MAPS – GIS Lesson: Groundwater, surface water, and water quality

Subject Area: Environmental Science, Water Resources, Physical Geography
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Lesson Description: In this lesson students identify sections of streams that could potentially be impacted by older septic systems.

Students create queries to identify potential problem systems, execute simple unit conversions, and apply buffers.

The lesson is written at a somewhat basic scientific level but could easily be adapted to apply Darcy's Law calculations to the study area.

ITSE National Technology Standards
1) Research and Information Fluency - Students apply digital tools to gather, evaluate, and use information.
2) Critical Thinking, Problem Solving, and Decision Making - Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
3) Demonstrate Creative Thinking - Students use technology to explore models and simulations of complex systems.

Geography Standards - Geography for Life 9-12th
1) The physical processes that shape the patterns of earth's surface.
2) The characteristics and spatial distribution of ecosystems on earth's surface.
3) The changes that occur in the meaning, use, distribution, and importance of resources.
4) How to apply geography to interpret the present and plan for the future.

Objectives: The students will be able to:
1) Derive information from a GIS
2) Provide a basic description of the connections that exist between groundwater and surface water.
3) Describe the potential impact of septic systems on water quality.
4) Improve map skills and problem solving

Prerequisites:
1) Students should have completed the MAPS-GIS Tutorial activity and be familiar with geospatial skill such as viewing data layers, using the measure and identify tool.
2) Students should have read the informational sheet on septic systems provided in the module guide.
3) Students should be familiar with the basic concepts of water movement.
4) Students should be able to execute basic unit conversions.

Materials: Computer access with high-speed internet, student activity sheet
Lesson Estimated Time: Approximately 60 minutes
Lesson Procedure: A basic introduction to the concepts of septic tanks, connection of ground and surface water, and water quality
Assessment/Evaluation: One hour should be the minimum time budgeted.
References and Citations: US Geological Survey and Lane Council of Governments