



**Pima County Natural Resources, Parks and Recreation
Environmental Education Field Study at Agua Caliente Park**

Aquatic Ecosystems - Elementary School Level

Description: Aquatic Ecosystems

The natural spring and pond at Agua Caliente Park are teeming with life. Use nets, skimmers and buckets to collect water samples and then watch the water come to life under the microscope. Students refine their observation skills and sketch aquatic invertebrates.

Linked to Arizona Academic Standards: Science S4: C1- G1PO2, G1PO3; G2PO1, G2PO3; G4PO2; G6PO1, G6PO6; C2-G1PO2, G2PO1, G2PO3; G3PO2; C3-KPO1, KPO2, G1PO1, G1PO3; G3PO1, G3PO2, G3PO3, G3PO4, G3PO5; G4PO1 G4PO3; G4PO1, G4PO3; G6PO1, G6PO2; G7PO1, G7PO2, G7PO3, G7PO5, G7PO6, C4-G3PO1; G4PO1, G4PO2; G8PO1, G8PO5, G8PO6; 3SS-F2PO5; 3SS-E7PO6; 3SSP4PO3, 3SS P4PO3; 4SS-F4, F7, E7, P4, P6.

Duration: 2 ½ hours

Objectives:

- Through field observations of aquatic habitats at Agua Caliente Park students determine the living and non-living components of the aquatic ecosystem (spring [the source of the water], benthic substrate [minerals and nutrients], atmosphere [O₂ and CO₂], sunlight, algae, cattails, reeds, fish, turtles, frogs, ducks, herons, kingfishers, macro-invertebrates, plankton, etc.).
- Students check off components observed directly or indirectly from a list on a provided worksheet.
- Students collect algae, benthic macro-invertebrates, fish, and plankton using D-nets, dip nets, plankton nets.
- Students sort collected organisms and observe them with hand lenses, scopes and viewers. Discuss organisms' body parts, life cycles, and feeding methods.
- Complete an aquatic art project called *gyotaku*. Learn the parts of a fish or turtle during the project.

Conceptual Framework:

- All living things are interrelated. They are a product of their environment which includes non-living resources, and are an integral part of it.
- Food webs are pathways through which energy flows from the sun to plants and subsequently to herbivores, omnivores, carnivores and decomposers.
- The essentials of habitat, required by plants and animals including humans, are food, water, shelter and space, in a suitable arrangement.

Revised 6/09

Vocabulary:

Abiotic	Habitat	Plankton
Biotic	Herbivore	Vertebrate
Adaptation	Invertebrate	
Aquatic	Key	
Carnivore	Macro- invertebrate	
Decomposer	Omnivore	

Equipment and Materials:

- Ecosystem component worksheets
- D-nets, dip nets and plankton net
- Sorting trays
- Collecting buckets
- Hand lenses
- Viewers
- Microscopes, binocular scopes
- Reference books, keys
- Materials for *gyotaku* art project (rubber specimens, tempera paint, art paper, rollers, brushes)

Description of Activity:

- Through field observations of aquatic habitats at Agua Caliente Park students determine the living and non-living components of the aquatic ecosystem (spring [the source of the water], benthic substrate [minerals and nutrients], atmosphere [O₂, N₂ and CO₂], sunlight, algae, cattails, reeds, fish, turtles, frogs, ducks, herons, kingfishers, macro-invertebrates, plankton, etc.). Instructors guide students to make the discoveries rather than telling them the answers.
- Students record the living and non-living parts on a worksheet.
- Students collect algae, macro-invertebrates, and fish using D-nets and dip nets.
- Students sort collected organisms and observe them with hand lenses, scopes and viewers. Discuss organisms in terms of anatomy, life cycles, feeding mechanisms, breathing mechanisms Students use a dichotomous key to identify macro-invertebrates collected.
- Students complete a *gyotaku* art activity learning the parts of a fish.

Late Arrivals: Rather than sketching a model of the aquatic ecosystem, briefly discuss how biotic and abiotic parts of the ecosystem all work together to create a functioning ecosystem. Ask students to point out connections between abiotic and biotic parts, and connections between biotic parts (i.e. predator/prey, herbivores/food source). This change should save about 20 minutes. If more time needs to be made up, shorten the time students spend with the microscopes. Prepare several different slides or specimens for the students to examine and then do a rotation. The important thing is to allow the students to have an outdoor experience and begin to understand an aquatic ecosystem.