

National & State Standards for High School Industrial Technology / Technology

The Standards for Technological Literacy (Content for the Study of Technology) –Clearly lists all content standards with precise benchmarks in order to obtain student knowledge of the standards. Also with each standard is a Vignette, of clear illustration of a class project and assignments that can meet the listed Standards & Benchmarks.

For a copy of the “Standards for Technological Literacy” go to www.OnlineTechnologyCurriculum.com Also see “Implementation in Action” to see how MN is addressing the need for implementation.

THE NATURE OF TECHNOLOGY

1

The Characteristics and Scope of Technology – *Students will develop an understanding of the characteristics and scope of technology.*

- Benchmark Topics
 - Nature of technology
 - **BM J** The nature and development of technological knowledge and processes are functions of the setting.
 - For example, the tractor, plow, and hay bailer are designed specifically for use around farms, while the pickup truck, tanker, and tractor-trailer are vehicles commonly used to move goods from farms to other areas.
 - Rate of technological diffusion
 - **BM K** The rate of technological development and diffusion is increasing rapidly.
 - The rate of development of inventions and innovations is affected by many factors, such as time and money. New technologies are built on previous technologies, often resulting in quick development and dispersion. For example, the first hand-held electronic calculator was designed to perform simple arithmetic. It has quickly evolved from a bulky product owned by a few people to a miniature, multi-function version owned by many.
 - Goal-directed research
 - **BM L** Inventions and innovations are the results of specific, goal-directed research.
 - For example, years of research led to the design and development of a laser system used in atmospheric studies. This same laser system was then modified and reapplied to treat the buildup of plaque in the arteries through laser angioplasty.
 - Commercialization of technology
 - **BM M** Most development of technologies these days is driven by the profit motive and the market.
 - The success of a technology is often determined by whether or not it is affordable and whether or not it works. People often develop and apply technology in a centralized and large-scale fashion to optimize efficiency and reliability, thus resulting in lower production costs.

2

The Core Concepts of Technology – *Students will develop an understanding of the core concepts of technology.*

- Benchmark Topics
 - Systems
 - Resources
 - Requirements
 - Optimization and Trade-offs
 - Processes Controls

3

The Relationships Among Technologies and the Connections Between Technology and Other Fields – *Students will develop and understanding of the relationships among technologies and the connections between technology and other fields of study.*

- Benchmark Topics
 - Technology transfer
 - Innovation and Invention
 - Knowledge protection and patents
 - Technological knowledge and advances of science and mathematics and vice versa

TECHNOLOGY AND SOCIETY

4 **The Cultural, Social, Economic, and Political Effects of Technology – Students will develop an understanding of the cultural, social, economic, and political effects of technology.**

- Benchmark Topics
 - Rapid or gradual changes
 - Trade-offs and effects
 - Ethical implications
 - Cultural, social, economic, and political changes

5 **The Effects of Technology on the Environment – Students will develop and understanding of the effects of technology on the environment.**

- Benchmark Topics
 - Conservation
 - Reduce resource use
 - Monitor environment
 - Alignment of natural and technological processes
 - Reduce negative consequences of technology
 - Decisions and trade-offs

6 **The Role of Society in the Development and Use of Technology – Students will develop an understanding of the role of society in the development and use of technology.**

- Benchmark Topics
 - Different cultures and technologies
 - Development decisions
 - Factors affecting designs and demands of technologies

7 **The Influence of Technology on History – Students will develop an understanding of the influence of technology on history.**

- Benchmark Topics
 - Evolutionary development of technology
 - Dramatic changes in society
 - History of technology
 - Early technological history
 - The Iron Age
 - The Middle Ages
 - The Renaissance
 - The Industrial Revolution
 - The Information Age

DESIGN

8 **The Attributes of Design – Students will develop an understanding of the attributes of design.**

- Benchmark Topics
 - The design process
 - Design problems are usually not clear
 - Designs need to be refined
 - Requirements

9 **Engineering Design – Students will develop an understanding of engineering design.**

- Benchmark Topics
 - Design principles
 - Influence of personal characteristics
 - Prototypes
 - Factors in engineering design

10 **The Role of Troubleshooting, Research and Development, Invention and Innovation, and Experimentation in Problem Solving – Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.**

- Benchmark Topics
 - Research and development
 - Research technological problems
 - Not all problems are technological or can be solved

- Multidisciplinary approach

ABILITIES FOR A TECHNOLOGICAL WORLD

11 Apply the Design Process – *Students will develop the abilities to apply the design process.*

- Benchmark Topics
 - Identify a design problem
 - Identify criteria and constraints
 - Refine the design
 - Evaluate the design
 - Develop a product or system using quality control
 - Reevaluate final solutions(s)

12 Use and Maintain Technological Products and Systems – *Students will develop the abilities to use and maintain technological products and systems.*

- Benchmark Topics
 - Document and communicate processes and procedures
 - Diagnose a malfunctioning system
 - Troubleshoot and maintain systems
 - Operate and maintain systems
 - Use computers to communicate

13 Assess the Impacts of Products and Systems – *Students will develop the abilities to use and maintain technological products and systems.*

- Benchmark Topics
 - Collect information and judge its quality
 - Synthesize data to draw conclusions
 - Employ assessment techniques
 - Design forecasting techniques

THE DESIGNED WORLD

14 Medical Technologies – *Students will develop an understanding of and be able to select and use medical technologies.*

- Benchmark Topics
 - Medical technologies for prevention and rehabilitation
 - Telemedicine
 - Genetic therapeutics
 - Biochemistry

15 Agricultural and Related Biotechnologies – *Students will develop an understanding of and be able to select and use agricultural and related biotechnologies.*

- Benchmark Topics
 - Agricultural products and systems
 - Biotechnology
 - Conservation
 - Engineering design and management of ecosystems

THE DESIGNED WORLD (Continued)

16 Energy and Power Technologies – *Students will develop an understanding of and be able to select and use agricultural and related biotechnologies.*

- Benchmark Topics
 - Law of Conservation of energy
 - Energy sources
 - Second Law of Thermodynamics
 - Renewable and non renewable forms of energy
 - Power systems are a source, a process and a load

17 Information and Communication Technologies – *Students will develop an understanding of and be able to select and use information and communication technologies.*

- Benchmark Topics
 - Parts of information and communication systems
 - Information and communication systems
 - The purpose of information and communication technology
 - Communication systems and sub-systems
 - Many ways of communicating through symbols

18

Transportation Technologies – Students will develop an understanding of and be able to select and use transportation technologies.

- Benchmark Topics
 - Relationship of transportation and other technologies
 - Intermodalism
 - Transportation of services and methods
 - Positive and negative impacts of transportation systems
 - Transportation processes and efficiency

19

Manufacturing Technologies – Students will develop an understanding of and be able to select and use manufacturing technologies.

- Benchmark Topics
 - Servicing and obsolescence
 - Durable or non-durable goods
 - Manufacturing systems
 - Interchangeability of parts
 - Chemical technologies
 - Marketing of products

20

Construction Technologies - Students will develop an understanding of and be able to select and use construction technologies.

- Benchmark Topics
 - Infrastructure
 - Construction processes and procedures
 - Requirements
 - Maintenance, alterations, and renovation
 - Prefabricated materials