

Drinking Water: Protecting the Source



United States Department of Agriculture
Natural Resources Conservation Service



Stewardship and Reflection – Source Water Protection and My Community

Lesson: 20

National Science
Education
Standards for
Grades 9-12

Content Standard A: Abilities Necessary to Do Scientific Inquiry

- *Design and conduct scientific investigations.*

Content Standard F: Science in Personal and Social Perspectives: Natural Resources

- *Human populations use resources in the environment in order to maintain and improve their existence. Natural resources have been and will continue to be used to maintain human populations.*

Content Standard F: Science in Personal and Social Perspectives: Environmental Quality

- *Natural ecosystems provide an array of basic processes that affect humans. Those processes include maintenance of the quality of the atmosphere, generation of soils, control of the hydrologic cycle, disposal of wastes and recycling of nutrients. Humans are changing many of these basic processes, and the changes may be detrimental to humans.*

Content Standard F: Natural and Human-Induced Hazards

- *Natural and human-induced hazards present the need for humans to assess potential danger and risk. Many changes in the environment designed by humans bring benefits to society, as well as cause risks.*

Student Learning
Objectives:

- 20.1 Share information about source water protection with members of the community.
- 20.2 Plan a water-related stewardship project with a local farmer, agriculture specialist, natural resource professional or educator.

Teacher Info Table Time

Instruction time for this lesson: The time needed to complete the activities in this section will vary according to teacher and student choices deciding the scope of the activities.

Resources, Tools, Equipment and Supplies

Resources

- *Adopt Your Watershed*, U.S. EPA: <http://water.epa.gov/action/adopt/index.cfm>
- *Community Service Projects for High School Students*, U.S. EPA: <http://www.epa.gov/highschool/community.htm>
- *Community Service Projects Ideas*, The Groundwater Foundation: <http://www.groundwater.org/ta/serviceproject.html>
- *Educating Young People about Water*, University of WI-Extension: www.uwex.edu/erc/ey paw
- *Environmental Service Learning*, National Environmental Education Week, National Environmental Education Foundation: http://www.eeweek.org/resources/service_learning
- *Give Water a Hand: A Youth Program for Environmental Action*, University of WI-Extension: www.uwex.edu/erc/gwah
- *The Groundwater Foundation*: www.groundwater.org
- *Locate Your Local District*, National Association of Conservation Districts: <http://nacdnet.org/about/districts/locate/>
- *National River Cleanup Week*, American Rivers: <http://www.americanrivers.org/our-work/restoring-rivers/national-river-cleanup/>
- *National River Cleanup Week*, “National Groundwater Awareness Week”, <http://www.ngwa.org/Events-Education/awareness/Pages/default.aspx>
- *Project WET*: www.projectwet.org
- *Protect Your Drinking Water for Life*, U.S. EPA: <http://water.epa.gov/action/protect/>
- *Save Our Streams*, The Izaak Walton League of America: <http://www.iwla.org/index.php?ht=d/sp/i/1977/pid/1977>
- *Service Awards*, Take Pride in America, (see youth award descriptions): <http://www.takepride.gov/honors2011.cfm>

Resources, Tools, Equipment and Supplies

Resources

- *Groundwater Guardian Communities*: <http://groundwater.org/gg/gg.html>
- *Protecting Schuylkill waters*: <http://schuylkillwaters.org/>
- *Stewardship and Education*, National Association of Conservation Districts: <http://nacdn.net.org/stewardship&education/>
- *Surf Your Watershed*, U.S. EPA: <http://cfpub.epa.gov/surf/locate/index.cfm>
- *Test Your Well*, The Groundwater Foundation: http://www.groundwater.org/pe/test_your_well.html
- *Water Quality Monitoring*, USDA NIFA: <http://uwex.edu/ces/csreesvolmon/>
- *Where Safe Water Begins*, Source Water Collaborative: www.sourcewatercollaborative.org
- *Water Quality*, Healthy Water Healthy People, Project WET: <http://projectwet.org/water-resources-education/water-quality-education>

Key Terms

Stewardship

SUMMARY OF CONTENT AND TEACHING STRATEGIES: [BACKGROUND FOR TEACHERS]

A. Sense of Place, Stewardship and Community Action¹

What are the key elements of a successful water education program?

1. It has stated goals about water education for youth. Youth should:
 - Understand basic water science and ecology.
 - Be able to collect and analyze information about environmental and socio-economic conditions relevant to local water decisions.
 - Be able to evaluate impacts and alternatives for community decisions about water.
 - Be able to apply new information in the community.
 - Have the opportunity to practice personal water management skills and make a personal commitment to using them.
2. It is connected to community water issues.
3. It helps instill a sense of place and a responsibility for stewardship of that place.
4. It meets youth educational and personal needs including fun and recreation.
5. It involves youth as full and valuable partners and acknowledges their contributions.
6. It involves community partners (individuals, schools, agencies and organizations) to avoid duplication and expand impacts.
7. It uses the support of an organization to provide continuity and stability and to ensure high quality.
8. It uses program design and activities to further program goals and address community needs.
9. It delivers information and skills effectively, including actually using water as part of teaching.
10. It is evaluated on several dimensions and incorporates resulting insights into new programs.

¹

Adapted from *Educating Young People about Water: A Guide to Program Planning and Evaluation*, Environmental Resources Center, University of Wisconsin: <http://www.uwex.edu/erc/ey paw/>

It can be a challenge for either community-based or school activities to offer programs which incorporate all of these elements of success. Schools and community-based programs, working together as partners, can each contribute their strengths to create a successful program that meets student needs. For example, classroom education can provide the foundation of science or social-science information and skills, while natural resource professionals contribute specific and detailed information about local water resources and issues.

Developing a sense of place among youth and adults is a critical goal of water education. By identifying with the qualities of their community, people will be motivated to practice stewardship: caring for their natural resources.

Grounding water education programs in the local community allows young people to practice and apply the skills they have learned, to take actions that can make a difference to their community, and to produce results they can see themselves.

The future of the nation's water quality and quantity will, for the most part, be determined locally. Since most communities draw their water resources from the local watershed, the decisions and actions people take related to water will affect them directly and immediately. Furthermore, actions which damage the resource, contaminate the supply, or use it up affect not just individuals but the community as a whole by changing its choices for the future.

INTEREST APPROACH:

Having students actively show they can apply what they have learned about sources of drinking water in their communities in a meaningful way will show that they not only know the material but that their knowledge is “usable” as well.

A suggestion for starting this lesson:

Think about the various activities you participated in during your participation in the FFA Source Water classes. Of all the activities, think of the one that you found most interesting. Why did you find it most interesting? How would you share that interesting information with others?

In Lesson 20, you will develop a plan for sharing something you learned during the FFA Source Water classes with members of your community.

OBJECTIVE BY OBJECTIVE:

Activity Outline and Teacher Support Information:

20.1. Share information about source water protection with members of the community.

ACTIVITY: Planning a Source Water Presentation

In this activity, students will develop a presentation about something they found particularly interesting during their FFA Source Water classes. This could be done as a large group project (the entire class) or by smaller groups of 4-5 students. After developing the presentation, they will share it with members of their community (another class, family and friends, a local service club). Students should decide which group they would like to invite for the presentation.

Directions to the class or groups:

1. First decide what your presentation will cover, such as information about your local watershed, drinking water pollutants in your community, climate change predictions for local agriculture, home water conservation tips, or actions to reduce polluted runoff. Be sure to include in your presentation specific actions that your audience (or your community) can take to help protect and restore water resources.
2. Choose a presentation method:
 - A talk in front of a group
 - An exhibit for use in a school, library, or community-room display case
 - Video or PowerPoint presentation
 - Public service announcements for local television or radio
 - School announcements
 - Other
3. Reserve a room or display space for the event.
4. Decide how to let people know about your presentation: letter, e-mail, flyers, posters, announcements.
5. Arrange to have the equipment you need (VCR, TV monitor, LCD projector, microphone, etc).

- 20.2. Plan a water-related stewardship project with a local farmer, agriculture specialist, natural resource professional or educator.

Water issues are community issues. Students can gain a better understanding of their community, while learning citizen science and other skills, by participating in a water stewardship project. Projects should be student-directed. Students have talents and interests to contribute to projects and they want to make their own decisions about how to help. Students will learn more if the action project is both a local priority and relates to a specific community need.

Students will need to partner with local water experts for a successful stewardship effort. Local experts might include county extension agents, drinking water system operators, waste water treatment plant operators, environmental educators from nature centers, county or state parks, wildlife refuges, watershed groups (visit epa.gov/surf) or conservation organizations (e.g. Trout Unlimited, Ducks Unlimited, Nature Conservancy, Audubon Society), Master Gardeners, universities, conservation districts, state departments of natural resources environmental protection or public health, or USDA Natural Resources Conservation Service (NRCS) offices. These experienced professionals can help identify and organize projects and can help find resources. If students want to do an agricultural-related water stewardship project they might contact a local farmer, technical service provider, ag extension agent, NRCS or conservation district expert, or any of the organizations listed in the resources section of this lesson.

ACTIVITY: Student stewardship project

This activity should be student driven. Students should decide if they want to work in one large group on one project or in smaller groups on different projects.

1. Decide what the broad purpose of your water project will be. For example, you may want to organize a tree-planting, stream cleanup, or storm drain stenciling project to improve water quality of a local stream. See *A Watershed Stewardship Toolkit for Volunteers* at epa.gov/adopt for some project ideas. You may want to consider writing thank you notes to farmers who are using conservation practices to protect water quality. Work with County Extension Agents to find farmers who are making a difference in your community.
2. Find out if you need any special permission, permits or training to conduct your project, (e.g., municipalities may require permits for storm drain stenciling, stream cleanups, or streambank restoration projects.) Solicit advice on whether you should team up with an expert or existing conservation organization to carry out your project.

3. With the help of your teacher, find a water expert partner to help you with your project. Ask your partner to help you fine-tune your project objectives. Can he or she provide any supplies or equipment to help with the project?
4. Identify some budget constraints and issues that farmers or others may face when implementing conservation practices. What are the estimated costs of your project? What obstacles might we face when implementing the project? Ask your water expert partner to help.
5. Make a chart to plan a project timeline. How many meetings will you need to finish planning your project? How much time will you need to carry out your project? How much time will you need to wrap up, assess results, celebrate success and reflect on the experience?
6. Take a moment to assess whether you have thought of all the key parts of your project. If you are going to invite others to participate, what will motivate and benefit them?

REVIEW / SUMMARY:

Ask students to make an entry in their journals about their presentation or stewardship project.

- How do you feel about your presentation/project?
- If you had an opportunity to do the presentation or project again, would you do anything differently? If so, what and why?
- How does it feel to try to make a difference?
- How will you continue your stewardship work?
- In the future, how will you help others protect and conserve water?

EVALUATION AND ANSWERS:

Teachers should assess the quality of the student presentations and/or stewardship projects as a measure of student learning.

