



Teaching Units for High School Science Developed by
Duke University Graduate Students in Pharmacology 693/694
Master of Arts in Teaching (MAT)

<http://sites.duke.edu/rise/duke-courses/pharm-693694/>

Daily Lesson Plan

Course Name: AP Environmental Science/AP Biology	Ⓢ Standard Ⓢ Honors ● AP
Unit Title: Ecological Health of the Ellerbe Creek Watershed and its Environmental Implications	Day/Date: Day 15 of 16
Relevant NC Standard Course of Study Goal(s):	
<i>North Carolina Standard Course of Study:</i>	
<ul style="list-style-type: none"> • Bio.2.1 Analyze the interdependence of living organisms with their environment. • Bio.2.2 Understand the impact of human activities on the environment. • EEn.2.2 Understand how human influences impact the lithosphere. • EEn.2.3 Explain the structure and processes within the hydrosphere. • EEn.2.4 Evaluate how humans use water. • EEn.2.7 Explain how the lithosphere, hydrosphere, and atmosphere individually and collectively affect the biosphere. • EEn.2.8 Evaluate human behaviors in terms of how likely they are to ensure the ability to live sustainably on Earth. 	
<i>College Board AP Course Standards</i>	
<ul style="list-style-type: none"> • Biology - Big Idea 4 Biological systems interact and these systems and their interactions possess complex properties. <ul style="list-style-type: none"> ○ 4.A Interactions within biological systems lead to complex properties. ○ 4.B Competition and cooperation are important aspects of biological systems.. ○ 4.C Naturally occurring diversity among and between components within biological systems affects interactions with the environment.. 	
Specific Lesson Objectives	
Students will understand:	
<ol style="list-style-type: none"> 1. Interactions among living systems and with their environment result in the movement of matter and energy relating to the significance of each to maintain the health and sustainability of an ecosystem. 2. Human activities (including population growth, urbanization, pollution, global warming, burning of fossil fuels, habitat destruction, and introduction of non-native species) may impact the environment from one generation to the next. 3. Sustainable agriculture and aquaculture practices have environmental impacts. 4. The development and implementation of environmental policy is a complex issue. 5. Ground water and surface water interact. 6. Humans influence freshwater availability and quality in North Carolina's river basins, wetlands, and tidal environments. 7. Biodiversity is important to the biosphere. 8. Distribution of local and global ecosystems changes over time. 9. The diversity of species within an ecosystem may influence the stability of the ecosystem. 10. Interactions between and within populations influence patterns of species distribution and abundance. 	
Students will know:	
<ol style="list-style-type: none"> 1. The importance and biological implications of the water, carbon, nitrogen, and phosphorous cycles 	

2. How humans modify ecosystems through population growth, technology, resource consumption, and production of waste
3. How to interpret data regarding the historical and predicted impact on ecosystems and global climate change
4. That urban development in the North Carolina Piedmont leads to habitat destruction and urban runoff
5. The effects of pesticides, herbicides, and pharmaceuticals on freshwater ecosystem health
6. Local environmental policies and organizations striving for effective conservation methods and stewardship
7. The general structure of freshwater ecosystems
8. How humans and other species manipulate and impact freshwater ecosystems for use and consumption
9. How pollutants flow through a watershed
10. How drinking water, stormwater, and wastewater systems impact the quantity and quality of water
11. How to evaluate the quality of North Carolina streams (chemical & physical properties and biotic indices)
12. Non-point sources of pollution
13. How biotic and abiotic factors affect biodiversity
14. How traditional agricultural practices can produce runoff and sedimentation issues in adjacent streams

Students will be able to:

1. Mathematically calculate the flow rate of streams
2. Identify common freshwater macroinvertebrates and what their presence or absence means for ecosystem health
3. Chemically test for pH, dissolved oxygen, and the presence of dissolved nitrogen, phosphorous, detergents, and pharmaceuticals
4. Use a compass to determine magnetic direction of travel and azimuth measurement
5. Read and interpret Public Land Survey maps to determine land use and an area's legal description

Key Vocabulary for this Lesson

- N/A

Materials

- Unit Exam
- Lab Practical: prepared freshwater macroinvertebrates; water samples; chemical testing kits - for pH, dissolved oxygen, and the presence of dissolved nitrogen, phosphorous; compasses; public land use maps

Technology Needs

- N/A

LESSON ACTIVITIES

Opening (Hook, Warm-Up, Anticipatory Set, Review, etc.)

Describe activity to elicit active involvement of students or refer to previous learning:
N/A

Procedure: Include all sections that apply to this lesson; combine as necessary.

Section	Time	What the Teacher will do:	What the Students will do:
Statement of Objective & Purpose	5 minutes	<ol style="list-style-type: none"> 1. Answer any remaining questions prior to handing out the unit exam and lab practical 2. Give detailed instructions on completing the exam and lab practical 	<ol style="list-style-type: none"> 1. Ask any remaining questions to clarify material 2. Listen to teacher's instructions in regards to the unit exam and lab practical
Input, Modeling, & Check for Understanding	0 minutes	N/A	N/A
Guided Practice	0 minutes	N/A	N/A
Independent Practice/ Homework	85 minutes	<ol style="list-style-type: none"> 1. Answer questions in regards to the unit exam and lab practical 	<ol style="list-style-type: none"> 1. Complete the unit exam and lab practical
Closing/ Summary	0 minutes	N/A	N/A
Assessment of Student Learning			
<i>How & when will you know that the students have learned this material?</i> Unit exam results, lab practical results			
Differentiation Strategies*			
<i>How will you adjust aspects of the lesson to accommodate student READINESS?</i>			
Struggling Students:	Gifted/Advanced Students:	English Language Learners:	
N/A	N/A	N/A	
<i>How will you adjust aspects of the lesson to accommodate students' LEARNING PROFILES?</i>			
N/A			
<i>How will you adjust aspects of the lesson to accommodate students' INTERESTS?</i>			
N/A			