Freshwater Animals in Bioremediation Systems

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HCPS III Science Standards Addressed: SC.BS. 4.6

Grade Level: 9th-12th
Project Time Span: 2-3 weeks (includes 1 field trip)

To The Teacher:
This lesson is designed to give students an opportunity to study freshwater animals that live in a bioremediation system, pond or natural stream.

Goals of the Lesson:
- Students will study the different animal organisms found in a bioremediation system and how they affect the entire ecosystem.

Student Learning Objectives (Benchmarks):
- SC.BS.4.6: Explain the organization of life on Earth using the modern classification system.

Resources and Materials:
Books

Materials
- Collection bottles
- Nets
- Underwater camera (optional)
- Buckets
- Beach footwear (if collecting in streams)

Instructional Procedures:
- Lecture on water safety collecting on school grounds, ponds or streams
- Lecture on safety on water bacteria such as Leptospirosis
- Lecture on the safe handling on the freshwater animals
- Lecture on the different types of freshwater animals (identification)
Student Learning Activities:
- Students will collect, identify, study habitat, life cycle, cultural uses, & releasing it back to it's habitat.

**Resources & Materials**

Bioremediation system (if available on school grounds or in community)
- Nets
- Collection bottles
- Buckets
- Underwater camera optional

Resource book: to identify the fresh water animals.
Field trip to a pond, stream or a wetland area.

**Instructional Procedure**

- Introduction to a bioremediation system or stream
  - Discuss what is a bioremediation system and how it relates to a stream or wetland?
    - Before your lecture on fresh water animals. See if the class can name fresh water animals save that list.
    - Lecture or show pictures on the different animals and their habitat so when the students start collecting they know where to look.
  - What have they collected?
    - Fresh water animals found in Konawaena's bioremediation system.
      - 'o'opu
      - hihiwai
      - guppies
      - mollies
      - tilapia
      - Chinese catfish
      - Sucker mouth catfish (plecostomus)
      - Thiarid snails
      - Pouch snails
      - Toads and frogs with tadpoles

- Lessons can be given on each individual species
  - Are the species native or exotic
  - Are the species beneficial to system
  - What are their habitat
  - How did they get there
  - What roles do they play in the system
  - What kind of damage is the exotic species doing to our native species

1. What can we do to protect our streams and wetlands?
   Group discussion on how to protect our water, streams, wetlands and native water animals.
2. Lesson on water safety
   Lesson on safety can be found on the malama web site. The lesson is called Safety written by Tami Lunsford, University of Hawaii Lab School
   Assessment:
   • Students able to identify the different fresh water species
   • Written report on pro & con’s on the different species
   • Produce a picture board or video on the bioremediation fresh water animals
   • Ability to give a tour on the bioremediation system.

Evaluation of Lesson:
What worked well
   Students love the hands on assignments. Gathering the species for identification was really exciting for the students

What would I do differently
   • Bring in species not found in our system to show students that in different location there may be fresh water animals found