FROM RIVERS TO SOUNDS IN THE BERTIE WATER CRESCENT

AN EARTH & ENVIRONMENTAL SCIENCE PROGRAM THAT FOLLOWS THE WATER

WORKSHOP 1: SEPTEMBER 20-21, 2018
Cashie River Center: 8:00 am to 3:00 pm

NORTH CAROLINA LAND OF WATER (NC LOW) & A TIME FOR SCIENCE (ATFS)
www.nclandofwater.org & www.atimeforscience.org

OBJECTIVES:

1. Develop a sense of your place in both space and time
2. Cultivate an understanding of
   a) The local and regional landscape and waterscape,
   b) The dynamics that drive change within the region, and
   c) How these forces dictate human response and vice versa.
3. Produce individual lesson plans that fit into your curricula.

AGENDA:

8:00-8:30: Introductions and Where are you?
8:30-9:00: Six Big Concepts in Earth and Environmental Science
9:00-9:50: Your Place in Space: North Carolina, Coastal Plain, and Bertie County
  Four Provinces of NC: Appalachian Mts, Piedmont, Coastal Plain, & Continental Margin
  Topographic & Geologic cross-section of NC, Coastal Plain, and Continental Margin
  River Drainage Basins
9:50-10:00: Break
10:00-10:45: Where is your home?
  Lidar map of "Bertie Water Crescent" (Fall Line to Suffolk Shoreline)
  Lidar map of Bertie Peninsula without and with towns and roads
  Bertie Co. cross-section topographic profiles
10:45-11:20: Water, water, water everywhere!
  Hydrologic cycle and the "5 Water Hubs" of the "Bertie Water Crescent" (label maps)
  Map Teams develop a story for each Bertie Water Hub and tell their stories
11:20-11:30: Break
11:30-12:00: Pick up lunch (supplied), meet at the vans with long sleeve shirt, shoes that can get wet, etc., and travel to the Chowan River bluffs
12:00-1:30: Chowan River bluffs—Characteristics and dynamics of a world class coastal system
1:30-2:00: Travel back to Cashie River Center
2:00-3:00: Wrap Up and Assignments
  Each team produces a lesson plan
  Assignment for next time (e.g., make 3-D model of Bertie County)

CHOWAN RIVER BLUFFS: the over-arching concepts

1. Chowan River estuary: the water, shore line, shore zone, and beach dynamics
2. Stratigraphy of the bluffs: beds of clay, iron, sand, and marine fossils
3. Recession of the bluffs: shoreline erosion, slumping, and recycled beach sediment

BERTIE-WINDSOR SCIENCE TEACHER WORKSHOPS

All of the science teacher workshops will utilize the fundamental concepts of earth and environmental science to focus on the basic concepts associated with "What's In Your Backyard"?

1. The workshops and field trips will focus on the character and dynamics of the incredible natural resource system of the Bertie-Windsor region and Atlantic Coastal Plain Province. It will also include the influence these resource dynamics have on the development of the human culture.

2. The program leaders will build the workshops and field trips around the six basic concepts in science to integrate the natural resources and cultural histories of the local to regional environments. Use of the big concept approach to science will provide teachers with a critical understanding of the interactive and interdependent nature of **earth systems**, as well as providing a critical framework for presenting specific components and processes required by the NC Essential Standards and EOG Science test.

   a) Earth's cycles: water, rock, & chemical
   b) Energy to do work: sun, fossil fuels, & natural hazards
   c) Time: human and geologic
   d) Earth's tectonism: changing landscapes & ecosystems
   e) Economic resources: elements, minerals, rocks, & soils
   f) Human dynamics: cultural history & environmental change

3. The leaders in the Bertie-Windsor Science Teacher Education Program include:

   a) Dr. Stan Riggs-Leader and Regional Earth and Environmental Expert, Ms. Dorothea Ames-Earth Science Educator, and Ms. Karen Clough-Program Coordinator, all from NC LOW; and Ms. Maria McDaniel-Education and Program Director for "A Time for Science" ATFS.

   b). Additional experts will be brought in for specific contributions including Dr. Bob Christian (NC LOW water quality and ecosystems services), Mr. Brian Baker (ATFS Astronomy Director), and Ms. Emily Jarvis (ATFS Executive Director).

WORKSHOP HANDOUTS: STATEMENTS & MAPS

1. Workshop Agenda
2. The Six Big Concepts of Earth and Environmental Science
    - Earth's Cycles: Water, Rock, and Chemical
    - Energy to do Work: Sun, Fossil Fuels, and Natural Hazards
    - Time: Human and Geologic
    - Earth's Tectonism: Changing Landscapes and Seascapes
    - Economic Resources: Elements, Minerals, Rocks, and Soils
    - Human Dynamics: Cultural History and Environmental Change
3. Map of Appalachians, Piedmont, & Coastal Plain Provinces
4. 3-D Cross-Section of Surface Topography NC
5. Map of Coastal Plain & Continental Margin Provinces
6. Bertie Peninsula Plain Lidar Map: Where do You Live? What are the Water Bodies?
7. Bertie Peninsula Lidar Map with Towns & Roads: Now Where do You Live?
8. Coastal Plain Shorelines: Product of Climate and Sea Level Changes
9. Drainage Basins NE NC: Product of Riverine Processes
10. Bertie Water Crescent: Lidar Topography and Cross Sections of Surface Topography
11. Earth's Water Cycle
12. Bertie Peninsula Water Hubs

SCAVENGER HUNT

Find the following items and either sample it or photograph it for your classes

1. Shrimp burrows
2. A natural spring
3. A fossil coral
4. High tide beach
5. A slump block
6. A braided river
7. An ironstone boulder
8. An eroding shoreline
9. Deposit of heavy minerals
10. An iron hardpan

VOCABULARY BINGO

1. Beach
   Sediment accumulation between water body and land
2. Braid plain
   Floodplain of a multi-channel river in an arid environment
3. Topography
   Land surface geometry above water level
4. Lidar
   Technique for measuring land surface elevation
5. Estuary
   Water body where river water mixes with ocean water
6. Cross-section
   Surface profile and underlying character of a vertical section of the earth
7. Mean sea level
   Average level of the present ocean surface
8. Trace fossil
   Indirect evidence of a former organism
9. Watershed
   Area contained within a drainage basin
10. Continental Margin
    Submarine province adjacent to the subaerial Coastal Plain Province
11. Interstream divide
    High land area between two drainage valleys
12. Hydrologic cycle
    Continuum of water movement within our planet's surface
13. Drainage basin
    A land basin that contains an integrated system of streams
14. Terrace
    Land surface formed by previous river or ocean levels during different climate conditions

15. Shoreline
    Line between any water body and adjacent upland
16. Shore zone
    Land area routinely covered by the moving shoreline
17. Trunk river
    Largest or primary river within a drainage basin
18. Black-water stream
    Tributary streams that drain upland swamps
19. Fall line\
    Line of intersection between old crystalline Piedmont rocks and young marine sediments of Coastal Plain rocks
20. Coastal plain
    Marine sediment province adjacent to Atlantic Ocean