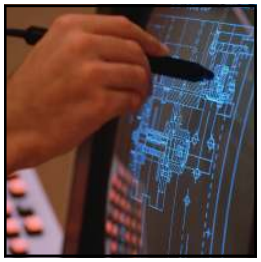
WHAT DO STUDENTS LEARN IN TECHNOLOGY EDUCATION?

In a word, it is about INNOVATION! It is about how people think! It is how to apply technology in the solutions of problems facing society. The aim is to solve problems and create opportunities within a realistic context. That context can start with the student's everyday environment and progressively move into more global issues.

Examples of technology problems and learning situations could be the cleaning of a stream that has become polluted, the creation and fabrication of an invention to solve a household problem, or designing and building of a habitat for a unique situation. The thinking process is closely related to that of an engineer, hi-tech worker, designer, or architect.

Students apply their ingenuity with tools, materials, processes, and resources to create solutions and opportunities for themselves and others. The nature of learning goes from the very early years of just "knowing" to more developed applications that might relate to the medical, agricultural, energy and power, information and communication, transportation, manufacturing, and construction technologies. It is a new and dynamic subject in our schools that is as fast moving and as up-to-date as the thinking of technology in our society! It is the future workforce thinking!

Adapted from An Educational Imperative, ITEA 2005.



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Indiana Department of Education

INDIANA TECHNOLOGY EDUCATION

INTRODUCTION TO ENGINEERING DESIGN

PROJECT LEAD THE WAY

TECHNOLOGY EDUCATION

ARE STUDENTS READY for the technological and engineered world? This question is more important today than ever before. As most kids play with technology, a central question that occurs is do they know what they can **DO** with it? Technology Education is the answer. Students who study technology apply problem-based learning that integrates (STEM) Science, Technology, Engineering, and Mathematics.

Students learn important skills and concepts needed for the workforce and society. This standards based curriculum can become a springboard for career exploration as well as a basis for determining personal goals for higher education.

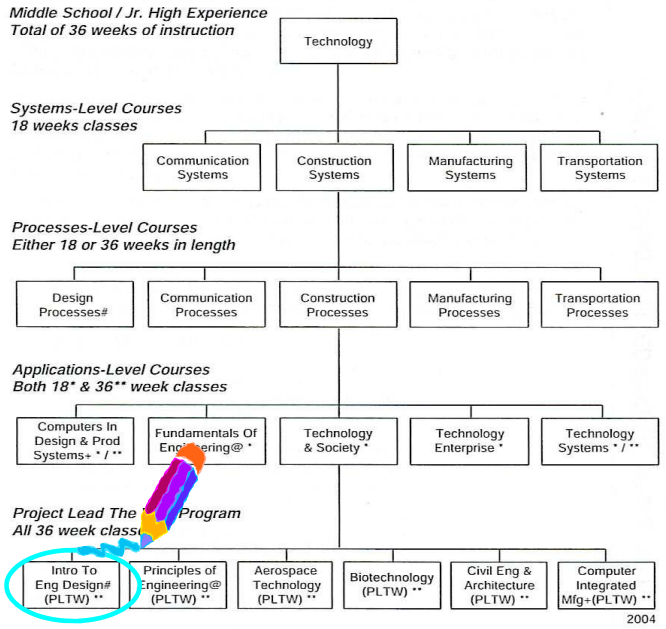
The Curriculum- The Indiana Technology Education curriculum is a **standards-based**, hands-on, minds-on program that applies and integrates academic concepts from Science, Technology Engineering, and Mathematics (STEM). The curriculum is designed for all students.

Introduction to Engineering Design #4812

An introductory course which develops student problem solving skills with emphasis placed on the development of three-dimensional solid models. Students will work from sketching simple geometric shapes to applying a solid modeling computer software package. They will learn a problem solving design process and how it is used in industry to manufacture a product. The Computer Aided Design System (CAD) will also be used to analyze and evaluate the product design. The techniques learned, and equipment used, is state of the art and are currently being used by engineers throughout the United States. Only those schools having a signed agreement with the national Project Lead the Way organization can use this course title. Schools involved in Project Lead the Way should use this course title in lieu of the Technology Education course "Design Processes."

- Suggested Grade Level: 9-10
- Recommended Prerequisite: Technology
- A two credit/two semester course.
- An Academic Honors Diploma elective or a Core 40 directed elective as part of a technical career area.
- A college preparation course as part of a pre-engineering program. Students are also expected to complete a college preparatory sequence of courses in mathematics.
- Competencies (content standards) defined by Project Lead the Way, Inc.
- This course is included as a component of the Engineering, Science, and Technologies career cluster and may also be included as a component of other related career clusters.

INDIANA TECHNOLOGY EDUCATION CURRICULUM



PLTW titles of **Digital Electronics** and **Engineering Design and Development** appear under the multidisciplinary category of the Indiana Department of Education guidelines.

All Technology Education courses are **Core 40 Directed Electives** as a part of a Career & Technical Area. These courses can be used in creating **4-year course plans and Career Academic Sequences** to support students in earning 8-10 credits for the Core 40 with Technical Honors Diploma.

Students working on an **Academic Honors Diploma** may also apply Technology Education credits toward their electives.

Topics of Study

This course emphasizes the development of a design. Students use computer software to produce, analyze and evaluate models of project solutions. They study the design concepts of form and function, then use state of the art technology to translate conceptual deign into reproducible products. Topics include:

- **Introduction to Engineering Design** Students learn the history of design & the design process. Students study the principles and elements of design, professional organizations, career opportunities & education requirements
- **Student Portfolio Development** Students learn how to develop and document engineering design portfolios
- **Sketching and Visualization** Students learn sketching and visualization techniques such as pictorials and annotated Sketches
- **Geometric Relationships** Students learn design relationships related to forms and shapes, geometric constraints, the Cartesian coordinate system and the origin plane
- **Modeling** Students learn apply conceptual, graphical, physical, mathematical, and computer modeling techniques
- **Assembly Modeling** Students learn about adding components, assembly constraints, part libraries, sub-assemblies, driving constraints, and adaptive design techniques
- **Model Analysis and Verification** Students learn about mass properties and tolerancing
- **Model Documentation** Students learn design and develop working drawings, with dimensioning and annotation
- **Presentation** Students apply communication techniques and develop presentation aids of engineering designs
- **Production & Marketing** Students learn how to design for manufacture, process planning, trends in automated manufacturing, materials procurement, handling, cost analysis, quality control, manpower and facility requirements, product cost analysis & packaging requirements

Requisite: Concurrent enrollment in college preparatory mathematics