



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:	<input checked="" type="radio"/> Standard <input type="radio"/> Honors <input type="radio"/> AP
Unit Title: Ecological Health of the Ellerbe Creek Watershed and its Environmental Implications	Day: 1 of 16
Relevant NC Standard Course of Study Goal(s):	
<ul style="list-style-type: none"> • NC: Bio.2.1 Analyze the interdependence of living organisms with their environment. • NC: EEn.2.3 Explain the structure and processes within the hydrosphere. • NC: EEn.2.4 Evaluate how humans use water. • NC: EEn.2.7 Explain how the lithosphere, hydrosphere, and atmosphere individually and collectively affect the biosphere. • AP: 4.C Naturally occurring diversity among and between components within biological systems affects interactions with the environment. • 	
Specific Lesson Objectives	
Students will understand:	
<ul style="list-style-type: none"> • 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. 	
Students will know:	
<ul style="list-style-type: none"> • The importance and biological implications of the water, carbon, nitrogen, and phosphorous cycles • The general structure of freshwater ecosystems 	
Students will be able to:	
<ul style="list-style-type: none"> • Maintain field notes and accurate records in a field notebook • Develop a methodology for stream sampling 	
Key Vocabulary for this Lesson	
<ul style="list-style-type: none"> <li style="width: 50%;">• Water quality <li style="width: 50%;">• Plankton <li style="width: 50%;">• Freshwater <li style="width: 50%;">• Benthic <li style="width: 50%;">• Ecosystem <li style="width: 50%;">• Littoral <li style="width: 50%;">• Stratified 	
Materials	
<ul style="list-style-type: none"> • Field notebooks • Toothpicks • Scales • Ruler with mm scale • Small pieces of soap (“hotel soap”) 	
Technology Needs	
<ul style="list-style-type: none"> • Computer with projector 	
LESSON ACTIVITIES	
Opening (Hook, Warm-Up, Anticipatory Set, Review, etc.)	
<ul style="list-style-type: none"> • Warm-up – Students will brainstorm ways that freshwater is used by humans • With a neighbor, students assign a ranking of 2, 1, or 0 if the water needs to be very clean, somewhat clean, or not at all clean. • Groups volunteer their practices that were assigned “2” and write them on the board • List can serve as a jumping-off point for a discussion of differential needs, and as a preliminary list for generating sampling sites. 	

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	2	Explain that the warm-up will be reevaluated during the course of the unit.	Participate in warm-up. Save warm-up in notebook.
	2	Give an overview of the goals of the unit and the topics that will be covered; including field trips and stream testing.	Listen
	2	Pass out field trip forms.	Put form in notebook to take home
Input, Modeling, & Check for Understanding	25	Lecture on "How to Keep a Field Notebook". Pay special attention to correct parts and choices the writer would have made.	Listen. Answer questions in PowerPoint.
	2	Pass out guidelines on field-notebooks <i>(Alternatively, students can take notes)</i>	Glue guidelines into the front cover of their notebooks.
Guided Practice	7	Instruct students to →	<ul style="list-style-type: none"> • Write name, year, title on cover. • Draw the table of contents. • Write "Date" and number pages 1-15 to start
Independent Practice/ Homework	35	<p>Explain weather lab</p> <ul style="list-style-type: none"> • Chance to observe in lab how streams erode banks • Be deliberate about recording data • Encourage trying different shapes, depths, water rates if time allows <p>Pass out weathering lab handouts</p> <p>Observe students and circle classroom</p>	<p>Listen</p> <p>Complete lab</p>
Closing/ Summary	5	<p>Give students time to clean lab area</p> <p>Ask students what the observed and wrap up with a look forward to what the lab results might mean for how streams erode banks.</p>	Respond to teacher prompts
Assessment of Student Learning			
<p>Student responses to closing questions</p> <p>Student writing in lab notebooks</p>			

Differentiation Strategies*		
<i>How will you adjust aspects of the lesson to accommodate student READINESS?</i>		
Struggling Students:	Gifted/Advanced Students:	English Language Learners:
Lab time is a great chance for students to work in differently sized/abled groups	Can investigate different types of soaps to see how different substrates erode at varying rates	Encourage ELL students to record data in their native language. If that is not possible, ask them to explain what they saw and make inferences.
<i>How will you adjust aspects of the lesson to accommodate students' LEARNING PROFILES?</i>		
Solo / group work Kinesthetic and active lab Oral and visual presentation and discussion		