

Basic Urban Hydrology
Grades 4-8

Enduring Understandings

1. Understand that there are three basic paths of water in urban areas: from source (groundwater and/or surface water) to tap, from use to treatment and beyond, and from rainfall through stormwater systems and beyond.
2. Understand that urban areas fit into and impact the water cycle, including runoff, recharge/percolation into the aquifer, evaporation and plant transpiration, condensation, and precipitation.
3. Understand the sources of, impacts of, and solutions to urban water quality issues, including non-point source pollution and drinking water quality.
4. Understand how urban flooding occurs and how human constructions reduce flooding.
5. Understand how to conserve water resources and reduce contributions to non-point source pollution.

Enduring Understanding(s)	Concepts	Activities	Arizona Education Standards	Materials Needed
1, 2, 5	A simulation of the movement of water within and between natural and constructed systems. Understanding water's movement on the planet supports water conservation measures.	The Blue Traveler (Discover a Watershed: Watershed Manager)	<p>Language Arts Reading: Strand 1: Concept 4</p> <p>Science Strand 2: Concepts 1 & 2 Strand 3: Concepts 1 & 2 Strand 4: Concept 1 Strand 5: Concept 1 Strand 6: Concepts 1-3</p> <p>Social Studies 3SS-E2, E7</p>	<p><u>Provided in kit</u> 9 Natural system game boards and explanation cards 9 Natural system station cards 19 natural/constructed system game boards and explanation cards 19 natural/constructed system station cards 19 dice <i>The Water Cycle</i> (Master and Transparency) <i>Water Journey Map, Part I</i> (Master) <i>Water Journey Map, Part II</i> (Master) <i>Water Molecule Movement</i> (Master)</p> <p><u>Provided by school/class</u> One copy per student of: <i>Water Journey Map, Part I</i> <i>Water Journey Map, Part II</i> <i>Water Molecule Movement</i></p>
2, 4	Human impact on regional water cycle.	Southwest Water Cycle Diagram (SPLASH)	<p>Science Strand 3: Concepts 1 & 2 Strand 6: Concepts 1 & 2</p>	<p><u>Provided in kit</u> CD of water sounds <u>Provided by school/class</u> Markers</p>

			Social Studies 3SS-E1, E5, E7	Masking tape Poster size pieces of paper
1, 2, 3, 4, 5	Survey sections of watershed near school/neighborhood. Record and report observations. Assess pollution sources. Research local pollution. Present research.	Walking in the Watershed (Stormwater Coalition)	Science Strand 1: Concepts 1-4 Strand 3: Concepts 1 & 2 Social Studies 3SS-E2, E7	<u>Provided in kit</u> <i>Stream Walk Survey</i> (Master) <i>Watershed Walk Survey</i> (Master) <u>Provided by school/class</u> Copies: <i>Stream Walk Survey</i> (1 per 3-4 students) <i>Watershed Walk Survey</i> (1 copy per student)
1, 2, 3	Explain where drinking water comes from and where wastewater goes once it leaves the home. Explain how the water we use fits into the water cycle.	Excuse Me, Is this the Way to the Drainpipe? (EPA)	Science Strand 3: Concept 1 Strand 6: Concept 1 & 2 Social Studies 3SS-E2, E7	<u>Provided in kit</u> <i>Excuse Me, Is This The Way To The Drainpipe?</i> Story (Master) <u>Provided by school/class</u> One copy per student of <i>Excuse Me, Is This The Way To The Drainpipe?</i> Story Art supplies
1, 3, 5	Describe urban forms of pollution. Provide reasons why people should monitor what they put on their lawns or in the streets. Identify ways to treat urban runoff.	A-maze-ing Water (Project WET)	Science Strand 1: Concept 1 Strand 3: Concepts 1 & 2 Strand 6: Concept 2 Social Studies 3SS-E2, E7	<u>Provided in kit</u> Chalk Paper bags Tokens <u>Provided by school/class</u> Materials needed for Option 2 (optional)
3, 5	Learn what types of nutrients and toxic substances contribute to storm water pollution. Better understand the need for clean water. Determine methods to improve storm water quality.	Fred the Fish and Urban Stew (Stormwater Coalition)	Science Strand 3: Concepts 1 & 2 Strand 4: Concept 3 Strand 6: Concept 2 Social Studies 3SS-E2, E7	<u>Provided in kit</u> Nine roles from script laminated cards Fish sponge String Washer Wide-mouthed jar 8 plastic jars holding salt, soil, pet waste (brown sugar), motor oil (syrup), litter (paper dots), detergent, household hazardous waste (red food coloring), fertilizer (green food coloring) <u>Provided by school/class</u> Paper
5	Identify ways in which water is used.	The Case of the Mysterious Renters (EPA)	Science Strand 1: Concepts 1 & 4	<u>Provided in kit</u> <i>The Case of the Mysterious</i>

	Determine how much water families use each day. Recognize the importance of conserving water. Determine ways in which water can be conserved.		Strand 3: Concepts 1 & 2 Social Studies 3SS-E2, E7 Math Strand 2: Concept 1	<i>Renters Scenario (Masters)</i> <i>How Much Water Do You Use? Survey (Master)</i> <i>Water Conservation Tips (Master)</i> <u>Provided by school/class</u> One copy per student of: <i>The Case of the Mysterious Renters Scenario</i> <i>How Much Water Do You Use? Survey</i> <i>Water Conservation Tips</i>
3	Apply investigative methods used by epidemiologists to trace the source of contagious diseases.	Poison Pump (Project WET)	Science Strand 1: Concepts 1, 3, 4 Strand 2: Concepts 1 & 2 Strand 3: Concepts 1 & 3 Strand 4: Concept 3 Social Studies 3SS-E7	<u>Provided in kit</u> <i>Broad Street Area Map Student Activity Sheet (Master and Transparency)</i> 8 sets of laminated <i>Victim Cards</i> 1 set of laminated <i>Clue Cards</i> <u>Provided by school/class</u> Markers One copy per student of <i>Broad Street Area Map Student Copy Sheet</i>
1, 2, 3, 4, 5	Sequence water-related occupations involved in transporting water to and from the house. Describe various water resource careers.	Wet-Work Shuffle (Project WET)	Science Strand 2: Concept 1 Social Studies 3SS-E2, E7	<u>Provided in kit</u> 8 sets of laminated <i>Water Career Cards</i> and <i>Category Cards</i> <i>A Water System (Master and Transparency)</i> <u>Provided by school/class</u> Poster sized paper Markers
4	Analyze how rainfall and storm events result in runoff over the surface of the earth and how streamflow is particularly influenced by urbanization. Students create design elements that incorporate more permeable surfaces into their own environments.	Streams in the City (EPA) Exercise I and IV (Exercise II and III optional)	Science Strand 1: Concepts 2, 3, & 4 Strand 3: Concepts 1 & 2 Strand 6: Concept 3 Math Strand 4: Concept 4 Social Studies 3SS-E2, E4, E7	<u>Provided in kit</u> <i>Exercise I and IV Activity Sheets (Masters)</i> <i>It's a hard (surface) life (Masters)</i> <u>Provided by school/class</u> <i>Exercise I and IV Activity Sheets (one copy per student)</i> <i>It's a hard (surface) life (one copy per student)</i>