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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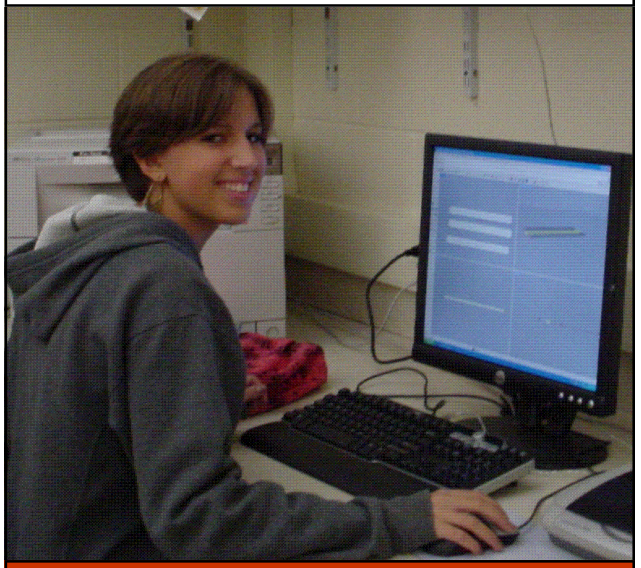
Indiana Department of Education

INDIANA TECHNOLOGY EDUCATION



PRINCIPLES OF ENGINEERING

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.

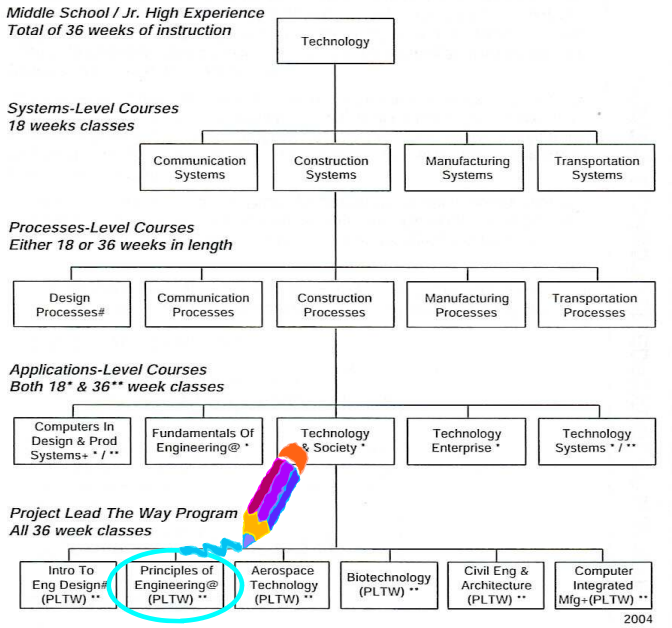
The Curriculum- The Indiana Technology Education curriculum is a **standards based**, hands-on, minds-on program that applies and integrates academic concepts from Science, Technology Engineering, and Mathematics (STEM). The curriculum is designed for all students.

Principles of Engineering #4814

Principles of Engineering is a broad-based survey course designed to help students understand the field of engineering and engineering technology and its career possibilities. Students will develop engineering problem solving skills that are involved in postsecondary education programs and engineering careers. They will also learn how engineers address concerns about the social and political consequences of technological change. 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 "Fundamentals of Engineering."

- Suggested Grade Level: 9-10
- Recommended Prerequisites: Technology, Introduction to Engineering Design (Project Lead the Way), and Digital Electronics (Project Lead the Way)
- 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 career clusters.

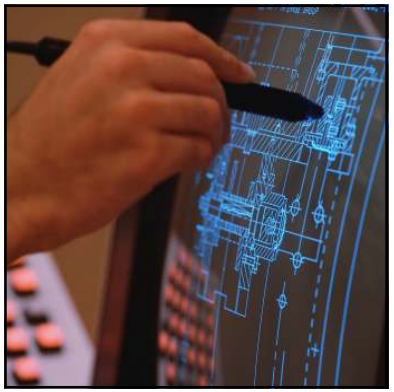
INDIANA TECHNOLOGY EDUCATION CURRICULUM



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 provides an overview of engineering and engineering technology. Students develop problem-solving skills by tackling real-world engineering problems. Through theory and practical hands-on experiences, students address the emerging social and political consequences of technological change. Topics include:

- **Overview and Types of Engineering** Students learn about the types of engineers and their contributions to society.
- **Design Process** Students learn about problems solving and how products are developed to include how engineers work in teams.
- **Communication and Documentation** Students collect and categorize data, produce graphic representations, keep and engineer's notebook and make written and oral presentations.
- **Engineering Systems** Students learn about the mechanical, electrical, fluid and pneumatic and control systems.
- **Statics** Students learn about measurement, scalars and vectors, equilibrium, structural analysis, and strength of materials.
- **Materials and Materials Testing** Students learn the categories and properties of materials, how materials are shaped and joined, and material testing.
- **Thermodynamics** Students will learn about units and forms of energy, energy conversion, cycles, efficiency and energy loss, and conservation techniques.
- **Engineering Quality and Reliability** Students will use precision measurement tools to gather and apply statistics for quality and process control. Students will also learn about reliability, redundancy, risk analysis, factors of safety, and liability and ethics.
- **Dynamics** Students will be introduced to linear and trajectory motion.

Requisite: Concurrent enrollment in college preparatory mathematics