

Service Learning Lesson Plan

Project Title: Pollution Prevention

Grade Level: 6-8, 9-12

Duration: 2 months

Main Subject Area: Science

Theme: Environment

Objective/Description

As part of a unit on water (water cycle; chemistry) students educate their community about storm water issues by developing a storm water education plan. Students implement the plan in order to encourage others to become more aware of storm water pollution and its prevention.

Common Core Content Standards

Next Generation Science Standards

6-8th Grade

- **PS 6.4.** Describe that chemical and physical changes occur all around us. Describe how renewable and nonrenewable energy resources can be managed
- **ST 6.1, 2, 5.** Science and Technology
- **SWK 6.2, 3, 4.** Scientific Ways of Knowing
- **ESS 7.2, 4.** Explain that Earth's capacity to absorb and recycle materials naturally can change environmental quality. Analyze data on the availability of fresh water that is essential for life etc.
- **LS 7.3, 4, 5, 6.** Explain how the number of organisms an ecosystem can support depends on adequate biotic and abiotic resources. Investigate how overpopulation impacts an ecosystem. Explain that some environmental changes occur slowly while others occur rapidly. Summarize the ways that natural occurrences and human activity affect the transfer of energy
- **ST 8.2, 4.** Science and Technology
- **SI 8.3.** Scientific Inquiry

9-12th Grade

- **ST 9.2.** Identify a problem or need, propose designs and choose among alternative solutions for the problem
- **SI 9.5.** Develop oral and written presentations
- **ESS 10.5.** Explain how the acquisition and use of resources, urban growth and waste disposal can accelerate natural change and impact the quality of life
- **LS 10.18, 19.** Describe ways that human activities can deliberately or inadvertently alter the equilibrium in ecosystems. Explain how changes in technology can cause significant changes in environmental quality. Illustrate how uses of resources at local, state, regional, national and global levels have affected the quality of life
- **SI 10.2** Present scientific findings using clear language, accurate data, appropriate graphs, tables, maps and available technology
- **ESS 11.11, 13.** Analyze how materials from human societies affect both physical and chemical cycles of Earth. Explain how human behavior affects the basic processes of natural ecosystems and their quality. Conclude that Earth has finite resources
- **SWK 11, 10.** Recognize that bias affects outcomes. Describe costs and trade-offs of various hazards

Driving Question

- How do individuals contribute to pollution?
- How can individuals implement solutions to various issues?

Investigation

Research, class instruction, interview civic leaders and/or professionals, survey neighbors or peers

- Go to “Making Waves: a nonpoint source pollution curriculum for educators,” www.hcswcd.org
- With the class, review/identify sources of storm water pollution, ways in which individuals contribute to the pollution of runoff at their homes, schools, businesses, and ways in which technology and “progress” aggravate or improve storm water quality (i.e., recycling, better product development, surface types).
- Support students in developing and doing an interview with local water quality experts and/or a survey of community members about their understanding of pollution and water issues.
- Have students choose a site to survey and report findings to class.

Preparation

Collaborative problem solving, planning, and task assignment by & with the students

- See “Planning Tools” at http://servicelearning.childreninc.org/?page_id=527.
- As a class, brainstorm how students can help prevent storm water pollution; guide students towards creating an education plan about the subject.
- Discuss and identify the audience that students will target and the main message to be conveyed.
- Divide students into small groups and have each group choose an element of the education plan to develop. Have each group determine what materials will be needed to develop their component of the project, where materials can be obtained, and how much money to budget (if appropriate); contact government or local agencies for support.
- Have the class create a timeline for the project and then have each group determine deadlines for the development of its component based on that timeline.
- Hold class discussions prior to each deadline where groups give reports about their activities and where classmates can give each other feedback.
- Help the class come up with a way (such as a post-project survey) to measure the success of the project and judge whether or not the target audience received the message.

Action

Service activities or methods used for addressing a social issue or community need

- Present the developed plan to the target audience(s) by hosting a Storm Water Pollution Prevention Fair, where the work of each group is on display (this will also serve as a “Demonstration” step).

Reflection

Frequent assessment of students' growing knowledge and developing skills; refer to driving question/objective

- See "Reflection/Evaluation" at http://servicelearning.childreninc.org/?page_id=483.
- After each step of the investigation process, have students discuss and/or write a reflection piece on the sources of storm water pollution, ways in which individuals contribute to the pollution of runoff at their homes, schools, businesses, and ways in which technology and "progress" aggravate or improve storm water quality (i.e., recycling, better product development, surface types)
- When the class meets to discuss each group's activities, have students share what they are learning about the driving question.
 - After the education plan is complete, have students reflect on the process. Discuss what went well and what could be done differently; determine what advice to give someone who wants to plan a storm water education project. Note unexpected outcomes.
 - Have students design and do a post-project survey to assess the impact of the education plan on the target audience.

Demonstration of Knowledge

Assessment of students' knowledge/skills and project outcomes

- Have each group present their work at the fair.
- Students each write a letter to a construction company or local water quality experts and report the findings from the site survey(s) they did during the investigation step.

Community Partners

Includes anyone who offers expertise to the project or who benefits from the project

Local soil and water quality/conservation groups, civic leaders, public works departments, business partners, school/district facilities manager

Outcome

Funds or goods generated, direct or indirect service provided, advocacy or education done

Storm water education plan; possible fundraising to promote practices or support global clean water initiatives (e.g., P&G's Children's Safe Drinking Water Foundation)

Secondary Subject Areas (All that apply are in bold)

- | | |
|-----------------------------------|---|
| ▪ English, Reading, Language Arts | ▪ Government and Civics |
| ▪ World Languages | ▪ Global Awareness |
| ▪ Arts | ▪ Financial, Economic, Business, and Entrepreneurial Literacy |
| ▪ Mathematics | ▪ Civic Literacy |
| ▪ Science | ▪ Health Literacy |
| ▪ Economics | ▪ Environmental Literacy |
| ▪ Geography | |
| ▪ History | |



21st Century Skills (All that apply are in bold)

- Career Readiness
- **Creativity and Innovation**
- **Communication and Collaboration**
- **Critical Thinking and Problem Solving**
- Physical Education
- Initiative and Self-direction
- Flexibility and Adaptability
- Consumerism
- Information Literacy
- Media Literacy
- Technology Literacy
- Productivity and Accountability
- **Leadership and Responsibility**
- **Social and Cross-cultural Skills**