed: The Colorado Educators Guide)	<b>Science</b> Strand 3: Concepts 1, 3 Strand 4: Concept 3 Strand 6: Concepts 1, 2  <b>Social Studies</b> 3SS-E1, E2, E3, E6, E7 4SS-E4	Provided in kit: Transparency of <i>Water Cycle Diagram</i> Laminated station signs Laminated game boards Laminated explanation cards Laminated sets of <i>Water User Cards</i> Dice  Provided by school/class: Copies of <i>Water Cycle Diagram</i> (1 per student) Copies of <i>Water Molecule Movement Student Activity Page</i> (1 per student)
1, 2, 3, 4, 5	Learn watershed terms.  Understand the physical properties or relationships of the watershed vocabulary.  Increase the ability to use analogies to explain the world.	River Talk (Discover a Watershed: Watershed Manager, p. 37)	<b>Language Arts</b> Reading Strand 1: Concept 4 Reading Strand 3: Concept 1 Writing Strand 1: Concept 1 Writing Strand 2: Concept 6  <b>Science</b> Strand 6: Concept 1, 2	Provided in kit: Transparency of <i>Watershed Diagram</i> Watershed Glossary (pp. 179-190)  Provided by school/class: Overhead projector Copies of <i>Watershed Diagram</i> and <i>River Talk Student Copy Page</i> (one of each per student) Dictionary and/or internet access
3, 4, 5	Distinguish between point and non-point source pollution.  Recognize that everyone contributes to and is responsible for a river or lake's water quality.  Identify Best Management Practices to reduce pollution.	Sum of the Parts (Discover a Watershed: Watershed Manager, p. 114)	<b>Language Arts</b> Writing Strand 1: Concept 1 Writing Strand 3: Concept 2  <b>Science</b> Strand 3: Concept 1, 2 Strand 6: Concept 1  <b>Social Studies</b> 3SS-E2, E3, E4, E7, E8	Provided in kit: Laminated waterfront property sections Transparency of <i>Major Sources of NPS Pollution and BMPs</i> Overhead pens  Provided by school/class: Items from student's desks (e.g., pencils, paper clips, books)
4	Analyze how people perceive the values of various water uses	Choices and Preferences, Water Index	<b>Language Arts</b> Reading Strand 3: Concept 1	Provided in kit: Colored Pencils

	differently.	(Discover a Watershed: Watershed Manager, p. 72)	<p><b>Science</b> Strand 3: Concept 1</p> <p><b>Math</b> Strand 1: Concept 2 Strand 2: Concept 1</p> <p><b>Social Studies</b> 3SS-E2, E6, E7, E8 4SS-E4</p>	<p>Provided by school/class: Copies of <i>Major Water Use Chart</i> and <i>Student Ranking Line Graph</i> worksheets (one copy of each per student) Rulers Calculators</p>
4, 6	<p>Describe historical and current aspects of water rights.</p> <p>Illustrate how water rights are used to allocate water.</p> <p>Evaluate water rights allocation systems.</p>	<p>Pass the Jug (Discover a Watershed: Watershed Manager, p. 100)</p>	<p><b>Language Arts</b> Reading Strand 1: Concept 4, 6 Reading Strand 3: Concept 1, 2</p> <p><b>Science</b> Strand 3: Concept 1, 2</p> <p><b>Social Studies</b> 2SS-E3 3SS-E2, E6, E7, E8 4SS-E4</p>	<p>Provided in kit: Plastic cups Water jug Laminated <i>Water Users Cards (Descriptions)</i> Funnel</p>

The following activity is included as an optional activity.

4, 5	<p>Cooperatively construct a simple abstract model of watershed use within a watershed.</p> <p>Identify different water user groups.</p> <p>Develop an introductory understanding of some of the issues involved in watershed management.</p>	<p>Watershed Manager (Discover a Watershed: Watershed Manager, p. 120)</p>	<p><b>Language Arts</b> Reading Strand 1: Concept 4, 6</p> <p><b>Science</b> Strand 3: Concept 1, 2</p> <p><b>Math</b> Strand 1: Concept 2</p> <p><b>Social Studies</b> 2SS-E3 3SS-E2, E6, E7, E8 4SS-E4</p>	<p>No materials provided in kit</p>
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