

Reading the River, Summer 2003

Meadow Creek Watershed Study – A 7th Grade Science Unit

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Meadow Creek Watershed Study

Grade Level: 7

Objectives

In this lesson, Students will be able to:

- 1.) Identify the components of a watershed.
- 2.) Identify on a Topographic Map the Meadow Creek Watershed area.
- 3.) Conduct stream monitoring tests using the *Pride Activity Check List* to assess potential environmental hazards.
- 4.) Develop a stream management plan that incorporates environmentally safe, best-management practices.
- 5.) Design an educational plan to inform the community about the problems, clean up and environmental maintenance of Meadow Creek.
- 6.) Implement a plan of continuous watershed watch data collection in conjunction with *Pride* for purposes of environmental stream awareness.

Program of Studies

Scientific Inquiry

- . Identify and refine questions that can be answered through scientific investigations combined with scientific information.
- . Use appropriate equipment (e.g. water thermometer), tools (e.g. map), techniques (e.g. computer skills), technology (e.g. computers), and mathematics in scientific investigations.
- . Design and conduct different kinds of scientific investigations to answer different kinds of questions.
- . Communicate (e.g. write, graph) designs, procedures, and results of scientific investigations.
- . Review and analyze scientific investigations and explanations of other students.

Conceptual Understanding

- . Investigate characteristic properties (e.g., density) of substances.
- . Investigate unity among organisms.
- . Investigate biological adaptation and extinction.

Applications/Connections

- . Use science to evaluate the risks to society for common activities (e.g., riding on airplanes, choice of habitation).

Core Content

Structure of the Earth System (e.g. Water Cycle)

. SC-M-2.1.5 Water, which covers the majority of the Earth's surface, circulates through the crust, oceans, and atmosphere, in what is known as the water cycle. Water dissolves minerals and gases and may carry them to the oceans.

Investigate and analyze populations and ecosystems.

. SC-M-3.2.1 All organisms must be able to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.

. SC-M-3.5.1 A population consists of all individuals of a species that occur together at a given place and time. All populations living together and the physical factors with which they interact compose an ecosystem.

. SC-M-3.5.4 The number of organisms an ecosystem can support depends on the resources available and abiotic factors (e. g., quantity of light and water, range of temperatures, soil composition). Given adequate biotic and abiotic resources and no diseases or predators, populations (including humans) increase at rapid rate. Lack of resources and other factors, such as predation and climate, limit the growth of populations in specific niches in the ecosystem.

Materials

- 1.) Text Book, handouts, electronic sources and other information on parts that make up a watershed and that particular ecosystem.
- 2.) Pen, pencil, paper, notebook and Topographic Map.
- 3.) Ecosystem and watershed survey checklists.
- 4.) Water monitoring kits and or equipment (temperature probes, ph probes, or kits, DO probes, or kits, Calculators, and any other physical/chemical probes, kits as desired and available, tape measure, compass and protractor).

Activity Procedures

- 1.) Discuss the various parts that make up a watershed, stream, river and ecosystem. Determine the difference between a good and bad watershed stream, and clean vs. dirty environmental stream area.
- 2.) Students will work in small groups of four.
- 3.) Students will use previously researched resources, (print and electronic) on watersheds and ecosystems to identify area of Meadow Creek Watershed on a topographic map.

4.) A field trip will follow classroom discussion. Students will take, notes, field sketches, photographs, and videos of stream area from start point to end of stream study.

5.) Students will take and record actual samples (Field Chemistry) on stream temperature, PH of stream, Habitat Assessment, Dissolved Oxygen Levels, (DO) and Electrical Conductivity.

6.) Students will bring back into the classroom results from stream tests to determine overall health of stream, and from those results develop a plan that includes all of the problems that were identified and a best course of action to take to educate the public and implement a plan that will have a positive impact on the Meadow Creek Watershed.

7.) The unit will culminate with a Spring Clean-up of Meadow Creek in conjunction with *Pride's* annual Spring Clean Up.

Definition and Explanation of Concepts

Students need to understand the watershed model and how it is Important in their daily lives, and what impact humans and their interaction with the environment have on a chosen watershed study, especially in a rural environment like ours. With this understanding, the students can differentiate the impact that human activities and interaction with a particular watershed and that ecosystem have on us. Students have the need to understand that any action causes a reaction in the environment that can be either helpful or harmful. Ecosystems consist of many different species that make up that particular population and are often a result of the physical factors that affect those species. Organisms compete and cooperate within ecosystems. Once a study is completed, students should be able to reasonably answer the following questions. What are the interrelationships and interdependencies that organisms generate for both helpful and harmful impacts on their environment? Can human beings and other organisms share the same stream watershed? Does agriculture help or hurt a stream ecosystem? Does local coal strip mining have a negative or positive impact? What effect does housing areas and deforestation around the stream environment cause on organisms that live downstream of the impacted zone. How can we, as students make a difference on our selected stream? Can we change community behavior that is harmful to our particular watershed area? Lastly and most importantly, how do we educate and positively change the behavior of our family, friends and others that live in this particular watershed community?

Assessment

Monitor the student's progress to ensure that they understand the concepts and that proper scientific methods are used to conduct and record accurate measurements.

Check the materials the students are reading and using for research to assure that proper research and sampling techniques are being followed.

References

People And Their Environment: Teachers' Curriculum Guide to Conservation Education; Edited By Brennan, Matthew J., 1969: J.G. Ferguson Publishing Company; Chicago, Illinois.

Ecology: Hands-on experiments, Jennett, Pamela J., 1995: Creative Teaching Press Inc.; Cypress, Ca.

Watershed Watch Biological Stream Assessment; Kentucky Department for Environmental Protection; 2000, Kentucky Division of Water.

Watershed Watch, Water Chemistry Sampling Methods; 1997, Kentucky Division of Water.

Rubric for Evaluating Model

___1.) Can student identify all of the components making up a watershed?

___2.) Can student accurately identify and map Meadow Creek stream area and its path to the Kentucky River?

___3.) Does the management plan for an environmentally safe stream incorporate best management practices?

___4.) Does the student demonstrate proper testing and recording of monitoring results from the stream to the proper worksheet?

___5.) Can student develop a plan showing identified problems and how to implement it to solve those problems.

___6.) Can student demonstrate, using the Internet, how to forward the results of the stream monitoring to the *Pride* website.

600 points are possible for this unit. Each Question is worth 100 points.