



RISE at **DUKE**
Raising Interest in Science Education

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: 6/16
Relevant NC Standard Course of Study Goal(s): <ul style="list-style-type: none"> • EEn.2.8 Evaluate human behaviors in terms of how likely they are to ensure the ability to live sustainably on Earth. • EEn.2.4 Evaluate how humans use water. • Bio.2.2 Understand the impact of human activities on the environment. 	
Specific Lesson Objectives	
Students will understand: <ol style="list-style-type: none"> 1. Distribution of local and global ecosystems changes over time. 2. Interactions between and within populations influence patterns of species distribution and abundance. 3. Ground water and surface water interact. 4. 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. 	
Students will know: <ol style="list-style-type: none"> 1. That urban development in the North Carolina Piedmont leads to habitat destruction and urban runoff 2. How humans and other species manipulate and impact freshwater ecosystems for use and consumption 3. How pollutants flow through a watershed 4. How drinking water, stormwater, and wastewater systems impact the quantity and quality of water 	
Students will be able to: <ol style="list-style-type: none"> 1. Maintain field notes and accurate records in a field notebook 2. Develop a methodology for stream sampling 3. Use a compass to determine magnetic direction of travel and azimuth measurement 4. 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"> • Compass, magnetic north, true north, declination, azimuth, public land survey system, township, range, section 	
Materials	
<ul style="list-style-type: none"> • Public land use maps and GIS maps of Durham County • Compasses 	

Technology Needs
<ul style="list-style-type: none"> • Laptop • Projector

LESSON ACTIVITIES			
Opening (Hook, Warm-Up, Anticipatory Set, Review, etc.)			
<p><i>Describe activity to elicit active involvement of students or refer to previous learning:</i> <i>Warm-up:</i> Students will use the techniques learned in warm-ups and mini-labs to develop a final “<i>Stream Sampling Plan</i>” that will be implemented on day 9 when students conduct the Ellerbe Creek field laboratory. Students should devise that in order to test a section of stream, we will need to: calculate flow rate, chemically test water samples, sample for macroinvertebrates, and create a physical stream profile including buffer analysis.</p>			
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	3 minutes	<ol style="list-style-type: none"> 1. Provide an overview of the day: Create a finalized <i>Stream Sampling Plan</i>, learn how to use a compass, learn how to read and interpret a variety of Public Land Use maps 	<ol style="list-style-type: none"> 1. Listen
Input, Modeling, & Check for Understanding	20 minutes	<ol style="list-style-type: none"> 1. Teacher will instruct students on the parts and use of a compass for orientation 2. Teacher will instruct students on the use of the Public Land Survey System and how to read and interpret different types of Public Land Use maps 	<ol style="list-style-type: none"> 1. Take notes from the lecture
Guided Practice	20 minutes	<ol style="list-style-type: none"> 1. Teacher will require students to demonstrate their ability with a compass and interpreting maps by asking for legal land descriptions 	<ol style="list-style-type: none"> 2. Participate in the demonstrations with the compasses and maps and actively ask and answer the teacher questions
Independent Practice/ Homework	45 minutes	<ol style="list-style-type: none"> 1. Teacher will assist students in developing a finalized <i>Stream Sampling Plan</i> 2. Teacher will ensure students are on the right course when doing a 	<ol style="list-style-type: none"> 1. Students will create their finalized stream sampling plan in class by incorporating the past week’s mini-labs and exercises

		short navigational activity	2. Students will utilize maps and compasses to complete a short navigational activity
Closing/ Summary	2 minutes	1. Teacher will answer any remaining questions on the topics of the day 2. Teacher will ensure students know what to have for Ellerbe Creek field trip	1. Students will ask questions in regards to the day's topics 2. Students will listen to what is needed for the Ellerbe Creek field trip
Assessment of Student Learning			
<i>How & when will you know that the students have learned this material?</i> Lab Practical Exam, Unit Exam, during the field trip to Ellerbe Creek, during the Ellerbe Creek Field Laboratory			
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>			
The lessons for today will be geared towards kinesthetic learners as each student will be equipped with a compass and have the opportunity to learn how to read and interpret a variety of maps. The maps and compass section of the class will all be conducted outside of the classroom. Students will work in small groups during a short, independent practice field exercise and it will be important for group members to work cohesively to complete the activity.			
<i>How will you adjust aspects of the lesson to accommodate students' INTERESTS?</i>			
The <i>Stream Sampling Plan</i> will incorporate both what the students have learned in the mini-labs and what they have developed through their own ideas and testing. From the previous week's demonstrations, they will be able to decide as a class what will be significant to test during the Ellerbe Creek Field Laboratory.			