Delaware Technology Education

Grades 6, 7, 8

Adopted 2007

Methodology of Technology Education

M1. Students will recognize The Nature, Impacts, and Evolution of Technology as they relate to the chronological human presence on Earth, as well as recognize the consequential influence of inventions and innovations that extend human capabilities. M1

01. Understand the evolution of technology and society and apply this understanding to predict impacts of current and future technology. M1.01

    01. Explain and predict the impacts of current and future technology, addressing ethical, cultural, social, economic, and political ramifications. M1.01.01

    03. Research and document technological inventions and their subsequent uses, recognizing that individuals, business and industry, or society often create the demand for a particular technological product. M1.01.03

    04. Design and use instruments to gather data, analyze and interpret technological trends to ascertain their positive and negative impacts, and finally, evaluate the accuracy of the gathered information to determine its usefulness. M1.01.04

    05. Understand that most inventions evolve through a slow and methodical process, with the specialization of function at the center of many technological improvements. M1.01.05

    06. Identify and describe the difference between the positive and negative impacts of past, present, and future technology. M1.01.06

    07. Recognize and demonstrate an understanding of the cultural and gender diversity reflected in technological inventions and innovations. M1.01.07

    08. Demonstrate, through varied media, an understanding of the nature, impacts, and evolution of technology. M1.01.08

    09. Identify the scientific knowledge on which a technological invention or innovation is typically predicated. M1.01.09

M2. Students will effectively communicate technological solutions by using Technology Education as an Interdisciplinary and Technological Link. M2

01. Use knowledge from and interactions with other curricular areas as resources that can be used to help solve technological challenges. M2.01

    01. Integrate other curricular skills (e.g., writing or measurement skills) with technological activities. M2.01.01

    02. Illustrate the interactions between technological systems; the effects that other fields of study have on the technological development of products and systems; and how a product or system developed for one setting can be applied to another. M2.01.02

    03. Apply problem-solving skills to enhance learning in other curricular areas. M2.01.03

    04. Present technological solutions in an effective manner using skills and knowledge from other curricular areas as resources. M2.01.04

M3. Students will develop and apply a practical understanding of The Use and Management of Technological Resources and Systems. M3

01. Investigate, design, model, and analyze creative solutions to increasingly complex technological challenges. M3.01

    01. Differentiate between types of technological resources (e.g., available or scarce, renewable or nonrenewable, and natural or synthetic) and examine resources that place environmental and economic concerns in direct competition. M3.01.01

    02. Describe the possible applications of technological resources to specific problem-solving activities (e.g., illustrate how to use technological resources to repair damage from natural disasters). M3.01.02

    03. Demonstrate responsible decision making in the use of resources and in the operation and maintenance of systems. M3.01.03

    04. Use a variety of technological resources to create solutions and systems for different environments. M3.01.04

    06. Recognize and identify existing technological resources (e.g., people, information, materials, tools and machines, energy, capital, and time). M3.01.06

    07. Recognize that waste management as related to technological systems is an important social issue. M3.01.07

    08. Demonstrate the effective management of resources in the process of developing, creating and evaluating solutions. M3.01.08

    09. Understand the concept of system maintenance and how people use controls as mechanisms to cause system change. M3.01.09

    10. Discuss the difference between open-and-closed-loop systems, as well as how systems can be connected and how malfunctions within a system can affect system quality. M3.01.10

M4. Students will demonstrate technological problem solving by applying The Design Process and The Systems Model. M4

01. Investigate, design, model, and analyze creative solutions to increasingly complex technological challenges. M4.01

    01. Evaluate and describe creative strategies that are appropriate to use when solving technological challenges. M4.01.01

    02. Investigate and brainstorm potential solutions to a specific technological challenge by employing the Design Process. M4.01.02

    03. Demonstrate appropriate use of the design process, giving heed to desired elements and features, the limits placed on the design, and more. M4.01.03

    04. Design, model, modify, evaluate, document and present two- and three-dimensional solutions to specific technological challenges. M4.01.04

    06. Recognize that not every problem is technological in nature and not every problem can be solved through technology. M4.01.06

    07. Recognize that while there is no perfect design, the requirements for a design are made up of criteria and constraints. M4.01.07

M5. Students will develop an operational awareness of Technological Concepts through focused invention and subsequent innovation. M5

01. Recognize how technological concepts are applied to the various systems of a technological solution. M5.01

    01. Recognize, investigate, and document how technological concepts are used in various technological systems. M5.01.01

    02. Distinguish and describe the technological concepts that comprise the various systems of a solution. M5.01.02

    03. Describe strategies to apply technological concepts to a design challenge. M5.01.03

    04. Apply and demonstrate technological concepts through the use of appropriate documentation. M5.01.04

    05. Describe the difference between invention and innovation. M5.01.05

M6. Students will explore technology-related skills, leadership skills, personal growth, and careers through opportunities provided by Active Participation in the Technology Student Association (TSA). M6

01. Begin to explore technology-related skills and applications through TSA activities. M6.01
    01. Participate in current competitive events and related programs at local, state, and national levels. M6.01.01
    02. Participate in leadership training activities at local, state, and national levels. M6.01.02
    03. Interact with each other on current competitive events and related programs in class, during which time they will be encouraged to examine the related political, ethical, cultural, and social issues. M6.01.03
    04. Engage in, through competitive events and related programs, real-world simulations that incorporate technology, innovation, design, and engineering through competitive events and related programs. M6.01.04

Technical and Practical Application of Technology Education

TPA1. Students will develop an understanding of The Design Process and be able to apply and transfer the related knowledge and skills to solve technological problems. TPA1

01. Recognize design as a creative planning process that leads to useful products and systems. TPA1.01
    01. There is no perfect design. TPA1.01.01
    02. Criteria and constraints make up design requirements. TPA1.01.02
    04. Design involves a set of steps, which can be performed in different sequences and repeated as needed. TPA1.01.04
    05. Brainstorming is a group problem-solving design process in which each person of the group presents his or her ideas in an open forum. TPA1.01.05
    06. Modeling, testing, evaluating, and modifying are used to transform ideas into practical solutions. TPA1.01.06
    08. Troubleshooting is a problem-solving method used to identify the cause of a malfunction in a technological system. TPA1.01.08
    09. Invention is a process to turn ideas and imagination into products and systems, while innovation is a process to modify an existing product or system. TPA1.01.09
    10. Some technological problems are best solved through experimentation. TPA1.01.10

TPA2. Students will develop an understanding of Agricultural, Bio-related, and Medical Technologies and be able to apply and transfer the related knowledge and skills. TPA2

01. Select, use, and understand agricultural, bio-related, and medical technologies. TPA2.01

    01. Agricultural innovation and advancement directly affects the time and personnel required to produce food for a large population. TPA2.01.01

    02. Most agricultural waste water can be recycled, and therefore, the use of agricultural technology is important in the conservation of water and other resources. TPA2.01.02

    03. Artificial ecosystems are man-made environments that replicate many aspects of the natural world. TPA2.01.03

    05. Genetic engineering involves modifying the structure of DNA to produce novel genetic material. TPA2.01.05

    06. Biotechnology applies the principles of biology to create commercial products or processes. TPA2.01.06

    07. Many tools and devices have been designed to help ascertain health information and provide a safe environment. TPA2.01.07

    08. Medical advancements, innovation related to equipment, and the field of immunology are all critical to the improvement of the health care system. TPA2.01.08

    09. Technological advances have made it possible to create new devices, repair or replace certain body parts, and develop means of mobility. TPA2.01.09

TPA3. Students will develop an understanding of Information and Communication Technologies and be able to apply and transfer the related knowledge and skills. TPA3

01. Select, use, and understand information and communication technologies. TPA3.01

    01. Information and communication systems allow information to be transferred between humans or between humans and machines. TPA3.01.01

    02. Information and communication technologies include the inputs and processes of information. TPA3.01.02

    03. Many factors can affect the design of a message, such as the intended audience, the delivery medium, and the purpose or nature of the message. TPA3.01.03

    04. Ideas are expressed through the use of a common language of symbols and drawings. TPA3.01.04

TPA4. Students will develop an understanding of Drafting, Design, and CADD and be able to apply and transfer the related knowledge and skills. TPA4

01. Select, use, and understand Drafting, Design, and CADD. TPA4.01
    01. Drafting skills can be used to generate and convey solutions to technological challenges. TPA4.01.01
    02. Drafting techniques employ the use of tools and conventions in order to develop solutions to technological challenges. TPA4.01.02
    03. The use of size description is essential to drafting and design conventions. TPA4.01.03

TPA5. Students will develop an understanding of Energy, Power, and Transportation Technologies and be able to apply and transfer the related knowledge and skills. TPA5

01. Select, use, and understand Energy, Power, and Transportation Technologies. TPA5.01
    01. Energy is the capacity to do work. TPA5.01.01
    02. Energy, through a variety of processes, can be harnessed to help perform work. TPA5.01.02
    03. Power is the rate at which energy is converted from one form to another; the rate at which energy is transferred from one place to another; or the rate at which work is done. TPA5.01.03
    04. A great deal of the energy that comes from the environment is not used efficiently. TPA5.01.04
    05. Power systems provide propulsion to and drive other technological products and systems. TPA5.01.05
    06. Transporting either people or goods involves the combined use of individuals and vehicles. TPA5.01.06
    07. Transportation vehicles are made up of subsystems (e.g., structural, propulsion, suspension, guidance, control, and support) that must function together for a system to operate effectively. TPA5.01.07
    08. Governmental regulations often influence the design and operation of transportation systems. TPA5.01.08
    09. Various processes, such as receiving, holding, storing, loading, moving, unloading, delivering, evaluating, marketing, managing, communicating, and using conventions, are necessary for a transportation system to operate efficiently. TPA5.01.09

TPA6. Students will develop an understanding of Construction and Manufacturing Technologies and be able to apply and transfer the related knowledge and skills. TPA6

01. Select, use, and understand Construction and Manufacturing Technologies. TPA6.01

    01. Construction and manufacturing systems change the form of natural materials through the processes of separating, forming, combining, and conditioning. TPA6.01.01

    02. Constructed and manufactured goods may be classified as durable (i.e., permanent) or nondurable (i.e., temporary). TPA6.01.02

    03. Construction and manufacturing processes include the design, development, assembly, and maintenance of products and systems. TPA6.01.03

    04. Products, whether constructed or manufactured, contain a variety of subsystems (i.e., subassemblies). TPA6.01.04

    05. Natural (i.e., raw) materials are typically converted to standard stock items, which in turn become the resources that are used in construction and manufacturing. TPA6.01.05

    06. Marketing involves informing the public of a product and assisting in product sales and distribution. TPA6.01.06

    07. The design of a structure must address a number of requirements. TPA6.01.07

    08. A structure rests on a foundation. TPA6.01.08

    09. Some structures can include prefabricated materials and be either temporary or permanent. TPA6.01.09