A Water Education Pathway: Texas Aquatic Science

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A Water Education Pathway: Texas Aquatic Science

By
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Texas A&M University San Antonio

December 1, 2016
From headwaters to the ocean, H2O has developed methods and technology enhancements to help today’s students become tomorrow’s engaged citizens who understand and advocate the environmental, economic and societal values of water.

H2O
Headwaters to Ocean

Funded by a generous grant from the Ewing Hasell Foundation
• Virtual Water Experience
• Tech Equipped Bay and Estuary Experience
• Watershed Technology Safari
ESTUARIES IN THE BALANCE: THE TEXAS COASTAL BEND

• Interactive multimedia focused on estuary ecosystems
• Games, videos, dynamic visualizations.
High-Tech Integration in Experiential Education

Prototype Technology Integration and Use

• Technology integration and research test bed

• Accommodate:
  – 17,500 K-12 students in class groups
  – 125,000 children and adults unguided

Watershed Education and Facilities

Texas Rivers Center
River Systems Institute

Headwaters to Ocean
High-Tech Integration in Experiential Education

Experiential Learning Laboratory - Technology Test Bed

- Multi-media, multi-screen array
- Linked 22-screen array
- Outdoor Wi-Fi network
- Interactive touch table
- Interactive kiosks
- Low-cost design
- Low-tech programming
- DEMO OUTDOOR CTRS
- EASILY EXPORTED
- RESEARCH PLATFORM
High-Tech Integration in Experiential Education

- iPad – iPhone for outdoor aquatic science instruction
  - Species ID Key
  - GPS Photo Scavenger Hunt
  - Journaling
  - Social-Network Ready
  - Games
  - Teacher-Friendly,
  - QR Code Scanner
  - Documents,
  - Videos
  - Photos
  - Links

Adaptable for outdoor learning ctrs
Conclusions

–Experiential water education can be enhanced by:

• interactive technology
• direct contact with water
• linking a water experience in one location to other water locations
• Cool apps, games, interactives and even bigger ideas……….all with no context for use by teachers.

• Loser! Loser!
Effective Pathway for Water Curricula

**Texas Aquatic Science**

- Texas’ first comprehensive curricula in Aquatic Science for middle and high schools students
- Meeting all state standards for education
- #1 Internet ranked curriculum for aquatic science

Headwaters to Ocean
Foundation for Instruction
quantity in the watersheds. Each region has different kinds of fish, wildlife and opportunities for people (fig. 3.6). Every stream, lake or even land is a reflection of its watershed. The goal of the Clean Water Act was to make the water “drinkable, swimmable and fishable.” Natural resources agencies, communities, and individuals work together for good water quality and quantity. Knowing our watershed and its relationship to surrounding water can help us conserve our aquatic resources.
Texas Aquatic Science

Teacher Guide

• Science investigations, games, cooperative learning activities, Internet projects, readings, videos, science journals, field based student research projects, tests and assessments.
Texas Aquatic Science Videos

Headwaters to Ocean
Workshops for Teachers

- Instruction for teachers on how to use Texas Aquatic Science:
  - Teachers Guide
  - Exercises
  - Integrating new mobile technology into outdoor and classroom education
Texas Aquatic Science Online

- [texasaquaticscience.org](texasaquaticscience.org)
- Chapters
- Videos
- Career Promotions
- Science stories
- How to help

eadwaters to Ocean
Texas Aquatic Science Online
225 videos – Closed Captioned
Texas Aquatic Science Online

iTunes Preview

Texas Aquatic Science
by Texas Parks and Wildlife

To listen to an audio podcast, mouse over the title and click Play. Open iTunes to download and subscribe to iTunes U collections.

Description

The Texas Aquatic Science series explores our state's ecosystems from headwaters to ocean. Find teaching materials and more resources at http://texasaquaticscience.org. For grades K-12.

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14 items

Customers also subscribed to

H2O

Headwaters to Ocean
Texas Aquatic Science Online

Aquatic Science

H2O
Headwaters to Ocean
Interconnected Curriculum

Texas Aquatic Science
A guide for students from molecules to ecosystems, and headwaters to oceans

You Can Make a Difference

Do you believe that everyone deserves a sustainable and adequate supply of clean, safe water for our homes, farms, and industries? Do you believe fish, wildlife, and all other aquatic life need an adequate supply of clean water, too?

If so, you can help ensure this happens in Texas. Here are ways you can help make a difference, as a student and as an adult. You may be able to think of other ways to help where you live.

- Learn where your drinking water comes from and tell others.
- Become a volunteer water quality monitor through the Texas Stream Team or, have your entire class monitor water quality (see sidebar on Stream Team).
- Learn about water conservation measures you can take and ways you can reduce pollution where you live.
- Help rescue stranded marine mammals; for example, volunteer through the Texas Marine Mammal Stranding Network.
Texas Aquatic Science
Certified Field Sites

- Connect aquatic science in the classroom with educators and outdoors learning
- 65 sites (so far)
- Reached 14,132 youth and 1,933 adults
- Generated over 960 volunteer hours
Effectiveness Research

- 2015-16 School Year
- 160 Teachers Trained for Pilot
- 4,500 Students in Pilot Study
- 39 Schools
Effectiveness Research - Results

- Teachers heavily rely on materials for instruction...
  - strong preference for using combination of printed and online
  - high percentage indicated effective curriculum
  - effective in enhancing student learning about water
Effectiveness Research - Results

• Statistics show patterns of website use:
  – heavy use when class is in session

• About 220,000 unique individuals visited the website in the 2015-16 school year, the first full year of classroom use.
Points of Discussion

1. “Apps” alone may not be effective
2. Teachers need context to teach
3. It’s no simple matter
   1. Time
   2. Money
   3. Diverse APPLIED Skills
Partners and Support

- The Meadows Center for Water and the Environment
- Harte Research Institute for Gulf of Mexico Studies
- Ewing Halsell Foundation, San Antonio
- Texas Parks and Wildlife Department
- USFWS - Sport Fish Restoration Program
- National Science Foundation
- The Meadows Foundation
- Research Coordination Network on Climate, Energy, Environment, and Engagement in Semiarid Regions
- Texas State High Performance Computing Team
- Gilbert M. Grosvenor Center for Geographic Education
- Hamline Univ. Ctr. for Global Environmental Education
- Texas State Aquarium
- Texas Pioneer Foundation
- International Crane Foundation
- Gary Jobs Corps
- Welder Wildlife Foundation
- Texas Stream Team