Title: “FROM WHERE DOES YOUR WATER FLOW?”
Stream Sources along the Appalachian Trail and Their Pieces of a Watershed

Abstract/Vignette: Integration of classroom requirements along with community needs can dovetail into student activities to promote and strengthen student interest in our actual geographical place -- our proximity to the Appalachian Trail and how our water sources rely heavily on the watershed it runs through on our ridge to the East.

Grade level(s): Please check all that apply.
- ☑ 9-12
- □ K-2
- □ 3-5
- □ 6-8
- □ College and Lifelong Learning

Discipline: Please check all that apply.
- □ Art and Music
- □ Health and PE
- □ Foreign Language
- □ Literature and Language Arts
- □ Mathematics
- □ Science
- □ Social Studies and Geography
- □ History
- □ Technology
- □ Technology

Year Developed: 2007

Period (month, week, year): variable – activity dependent

Teaching environment:
- ☑ In the Classroom (indoors)
- ☑ Outdoors
- ☑ In the Community
- □ Online/Virtual
“FROM WHERE DOES YOUR WATER FLOW?”
Stream Sources Along the Appalachian Trail and Their Pieces of a Watershed
A TRAIL TO EVERY CLASSROOM project (2007)
Kathleen E. Seiler
Waynesboro Area Senior High School
Waynesboro, PA 17268

OVERVIEW:
Integration of Pennsylvania State Standards/classroom requirements along with community needs can dovetail into student activities to promote and strengthen student interest in our actual geographical place -- our proximity to the Appalachian Trail, and how our water sources rely heavily on the watershed it runs through on our ridge to the East.

1. BIG IDEA: Provide opportunities to experience and explore the Appalachian Trail in our school district area (less than 6 miles away) to as many student groups as possible. Questions to explore: Why is the AT valuable? Where exactly IS the AT? How is it identified? Who can use it? Who cares for it? How is it connected to our potable water?

2. PENNSYLVANIA STATE STANDARDS:
READING, WRITING, SPEAKING, LISTENING
1.4.8 D. and 1.4.11. D Maintain a written record of activities...[and] experience....
1.6.8 D. and 1.6.11. D Contribute to discussions

ENVIRONMENT AND ECOLOGY
4.1.10 A. Describe changes that occur from a stream’s origin to its final outflow.
4.1.12 A Categorize stream order in a watershed
4.1.10 C Describe the physical characteristics of a stream and determine the types of organisms found in aquatic environments
4.1.10. E Identify and describe natural and human events on watersheds and wetlands
4.8.10. C Analyze how human activities may cause changes in an ecosystem
4.6.10. A Explain the biotic and abiotic components of an ecosystem and their interaction

3. ESSENTIAL QUESTIONS (CONTENT)
How is “our” AT in Franklin County linked to our watershed? Where are “our” streams? Are they “clean”? How is this all connected? How do humans impact the water along the AT?

4. SKILLS & HABITS OF MIND
   Relationships of geography/topography -- using a contour map (see AT maps from KTA); cause/effect; problem-solving; monitoring; teamwork

5. COMMUNITY-BASED LEARNING OPPORTUNITY
   * Involvement with Renfrew Institute’s monthly water quality monitoring system (tied in with Dickinson College’s ALLARM database); includes Water Striders activities such as leaf packets (contact person - Melodie Anderson-Smith)
   *Volunteer with Antietam Watershed Association’s riparian tree plantings (in association with the Chesapeake Bay Foundation (contact person - Dr. Steve Rettig)
   *Group activities with the Mont Alto/Penn State University Forestry students, in cooperation with Dr. Beth Brantley (eab8@psu.edu) for forest management issues in our watershed/reservoir area

6. VOCABULARY
   watershed, macroinvertebrates, indicator, stream order, infiltration, run-off, erosion, check dams, percolation, recharge, impervious, ...

7. PROPOSED UNIT PROJECT
   Beginning with my Envirothon group, my students have already begun involvement in water quality testing via Renfrew Institute. Water samples from Red Run, just off the AT ridge, are used. Data sharing with other sites nearby show relationships with impacts from highway proximity, recent development, etc. We are preparing this year for our Current Issue: Recreational Impacts on the Natural Environment. Monthly hikes on the AT to observe proper use of water bars, check dams, etc. and look for signs of invasive species and types of biodiversity will add to our journal notes (evidence and reflection). Biodiversity is also checked with water samples of macroinvertebrates and noting indicator species for clean water, and range of species (healthier water). First order stream testing, as found in the ridge, compared to the stream near Renfrew (East Branch Antietam Creek) also shows habitat variation.
   This project can expand to the 9th grade science classes (they do testing of domestic water) and 10th grade (testing of municipal water). Students may be
able to complete this as a 1/2 day field trip. After-school opportunities also are scheduled.

8. RELATED TEXTS
Stream Monitoring information from Pennsylvania DCNR & http://www.worldwatermonitoringday.org; Rivers and Streams (Martin 1999, Grolier) WOW! The Wonders of Wetlands; materials from The Watercourse and Council for Environmental Education (CEE), Project WET, PA Fish & Boat Commission (http://www.fish.state.pa.us), Envirothon study materials (http://www.envirothonpa.org)
NEWSLETTERS of local hiking groups often have related articles on the flora/fauna of the AT and will often donate copies to school groups: Potomac Appalachian Trail Club (http://www.patc.net); The Appalachian Trail Conservancy (http://www.appalachiantrail.org) and the Keystone Hiking Association (http://www.kta-hike.org)
Other maps can be map via the Google maps program.

9. MODELS
None aware of locally for longitudinal school group study other than the ALLARM system; can check with Shippensburg University (Drs. Tim Maret and Pablo Delis, doing a Pennsylvania state herpetology atlas (http://www.herp.atlas.w.ship.edu/~timare/hepr.htm) ; can also check with “Adopt a Stream Program” with the Pennsylvania Fish & Boat Commission, Bellefonte, PA 16823

10. ACTIVITIES
Envirothon Group:
Starting with the watershed activity of crinkled newspapers on a tarp-covered area of floor (better yet, outside!) & lightly drizzle water over the “ridges” and watch how water flows & converges -- gives a birds-eye view of what really does make up a watershed. Use our watershed unit materials over the first two meetings to build a basis of understanding; use local topo maps to find the streams we will be hiking near on the Appalachian Trail that are part of our local watershed, ergo, our drinking water! (Falls Creek, Red Run, Mackey Run, Bailey Spring, Deer Lick Run, Rattlesnake Run, East Branch Antietam, Tumbling Run, Hayes Run) This is also a time for stream order evaluation. Perspective on how our water testing sites relate to each other w/ data will also become more apparent.
Continuing water quality tests can also be compared with municipal data (there are 5 sources for the township: 2 springs, 3 wells; Mr. Scott Melego, Water Co. Superintendent).
Hikes on a monthly basis, to cover the distances from the MD/PA line to the South Mountain area, by the Waynesboro municipal reservoir, will be
approximately 4 - 6 miles (or shorter) in segments. Students will bring along their notebook/journal to record both evidence and their reactions/thoughts.

Student Groups: (we just got a new principal; not sure just yet how to work the logistics of small field trips): take selected 9th & 10th grade groups on short hikes w/ the above activities, maps, data, etc. Expand the population of exposure!

*This may also evolve into having the Art Class, during their Photography Unit, take teacher-led hikes. Will begin w/ volunteers on Saturdays or after school; if successful, will expand to school-day involvement.

* Teachers have expressed an interest in becoming involved with learning more of local hiking areas. Once comfortable, they could take their own groups out on the A.T. The Middle School just started a 2 1/2 week unit on our Appalachian Mountain region, complete with field trip to the trail. These students may be interested in furthering their experiences when at the High School.

* Being outdoors with a purpose may also include the “Saturday School” behavior kids -- hand-pick a few who may benefit by such an experience. This type of activity might also fold into the Summer School make-up Physical Education class!

T-shirts with the logo: **W.H.A.T.'s T.H.A.T.**

“Waynesboro High -- Appalachian Trail -- To Hike And Treasure”
“Wet Hikers of the Appalachian Trail” (Stream Surveyors)
“Wildlife Habitats Analysis and Tracking” (tie in with the Megtransect mammals cameras)
etc. etc.

***Other activities may be possible, especially with the ability to tie in to a student’s Graduation Project requirements.

11. ANALYSIS AND INTERPRETATION OF LITERATURE

Continual journaling on the trips, study meetings, AT maps, articles from the newsletters; may even challenge them to read *Sand County Almanac* (Aldo Leopold) and other similar books/authors. Since I don’t teach the class (Envirotthon) for credit, it’s only an activity, other ideas for students in the science classes would have to come from their teachers.

12. PRODUCT

Ongoing water quality assessment with Renfrew Institute, personal journals, experienced hikers!

13. ASSESSMENT
*Pre- and Post-testing, including attitude/experience
*Data sheets
*Performance at local Envirothon competition
*Display/presentation at Earth Day at Renfrew Park (April)

14. **FINAL CELEBRATION** -- both along a stream of study!
   * bonfire/cookout -- perhaps at Tumbling Run shelter
   * perhaps a summer campout at the Hermitage Cabin (where we have to carry in our water!)

15. **EVALUATION**
   * Feedback forms, discussion, community outreach response at Earth Day!

********************************************************************
Sample of page in notebook journal (Double-entry)

EVIDENCE (WHAT I SAW, HEARD, FELT) REACTION - THOUGHTS, FEELINGS