

K-12 Environmental and Water Resources Education

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What is Project Lead The Way?

- Project Lead The Way® (PLTW) is a not-for-profit organization that promotes pre-engineering courses for middle and high school students.
- PLTW forms partnerships with public schools, higher education institutions and the private sector to increase the quantity and quality of engineers and engineering technologists graduating from our educational system.
- The PLTW curriculum was first introduced to 12 New York State high schools in the 1997 - 98 school year. A year later, PLTW field tested its four unit Middle School Program in three middle schools. Today, the programs are offered in 600 schools in 35 states

Project Lead the Way

- Principles of Engineering
- Introduction to Engineering Design
- Students explore technology systems and engineering processes to find out how math, science, and technology help people. Using computer modeling software, students learn the design process. They solve design problems as they develop, create, and analyze product models.

Computer Integrated Manufacturing-Project Lead the Way

- Students use computer simulations to learn about the logic of electronics as they design, test, and actually construct circuits and devices.
- Students learn concepts of robotics and automated manufacturing by creating three-dimensional designs with modeling software and producing models of their designs.

Project Lead the Way

- **Foundation Courses:**

Principles of Engineering

Introduction to Engineering Design

Digital Electronics

- **Specialization Courses:**

Computer Integrated Manufacturing

Civil Engineering and Architecture

Biotechnical Engineering (in development)

Aerospace Technology (in development)

Aerospace Curriculum-Project Lead the Way

- A systemic curriculum package that will introduce students to the world of aeronautics, flight, and engineering in the elementary grades.
- Lessons will related to aerospace information systems, astronautics rocketry, propulsion, and the physics of space science, space life sciences (BioSpace) that includes looking at habitat and crew systems with life support, and the biology of space science, principles of aeronautics, structures and materials, and systems engineering.

Project Lead the Way in Colorado

		Lakewood	2001
	Bell Middle School	Golden	2004
	Centaurus High School	Lafayette	2002
	Coronado High School	Colorado Springs	1999
	Creekside Middle School	Monument	2002
	Dakota Ridge High School	Littleton	2002
	Eagleview Middle School	Colorado Springs	2002
	East High School	Denver	2004
	East High School - CO	Denver	2004
	East Middle School	Colorado Springs	2003
	Englewood High School	Englewood	2004
	Faith Christian High School	Arvada	2000
	Faith Christian Middle School	Arvada	2000
	Falcon High School	Falcon	2002
	Flood Middle School	Englewood	2004
	General William Mitchell High School	Colorado Springs	1999
	Golden High School	Golden	2003
	Grant Ranch	Denver	2004
	Henry Middle School	Denver	2002
	Holmes Middle School	Colorado Springs	2001
	John F. Kennedy High School - CO	Denver	1999
	Manitou Springs Middle School	Manitou Springs	2002

American Society for Engineering Education

- **MISSION STATEMENT**
- **America's leadership in the global economy stems from engineering and technological research and a marketplace that rewards quality and innovation. To ensure the continued strength of these national assets, the ASEE Engineering K12 Center works to enhance achievement in pre-college science, technology, engineering, and mathematics (STEM) education by promoting the effective application of engineering principles to K-12 curricula.**

STRATEGIES-ASEE

- Enhance awareness in the K-12 community and beyond of the opportunities and rewards afforded by study and work in engineering and technology fields.
- ENGINEERING: GO FOR IT, ASEE's new guidebook to engineering for high school students will be published in September, 2003.
- **The BEST PRACTICES INITIATIVE** seeks to help engineering education outreach programs most effectively serve the K-12 community with the best that engineering educators have to offer.
- ASEE supports community-building and networking opportunities with discounted membership opportunities for K-12 teachers and schools, formation of a K-12 Division within the society, and meetings of leaders in engineering education outreach

Project Wet Water Education for Teachers

- This is an exciting non-profit education for educators and young people ages 5-18
- The program provides classroom ready teaching aids based on the science of water
- The Project Wet program is centered on the curriculum guide that contains 90 broad-based water resources activities.
- The curriculum is interdisciplinary and hands on.

ASEE PROGRAMS

- Acoustics@
- Aeronautics and Aerospace@
- Astronomy@
- Chemistry@
- Earth Sciences@
- Fairs and Competitions (60)
- Magnet Schools@
- Meteorology@
- Paleontology@
- Projects (15)
- School Departments (7)
- Summer Programs (25)
- Activities (20)
- Agriculture@
- Biology@
- Curriculum Standards (26)
- Environment and Nature@
- Geography
- Mathematics
- Oceanography
- Physics
- Resources (8)
- Space@
- Teaching (58)

Intel International Science and Engineering Fair

- World's largest pre-college science fair
- Held annually in May, brings together 1,200 students from 40 nations to compete for scholarships, grants and internships
- Includes many sciences including Biology, Social Sciences, Earth and Space Sciences, and Engineering, and Environmental Science.

Pennsylvania Programs

- Lehigh Valley Science and Engineering Fair
K-12 science and engineering fair
- Pennsylvania Envirothon – The purpose of this competition is to instill an understanding of the ecological and community factors that are involved in environmental decisions.
- Delaware River Education Youth Eco-Leadership Summit- Study aspects of Delaware River Watershed. Schools send a team of six students to represent their watershed and conduct 20 minute presentation

WERC'S Environmental Design Contest

- Students teams from throughout the United States, Canada, Mexico and other countries team together
- Students present a fully operation environmental design

Hydro Power

- This is a team or individual water power competition
- The mechanical power of each device is measured for efficiency and time. Each contestant is give a design parameter that much incorporate a turbine wheel

Conclusions

- Many exciting state and national programs have been developed for K-12 Water and Environmental Education.
- ASCE should incorporate information and links on resources for K-12 Water and Environmental Education
- A national competition sponsored by ASCE at the K-12 level would enhance our visibility and help improve dissemination of water education.