About ITEEA

The International Technology and Engineering Educators Association (ITEEA)

(formerly the International Technology Education Association/ITEA) is the largest professional educational association, principal voice, and information clearinghouse devoted to enhancing technology and engineering education through experiences in our schools (K–12). Its membership encompasses individuals and institutions throughout the world, with primary membership in North America.

ITEEA represents technology and engineering educators who are classroom teachers, developers, administrators, and university personnel in the field, representing all levels of education, while ITEEA corporate members are comprised of leading technology companies. ITEEA has members from over 45 different countries.

ITEEA conducts a vigorous public policy program, frequently providing information to government agencies, associations, and other special interest groups concerning technology and engineering education. The association strives to provide an understanding of the importance of technology and engineering education to the future growth and well-being of all nations.

ITEEA’s mission is to advance technological capabilities for all people and to nurture and promote the professionalism of those engaged in these pursuits.

ITEEA seeks to meet the professional needs and interests of members as well as to improve public understanding of technology education and its contributions. ITEEA’s curriculum interests reside in the “T” and “E” of STEM (science, technology, engineering, and mathematics) education.

ITEEA holds an annual conference – the largest technology education showcase of exhibits and educational sessions in the world.

ITEEA sponsors an active honors and awards program that recognizes outstanding teachers and programs (K–12) from states, provinces, and countries that are affiliated with the association. ITEEA also presents award certificates and supports other programs that recognize outstanding efforts in the profession of technology and engineering education.

ITEEA publishes a variety of publications that lead the profession by providing teaching directions, instructional ideas, and networking opportunities, including:

- Journals: Technology and Engineering Teacher, The Elementary STEM Journal (formerly Children’s Technology and Engineering), and the Journal of Technology Education (pg. 19)
- NEW! Standards for Technological and Engineering Literacy (pg. 11)
- Engineering byDesign™ Curricular Offerings (pp. 4–10)
- STEM Connections – ITEEA’s monthly electronic newsletter

Engineering byDesign™ includes courses and units that comprise a comprehensive K–12 model program that delivers STEM and technological literacy. EbD™ courses and units are available in this catalog or through membership in the EbD™ Consortium. For more information about EbD™ Consortium Membership options, please contact Nancye Hart at nhart@iteea.org.
For the most up-to-date information about ITEEA activities, standards, programs, conferences, professional development, membership, publications, or resources, visit the ITEEA interactive website at www.iteea.org

And for the latest information about the Engineering byDesign™ Program, be sure to check out the EbD™ site at www.engineeringbydesign.org

Items in this Product Guide can also be purchased from the ITEEA eStore at https://portal.iteea.org/Shop/Product-Catalog.
The International Technology and Engineering Educators Association's STEM Center for Teaching and Learning™ has developed the only standards-based national model for Grades K–12 that delivers technological literacy through integrative STEM-based instruction. Engineering byDesign™ is built on the Next Generation Science Standards, the Common Core State Standards, and the Standards for Technological Literacy (ITEA/ITEEA).

**STEM CTL/EbD™ CONSORTIUM OF STATES**

The STEM Center for Teaching and Learning™/STEM CTL™ is the research, curriculum, and professional development arm of the International Technology and Engineering Educators Association (ITEEA). ITEEA's STEM CTL™ is the sole-source developer of the Engineering byDesign™ (EbD™) Standards-Based Model Program and the EbD™ Teacher Network. Through ITEEA's STEM CTL/EbD™ Consortium, products and services are provided that are developed specifically for Consortium members. Membership in the Consortium provides exclusive rights to products and services in the year of development. The Engineering byDesign™ Program is based on the Understanding By Design (Wiggins and McTighe) process. EbD™ is the only model program based on three sets of content standards (Technology: ITEEA's STL, Mathematics: NCTM, and Science: AAAS/NGSS), as well as best practices for assessment, professional development, and curriculum development. The EbD™ Model Program has completed a crosswalk with the STEM and IT Clusters core knowledge and skill statements and provides articulated sequencing of courses. Contact ebd@iteea.org for additional information.
Foundations of Technology, Standard Edition
A Standards-Based High School Model Course Guide
This course guide, intended for Grades 9-10, prepares students to understand and apply technological concepts and processes that are the cornerstone for the high school technology program. Group and individual activities engage students in creating ideas, developing innovations, and engineering practical solutions. Technology content, resources, and laboratory/classroom activities apply student applications of science, mathematics, and other school subjects in authentic situations.
P196E - $74; Members $62
(delivered as a downloadable pdf)

Technology and Society, Standard Edition
A Standards-Based High School Model Course Guide
Technology and Society teaches critical thinking skills as they relate to the creation and use of technology. Through the study of contemporary issues of science and technology, students are introduced to structured methods for assessing technology and science issues and developing defensible opinions and positions.
P198E - $27; Members $22
(delivered as a downloadable zip folder)

Technological Design, Standard Edition
A Standards-Based High School Model Course Guide
In Technological Design, engineering scope, content, and professional practices are presented through practical applications. Students, in engineering teams, apply technology, science, and mathematics concepts and skills to solve engineering design problems and innovate designs. Students research, develop, test, and analyze engineering designs using criteria such as design effectiveness, public safety, human factors, and ethics. This course is an essential experience for students who are interested in technology, innovation, design, and engineering.
P236E - $95; Members $75
(delivered as a downloadable zip folder)

Engineering byDesign™ course descriptions are available here.
**Scientific & Technical Visualization I and II**
*Scientific & Technical Visualization I and II* are courses for Grades 10–12 focused on the principles, concepts, and use of complex graphic and visualization tools as applied to the study of science and technology. Students use complex 2-D graphics, 3-D animation, editing, and image analysis tools to better understand, illustrate, explain, and present technical, mathematical, and/or scientific concepts and principles. Emphasis is placed on the use of computer-enhanced images to generate both conceptual and data-driven models, data-driven charts, and animations. Science, math, and visual design concepts are reinforced throughout each course, which should take about 36 weeks to complete.

This curriculum was developed to help teachers offer a focused, demanding, and exciting program of study addressing the core concepts and principles of scientific visualization. Scientific visualization involves theoretical mathematics, specialized computer programming, and the development of novel solutions to help scientists visualize and comprehend science problems of the highest order. The goal for these courses is to help high school level students gain experience using a multitude of computer graphic software, develop problem-solving skills, become independent learners, and acquire the intellectual confidence required to help them be successful with their post-secondary education.

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**Game Art Design, Standard Edition**
*Game Art Design (GAD)* introduces students to the basic skills necessary to enter the video game industry. In GAD, the students are introduced to the history of games and technology to help them understand where the industry has been and what the future may hold. Students also explore the basics of game theory and strategic thinking. Game designers create prototypes that provide a way to create aspects of the game or a working model of a game. This course will walk the student through this process, culminating in a finished board game prototype incorporating all of the aspects learned in game theory. In the culminating project, students practice learning a game engine and produce a functioning 2-D game.

**P262E** - $44; **Members $38** *(delivered as a downloadable zip folder)*

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**EbD-PathwayExtensions™**

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**Note:** There is no shipping charge for downloadable files.
Advanced Design Applications, Standard Edition
A Standards-Based High School Model Course Guide
Advanced Design Applications is intended for Grades 11-12 and focuses on three dimensions of technological literacy—knowledge, ways of thinking and acting, and capabilities—with the goal of students developing the characteristics of technologically literate citizens. It employs teaching/learning strategies that enable students to explore and deepen their understanding of "big ideas" regarding technology and makes use of a variety of assessment instruments to reveal the extent of understanding. The 36-week unit includes Manufacturing Technologies, Energy and Power Technologies, Construction Technologies, and Transportation Technologies.
P200E - $73; Members $63 (delivered as a downloadable pdf)

Advanced Technological Applications, Standard Edition
A Standards-Based High School Model Course Guide
Advanced Technological Applications is a 36-week course that presents four nine-week learning units. The course is standards-based, with engineering-related curricula designed for upper-level high school students. The goal is to provide an engineering or technical base for high school students who plan to continue their education in technical or engineering programs at the community college or university level. There are eight separate learning units that include both instructor and student guides. Each nine-week learning unit begins with a robust Primary Challenge or design problem that is then supported in subsequent learning cycles. Unit titles are: Information and Communication Technologies, Medical Technologies, Agriculture and Related Biotechnologies, and Entertainment and Recreation Technologies.
P203E - $71; Members $61 (delivered as a downloadable pdf)
These publications assist middle school technology and engineering teachers and curriculum developers in making informed decisions about appropriate content, methods and activities, assessment strategies, and resources for standards-based instruction for engineering and technological literacy in the context of STEM in Grades 6–8 and are essential for implementing standards-based technology education instruction for the middle school.

**Exploring Technology, Standard Edition**  
A Standards-Based Middle School Model Course Guide  
This sixth grade course focuses on core concepts of technology and various approaches to solving problems, including engineering design and experimentation. Group and individual activities engage students in brainstorming, visualizing, modeling, constructing, and testing their own designs as they discover how engineering and technology impact every individual and society as a whole.  
P223E - $50; Members $45 (delivered as a downloadable pdf)

**Technological Systems, Standard Edition**  
A Standards-Based Middle School Model Course Guide  
*Technological Systems* introduces students to systems and processes to develop an understanding of the impact of technology on humans, the environment, and the global community. By investigating systems through their function, design, and development, students will understand what systems are, why they are developed, and how “systems thinking” can be used to describe them. Students engage in activities and experiences where they evaluate the impacts of technology through the lenses of culture, society, economics, and the environment.  
P235E - $50; Members $45 (delivered as a downloadable zip folder)

**Engineering for All, Standard Edition**  
A Standards-Based Middle School Model Course Guide  
*Engineering for All* focuses on how to engineer solutions to problems that concern everyone on this planet: how to provide enough good food for people to eat, and how to supply all people with fresh water to drink. Key components of both stand-alone units—Water: The World in Crisis and Vertical Farms: Fresh Food for Cities—encourage students to develop predispositions to forge a sustainable future and discover how engineering is a route to engage in socially significant work.  
P270E - $50; Members $45 (delivered as a downloadable pdf)

**Invention and Innovation, Standard Edition**  
A Standards-Based Middle School Model Course Guide  
*Invention and Innovation* prepares students with opportunities to apply the design process in the invention or innovation of a new product, process, or system. In this course, students learn all about invention and innovation. They have opportunities to study the history of inventions and innovations, including their impacts on society. They learn about the core concepts of technology and about the various approaches to solving problems, including engineering design and experimentation. Students apply their creativity in the invention and innovation of new products, processes, or systems. Finally, students learn about how various inventions and innovations impact their lives. Students participate in engineering design activities to understand how criteria, constraints, and processes affect designs. Students are involved in activities and experiences where they learn about brainstorming, visualizing, modeling, constructing, testing, experimenting, and refining designs. Students also develop skills in researching for information, communicating design information, and reporting results.  
P231E - $60; Members $54 (delivered as a downloadable zip folder)

Invention and Innovation builds on K-5 experiences as well as those in *Exploring Technology* and develops students’ understanding of the scope of technology and the iterative nature of technological design and problem-solving processes. Likewise, students participate in engineering design activities to understand how criteria, constraints, and processes affect designs. Students will be involved in activities and experiences where they learn about brainstorming, visualizing, modeling, constructing, testing, experimenting, and refining designs. Students will also develop skills in researching for information, communicating design information, and reporting results.  
P231E - $60; Members $54 (delivered as a downloadable zip folder)
**Invention, Innovation, and Inquiry (I³)**

*Invention, Innovation, and Inquiry: Units for Technological Literacy, Grades 5–6,* was funded by the National Science Foundation. This project is so named because invention and innovation are the hallmarks of technological thinking and action. Each unit has standards-based content, suggested teaching approaches, and detailed learning activities, including brainstorming, visualizing, testing, refining, and assessing technological designs. Students will learn how inventions, innovations, and systems are created and how technology becomes part of their lives.

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**Invention: The Invention Crusade**

Students develop an idea for an invention by designing and constructing a working model or prototype of a gadget that helps a small child to do a household task.

**P208** - $15; Members $12 *(print version)*  
**P208E** - $15; Members $12 *(downloadable pdf)*

**Innovation: Inches, Feet, and Hands**

Students use the engineering design process to design and develop an improved product that is used by the human hand.

**P209** - $15; Members $12 *(print version)*  
**P209E** - $15; Members $12 *(downloadable pdf)*

**Communication: Communicating School Spirit**

Students examine communication processes and mediums by designing, developing, and implementing different types of commercial projects promoting school spirit.

**P210E** - $13; Members $10 *(downloadable pdf)*

**Transportation: Across the United States**

Students investigate the systems of transportation and how transportation has impacted the United States. Then they apply their learning by designing a transportation vehicle.

**P211** - $15; Members $12 *(print version)*  
**P211E** - $15; Members $12 *(downloadable pdf)*

**Inquiry: The Ultimate School Bag**

Students use inquiry skills to redesign a school bag and construct a model of the “Ultimate School Bag.”

**P212** - $15; Members $12 *(print version)*  
**P212E** - $15; Members $12 *(downloadable pdf)*

**Manufacturing: The Fudgeville Crisis**

Students explore food preservation and packaging as their companies mass-produce and package “fudge” for a Fudge Festival.

**P216** - $15; Members $12 *(print version)*  
**P216E** - $15; Members $12 *(downloadable pdf)*

**Construction: Buildings and Beams**

Students act as structural engineers and design and construct at least two laminated paper beams—testing, evaluating, and redesigning their beams for maximum strength.

**P217** - $15; Members $12 *(print version)*  
**P217E** - $15; Members $12 *(downloadable pdf)*

**Power and Energy: Whispers of Willing Wind**

Students gain an understanding of wind energy and power as they construct a device that captures wind energy and converts it to electricity.

**P218** - $15; Members $12 *(print version)*  
**P218E** - $15; Members $12 *(downloadable pdf)*

**Design: Toying with Technology**

Students explore two-dimensional (2D) and three-dimensional (3D) visualization processes and mediums by designing, developing, and building toys that solve a given problem.

**P219E** - $13; Members $10 *(downloadable pdf)*

**Technological Systems: Creating Mechanical Toys**

Students investigate two mechanical devices—pneumatics and linkage mechanisms—and design a toy that uses both to create movement.

**P220** - $15; Members $12 *(print version)*  
**P220E** - $15; Members $12 *(downloadable pdf)*

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All units contain teacher background information, handouts, transparency masters, and a student packet. Each unit is designed to integrate mathematics and science with technology and take 8 to 10 days.
Welcome to EbD-TEEMS™ for Grades PreK-6.

### GRADE BUILDING BLOCK

<table>
<thead>
<tr>
<th>GRADE</th>
<th>BUILDING BLOCK</th>
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<tbody>
<tr>
<td>PreK</td>
<td><strong>Our Living World</strong></td>
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<tr>
<td></td>
<td>Introduces preschool students to the life cycles of plants, butterflies, and frogs. Group activities offer a multisensory, hands-on learning experience in which young students plant and observe seed growth, enjoy literature, and discover the circle of life.</td>
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<tr>
<td>Kindergarten</td>
<td><strong>A Home for all Seasons</strong></td>
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<tr>
<td></td>
<td>Students are challenged to craft homes for animals to meet their basic needs during seasonal changes or in different habitats.</td>
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<tr>
<td>First Grade</td>
<td><strong>Agriculture Around Us</strong></td>
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<tr>
<td></td>
<td>Students are challenged to design a garden as they explore the products, processes, and by-products of food and fiber systems.</td>
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<tr>
<td>Second Grade</td>
<td><strong>Our Environment, Our Health</strong></td>
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<tr>
<td></td>
<td>Students are challenged to create absorbent mats as they learn about problems from the use of fossil fuels and methods to reduce, reuse, and recycle objects and materials.</td>
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<tr>
<td>Third Grade</td>
<td><strong>Every Drop Matters</strong></td>
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<tr>
<td></td>
<td>Students are challenged to develop systems to conserve and reuse water as they explore the scarcity of water resources on Earth.</td>
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<tr>
<td>Fourth Grade</td>
<td><strong>The Power of Solar</strong></td>
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<tr>
<td></td>
<td>Students are challenged to build and test models as they explore solar energy as a sustainable source of power for structures.</td>
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<tr>
<td>Fifth Grade</td>
<td><strong>Community Connections</strong></td>
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<tr>
<td></td>
<td>Students are challenged to plan improvements to community infrastructure as they explore transportation and public services.</td>
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<tr>
<td>Sixth Grade</td>
<td><strong>Our World and Me</strong></td>
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<tr>
<td></td>
<td>Sixth-grade learners explore robotics through the engineering field of mechatronics. Mechatronics is an interdisciplinary engineering field that focuses on the integration of mechanical, electrical, and software systems.</td>
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</tbody>
</table>

In today’s rapidly changing, technological world, a foundation in Science, Technology, Engineering, and Mathematics (STEM) is as important as one in English language arts. Likewise, meaningful teaching and learning in STEM must begin as early as it does in English language arts. EbD-TEEMS™ is an acronym for Engineering byDesign-Technology, Engineering, Environment, Mathematics, and Science™. It is an integrative, elementary curriculum designed to serve as a model and instructional resource for building a solid foundation in STEM education for all students. The EbD-TEEMS™ Integrative Curriculum for Elementary STEM (EbD-TEEMS™) leverages technological design challenges in an environmental context as the focus for learning. Science and mathematics conceptual development is supported through strategic integration of key concepts and skills and is the result of aligning the sequence of EbD-TEEMS™ to the sequence of widely adopted science and mathematics curricular programs. Additionally, the Grand Challenges for Engineering identified by the National Academy of Engineering are used as a context for problem solving, and inquiry and design-based instructional strategies further enhance the design of EbD-TEEMS™.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Price</th>
<th>Members Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>PreK</td>
<td><strong>Our Living World</strong></td>
<td>$79</td>
<td>$40</td>
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<td>Kindergarten</td>
<td><strong>A Home for all Seasons</strong></td>
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<td>Grade 1</td>
<td><strong>Agriculture Around Us</strong></td>
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<tr>
<td>Grade 2</td>
<td><strong>Our Environment, Our Health</strong></td>
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<td>Grade 3</td>
<td><strong>Every Drop Matters</strong></td>
<td>$79</td>
<td>$40</td>
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<tr>
<td>Grade 4</td>
<td><strong>The Power of Solar</strong></td>
<td>$79</td>
<td>$40</td>
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<tr>
<td>Grade 5</td>
<td><strong>Community Connections</strong></td>
<td>$79</td>
<td>$40</td>
</tr>
<tr>
<td>Grade 6</td>
<td><strong>Our World and Me</strong></td>
<td>$79</td>
<td>$40</td>
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</tbody>
</table>

(Delivered as a downloadable pdf or zip folder.)
Standards for Technological and Engineering Literacy: The Role of Technology and Engineering in STEM Education


**Summer Pricing:**
- P271 - $32.50; Members $25 (print version). (Shipping charges apply.) Must be logged in to see member pricing. Order online [here](http://iteea.org/stel_es.aspx).
- P271E - $25; Members free (printable pdf) Download [here](http://iteea.org/stel_es.aspx).
- P271B - $25; Members free (downloadable ePub) Download [here](http://iteea.org/stel_es.aspx).

**STEL Executive Summary**
- P272 - $25 (package of 25) (print version). (Shipping charges apply.)
- P271E - free (downloadable pdf) Download [here](http://iteea.org/stel_es.aspx).

Download the STEL Executive Summary now at: [http://iteea.org/stel_es.aspx](http://iteea.org/stel_es.aspx)
Standards for Technological Literacy: Content for the Study of Technology, *Third Edition*

*Standards for Technological Literacy* (STL) includes content standards for the study of technology in Grades K-12. It represents what every person should know and be able to do in order to be technologically literate. This document is designed for anyone who will be developing standards-based curricula as well as the technology education community at large because of its comprehensive treatment of the study of technology.

ISBN: 978-1-887101-02-8
P160E - free for members and nonmembers (downloadable pdf file)

Advancing Excellence in Technological Literacy: Student Assessment, Professional Development, and Program Standards

*Advancing Excellence in Technological Literacy* (AETL) is designed as a companion document to *Standards for Technological Literacy*. Like STL, AETL is based on the vision that all students can and should become technologically literate and was created to provide the means for implementing STL in K-12 laboratory-classrooms.

P184E - $24; Members $20 (downloadable pdf file)

Note: There is no shipping charge for downloadable files.

Technological Literacy for All: A Rationale and Structure for the Study of Technology

The 2006 edition of *Technological Literacy for All: A Rationale and Structure for the Study of Technology* is a major rewrite of *Technology for All Americans: A Rationale and Structure for the Study of Technology* (ITEA, 1996) that enhances and updates the original edition considerably. It provides much more explanation of what technology and technological literacy are as well as why everyone needs to be technologically literate. This edition provides a logical transition from the 10 universals (processes, knowledge, and contexts) generated in the first edition into the 20 standards found in ITEA/ITEEA's *Standards for Technological Literacy* (2000/2002/2007). Also included in this new edition are sections on the teaching of technology in Grades K-12 and beyond.

P214E - $15; Members $12 (downloadable pdf file)
Addenda to Technological Literacy Standards Series

Developed by ITEA/ITEEA’s Technology for All Americans Project

Measuring Progress: Assessing Students for Technological Literacy

Measuring Progress is a resource for teachers to use as they plan and implement standards-based student assessment. It is intended to help users implement the student assessment standards in Chapter 3 of AETL. The step-by-step approach presented is a closely aligned modification of the widely accepted backwards design model outlined by Grant Wiggins and Jay McTighe. The modification enables the approach to be applied to many levels of the program—course, unit, or lesson. Measuring Progress also provides a handy resource for information about a variety of assessment tools and methods, including descriptions, guidelines for use, and lists of advantages and disadvantages. ISBN: 978-1-887101-04-2

P187E - $23; Members $19 (downloadable pdf file)

Developing Professionals: Preparing Technology Teachers

Developing Professionals offers practical guidance for those who plan, implement, and/or evaluate the standards-based education of teachers of technology. It is intended to help users implement the professional development standards in Chapter 4 of AETL by addressing professional development at both the preservice and in-service levels, including the need for teacher candidates and teachers to become responsible for their own professional growth. ISBN: 978-1-887101-06-6

P190E - $23; Members $19 (downloadable pdf file)

Planning Learning: Developing Technology Curricula

Planning Learning provides curriculum developers with a multistep approach to developing and revising standards-based technology curricula, complete with practical suggestions and worksheets. The approach is a modification of the widely accepted backwards design model outlined by Grant Wiggins and Jay McTighe. Planning Learning is also closely aligned with the approach for student assessment that is outlined in the addendum titled Measuring Progress. ISBN: 978-1-887101-07-3

P191E - $23; Members $19 (downloadable pdf file)

Realizing Excellence: Structuring Technology Programs

Realizing Excellence is considered the “umbrella” addendum to all the other STL/AETL addenda and is intended to help educators implement the program standards in Chapter 5 of AETL (previous page). It offers educators and other concerned individuals practical suggestions and hands-on tools for planning, developing, implementing, and evaluating standards-based technology programs. ISBN: 978-1-887101-05-9

P189E - $23; Members $19 (downloadable pdf file)

Note: There is no shipping charge for downloadable files.

Back to Table of Contents
While not all technology education laboratories will look exactly the same, there are certain laboratory requirements that should be included in any technology education laboratory design. These designated areas are defined in this standards-based ITEEA Facilities Planning Guide and provide logical and specific guidelines for designing and implementing a standards-based laboratory in your local school, no matter what the size.

While the primary focus of this guide is on senior high school laboratory requirements, the elements and recommendations are appropriate and relevant to any middle school-level laboratory and should be incorporated in any laboratory design.

**Safer Makerspaces, Fab Labs, and STEM Labs: A Collaborative Guide!**
Safer hands-on STEM is essential for every instructor and student. Read the latest information about how to design and maintain safer makerspaces, Fab Labs, and STEM labs in both formal and informal educational and community settings. This book features information about liability/legal standards, better professional practices, safety controls, addressing biological/chemical/physical hazards, first aid procedures, the facilities planning process, recommended designs and existing examples, and frequently asked safety questions. It is easy to read, providing practical recommendations and examples for instructors, administrators, and media specialists. If your community or school system is looking to design or modify a facility to engage students in safer hands-on STEM activities, then this book is a must read! FREE preview available at [https://sites.google.com/a/vt.edu/safetybook2017/](https://sites.google.com/a/vt.edu/safetybook2017/).

**P244E - $23; Members $18 (downloadable pdf file)**

**Designing Safer Learning Environments for Integrative STEM Education**
*Fourth Edition*
V. William DeLuca and W. James Haynie, Ill
Revised in 2014 by Tyler S. Love and Kenneth Russell Roy
Completely revised in 2014, this manual aids teachers in developing and carrying out a safety program in the technology and engineering education classroom. The guide uses the systems approach: Safety in the classroom is dependent on the interaction of varied elements, and many of these elements are discussed in the text, such as the environment, human factors, tools and equipment; processes, materials, and outside influences. The manual includes sample releases and other forms that teachers can duplicate for classroom use. New in this edition are 18 printable safety posters with corresponding safety tests and PowerPoint presentations and videos that teachers can use to reinforce safer practices as well as a link to ITEEA’s Safety Resource site where teachers can access these resources.

**P268 - $49; Members $42 (print version only - spiral bound)**

**Facilities Planning Guide**
While not all technology education laboratories will look exactly the same, there are certain laboratory requirements that should be included in any technology education laboratory design. These designated areas are defined in this standards-based ITEEA Facilities Planning Guide and provide logical and specific guidelines for designing and implementing a standards-based laboratory in your local school, no matter what the size.

While the primary focus of this guide is on senior high school laboratory requirements, the elements and recommendations are appropriate and relevant to any middle school-level laboratory and should be incorporated in any laboratory design.

**P244E - $23; Members $18 (downloadable pdf file)**
The Overlooked STEM Imperatives: Technology and Engineering, K–12 Education

As the STEM education movement gains momentum, our leaders cannot continue with the mentality that our society only moves forward on mathematics and science alone.

Take this opportunity to gain a better understanding of the need for STEM education and its critical role in creating a technologically literate society. The rationale for the “T and E” has been specifically addressed in order to gain support for these subjects as part of the overall STEM effort.

You are invited to explore the power and promise of a STEM (science, technology, engineering, and mathematics) education through this publication, but more importantly, to seek to understand the importance of ensuring that the “T and E” are equal partners within STEM to adequately prepare the next generation workforce as well as valued contributors to our communities and society.

P240E – $15; Members $13 (downloadable pdf file)

The Connection to the 21st Century Workforce: Technology and Engineering Education

Building a competitive workforce for the 21st Century requires the careful alignment of K-12 and university curricula with the skill needs of business and industry. In addition to making students better problem solvers, critical thinkers, and users of technology, academic preparation must instill in them the desire to become lifelong learners, willing and able to adjust and adapt to changes in workforce skill requirements resulting from fast-changing global markets. This publication provides a snapshot of the current state of the economy and workforce, followed by the identification and requirements of knowledge and abilities needed for 21st Century occupations; an explanation of how technology and engineering education programs promote learning about technology and can be taught in exciting ways that motivate learners to pursue STEM occupations; chapters that explain the contributions of technology and engineering education, K-12; a chapter explaining how technology and engineering teacher education can prepare teachers to deliver the education that is needed by students of the 21st Century; and an overview of the benefits business and industry can expect from the recommendations made within this publication.

P246E – $17; Members $15 (downloadable pdf file)

Equity Guide

Create a program that reflects educational equity, recognizing the learning differences of all students regardless of gender or ethnicity.

P232E – $23; Members $19 (downloadable pdf file)

Determining Progress Toward Achieving Equity, Second Edition

This document includes the following materials:
- Equity in Science, Technology, Engineering, and Mathematics (STEM)
- Factors that Influence Females’ Decisions to Participate in STEM Areas
- Assessing Equity in Your Program and Creating an Equity Action
- Retention and Recruiting
- Resources

P232E – $23; Members $19 (downloadable pdf file)
ItEEA Publications

Resources in Technology and Engineering
These resources provide insights, perspectives, and innovation in technology for teachers and students. The authors view STEM as learning through Imagineering! Each publication contains 5-7 in-depth, standards-based studies of relevant topics as well as suggestions for practical application. Previously published in Technology and Engineering Teacher.

Biotechnology/Medicine
P250E – $17; $15 Members (downloadable pdf file)

Construction, Manufacturing, and Communication
P247E – $17; $15 Members (downloadable pdf file)

Energy
P248E – $17; $15 Members (downloadable pdf file)

Environment
P249E – $17; $15 Members (downloadable pdf file)

Technological Innovation
P251E – $17; $15 Members (downloadable pdf file)

Transportation
P252E – $17; $15 Members (downloadable pdf file)

Preparing the Class of 2020
If you have been searching for STEM activities for the elementary classroom, this publication is for you. The document is a compendium of over 30 hands-on projects that have appeared as either Activities or Quick Activities in Volumes 10-14 of ITEEA’s Technology and Children (now The Elementary STEM Journal) journal. The activities will energize your students by encouraging them to work cooperatively and think creatively, all the time enhancing their 21st Century skills.

P245E – $24; Members $20 (downloadable pdf file)
**Riding the Elementary T.I.D.E.**

is a project developed for students in grades two and three. Each unit focuses on a different facet of the acronym TIDE (Technology, Innovation, Design, and Engineering). The units are each about three hours long and contain background material for the teacher as well as an age-appropriate design challenge for the students. Funding for the units was provided by the National Education Association.

### Units:

**The GREEN Mission:** Students are introduced to simplified steps that make up the design process and are then asked to design a solution to a packaging problem for G.R.E.E.N. Incorporated. This environmentally friendly company is hosting an Earth Day contest to seek ideas for sustainable and cost-effective ways to package products that could be purchased on the internet.

**The Garden Gadget Gala:** Students will learn the difference between invention and innovation and will then be asked to interview an older person to get an idea as to what garden tools they have difficulty using. The interview responses will be used to innovate the garden tools that students will bring to class. After the students have changed the garden tool using play dough and other materials, they will present their ideas to a panel of invited guests.

**Technology in a Bag:** In this unit, students will begin to understand that common materials can be used for more than just their intended purpose. Students will also begin to recognize that particular materials are used to make products in order to fit their intended purpose.

**Investigative Minds:** Students begin to understand how products work by taking them apart using simple hand tools, and exploring their inner workings. By doing this they will recognize a variety of different materials, mechanical parts, and uniquely shaped pieces. Through these activities they will also be introduced to two engineering fields and better understand what work individuals do in these fields.

P233E - $17; Members $14 (downloadable pdf file)
Classroom Challenges

Here are classroom challenges designed to turbo-charge those creative juices and integrated subject discussions. Get students working in teams to address multidisciplinary and multidimensional aspects of real-world problem solving. Great stuff for the STEM classroom! Each publication contains 19-20 topics. Previously published in Technology and Engineering Teacher.

Environment, Energy, Invention, and Safety
P253E – $15; $13 members (downloadable pdf file)

Problem Solving and Design
P254E – $15; $13 members (downloadable pdf file)

Engineers and Engineering: A Review

Students are fascinated by the topic of engineering, so why not treat them with Engineers and Engineering: A Review, a new e-book from ITEEA written by retired engineer and inventor, Harry T. Roman. Harry is a long-time ITEEA contributor and author and talks plain and simple about engineering and what engineers do.

You will learn about the legacy, excitement, and history of this noble profession, one of the oldest in the world—the people who built the pyramids and the other great wonders of the ancient world. In our STEM educational paradigm, the inclusion of engineering pays tribute to the time-honored tradition of the engineering problem-solving process, the foundation of all new product development.

Examine the daily activities of engineers, the different kinds of engineering, how engineers grow and mature on the job, and the salaries for professionals in the field today. See how engineers manage and lead project teams to complete large scale projects. Learn the critical skills engineers need to be successful; and how engineering and invention are so similar.

P261E – $17; Members $13 (downloadable pdf file)

Alternate Energy Technology Design Challenges

Written by Harry T. Roman, author of the Classroom Challenge feature of Technology and Engineering Teacher, this publication contains 12 interesting and highly challenging alternate energy design problems that can be assigned to individual students or teams of students. Each problem is open-ended and multidimensional to give the student(s) a chance to experience the kinds of real-world problems that alternate energy engineers will face on the job.

P241E – $15; Members $13 (downloadable pdf file)
Free Classroom Activities from Harry Roman and ITEEA!
(Contribution of any amount to the ITEEA Foundation requested with download.)

Regular ITEEA contributor and author of the long-time “Classroom Challenge” feature in Technology and Engineering Teacher, Harry Roman, has released a new publication titled, Super Book of 180+ STEM Classroom Activities to Stimulate Student Thinking and Creativity.

To support the important work of ITEEA’s Foundation, Harry is providing his newest publication to all for download at no cost—but asks that anyone who downloads consider making a donation to the ITEEA Foundation.

Harry has previously released The Big Book of STEM Classroom Challenges, and 100+ Activities to Bring STEM to Life for Classrooms and Student Project Teams, both of which are also available for download with a Foundation donation. As a retired engineer and inventor, Harry likes teaching teachers, students, and school leaders about STEM and its applicability.

The ITEEA Foundation is in the middle of its Capital Campaign, with a goal of raising $250,000, which will allow it to continue providing much needed support to current and future educators, as well as to those in our communities who are in need of assistance. Without the continued support of generous donors like you, these needs will regrettably go unmet.

ITEEA’s Foundation is depending on your assistance and generosity. Please enjoy these activities and donate today to pledge your support. Be assured that your contribution will be put to good use to support tomorrow’s problem solvers today!

Donate to the ITEEA Foundation: www.iteea.org/Activities/AwardsScholarships/39072/FTEE.aspx

Download Super Book of 180+ STEM Classroom Activities to Stimulate Student Thinking and Creativity: www.iteea.org/File.aspx?id=175898&v=65699e2f

Download The Big Book of STEM Classroom Challenges: www.iteea.org/File.aspx?id=162611&v=23132da1

Download 100+ Activities to Bring STEM to Life for Classrooms and Student Project Teams: www.iteea.org/File.aspx?id=156460&v=10fdeb69
Technology and Engineering Teacher

Subscribe to *Technology and Engineering Teacher*—the leading professional journal of technology and engineering education. Each issue contains ideas for the classroom and technology learning activities that teachers find very useful. These activities are successfully being used in classrooms around the country and are age-appropriate for students in Grades 6–12. Also included:

- Articles on current trends and changes in technology and engineering education
- Teacher Highlights
- Classroom Challenges
- Safety Spotlight
- Plus, much more

Published eight times during the school year (beginning in September—combined issues in December/January and May/June), *TET* is a valuable resource for your classroom.

**MEMBERS** – All memberships include one *TET* subscription. Elementary and MS/HS group memberships include multiple copies. (International, Student, and Advocate member types receive their copies electronically.)

**TET01** - Print *TET* subscription, USA - $110/year (included in all ITEEA memberships) *Subscription prices include Shipping & Handling via surface mail.*

**TET03** - Electronic *TET* subscription - $70/year

**PTET01** - Single *TET* issue (print) - $11.00; Members - $10.00

*Shipping & Handling charges will be added to single copy prices. To order individual print issues please contact the ITEEA office at (703) 860-2100 or email iteea@iteea.org.

**TET03-1** - Single *TET* issue (electronic) - $8.50

Electronic journals will be delivered via email as a link to both pdf and html versions.

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The Elementary STEM Journal

(formerly Children’s Technology and Engineering)

Written expressly for elementary teachers and published four times during the school year (September, December, March, and May), *The Elementary STEM Journal* is packed with practical, innovative, and creative articles and hands-on activities. Features also include:

- Books to Briefs
- Career Connections
- Kids Code
- STEM at Home
- and more!

**MEMBERS** – *ESJ electronic subscriptions* are included in Elementary and Institutional group memberships as well as in the Elementary STEM Council membership.

**ESJ01** - Print *ESJ* Subscription, USA - $50/year; Members - $35/year

**ESJ03** - Electronic *ESJ* Subscription - $30/year

**PESJ01** - Single *ESJ* issue (print) - $11.00

*Shipping & Handling charges will be added to single copy prices. To order individual print issues please contact the ITEEA office at (703) 860-2100 or email iteea@iteea.org.

**ESJ03-1** - Single *ESJ* issue (electronic) - $8.00

Electronic journals will be delivered via email as a link to both pdf and html versions.

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Journal of Technology Education

*JTE* is a refereed scholarly journal that provides a forum for discussion of technology education. Conceptual as well as research-based articles are published. This biaannual journal is cosponsored by ITEEA and its Council on Technology and Engineering Teacher Education (CTETE).

**JTE01** - Print *JTE* subscription, USA - $20/year

**JTE02** - Print *JTE* subscription, outside USA - $30/year

**JTE03** - Print *JTE* library subscription, USA - $30/year

**JTE04** - Print *JTE* library subscription, outside USA - $40/year

**ORDER ONLINE AT:** https://portal.iteea.org/Shop/Subscriptions

**PLEASE DIRECT INQUIRIES TO:** Annette Rose and Jim Flowers, *JTE* Editors, jte@iteea.org

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ITEEA ENCOURAGES ITS READERS TO CONTRIBUTE TO THE FIELD OF TECHNOLOGY AND ENGINEERING EDUCATION THROUGH SUBMISSION OF ARTICLES FOR THESE VITAL PUBLICATIONS.

FOR MORE INFORMATION ON THE SUBMISSION PROCESS, VISIT www.iteea.org/submit_articles.aspx

OR EMAIL kdelapaz@iteea.org
High School Units:

Moving Cargo: **Focus**: Transportation. Serves as an augmentation or replacement for a Foundations of Technology unit or as a stand-alone unit.

Transportation and Space: Reuse and Recycle: **Focus**: Transportation (Grades 10-12). Serves as an augmentation or replacement for a Technological Issues unit or as a stand-alone unit.

Engineering Design for Human Exploration: **Focus**: Energy and Power. Serves as an integral part of Engineering Design or as a stand-alone unit.

Lunar Growth Chamber: **Focus**: STS-118 Lunar Plant Growth Chamber. Serves as an augmentation or replacement in Invention and Innovation or as a stand-alone unit.

Middle School Units:

Lunar Colonization: **Focus**: Energy and Power. Serves as an integral part of Exploring Technology or as a stand-alone unit.

Space Transportation: Reshooting the Moon: **Focus**: Transportation. Serves as an integral part of Technological Systems or as a stand-alone unit.

Creating a Space Exploration Infrastructure: **Focus**: Transportation. Serves as an integral part of Invention and Innovation or as a stand-alone unit.

Packing Up for the Moon: **Focus**: STS-118 Lunar Plant Growth Chamber. Serves as an augmentation or replacement unit in Invention and Innovation or as a stand-alone unit. (also available in Package P230CD)

P237E - $17 (Package includes all four units – delivered in a downloadable zip folder as interactive electronic publications)

P238E - $17 (Package includes all four units – delivered in a downloadable zip folder as interactive electronic publications)

Elementary Units:

Moon Power: **Focus**: Energy and Power. Incorporates technological literacy, science, mathematics, language arts, and social studies standards. Available as a stand-alone unit in two tracks: Design and Build or Design and Evaluate.

Moon Munchies: **Focus**: STS-118 Lunar Plant Growth Chamber. Incorporates technological literacy, science, mathematics, language arts, and social studies standards. Available as a stand-alone unit in two tracks: Design and Build or Design and Evaluate. (also available in Package P230CD)

P239E - $9 (Package includes both units – delivered in a downloadable zip folder as interactive electronic publications)

Units developed in collaboration with the ITEEA-NASA Designing Human Exploration Project

Lunar Plant Growth Chamber Design Challenges

Developed in conjunction with NASA’s STS-118 Mission and the first Educator Astronaut in space. The STS-118 Design Challenges coordinate with the Space Shuttle Endeavour’s mission that flew in August 2007 with a six-person crew that included ITEEA member and Educator Astronaut, Barbara Morgan. The Design Challenges focus on a lunar plant growth chamber design. A second phase coordinates with the Design Challenge to offer a science experiment on the growing of seeds. Each unit consists of two tracks: Design and Build or Design and Evaluate.

Elementary Unit: Moon Munchies
Middle School Unit: Packing Up for the Moon
High School Unit: Lunar Growth Chamber

P230E – $9 All three units

Through a partnership with NASA, ITEEA/ITEA is pleased to offer the STS-118 Design Challenges. These challenges coordinate with the Space Shuttle Endeavour’s STS-118 mission that flew in August 2007 and delivered a payload to the International Space Station. The six-person crew included ITEEA member and Educator Astronaut, Barbara Morgan. Ms. Morgan and NASA are dedicated to inspiring the next generation of explorers and finding ways to connect space exploration with K–12 classrooms. The Design Challenges focus on a lunar plant growth chamber design. A second phase coordinates with the Design Challenge to offer a science experiment on the growing of seeds. Each unit consists of two tracks: Design and Build or Design and Evaluate.
Elementary School

These resources provide strategic directions for developing contemporary, beginning-level units and thematic instruction compatible with *Standards for Technological Literacy: Content for the Study of Technology (STL)*. Content includes curriculum goals and objectives, instructional strategies and sequences, content connections, and sample student assessment strategies. The information contained in these guides will assist teachers in beginning to implement STL and can also be used by state, provincial, and local curriculum developers in creating standards-based curriculum.

Technology Starters,
*A Standards-Based Guide*

P182E - $15 (downloadable pdf file)

Models for Introducing Technology,
*A Standards-Based Guide*

P186E - $15 (downloadable pdf file)

Note: There is no shipping charge for downloadable files.

Teaching Technology: High School

*Strategies for Standards-Based Instruction*

High school teachers will be able to expand their instructional toolbox with contemporary methods and teacher-tested activities that are aligned with *Standards for Technological Literacy*. A resource section recommends classroom materials that support high school content and activities.

P173E - $10 (downloadable pdf file)

Teaching Technology: Middle School

*Strategies for Standards-Based Instruction*

Presents contemporary methods, activities, and resources for standards-based instruction in Grades 6–8. Activities, selected from national curriculum projects, have been teacher-tested. Each classroom/laboratory activity corresponds with relevant methods and STL standards.

P167E - $10 (downloadable pdf file)
**ITEEA Logo Products**

**Technology and Engineering Bring STEM to Life!**

**ITEEA Logo Whisper Pique Polo Shirt**
This black polo with ITEEA’s “Technology and Engineering Bring STEM to Life” logo is made from easy-care wonder fabric that still fits your budget. Easy-care 60% cotton/40% polyester, 5.6-oz., relaxed fit, double-needle top-stitching, half-moon patch, split tail.

**Mens Sizes:**
- T189M $25
- T189L $25
- T189XL $25

**Ladies Sizes:**
- T189WS $25

**ITEEA Logo Tee Shirt**
This comfortable, loose-fitting tee is 100% cotton and comes with the ITEEA “Technology and Engineering Bring STEM to Life!” message.

Sizes:
- T190S $12
- T190M $12
- T190L $12
- T190XL $12
- T190XXL $12

**ITEEA Superhero Tee Shirt**
Sing the praises of your colleagues with this new Superhero tee shirt from ITEEA. This 100% cotton tee is comfortable and fun to wear.

Sizes:
- T191S $15
- T191M $15
- T191L $15
- T191XL $15

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**ITEEA Logo Products**

**Lapel Pins**
- **ITEEA Affiliated Council Pin**
  - Council for Supervision and Leadership (CSL)
  - T182 - Members Only - $5
- **ITEEA Member Pin**
  - ITEEA Membership Pin
  - T181 - Members Only - $5

**Student Recognition Award Certificate**
- Use these handsome 8 ½” x 11” certificates to recognize the work of your outstanding students. Each certificate is signed by both ITEEA’s President and Executive Director.
- T025 - $1 each
- T026 - 5 copies for $4

**“This We Believe” Certificate**
- This certificate describes the goals and aims of technology and engineering education and its professionals. Suitable for framing (8 ½” x 11”).
- T105 - $1 each

**ITEEA Translucent Click Pen**
- Black ballpoint ink cartridge pen with click-action mechanism. In “smoke” color and imprinted with the ITEEA logo.
- T186 - $1 each
1. Customer Information:

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About Your Order:

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Special Delivery Requests: For special shipping requests, call 703-860-2100. Requests for same-day shipping must reach ITEEA by noon (EST/EDT).

Returns: Within 30 days of invoice date, items in good condition may be returned for credit or refund. Those wishing to return a complete or partial order must obtain permission from ITEEA prior to the return. A restocking fee (20% of the price of the returned item[s] or a minimum of $10) will be charged. Discontinued/sale items are not returnable.

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NOTE: There are no shipping charges for downloadable items.

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| TOTAL $ |

NOTE: There are no shipping charges for downloadable items.

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Please attach original P.O. and include correct Shipping charges.

☐ Enclosed is my check # __________________________ payable to ITEEA (U.S. funds drawn on U.S. bank).

☐ Charge $ __________________________ to:

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Card Number __________________________
Exp. Date _______________________
Name as it appears on the Card __________________________
Signature __________________________

*NOTE: There are no shipping charges for downloadable items.

Also available in the Continental U.S.: UPS 3-Day Select, UPS 2nd Day Air, UPS Next Day Air. For rates or other special shipping requests, call 703-860-2100 before noon (Eastern Time).