

**TE.IaI. Invention and Innovation
Grade 7**

Essential Discipline Goals

- Develop an understanding of the nature of technology.
- Develop abilities to assess the impacts of technology.
- Demonstrate knowledge of and apply the engineering design and development process.
- Demonstrate knowledge of and skills related to the core technologies, the building blocks of the designed world.
- Demonstrate knowledge of the major enterprises that produce the goods and services of the designed world.

Standard #	Standard Indicator
TE.IaI.01	Develop an understanding of the nature, characteristics and scope of technology*. (ITEA, STL 1)
TE.IaI.01.01	Explain that new products and systems can be developed to solve problems or to help do things that could not be done without the help of technology. (ITEA, STL 1-F)
TE.IaI.01.02	Explain that the development of technology is a human activity and is the result of individual or collective needs and the ability to be creative. (ITEA, STL 1-G)
TE.IaI.01.03	Explain that technology is closely linked to creativity, which has resulted in innovation. (ITEA, STL 1-H)
TE.IaI.01.04	Explain that corporations can often create demand for a product by bringing it onto the market and advertising it. (ITEA, STL 1-I)
TE.IaI.02	Develop an understanding of the core concepts of technology.* (ITEA, STL 2)
TE.IaI.02.01	Explain that technology systems can be connected to one another. (ITEA, STL 2-P)
TE.IaI.02.02	Explain that malfunctions in any part of a system may affect the function and quality of the system. (ITEA, STL 2-Q)
TE.IaI.02.03	Explain that different technologies involve different sets of processes. (ITEA, STL 2-T)
TE.IaI.03	Develop an understanding of the relationships among technologies and the connections between technology and other fields of study.* (ITEA, STL 3)
TE.IaI.03.01	Explain that a product or system designed for one purpose may be applied to another purpose.
TE.IaI.03.02	Identify and describe the interaction between science, math and technology.
TE.IaI.04	Develop abilities to assess the impacts of products and systems.* (ITEA, STL 13)
TE.IaI.04.01	Use data collected to analyze and interpret trends in order to identify the positive or negative effects of technology. (ITEA, STL 13-G)

- TE.IaI.04.02 Interpret and evaluate the accuracy of the information obtained and determine if it is useful. (ITEA, STL 13-I)
- TE.IaI.05 Develop an understanding of the cultural, social, economic, and political effects of technology.* (ITEA, STL 4)**
- TE.IaI.05.01 Explain that the use of technology affects humans in various ways, including their safety, comfort, choices, and attitudes about technology's development and use. (ITEA, STL 4-D)
- TE.IaI.05.02 Explain that technology, by itself, is neither good nor bad, but decisions about the use of products and systems can result in desirable or undesirable consequences. (ITEA, STL 4-E)
- TE.IaI.05.03 Explain that the development and use of technology poses ethical issues. (ITEA, STL 4-F)
- TE.IaI.05.04 Explain that economic, political, and culture issues are influenced by the development and use of technology. (ITEA, STL 4-G)
- TE.IaI.06 Develop an understanding of the effects of technology on the environment.* (ITEA, STL 5)**
- TE.IaI.06.01 Explain that decisions to develop and use technologies often put environmental and economic concerns in direct competition with one another. (ITEA, STL 5-F)
- TE.IaI.07 Develop an understanding of the role of society in the development and use of technology.* (ITEA, STL 6)**
- TE.IaI.07.01 Describe how many inventions and innovations evolved by a slow and methodical process of testing and refinement.
- TE.IaI.07.02 Explain that throughout history, new technologies have results form the demands, values, interests of individuals, businesses, industries, and societies. (ITEA, STL 6-D)
- TE.IaI.07.03 Explain that the use of inventions and innovations has led to changes in society and the creation of needs and wants. (ITEA, STL 6-E)
- TE.IaI.08 Develop an understanding of the attributes of design.* (ITEA, STL 8)**
- TE.IaI.08.01 Evaluate and modify designs and products created to solve a problem and explain how one solution can cause other problems. (VSC Science/Skills and Processes/Technology)
- TE.IaI.08.02 Explain that requirements for a design are made up of criteria and constraints. (ITEA, STL 8-G)
- TE.IaI.09 Develop an understanding of engineering design.* (ITEA, STL 9)**
- TE.IaI.09.01 Define brainstorming as a group problem-solving design process in which each person in the group presents ideas.
- TE.IaI.09.02 Explain that design involves a set of steps, which can be performed in different sequences and repeated as needed. (ITEA, STL 9-F)
- TE.IaI.09.03 Explain that modeling, testing, evaluating, and modifying are used to transform ideas into practical solutions. (ITEA, STL 9-H)
- TE.IaI.10 Develop abilities to apply the design process.* (ITEA, STL 11)**
- TE.IaI.10.01 Define the problem.
- TE.IaI.10.02 Brainstorm Possible Solutions.
- TE.IaI.10.03 Generate Ideas.
- TE.IaI.10.04 Research Ideas/Explore Possibilities.

- TE.IaI.10.05 Specify Constraints and Identify Criteria.
- TE.IaI.10.06 Consider Alternative Solutions.
- TE.IaI.10.07 Select An Approach.
- TE.IaI.10.08 Develop Written Design Proposal.
- TE.IaI.10.09 Make Model/Prototype.
- TE.IaI.10.10 Test and Evaluate
- TE.IaI.10.11 Refine and Improve.

- TE.IaI.11 Select and use tools and equipment correctly and safely.***
- TE.IaI.11.01 Select and use the appropriate tools and equipment in; making two-dimensional and three-dimensional representations of design solutions, forming and molding processes, machining processes, assembly processes and testing the object.

- TE.IaI.12 Develop an understanding of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.* (ITEA, STL 10)**
- TE.IaI.12.01 Compare the processes of invention and innovation.
- TE.IaI.12.02 Explain that invention is the process of turning ideas and imagination into devices and systems. Innovation is the process of modifying an existing product or system to improve it. (ITEA, STL 10-G)
- TE.IaI.12.03 Explain that some technological problems are best solved through experimentation. (ITEA, STL 10-H)

- TE.IaI.13 Develop abilities to use and maintain technological products and systems.* (ITEA, STL 12)**
- TE.IaI.13.01 Use tools, materials, and machines to safely diagnose, adjust, and repair systems. (ITEA, STL 12-I)
- TE.IaI.13.02 Use computers and calculators in various applications. (ITEA, STL 12-J)

- TE.IaI.14 Students will apply research tools to investigate a topic or issue.**
- TE.IaI.14.01 Select the appropriate research tool to locate materials related to a given topic.
- TE.IaI.14.02 Use research tools to locate online resources.
- TE.IaI.14.03 Use research tools to locate printed resources
- TE.IaI.14.04 Verify the validity of a source located with a research tool.
- TE.IaI.14.05 Extract data relevant to a given topic.
- TE.IaI.14.06 Investigate careers related to interests and abilities.

Key

* **Standard from the Maryland State Curriculum.**