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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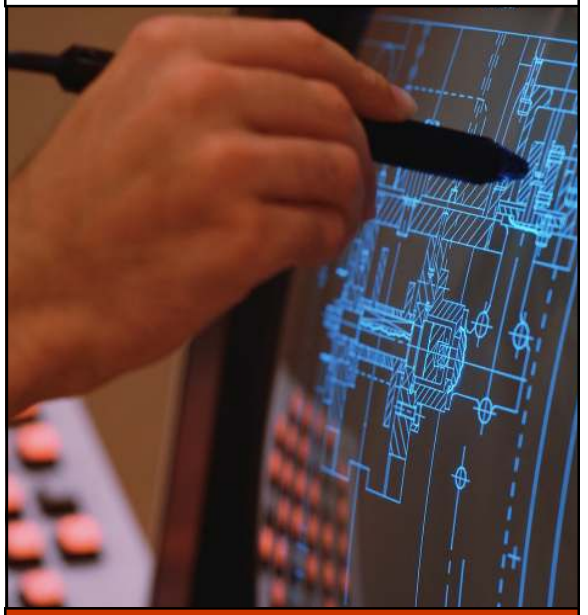
Indiana Department of Education

INDIANA TECHNOLOGY EDUCATION



ENGINEERING DESIGN & DEVELOPMENT

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.

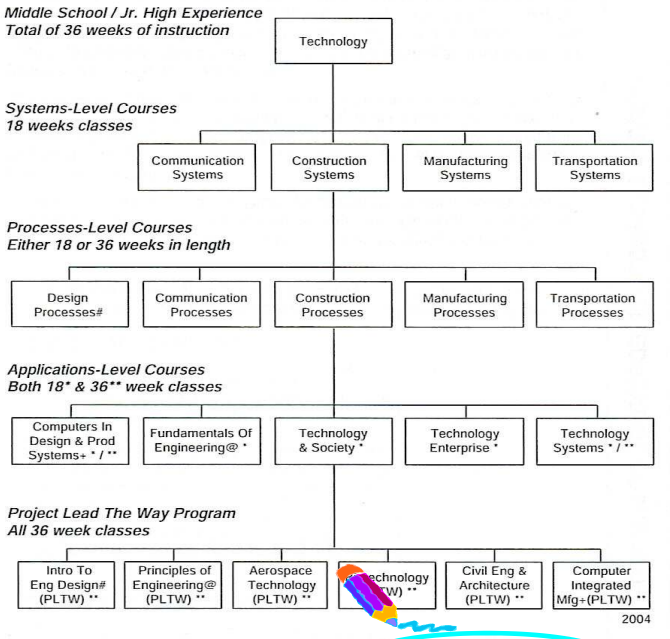
The Curriculum- The Indiana Technology Education curriculum is a **standards-based**, hands-on, minds-on program that applies and integrates academic concepts from Science, Technology Engineering, and Mathematics (STEM). The curriculum is designed for all students.

Engineering (Design & Development) #5644

Engineering is designed to introduce students to the fundamental aspects of engineering and engineering technology. Instruction will emphasize underlying principles of engineering processes and the development of three-dimensional solid models. Instructional activities will build skills ranging from sketching simple geometric shapes to applying a solid modeling computer software package. Students will develop critical thinking and problem-solving skills through instructional activities that pose design and application challenges for which they develop solutions. The techniques learned, and equipment used, should be state of the art and reflect equipment and processes currently being used by engineers throughout the United States. Schools with a signed agreement with the PLTW can use this title to offer the following PLTW courses over a two year period: Principles of Engineering and Introduction to Engineering Design.

- Suggested Grade Levels: 9 -12
- A two, four or six credit course over two to six semesters. Schools on block schedules may adjust the total number of credits to meet the local standard.
- The nature of this course allows for a second year of instruction provided that content and standards address higher levels of knowledge.
- A Core 40 directed elective as part of a technical career area.
- This course qualifies as an Academic Honors Diploma elective.
- Schools involved in Project Lead The Way must use the content standards developed for the pre-engineering program.
- This course is a component of the Engineering, Science, and Technologies career cluster and may also be included as part of the Building and Construction and Manufacturing and Processing career clusters.

INDIANA TECHNOLOGY EDUCATION CURRICULUM



PLTW titles of **Digital Electronics** and **Engineering Design & 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 lets students apply what they have learned in academic and pre-engineering courses as they complete challenging, self-direct projects. Students work in teams to design and build solutions to authentic engineering problems. An engineer from the school's partnership team mentors each student team. Students keep journals of notes, sketches, mathematical calculations and scientific research. Student teams make progress reports to their peers, mentor and instructor and exchange constructive criticism and consultation. At the end of the course, teams present their research paper and defend their projects to a panel of engineers, business leaders and engineering college educators for professional review and feedback. This course equips students with the independent study skills that they will need in postsecondary education and careers in engineering and engineering technology. Topics of study include:

- **Introduction to Engineering Design and Development.** Justification of Course/Project, Course Expectations
- **Elements of Formal Research.** Daily Research Journal, Conventional Library Resources, Using the Computer as a Research Tool, Contacting the Experts
- **Guided Research.** Topics for Research, Gaining Knowledge, How to Write a Problem Statement, Researching Alternative Solutions, Developing Alternative Solutions, Redefining and Justifying the Alternative Solutions, Presentation Methods
- **Independent Research.** Expectations for Independent Research, Developing the Prototype, Research Paper
- **Formal Presentations.** Formal Presentation

Prerequisites: Concurrent enrollment in college preparatory mathematics, Introduction to Engineering Design, Digital Electronics, Principles of Engineering, and a PLTW specialty course

project lead the way