



OPAS Prepare Workgroup

Survey of Candidate Pre-Engineering Programs

May 6, 2008 – Rev C

*Please let Jo know ASAP if you have information to add for any of these entries or new entries to suggest.
Thanks!*

Overview

The Prepare Workgroup requested a survey of available materials in pre-engineering education. Are there other programs comparable to Project Lead The Way? How do available programs differ?

Methods

Jo compiled a table of known materials, and circulated it to committee members and other knowledgeable parties for additions and comments. OPAS has some of these texts available from a previous, related textbook survey. Most information is derived from a cursory review of websites.

The information is organized as noted below. Categorization may be semi-arbitrary. A future revision will alphabetize the table entries.

- **Table 1: Multi-year curricula for Middle and High School**
- **Table 2: Single year/course curricula for middle and high school**
- **Table 3: Unit and Enrichment Materials, Middle and High School**
- **Table 4: Elementary School Courses, Units, and Enrichment Materials**

Table 1: Multi-year curricula for Middle and High School

Program/ Website	Target Audience/ Type	Comments; Prelim Evaluation
Project Lead the Way www.pltw.org Non-profit	4 year curriculum, CTE, college-bound & professional development	Well-reviewed in Prepare via several presentations and papers. Well-defined infrastructure; model reinforces quality via requirements & certification Good rep w/ industry buy-in nationally; good base of data including longitudinal
Engineering by Design www.iteaconnect.org/EbD/CATTS/cattsproducts.htm www.iteaconnect.org/Publications/productguide.pdf Illinois State University, NSF	K-12	Via Cary
Humans Innovating Technology Series (HITS) www.iteaconnect.org/Publications/HitsKits.pdf www.iteaconnect.org/Publications/productguide.pdf	Supplementary classroom activities for Engineering by Design	Via Cary
Smithsonian-Lemelson Series www.iteaconnect.org/Publications/productguide.pdf	Free Enrichment Materials	Via Cary
Amatrol http://www.amatrol.com/ Commercial vendor (IN) Turn-key systems	High school, college, university, union & industrial training. Self-described “technical education” Tuition-free teacher professional development	A few previous ETIC grantees use this vendor. More aimed at producing technicians rather than engineers? Interesting: HQ is in Indiana, which chose PLTW for state-wide implementation Looks like multiple repackagings of a large base of modules for STEM, Pre-E, Eng. Project-based.
LabVolt http://www.labvolt.com/ Commercial vendor (NJ) Turn-key systems	“Student, industrial, government” “World Leader in Technical Training”	At least one previous ETIC grantee uses this vendor Seems to have fewer topics/modules than Amatrol. Literature has greater emphasis on “cost-effective”. Recent \$13M US contract with National Police of the Republic of Indonesia

<p>Intelitek http://www.intelitek.com/ Commerical Vendor (NH) Turn-key systems</p>	<p>Middle, High School; community college, university, industrial trainer Engineering, Mechatronics</p>	<p>Via Doug. “We have a lab of equipment from Intelitek at McNary High School and use Learnmate to track student progress through the various units.” Produce the Scorbot robot and CNC ExpertMill recommended by PLTW. Also provide Learnmate student management software—an entire line of industrial training software and hardware, similar to Amatrol and Lab Volt.</p>
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Table 2: Single year/course curricula for middle and high school

Program/ Website	Target Audience/ Type	Comments; Prelim Evaluation
Infinity Project – www.infinity-project.org Institute for Engineering Education, Texas Instruments, NSF	High school per WSJ* “Includes textbooks, hardware, engineering-design software and a mandatory teacher training program. Cost is \$6,500 for a class of 20 students.” Current penetration is 300 schools, up from 12 in 1999.	Dick has textbook and will critique; Jo believes this is a one year course, fairly intense, pretty geeky (if fun geeky) David Coronado: “I found the textbook to be just as sterile as a traditional science book. Multiple choice questions, memorizing random terminology and short spurts of information. It is not a hands-on, design book taking a systems approach to design. In summary, I find it the same old, same old science texts, except we are substituting the words engineering. Plus its published by Prentice Hall. I personally think they are horrible when it comes to textbooks.”
Engineering the Future http://www.mos.org/etf/ Boston Museum of Science & Key Curriculum Press	High School, 1 year curriculum aimed at the level of a general science/ inquiry class for 9 th graders; Web support & professional development	Presented at the Prepare Meeting April 3, 2008; Jo has DVDs & textbook set; Cary provided additional supporting docs 4/22/08
Materials World Modules www.materialsworldmodules.org NSF, Northwestern University (Evanston, IL) Started 2002 (site)	Middle,High School, Per Cary, one of the first curricula with a focus on engineering and technology. Focus on Materials Engineering – books, kits, training	Via Cary Inquiry & Design-based News on the site last updated 2007 Units help teachers meet NSES and state standards, but site does not claim units are “standards-based”
Salvadori Center http://www.salvadori.org/ Education and the Built Environment. See It. Build It. Know It. 30 year old organization. NSF funding.	K-12 Lessons integrate across a grid of disciplines Foundational units on measurement, etc.	Via Brad.

Electronics Circuits for the Evil Genius http://www.elxevilgenius.com/ 57 lessons, about 100 hours	High School. Beginning basic electronics hardware how-to; “smart 13 year olds” on up; Meets Canadian standards for HS electronics class.	Via Jill Hubbard. There is a whole series of “Evil Genius” books on Amazon
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Table 3: Unit and Enrichment Materials, Middle and High School

Program/ Website	Target Audience/ Type	Comments; Prelim Evaluation
Materials World Modules www.materialsworldmodules.org	High School, Per Cary, one of the first curricula with a focus on engineering and technology. Focus on Materials Engineering	
Smithsonian-Lemelson Series www.iteaconnect.org/Publications/productguide.pdf	Free Enrichment Materials, tied to ITEA standards and curricula	Via Cary
Tech-Know, Instructional Materials for Technological Literacy http://www.ncsu.edu/techknow/		Via Tom Standards-based instructional models that link to Technology Student Association (TSA) challenge events
PCS Edventures, New Learning for a New World http://edventures.com/imssc/nsimssc/index.php?	K-12, formal & informal May be more like units than curricula	Via Brad Looks similar to LEGO Education
Salvadori Center http://www.salvadori.org/ Education and the Built Environment. See It. Build It. Know It. 30 year old organization. NSF funding.		Per Brad.
Electronics Circuits for the Evil Genius http://www.elxevilgenius.com/ 57 lessons, about 100 hours One of a series of “Evil Genius” books on Amazon	High School. Beginning basic electronics hardware how-to; “smart 13 year olds” on up; Meets Canadian standards for HS electronics class.	Via Jill Hubbard.

Table 4: Elementary School Courses, Units, and Enrichment Materials

Program/ Website	Target Audience/ Type	Comments; Prelim Evaluation
Engineering is Elementary http://www.mos.org/eie/	K-6; Books combines engineering, social science/geography, story, and an engineering project with followup activities/experiments	OPAS has some evaluation copies of some of the books; Ellen Lyon is evaluating
Stuff That Works – http://citytechnology.cny.cuny.edu/	K-6; Per WSJ*, professional development guide for teachers, \$17 per teacher guide	Intro to basics of design technology through curriculum materials (5-6 books), teacher resources, and professional development; ~20+ states, ~40+ districts; GREAT standards database -- aligned to national science, math, ELA & social studies – pulls up relevant state standards for each lesson/area
Children Designing and Engineering — www.childrendesigning.org New Jersey	K-2 and 3-5 per WSJ* “Each curricular unit comes with lesson plans and kits of consumable materials for a class of 24 children, \$300 to \$750 per unit”.	Seems pretty good. Units are 15-22 hours == 4-6 weeks
Kinetic City http://www.kineticcity.com/	K-6 informal venues	

* WSJ = Wall Street Journal, March 13, 2008, “Reading, Writing ... and Engineering”, Anne Marie Chaker, pp D1-2.