Lesson Title	Ecology: Effects of Land Use on Natural Streams
Length of Lesson	One (50 minute) class period
Created By	Bo Cherry
Subject	General Science
Grade Level	8th grade
State Standards	8th: 1 d (Inquiry); 3 a (Life Science)
DOK Level	DOK 3
DOK Application	Draw Conclusions, Develop Logical Argument, Compare
National Standards	5-8: A (Inquiry); C (Life Science)
Graduate Research Element	My research deals specifically with this topic. I am looking at how agricultural practices in Smith County, MS affect the chemistry and, in turn, the life found in streams and lakes.

Student Learning Goal:
MS 8th Grade:
(Inquiry)1 (d) Analyze evidence that is used to form explanations and draw conclusions; (Life Science) 3 (a) Analyze how adaptations to a particular environment can increase an organism's survival and reproduction and relate organisms and their ecological niches to evolutionary change and extinction.

National Science Education Standards of Content 5-8:
(Inquiry - A) Think critically and logically to make the relationships between evidence and explanations; Develop descriptions, explanations, predictions, and models using evidence; Recognize and analyze alternative explanations and predictions; (Life Science - C) Diversity and adaptations of organisms.

Materials Needed (supplies, hand-outs, resources):
Computer; Projector; Powerpoint Presentation (INSPIRE_Cherry_03.01.11_PP); Notes for Presentation (INSPIRE_Cherry_03.01.11_Notes)

Lesson Performance Task/Assessment:
This lesson is designed as a sort of supplemental lesson which is intended to show the relationship between chemistry and ecology. The lesson will begin with a short review of some chemicals that the students should be familiar with (Nitrates, Phosphates, and some heavy metals). A discussion of how these chemicals are used in agriculture will follow. Students will be expected to take notes, and questions will be asked frequently by the instructor to check for understanding. Next, there will be a short review of the hydrologic cycle and runoff in particular. Guided questions (found on

INSPIRE_Cherry_03.01.11_Notes) will be asked to allow students to make the connection of surface water contamination to the agricultural practices mentioned earlier. The particular research topic deals with broilers (chickens which are bred for mass production), so at this point students will be introduced to this research and the area of study (Smith County, MS). Pictures of the area and of the concerning agricultural practices will be shown. Tables of contaminant levels found in the streams will be shown. Next, a map will be shown which includes the site of a proposed reservoir. Guided questions will force students to think about the implications of such a reservoir built within this watershed. Finally, to link this to ecology, we will discuss the life that you find in streams and lakes like these, and how it is affected by these contaminants. Examples of "dead" or eutrophic lakes will be shown and diagrams will accompany this to explain why these "dead" or eutrophic lakes exsist.

Lesson Relevance to Performance Task and Students:
This lesson will introduce students to various ecosystems and how humans affect them. Students will be able to draw their own conclusions based on previous examples. This will be done throughout the lesson as the instructor will ask the students questions during the lecture.

Anticipatory Set/Capture Interest:
In order to capture the students' interest for this lesson, images will be shown of students performing research in the field and in the lab, accompanied with explanations of what the researchers are doing. This will interest the students because it is real-life science being performed by young people that enjoy the research.

Guided Practice:
The Powerpoint Presentation will be guided. Students will be asked guided questions that are intended to provoke discussion. Students will also interpret graphs, tables, and maps throughout the lesson.

Independent Practice:
Students or groups of students will be asked several discussion questions which they will be given time to discuss, then answer for the entire class. This gives students a chance to think logically with one another, and communicate their discussions to the rest of the class.

Remediation and/or Enrichment:
Remediation – Individual IEP; the PowerPoint will be made available to resource teacher;
Enrichment – Students could be asked to come up with examples of things that may be going on in their town that could affect the environment and the natural inhabitants.

Check(s) for Understanding:
The instructor will be asking several questions throughout the lecture. This will serve as a sort of formative assessment to check for student understanding.

Closure:
Question 1: What are ways in which we (humans) can lessen our impact on the environment and on the wildlife that surrounds us?

Question 2: What is another example of a way in which pollutants can enter an ecosystem and cause harm to wildlife?

Possible Alternate Subject Integrations:
Ecology, Life Science, Chemistry

Teacher Notes:
None