

## WATERSHED SCIENCE EDUCATION

The goal for our education program is to increase scientific and geographic literacy. We accomplish this goal via two program objectives:

- (1) Enhance young people's awareness and appreciation of Pacific Northwest forest and aquatic ecosystems, while cultivating fundamental skills in science and geography; and
- (2) Increase the number of ethnic minorities and female youth who seek academic and professional careers in science, geography, and natural resources.

Science Literacy: "All of us have a stake, as individuals and as a society, in scientific literacy. An understanding of science makes it possible for everyone to share in the richness and excitement of comprehending the natural world. Scientific literacy enables people to use scientific principles and processes in making personal decisions and to participate in discussions of scientific issues that affect society. A sound grounding in science strengthens many of the skills that people use every day, like solving problems creatively, thinking critically, working cooperatively in teams, using technology effectively, and valuing life-long learning. And the economic productivity of our society is tightly linked to the scientific and technological skills of our work force."

— Richard Klausner, Chairman  
National Committee on Science Education Standards and Assessment

**SCIENCE EDUCATION:** Our Watershed Science Education Program seeks to accommodate the full range of learning abilities, cultures, and ages through a flexible science program that actively engages participants in the science inquiry process, applied sciences, and geography. We challenge students to use their creative and critical higher-order thinking skills, cultivate their interest and skills in science and math, and inspire them to be life-long learners. To date, Wolfree has served over 125,000 students representing more than 120 Pacific Northwest schools.

**UNDER-SERVED POPULATIONS:** People of all economic backgrounds need opportunities to succeed in science and math. Since 1999, with strong support from a host of local foundations, organizations and corporations, Wolfree has been engaged in an Underserved Communities Initiative. The long-term goal of this Initiative is have a majority of our participants come from targeted underserved communities-- primarily low income, inner city, and rural populations that have little or no access to high quality science programs.

**CORE ELEMENTS:** Wolfree provides projects that have the following core elements.

- Field based. Students explore the natural world at several diverse field sites located throughout the Pacific Northwest.
- Experiential. Teams use contemporary scientific research tools, technology and techniques to collect and analyze scientific data.
- Small teams. Research teams of usually seven, five students and two mentors, immerse themselves in the study of ecology.

- **Science Inquiry:** Students do the following: (1) Use technology and mathematics to improve investigations and communications; (2) Formulate and revise scientific explanations and models using logic and evidence; (3) Recognize and analyze alternative explanations and models; and (4) Communicate and defend a scientific argument.
- **Applied Science:** Students do the following: (1) Use problem-solving techniques, research skills, and decision-making strategies (individually and collaboratively) to identify issues and problems; and (2) Conduct research, and evaluate information to formulate and defend a position or decision. Students learn how to make observations, develop questions and hypotheses, design investigations to test their hypotheses and present their conclusions.
- **Geography:** Students do the following: (1) Use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective; and (2) Explore the characteristics and spatial distribution of ecosystems on earth's surface.
- **Guided by scientists, resource specialists, and educators (mentors).** Over 250 professional scientists from nearly 70 public and private organizations support WolfTree students. Mentors are trained to engage students with challenging questions, encourage critical and creative thinking, and guide students towards meaningful conclusions.
- **Classroom activities and materials complement field studies.** WolfTree staff and mentors facilitate pre and post classroom activities to provide a seamless link between the classroom and the field. Teachers are provided with a host of supplemental instructional materials including our Ecology Field Guide, a comprehensive guide to our field studies.
- **Accommodates a full range of learning abilities and cultures.** Females and minorities are especially encouraged to succeed through special projects.
- **Tied to national and state standards and benchmarks.** All our programs provide students the opportunity to fulfill school benchmark requirements, especially regarding science inquiry.

## OUTCOMES

Upon completion of a WolfTree Watershed Science projects, students are able to:

- Demonstrate an understanding about the structure and functions of watersheds
- Apply advanced observation and awareness techniques
- Formulate testable questions or hypotheses based on observations
- Design an investigation to test their hypotheses
- Collect watershed data using contemporary scientific tools and technology
- Analyze, organize, and summarize their data
- Answer their scientific questions or assess whether their hypothesis is supported by data
- Effectively communicate their observations and conclusions; and
- Fulfill national and state requirements for science, science inquiry, and geography.