

Oregon Pre-engineering & Applied Science (OPAS) Initiative

February 5, 2010

The OPAS vision is that all Oregonians have the opportunity to choose and successfully pursue engineering or applied science as their field of study and career, thereby helping Oregon's industries contribute to state economic needs, and innovate and prosper in the global economy. The OPAS mission is to **increase the number of work-ready engineers and applied scientists** in Oregon through collaborations of education sectors, industry, and government stakeholders that ensure that all K-12 students have access to high quality education and career exploration opportunities that prepare them for postsecondary and workplace opportunities and success.

The OPAS Strategy can be summarized as

- Motivate: Enhance the ability of STEM¹ education programs to increase students' interest and knowledge of engineering and applied science opportunities.
- Prepare: Increase the students' exposure to engineering and applied science through active learning, student inquiry, engineering problem solving, and creative teamwork.
- Succeed: Increase the enrollment and successful completion of STEM programs by underrepresented populations.
- Pathways: Create, develop, and maintain engineering and applied science pathways so that more students successfully transition among education institutions and into the workforce.

OPAS assists schools in the implementation of high quality pre-engineering and applied science curriculum in school and outside of school with a strong focus on attracting traditionally underrepresented students. More importantly, it helps students understand the many options available to them in engineering and applied science careers and helps them connect what goes on in the classroom with the outside world and their futures. OPAS implements its strategy through partnerships with university campus program offices and national and state non-profit organizations. These partners will implement the OPAS portion of our STEM strategy with an emphasis on increasing the quantity and diversity of students motivated and prepared for STEM careers.

OPAS programs





- Motivate and prepare students for success in STEM and STEM careers with a special emphasis on increasing the diversity of students participating in STEM fields.
- Enhance STEM literacy during the traditional school day and by extending learning beyond the school day.
- Build on successful programs.
- Address critical pre-college gaps.
- Extend opportunities to students statewide.

¹ Science Technology Education & Mathematics







The proposed investments are divided into two major categories:

- 1) Programs that deliver rigorous pre-engineering & applied science curriculum programs to K12 classrooms during the traditional school day.
 - Use engineering & technology to motivate and reinforce science & math learning
 - Provide high quality professional development opportunities to Oregon teachers
 - Support teachers with a professional learning community
- 2) Programs that extend learning beyond the traditional school day by extending the reach of proven STEM programs that
 - Increase learning time
 - emphasize attracting minority and under-represented students
 - deliver comprehensive services to high-need students through local partnerships with community-based organizations, nonprofit organizations,
 - engage families and communities in supporting the academic success of their students

Programs for the Traditional School Day

Initiative	Key Examples	1-5	6-8	9-12
Pre-Engineering		X		
Computer Science	 			X
Pre-Engineering	 <p>Gateway To Technology Introduction to EngineeringEngineering Design & Development</p>		X	X

Programs to Extend Learning beyond the Traditional School Day

Initiative	Key Examples	K-5 6-8 9-12
Engineering Coaching	 Engineering Coaching And Mentorship Program	<p style="text-align: right;">X</p>
	 Mathematics Engineering Science Achievement	<p style="text-align: right;">X X</p>
Diversity Programs	 Northwest Science Expo System	<p style="text-align: right;">X X</p>
	 Oregon Robotics Tournament & Outreach Program	<p style="text-align: right;">X X X</p>
	 Science & Math Investigative Learning Experiences	<p style="text-align: right;">X X</p>
Internships Informal Classes	 Saturday Academy	<p style="text-align: right;">X X X</p>

Investment Alternatives

	Alt 1	Alt 2	Alt 3	Alt 4
In-class Programs				
Pre-engineering - Grades 1 to 5	\$223,630			
Computer Science - High School	\$494,200	\$494,200	\$300,000	\$200,000
Pre-engineering - Grades 6 to 12	\$809,450	\$809,450	\$320,000	\$300,000
Subtotal	\$1,527,280	\$1,303,650	\$620,000	\$500,000
Out-of-School Time Programs				
Engineering Coaching And Mentorship Program	\$430,475	\$430,475	\$300,000	\$160,000
Programs targeting diversity in grades 4 to 8	\$849,882	\$600,000	\$350,000	\$300,000
Student internships	\$75,000	\$75,000	\$75,000	\$75,000
Growth of ECS OST Classes	\$170,493			
Growth in ECS via science projects & fairs	\$100,000			
Subtotal	\$1,625,850	\$1,105,475	\$725,000	\$535,000
Marketing	\$130,000	\$130,000	\$100,000	\$47,000
OPAS Oversight and Support	\$390,150	\$ 270,000	\$ 180,000	\$160,000
Totals	\$3,543,280	\$2,679,125	\$1,525,000	\$1,195,000

Students Impacted Based on hypothetical allocation of Alternative 1 Investment

In-Class Programs			
Engineering is Elementary Program	1125	2775	3900
The Exploring Computer Science Curriculum	300	700	1000
Project Lead the Way Program	465	878	1343
Subtotals	1890	4353	6243
Outside of School Time Programs			
Engineering Coaching And Mentorship Program	370	641	1011
Oregon MESA (Math, Engineering, Science Achievement) Program	150	150	300
SMILE (Science Math Investigative Learning Experience) Program			
SMILE Clubs	90	120	210
Classrooms	450	900	1350
4H Clubs	75	150	225
Subtotal	615	1170	1785
Oregon Robotics Tournament and Outreach Program	301	890	1191
Saturday Academy			
Internship Program	17	17	34
After School Program	100	500	600
Subtotal	117	517	634
Northwest Science Expo System (NWSES)	1000	1350	2350
Total	6333	13424	19757