



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 7 of 16
Relevant NC Standard Course of Study Goal(s): <ul style="list-style-type: none"> • 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.2.8 Evaluate human behaviors in terms of how likely they are to ensure the ability to live sustainably on Earth. 	
Specific Lesson Objectives	
Students will understand: <ol style="list-style-type: none"> 1. 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. 2. The development and implementation of environmental policy is a complex issue. 3. Ground water and surface water interact. 4. Humans influence freshwater availability and quality in North Carolina's river basins, wetlands, and tidal environments. 	
Students will know: <ol style="list-style-type: none"> 1. How humans modify ecosystems through population growth, technology, resource consumption, and production of waste 2. That urban development in the North Carolina Piedmont leads to habitat destruction and urban runoff 3. The effects of pesticides, herbicides, and pharmaceuticals on freshwater ecosystem health 4. Local environmental policies and organizations striving for effective conservation methods and stewardship 5. How humans and other species manipulate and impact freshwater ecosystems for use and consumption 6. How pollutants flow through a watershed 7. How drinking water, stormwater, and wastewater systems impact the quantity and quality of water 8. How to evaluate the quality of North Carolina streams (chemical & physical properties and biotic indices) 9. Non-point sources of pollution 	
Students will be able to: <ol style="list-style-type: none"> 1. Maintain field notes and accurate records in a field notebook 2. Read and interpret Public Land Survey maps to determine land use and an area's legal description 	
Key Vocabulary for this Lesson	
<ul style="list-style-type: none"> • <i>N/A</i> 	
Materials	
<ul style="list-style-type: none"> • Bus to transport students 	

<ul style="list-style-type: none"> • GIS maps of the Ellerbe Creek Watershed area around the Duke Diet and Fitness Center on Trinity Avenue, Durham, NC • Field Trip Permission Forms • Students will need to bring their field notebooks
Technology Needs
<ul style="list-style-type: none"> • N/A

LESSON ACTIVITIES			
Opening (Hook, Warm-Up, Anticipatory Set, Review, etc.)			
<i>Describe activity to elicit active involvement of students or refer to previous learning:</i> 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	10 minutes	1. Teacher will introduce students to Katherine Meehan of the Ellerbe Creek Watershed Association and will familiarize the students with the area through the use of GIS maps	<ol style="list-style-type: none"> 1. Listen 2. Students will introduce themselves to Katherine Meehan
Input, Modeling, & Check for Understanding	70 minutes	<ol style="list-style-type: none"> 1. Teacher and Katherine Meehan from the Ellerbe Creek Watershed Association will take students on an interactive walking tour of the Ellerbe Creek Watershed near Duke Diet and Fitness. This location is the confluence of two most polluted branches of the creek that are heavily impacted by urban runoff and stormwater erosion. 2. Check for understanding via “Cold Calling” 	<ol style="list-style-type: none"> 1. Take notes from the lecture 2. Participate and actively ask and answer the teacher’s and Katherine Meehan’s questions
Guided Practice	0 minutes	N/A	N/A
Independent Practice/ Homework	0 minutes	N/A	N/A
Closing/ Summary	10 minutes	1. Teacher and Katherine Meehan will answer any final questions	1. Students will ask any remaining questions

		in regards to the day's field trip	
		2. Teacher will ensure all students are accounted for the trip back to the high school	
Assessment of Student Learning			
<i>How & when will you know that the students have learned this material?</i>			
Daily review questions, Lab Practical Exam, Unit Exam, Stream Sampling Plan			
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>			
This lesson provides a visual approach to learning about the effects of urbanization upon urban streams and examines in detail the effects of poor stormwater mitigation systems and the policy that is currently in place controlling such issues. Students will be able to see the real world applicability of what they had been learning in class during the previous 6 days of the unit.			
<i>How will you adjust aspects of the lesson to accommodate students' INTERESTS?</i>			
N/A			