Marine/Aquatic Science Education and Integrating Formal and Informal Education and Outreach Opportunities

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Marine/aquatic science education and integrating formal and informal education and outreach opportunities:
The Texas Aquatic Science Pathway

By
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September 20, 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.
• Virtual Water Experience
• Tech Equipped Bay and Estuary Experience
• Watershed Technology Safari

Headwaters to Ocean
Web-Based Interactive Learning

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
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

Headwaters to Ocean
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
Opps!

• 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
CHAPTER 3
26

AQUATIC SCIENCE CAREERS

Hydrologist

Hydrologists study the movement, distribution, and quality of water.

Headwaters to Ocean

The book focuses on aquatic science careers and explores the movement of water in the environment. It highlights the importance of understanding the hydrological cycle and the impact of human activities on water resources. The text emphasizes the need for interdisciplinary collaboration to address water conservation and management challenges.
THE CONNECTION BETWEEN SEAWEED, JELLYFISH, AND BEACH TRASH IN TEXAS

Beachgoers in Texas often witness seaweed, jellyfish, and trash littered on the beach. Believe it or not, all these are connected! Much of the trash and seaweed that ends up on Texas beaches is brought in from the Gulf of Mexico. Marine currents and winds in the gulf push debris towards Texas beaches. Marine currents and winds then push this debris towards Texas beaches. Marine currents push debris into the gulf, while the wind pushes debris towards the coast. This cycle continues, sending debris along with it to beaches along the coast. Debris then washes up on the coast of Texas beaches through a process called drift. The drift process moves debris along the coast, helping to wash it away. This cycle continues with beaches receiving debris from the gulf and the wind pushing debris towards the coast. Marine currents then push debris towards Texas beaches, completing the cycle.

Jellyfish also play a role in the connection between the gulf and Texas beaches. Jellyfish are known to drift with the currents, creating a potential source of debris. However, jellyfish can also be found in the gulf, contributing to the overall debris concentration. This connection highlights the importance of addressing marine debris and its impact on beachgoers, wildlife, and ecosystems.
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

America's Sea: The Gulf of Mexico

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

Using Mobile Technology for Classroom and Outdoor Education

When: July 19, 9am-4pm
Cost: $25.00 (includes lunch)
Registration Deadline: July 13
Location: Welder Wildlife Foundation, Sinton, TX
For directions visit http://welderwildlife.org/content/visitors/directions/
Contact: Liz Bates 361-364-2643 conservationeducator@welderwildlife.org
Space limited to 20 participants

Description
Educators will learn ways to utilize mobile technology (smart phones and pads) in the classroom and outdoors. Topics covered include:
- How to add your own educational content for student use to smartphones and mobile pads.
- QR (quick response) Codes: what are they and how to use them in education.
- The URL (universal resource locator): what are they and how to use them.
- Websites and internet web hosts demystified
- Transferring files to web hosts: FTP agents (file transfer protocol).
- Downloading content from web hosts: a new and easy way to use the Internet for education.
- What if I have weak Wi-Fi or no Internet service at all? Can I still use my smartphone or mobile pad?
- There’s an “app” for that.
- Let’s build a website.

Who should attend?
The workshop is designed for educators that have a basic understanding of computers. This includes knowing how to use basic word processing, spreadsheets, and moving files from one place to another. Knowing how to use photo editing software, presentation programs, and make acrobat files (pdf) will be useful, but not necessary. The workshop is not designed for educators with a more advanced knowledge of computers, websites, smartphones and pads.

Instructor: Rudy Rosen, Ph.D.
Rudy is currently managing H2O, an experienced-based, technology-enhanced project to improve education of youth about water (www.water-texas.org) Jointly supported by Texas State University and Texas A&M University - Corpus Christi. He is a research professor at the River Systems Institute and Department of Biology, Texas State University in San Marcos.
Texas Aquatic Science Online

- [texasaquaticscience.org](http://texasaquaticscience.org)
- Chapters
- Videos
- Career Promotions
- Science stories
- How to help
Texas Aquatic Science Online University Course

Published on Apr 18, 2015
Oceans: Gulf of Mexico Summary Overview, from Aquatic Science STEM curriculum Lesson 12 (Oceans: The Gulf of Mexico) closed captioned in English that includes topics. Which states share Gulf waters? Which other countries share the Gulf? What are some of the industries in the

H2O Headwaters to Ocean

CE³SAR
Texas Aquatic Science Online
225 videos – Closed Captioned

AQUATIC & WATER SCIENCE VIDEOS

SCIENCE LESSONS WITH DR. RUDY ROSEN FROM TEXAS AQUATIC SCIENCE

CLICK FOR VIDEOS  CLOSED CAPTIONED VIDEOS
Texas Aquatic Science Online

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 6-12.

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<th>Description</th>
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14. Chapter 14. Water for One of the greatest ch...

14 Items

Customers also subscribed to

Headwaters to Ocean
Interconnected Curriculum
Texas Aquatic Science
Certified Field Sites

- Connect aquatic science in the classroom with educators and outdoors learning
- 65 sites (so far)
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

H2O
Headwaters to Ocean
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
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AQUATIC COMMUNITIES
INTRODUCTION

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Headwaters to Ocean