



**Pima County Natural Resources, Parks and Recreation
Environmental Education Field Study**

**Water Monitoring in Freshwater Habitats
High School Lesson Plan**

Description: Water Monitoring in Freshwater Habitats

The natural spring and pond at Agua Caliente Park are teeming with life. Students collect samples to measure water quality and identify indicator species. The data collected are used to learn the relationship between water quality and the abundance of life. Water chemistry tests conducted include pH, electrical conductivity, alkalinity and dissolved oxygen.

Linked to Arizona Academic Standards: Science S4, C3, HSPO1-PO2; C4, HSPO4, HSPO6; C5, HSPO2, HSPO4; S5, C1, HSPO2; C4, HSPO2, HSPO12.

Duration: 2 ½ hours

Objectives:

- Understand the concepts of water quality and water quality monitoring
- Make accurate physical and chemical water quality measurements and record data collected
- Understand the concept of indicator species and tolerance levels in assessing water quality in freshwater habitats
- Collect, identify and quantify selected indicator species at Agua Caliente Park
- Using collected data and the presence or absence of indicator species, make an assessment of the water quality at Agua Caliente Park pond.
- Based on assessment, make suggestions to improve the water quality, or discuss potential threats

Conceptual Framework:

- Carrying capacity, or the limit that a habitat can support over time without stress to the organism or its resource base, is influenced by geological, climatic, biological and/or behavioral factors including human activities.
- Change due to human and non-human forces is a fundamental characteristic of the physical environment that shapes populations, species, communities and ecosystems.

Vocabulary:

Alkalinity	Electrical Conductivity	Mayfly
Benthos	Hellgrammite	Midge Fly
Caddisfly	Indicator Species	Non-Point Source
Damselfly	Larva	Point Source Pollution
Dissolved Oxygen	pH	Tolerance Levels
Dragonfly	Macro-Invertebrate	Stonefly

Revised 6/09

Materials:

Pencils For Each Student
Clipboards
Data Recording Worksheet
Macro-Invertebrate Worksheet
Dry Erase Board
Sample Buckets
Thermometers
pH Meters
EC Meters
Transparency Tubes

Dissolved Oxygen Test Kits
Alkalinity Test Kits
Safety Glasses
Latex Gloves
Hand Dip Nets
D-Net
Sorting Trays, Pipettes, Spoons
Dissecting Scopes
Macro-Invertebrate Keys

Preparation:

- Calibrate pH and electrical conductivity meters

Description of Activity:

- Students will make an assessment of the water quality in the spring, stream and pond #1 at Agua Caliente Park by sampling and taking measurements of temperature, transparency, pH, electrical conductivity, alkalinity and dissolved oxygen.
- Students will sample macro-invertebrates from the ponds, identify them using dichotomous keys, and quantify indicator species collected.
- Using the physical and chemical measurements made, and the presence or absence of indicator species, students make an overall assessment of the water quality in the pond at Agua Caliente Park.
- Discuss potential threats to the pond's water quality.