



# Student Watershed Research Project

## PROGRAM DESCRIPTION

### *Content*

- data collection and analysis
- collaboration with outside agencies
- environmental stewardship
- engaging students in local environmental issues
- integrating watershed research into regular curriculum
- chemistry, microbiology macro-invertebrate inventory, vegetation inventory, habitat assessment

The Student Watershed Research Project (SWRP) involves teachers, students, scientists, businesses, governmental agencies, community groups, and metropolitan schools in Portland, Oregon, and Vancouver, Washington, in watershed education and collection of quality data. SWRP develops a awareness, knowledge, skills, and commitment leading to responsible behavior and constructive actions with regard to water quality and watershed resources.

As citizen scientists, students learn to gather and use scientific information in in community decision-making. Students add valuable information to a regional watershed database and simultaneously gain an increased awareness of the complex issues involved in environmental stewardship.

SWRP is based at the Saturday Academy of the Oregon Graduate Institute of Science and Technology. Its goals are: (1) collaboration between science teachers, students, and practicing scientists; (2) provision of training, equipment, and materials for watershed monitoring; (3) maintenance of a database of student-collected data; (4) sharing of data with participating agencies and community groups; and (5) fostering stewardship of natural areas and natural resources by students. The Student Watershed Research Project models the value of partnerships among public schools, community agencies, and professional scientists. Those who wish to develop a similar program need to foster a partnership with local and/or state agencies and scientists whose work is related to the areas of focus in the science curriculum.

## PROGRAM CONTEXT

SWRP began in 1991 and has trained 91 teachers who directly impact over 6,000 students in grades 8-12 from 18 public and private school districts in the Portland/Vancouver metropolitan areas. The SWRP model is being applied at 50 sites on streams that vary greatly in their physical, chemical, and biological make-up. SWRP has been applied in both middle and high schools.

### *Context*

- urban, suburban, and rural schools in Oregon and Washington
- varied student populations

## STAFF DEVELOPMENT PROGRAM



Teachers who guide students' work in SWRP participate in the intensive five-day Riparian and Aquatic Ecosystem Monitoring: A Technical Training Workshop, offered in the summer months. Training includes both lab and field components and is taught by SWRP staff, classroom teachers, university faculty, research scientists, and state personnel. Content includes basic chemistry, advanced chemistry, microbiology, macroinvertebrate inventory, vegetation inventory, habitat assessment, data and communications, watershed connections, curriculum integration, community resources, and program design and assessment.

Following the training, three or four mandatory meetings are held throughout the year. Meetings address quality assurance/quality control procedures, data collection parameter updates, and innovative curriculum and community volunteering ideas. Ongoing technical support is provided to teachers involved in the program. SWRP staff serves as a resource for gathering information on parameters and protocols, sampling site background, and sampling and meeting coordination. SWRP technical staff orchestrate classroom visits and field sampling assistance with volunteers from agencies and organizations.

Teachers who integrate watershed analysis components in their classroom expand their science knowledge and pedagogical processes by combining biology, chemistry, earth and life sciences with writing, mathematical, and statistical skills. Teachers work in areas beyond their content specialization and typically beyond what their curriculum normally includes. Teachers also refine data collection and analysis skills in order to help students mathematically model and statistically analyze their data findings.

### *Process*

- training
- hands-on applications
- ongoing support meetings
- ongoing workshops to extend content
- technical support
- classroom visitations

### *Intended Audience*

- individual volunteer teachers

## SUMMARY OF RESULTS

The Student Watershed Research Project increases students' involvement in science and their ability to perform data collection and analysis as practicing scientists do. Student achievement is measured by the accuracy of the students' data collection and analysis, their ability to present their findings to their peers, scientists, and community members, and their involvement in regional watershed policy decisions.

## EVIDENCE OF INCREASED STUDENT ACHIEVEMENT



### *Success Indicators*

- student data samples
- professional and peer review of student data analysis reports
- student presentations and displays



The evidence of student success for the Student Watershed Research Project is atypical. Rather than demonstrating increased performance on a standardized assessment of science knowledge, students demonstrate knowledge of data collection and analysis by having their test results compared to duplicate samples analyzed by professional laboratories. SWRP staff combine professional laboratory results with the students' data, provide feedback on the data for both the students and teachers, and audit student data. SWRP standards for reliability of student-collected data are very high. SWRP staff coordinate and supervise a rigorous quality assurance/quality control program.

The reproducibility of SWRP data allows local agencies to use the data to make policy decisions. The SWRP model has been recognized locally and nationally for the quality of the data produced, which reflects the quality of student and teacher performance. The data produced by students was used in a publication by Oregon's Department of Environmental Quality in establishing surface water quality standards for dissolved oxygen.

In addition, students write their group findings and then present them to a panel of their classroom peers. Students become "specialists" in the particular parameter they measure, and each group presents both background and findings for their testing during these presentations. Annual summits allow students to display data on posterboard and give oral presentations, where the quality and content of presentations are judged by various watershed health professionals. Students also have opportunities to provide information to regulatory agencies regarding the watershed they monitor.

Student Watershed Research Project develops teachers' understanding of watershed research and provides an excellent model of authentic performance assessment for students. Intensive summer training for teachers is followed by a wide range of ongoing support to facilitate implementation of the learning in their classrooms. SWRP contributes to students' understanding, appreciation, and practice of science as a result of their teachers' participation in professional development that models hands-on, practical learning experiences.



## SAMPLE SITES



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## DOCUMENTATION

Student Watershed Research Project.(1997). *Fifth Annual Student Watershed Summit:Summary Evaluation Comments*. Author.