

Aquatic Life Advanced
Life Science: Grades 7-12

Enduring Understandings:

1. Understand that water quality impacts aquatic life, which can be an indicator of water quality.
2. Understand that human activity impacts aquatic life.
3. Understand the characteristics of freshwater aquatic ecosystems in Arizona and the semi-arid southwest including: biotic and abiotic factors, changes over time, diversity of ecosystems types, species diversity, species adaptations, needs of endangered species, and concerns about invasive species.
4. Understand the ecological and social value of aquatic ecosystems and the benefits of responsible management.
5. Understand political, economic, social, and cultural issues associated with aquatic ecosystems, including loss of habitat, and analysis of issues.

Enduring Understanding(s)	Concepts	Activities	Arizona Education Standards	Materials Needed
2, 4, 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, p. 15)	Science Strand 2: Concept 1 Strand 3: Concept 1, 2 Strand 5: Concept 1 Strand 6: Concept 1 Social Studies 3SS-E7 3SS-P4	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>Water Journey Map, Part I</i> (one per student) <i>Water Journey Map, Part II</i> (one per student) <i>Water Molecule Movement</i> (one per student)
1, 3, 5	Wildlife responds to its environment through physiological or behavioral adaptations. Changing environmental factors affect wildlife: more specialized organisms are less adaptable and thus less able to survive change.	Blue-Ribbon Niche (Aquatic WILD, p. 52)	Language Arts W-F4 Science Strand 1: Concept 1-4 Strand 2: Concept 2 Strand 3: Concept 1, 2 Strand 4: Concept 3, 4 Strand 6: Concept 1	<u>A Guide to Common Freshwater Invertebrates</u> Variety of art materials VCR Video: "Rivers Lost"
2, 3, 4, 5	All residents of Arizona interact with wildlife directly and indirectly. The esthetic, economic, and spiritual values humans place on	To Dam or Not to Dam (Aquatic WILD, p. 170)	Language Arts LS-E1 LS-E4 LS-E5 VP-P1	Role playing cards Art materials for creating visuals

	<p>wildlife vary from person to person and culture to culture.</p> <p>Human activities are an important factor affecting plant and animal succession, distribution, and population levels.</p> <p>Humans have at their disposal tools and knowledge to significantly impact the quality and quantity of habitat.</p>		<p>Science Strand 1: Concept 1-4 Strand 2: Concept 2 Strand 3: Concept 1, 2 Strand 4: Concept 3, 4 Strand 6: Concept 1</p> <p>Social Studies 2SS-E7 2SS-P10 3SS-E6 3SS-E7 3SS-E8 3SS-P3 3SS-P4</p>	
1, 2, 3, 4, 5	<p>The leading source of water quality degradation is nonpoint source (NPS) pollution, which occurs when runoff carries pollutants to surface water bodies.</p> <p>Common NPS pollutants include sediments, nutrients, pesticides, and petroleum products.</p> <p>Steps can be taken to reduce the amounts of NPS pollutants that reach surface water bodies.</p>	There Is No Point To This Pollution! (HWHP, p. 136-144)	<p>Language Arts R-E1 R-E2 R-E5 R-P1 W-E1 W-P1</p> <p>Science Strand 1: Concept 1-4 Strand 2: Concept 2 Strand 3: Concept 1, 2 Strand 4: Concept 3, 4 Strand 6: Concept 1</p> <p>Math 2M-P1 2M-P2 3M-P2</p> <p>Social Studies 3SS-E4 3SS-E7 3SS-E8 3SS-P1 3SS-P2 3SS-P4</p>	<p>1 large clear container</p> <p>Water</p> <p>Plastic cups (1 per group)</p> <p>Food coloring</p> <p>Powdered cocoa</p> <p>Cooking oil</p> <p>Copies of <i>Loop Lake Worksheet</i>, <i>Loop Lake Map</i>, <i>Water Quality Data</i>, and <i>Water Quality Graphs</i> (1 of each per group)</p>
1, 3	Biological assessment (bioassessment) is one important way to assess water quality.	Benthic Bugs and Bioassessment (HWHP, p. 154-163)	<p>Language Arts R-E1 R-E2 R-P1</p>	Copies of <i>Macroinvertebrate Identification Chart</i> student copy page (1 per group)

	<p>Macroinvertebrates are valuable indicators of the health of aquatic environments because they inhabit the bottom (benthic) and do not move large distances.</p> <p>Macroinvertebrates vary in their tolerance of environmental stressors.</p>		<p>W-E1 W-E8 W-P1</p> <p>Science Strand 1: Concept 1-4 Strand 2: Concept 2 Strand 3: Concept 1, 2 Strand 4: Concept 3, 4 Strand 6: Concept 1</p> <p>Social Studies 3SS-E7 3SS-P2 3SS-P4</p> <p>Math 2M-P1</p>	<p>Copies of <i>Macroinvertebrate Data Sheets I, II, III</i> student copy pages (1 each per group)</p> <p>Prepared samples</p>
1, 3	<p>Every species has a habitat that is most favorable to its survival.</p> <p>Aquatic organisms vary in their tolerance of different ranges in temperature, dissolved oxygen, salinity, and pH.</p>	Water Quality Windows (HWHP, p. 164-173)	<p>Language Arts R-E1 R-E2 R-E5 W-E1</p> <p>Science Strand 1: Concept 1-4 Strand 2: Concept 2 Strand 3: Concept 1, 2 Strand 4: Concept 3, 4 Strand 6: Concept 1</p> <p>Social Studies 3SS-E7 3SS-P2 3SS-P4</p>	<p>One set each of <i>Organism Cards</i> and <i>Water Quality Windows</i> cards.</p> <p><i>Answer Key.</i></p>
1, 2, 3, 4, 5	<p>Wildlife is a product of habitat.</p> <p>Wildlife responds to its environment through physiological or behavioral adaptations.</p> <p>Changing environmental factors affect wildlife: more specialized organisms are less adaptable and thus less able to survive change.</p>	Arizona Wildlife Views video segment: “Rivers Lost” – OR – “Our Native Fish Heritage”	<p>Language Arts LS-E3 LS-E4</p> <p>Science Strand 1: Concept 3 Strand 2: Concept 2 Strand 3: Concept 1, 2 Strand 4: Concept 3, 4</p> <p>Social Studies 3SS-E2</p>	<p>VCR</p> <p>Video: “Rivers Lost” – OR – “Our Native Fish Heritage”</p>

	<p>Responsible environmental actions are the obligations of all levels of society, beginning with the individual.</p> <p>Humans have at their disposal tools and knowledge to significantly impact the quality and quantity of wildlife habitat.</p>		3SS-E7	
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