

**2008 USDA-CSREES**

**Water Conference**

**Sparks Nevada**

**February 3 - 8**

**Water Resources Education for  
Middle School Students  
in Rural Virginia**

**Presenters**

**Barry Fox**

**Extension Specialist, 4-H Marine/Aquatic Education  
(Retired)**

**Dr. Asmare Atalay**

**Agronomist**

**Virginia State University**

**This is a pilot educational program designed to inform middle school students (grades 6 – 7) in rural Virginia about Virginia’s surface and groundwater resources.**



**GOAL:**

**Educate youth about their local drinking and surface water resources, and how they can conserve and protect these resource.**

## **Proposed activities:**

- **Six hours of teacher instruction to address the learning objectives. Instruction will include interactive lecture, hands-on educational activities, model demonstrations and laboratory activities.**
- **Additional classroom visits to demonstrate educational activities with students for teachers.**
- **Half-day field trip to a local watershed to conduct water quality testing, biological monitoring and observe land use impacts on water quality.**
- **Pre/post testing to validate learning objectives.**
- **Pre/post attitude/awareness survey to measure changes in environmental awareness.**

# Objective

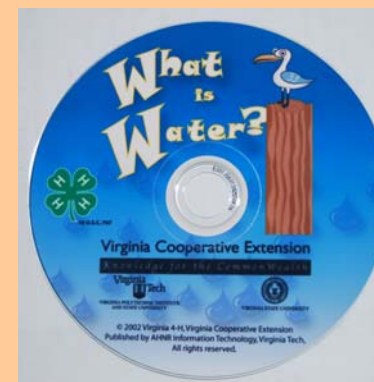
Describe the structure of water and demonstrate various properties (surface tension, solvency, buoyancy, etc.).

## Strategies

*What is Water?*

*Project WET*

- Hangin' Together
- H<sub>2</sub>Olympics
- Adventures in Density





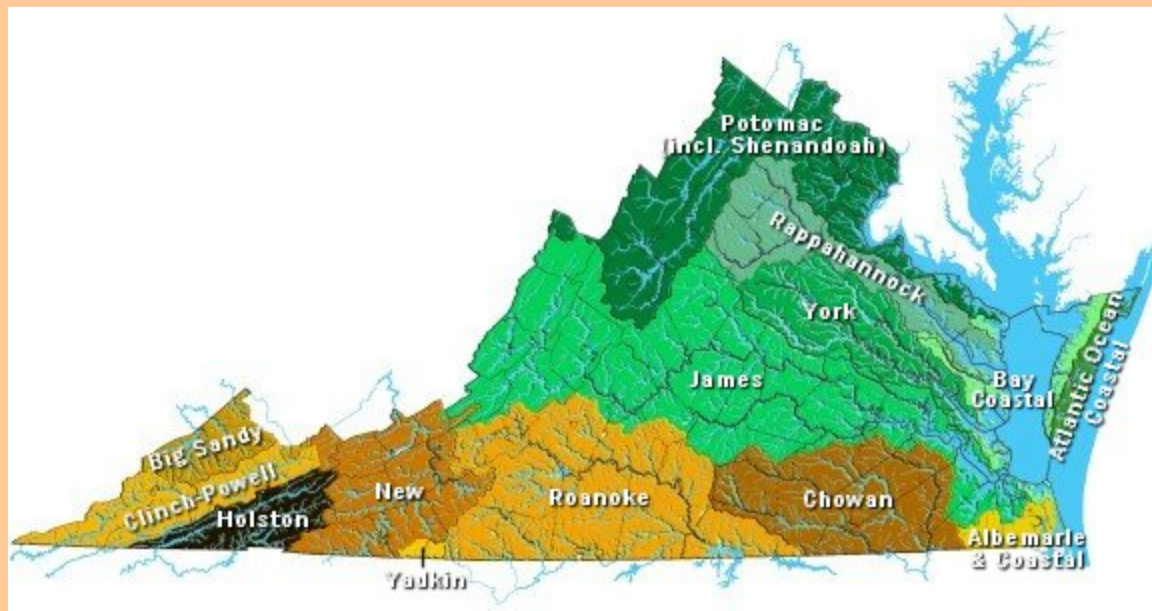
# Objective

Describe major characteristics of and issues facing Virginia's watersheds.

## Strategies

- Virginia Watershed Map Activities
- *Watershed Connections*
- *Raindrops Falling on My Head*
- **Soil and Water Conservation Puzzles**

(Virginia Department of Conservation and Recreation)



# Objective

**Explain how Virginia manages its water resources and which agencies are involved.**

## Strategies

### **Regulation Rummy and BINGO**

- **Dams for ponds and lakes – DCR**
- **Pond and lake construction – DEQ (NRCS, DCR, etc.)**
- **Non-point Sources – DCR**
- **Point Sources – DEQ**
- **Freshwater fisheries – DGIF**
- **Coastal Fisheries – VMRC**
- **Coastal development – CBLAD, DEQ**
- **Streams and Riparian – DOF, DCR**
- **Wetlands – DEQ, DCR**
- **Parks and Recreation - DCR**

# Objective

Demonstrate how land use impacts water quality.

## Strategies

- *Enviroscape*
- *Project WET* (Sum of the Parts, Incredible Journey)



- Demonstrate types of land use.
- Demonstrate sources and types of point and non-point source pollution.
- Demonstrate BMPs to reduce pollution.
- Demonstrate cumulative effects of pollution.







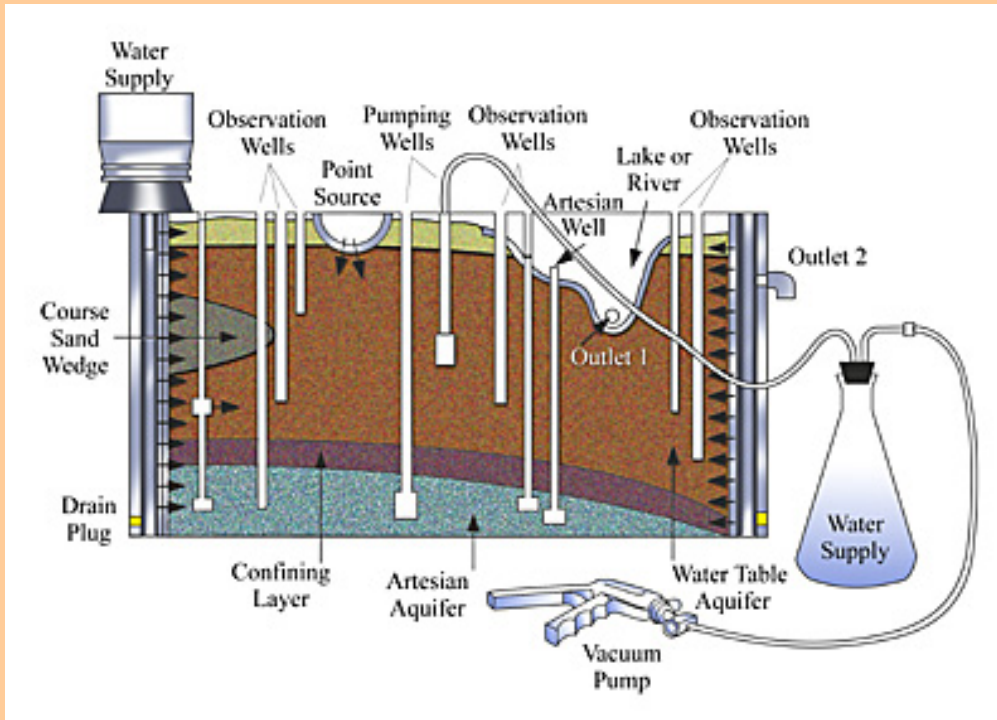
# Objective

Describe and demonstrate how surface water and groundwater are connected and how well and septic systems function.

## Strategies

- Groundwater Flow Model
- *Enviroscape*

- Demonstrate groundwater features.
- Demonstrate groundwater processes.
- Demonstrate surface water and groundwater connections
- Demonstrate groundwater pollution sources, movement and options.

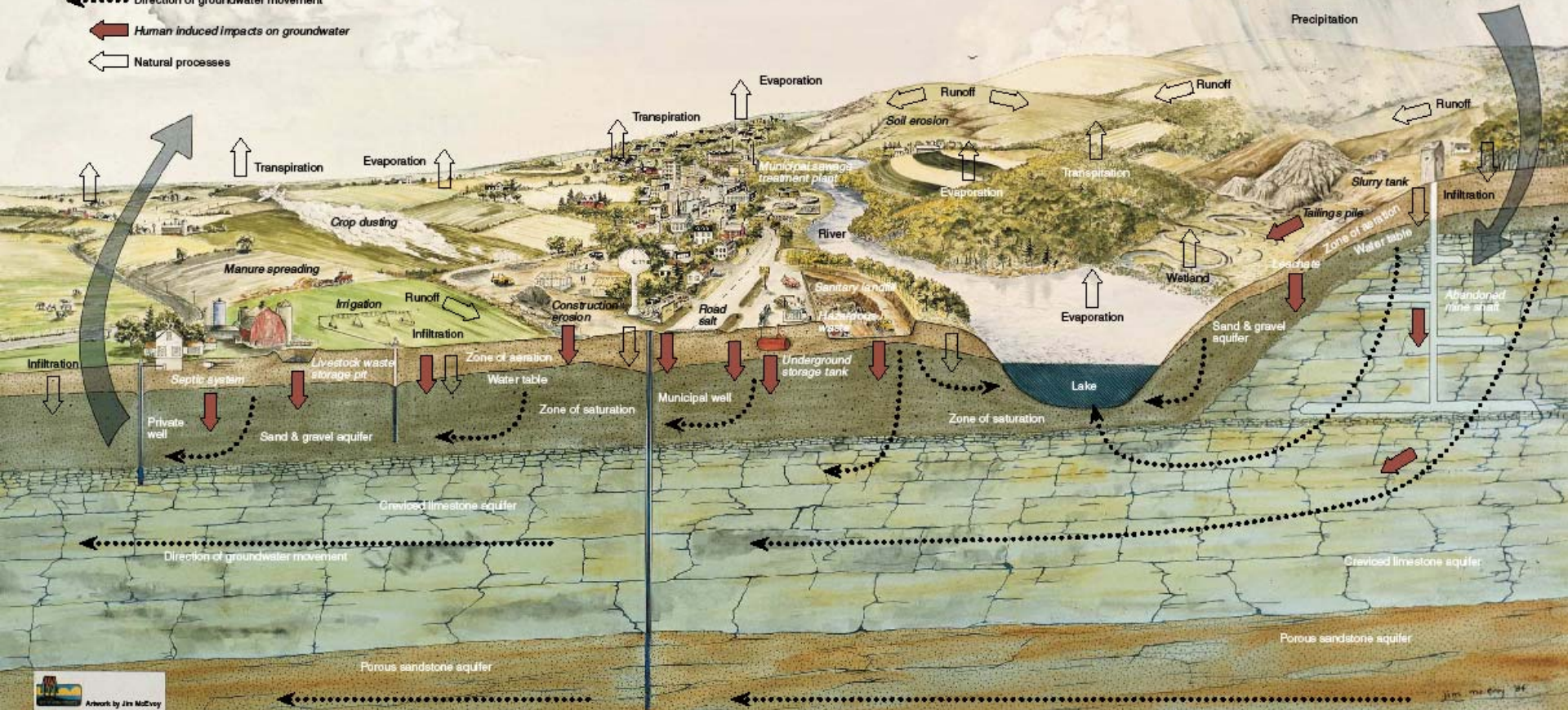


# Groundwater and land use in the water cycle

←..... Direction of groundwater movement

← Human induced impacts on groundwater

← Natural processes



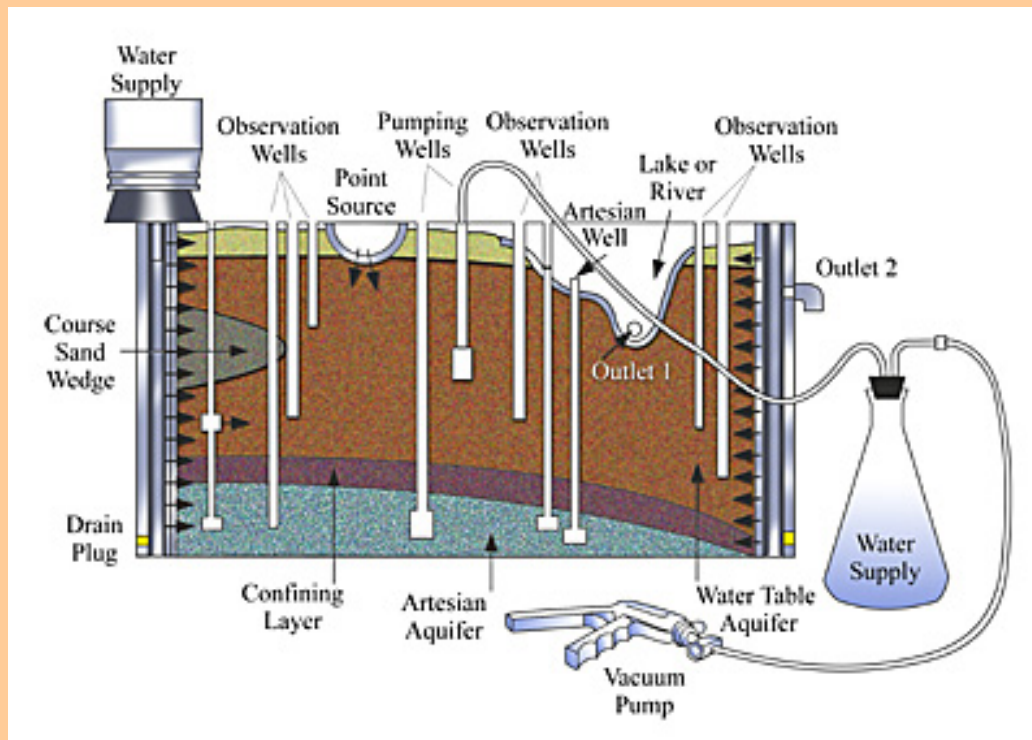


# Objective

How to protect private wells and maintain a healthy septic system.

## Strategies

- Groundwater Flow Model
- Well and septic illustrations



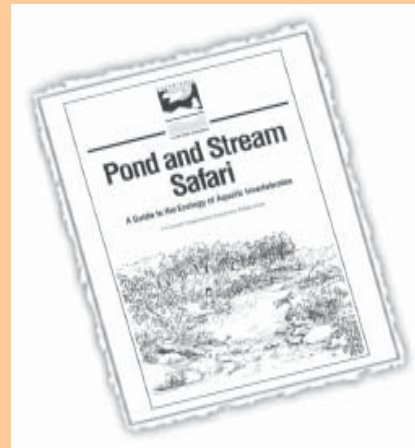
- Demonstrate well features and processes.
- Demonstrate septic system features and processes.
- Demonstrate well and septic maintenance.

# Objective

**Demonstrate and describe how water quality is monitored (physical, chemical, biological).**

## Strategies (Classroom and Field Activities)

- Stream structure and flow measurements
- pH, Alkalinity, Nitrate, Dissolved Oxygen Tests
- Aquatic Macro-invertebrates





# Objective

Demonstrate and describe how to protect water quality at home, school and community.

## Strategies (Classroom and Field Activities)

- *Enviroscape*
- Groundwater Flow Model
- *Home Assist* (excerpts)
- *Give Water a Hand* (excerpts)



**Farm•A•Syst Home•A•Syst**

# Give Water A Hand

for young people taking  
action in their community

# Content/Standards of Learning Correlation

<b>Content Area</b>	<b>Standard of Learning</b>
<b>Water structure and properties</b>	<b>6.4, 6.5</b>
<b>Watershed characteristics</b>	<b>6.7</b>
<b>Resource management, use and issues</b>	<b>6.7, 6.11, 7.12</b>
<b>Land use and water quality</b>	<b>6.7, 6.11, 7.12</b>
<b>Surface water/groundwater interaction</b>	<b>6.7, 6.11, 7.12</b>
<b>Water quality monitoring</b>	<b>6.1, 6.7, 7.1, 7.12</b>



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390-055  
 APRIL, 1989

4-H MARINE PROJECT  
 UNIT FIVE

# WHAT IS WATER POLLUTION?

NAME: \_\_\_\_\_  
 UNIT: \_\_\_\_\_  
 DATE: \_\_\_\_\_

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4-H MARINE PROJECT  
 UNIT SIX

390-057  
 APRIL, 1989

# TAXONOMY

THE SCIENCE OF CLASSIFICATION

NAME: \_\_\_\_\_  
 UNIT: \_\_\_\_\_  
 DATE: \_\_\_\_\_

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390-059  
 APRIL, 1989

4-H MARINE PROJECT  
 UNIT SEVEN

# AQUATIC ANIMAL ADAPTATIONS

NAME: \_\_\_\_\_  
 UNIT: \_\_\_\_\_  
 DATE: \_\_\_\_\_





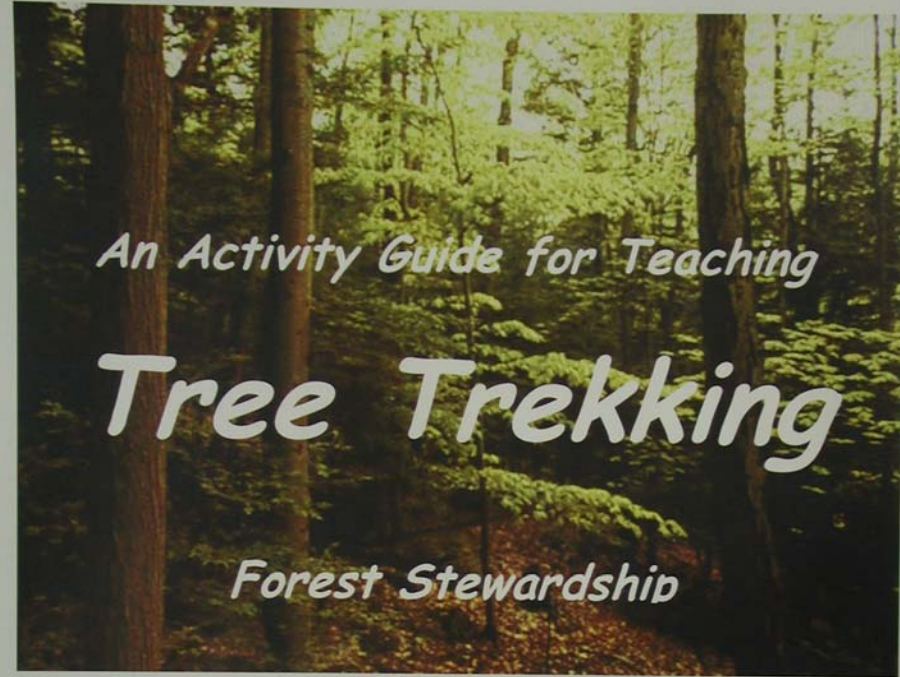
May 2006

# Water Quality Indicators

Alkalinity  
TDS  
Nitrate  
Dissolved Oxygen  
Salinity  
Hardness  
Phosphate  
TSS  
Ammonia  
pH



An introduction to water quality indicators, what they mean and how they are measured



*An Activity Guide for Teaching*

# Tree Trekking

*Forest Stewardship*

Publication 390-027  
Reprinted May 2001



4-H is a community of young people across America who are learning leadership, citizenship and life skills.





project WILD  
K-12 Activity Guide

project WILD  
*Aquatic*  
Education  
Activity Guide

Project WET



Curriculum & Activity  
Guide

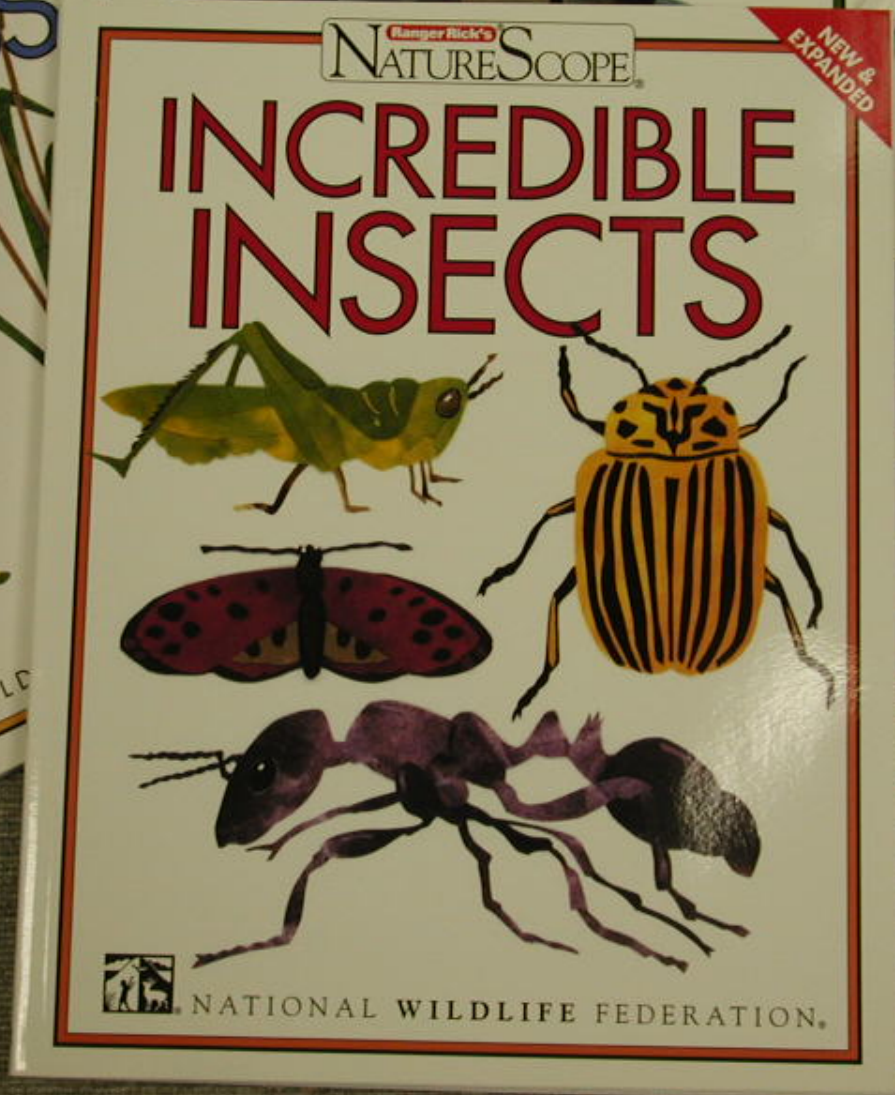
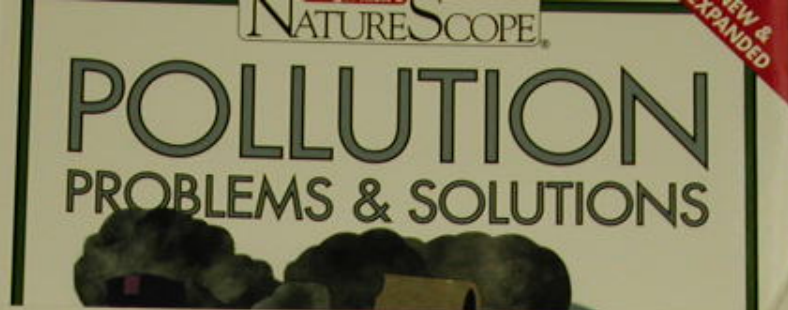
PROJECT WET  
WATER EDUCATION TRUST

Environmental  
Education  
Pre K-8  
Activity  
Guide

Project  
Underground

A Natural Resource Education Guide







Worms Xylem Yeast Zooplankton

THE 411

TRANSPORT  
DNA & RNA  
MITOSIS  
MITOSIS



MAKE UP  
W  
5 6







# Study Habits

Write down your assignments in a notebook or on a calendar. Prioritize your homework.

Set a regular time each day to study.

Keep papers, pencils, a calculator, and a dictionary nearby.

Find a quiet, comfortable place to spread out your books.

Turn off the television and don't take cell phone calls or e-mail.

★ Reward yourself!























ow's  
ades  
Virginia Tech

















No turn! Welcome! No turn!  
SOL 6.7.6.9 The student will investigate and understand the natural processes and human interactions that affect watershed systems.  
Please have a seat, get unpacked by your science "pod" on desk and smile.  
CLOUDS Write down homework  
Complete DSR # 64  
Work on Christmas worksh

Tributary

Homework  
1  
-Have a word think sets  
-Science Fair Project (mandatory for Honors Science 6 students) due January 10, 2007

2006-2007  
YEARBOOKS!!  
The Student Body  
Members  
Are Invited

ABSTRACT  
We are open to  
K-12 and Adults in  
Plant Groups  
PROCEDURE  
CARE

ICE CREAM  
FAMILY SIZE





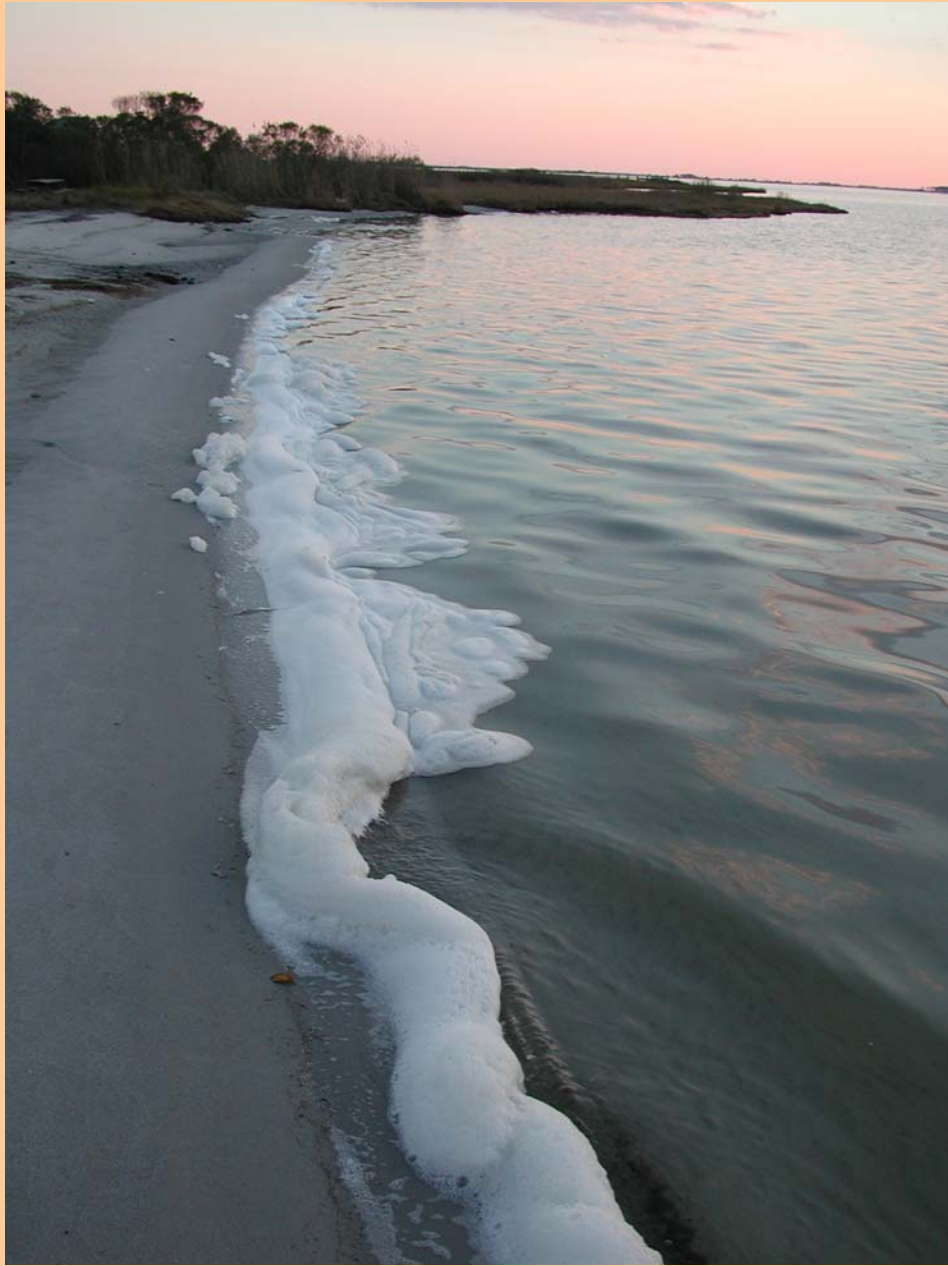












# Current Results

**Teacher Pre-test Results (average) 33.5% correct**

**Teacher Post-training Test Results (average) 92.4% correct**

**Student Vocabulary Pre-assessment (average) 3/12**

**(Post-assessment pending)**

**Student Water Process Pre-assessment 3/10**

**(Post-assessment pending)**

**Student Priority of Water Resources (pre/post pending)**

**Student Behavioral changes (re: water resources) (pre/post pending)**





























































**Thank You!**

**Question?**