Introduction to Career Cluster Technologies

Introduction to Career Cluster Technologies provides students in Grade 6 with knowledge and processes needed to begin their understanding of technological literacy and career awareness. This course is aligned with the International Technology Education Association’s Standards for Technological Literacy. It provides students with exposure to the sixteen career clusters and their association pathways by exploring technologies related to these clusters for a minimum of nine weeks to a maximum of two semesters. For a nine-week or 35-hour rotation course, the following standards must be included: 1, 2, 4, 7, 8, 9, 11, and 21. For a semester or 70-hour course, the following standards must be included: 1, 2, 4, 5, 7, 8, 9, 13, 14, 15, 17, 18, and 21. All standards must be included in a one-credit or two-semester course.

Students gain knowledge and skills in the application, design, production, and assessment of products, services, and systems in a variety of areas including, but not limited to, medical, agriscience, energy and power, communications, transportation, manufacturing, and construction technologies.

Student in this course may affiliate with the Technology Student Association (TSA) as the co-curricular career and technical student organization (CTSO). TSA provides additional opportunities that enhance classroom instruction, develop leadership skills, and promote career development.

Nature of Technology

Students will:

1. Develop an understanding of the characteristics and scope of technology.
   - Identifying how things that are found in nature differ from things that are human-made in how they are produced and used
   - Explaining how tools, materials, and skills are used to make things and carry out tasks
   - Explaining how creative thinking and economic and cultural influences shape technological development

2. Develop an understanding of core concepts of technology.
   - Identifying a subsystem that operates as part of another system
   - Describing when parts of a system are missing, it may not work as planned
   - Illustrating how resources are the things needed to get a job done
   - Describing how tools are used to design, make, use, and assess technology
   - Explaining that tools and machines extend human capabilities

3. Develop an understanding of the relationships among technologies and other fields of study.
   - Explaining how technologies are often combined
   - Explaining how various relationships exist between technology and other fields of study

Technology and Society

4. Develop an understanding of the cultural, social, economic, and political affects of technology.
5. Summarize the effects of technology on the environment.
   - Describing how waste must be appropriately recycled or disposed of to prevent unnecessary harm to the environment
   - Identifying how the use of technology affects the environment in good and bad ways

6. Explain the role of society in the development and use of technology.
   - Describing how people’s wants and needs change, new technologies are developed, and old ones are improved to meet those changes
   - Explaining how family, community, and economic concerns may expand or limit the development of technologies

7. Understand the influence of technology on history
   - Summarizing why people have made tools to provide food, to make clothing, and to protect themselves

**Design**

8. Describe the attributes of design
   - Explaining that the design process is a purposeful method of planning practical solutions to problems
   - Recognizing the requirements for a design include such factors as the desired elements and features of a product or system or the limits that are placed on the design

9. Develop an understanding of the engineering design process.
   - Identifying how the engineering design process involves defining a problem, generating ideas, selecting a solution, testing the solution(s), making the item, evaluating it, and presenting the results
   - Explaining why when designing an object, it is important to be creative and consider all ideas
   - Describing how models are used to communicate and test design ideas and processes

10. Explain the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
    - Recognizing how trouble shooting is a way of finding out why something does not work so that it can be fixed
    - Explaining how invention and innovation are creative ways to turn ideas into real things
    - Documenting the process of experimentation, which is common in science, and can be used to solve technological problems

**Abilities for a Technological World**

11. Apply the design process
• Collecting information about everyday problems that can be solved by technology, and generate ideas and requirements for solving the problem
• Explaining that the process of designing involves presenting some possible solutions in visual form and then selecting the best solution(s) from many
• Testing and evaluating the solutions for the design problem
• Improving the design solutions

12. Develop the abilities to use and maintain technological products and systems.
   • Following step-by-step instructions to assemble a product
   • Selecting and safely using tools, products, and systems for specific tasks
   • Using computers to access and organize information
   • Explaining why common symbols, such as numbers and words, are used to communicate ideas

13. Assess the impact of products and systems.
   • Classifying collected information in order to identify patterns
   • Assessing the influence of a specific technology on the individual, family, community, and environment
   • Evaluating the trade-offs of using a product or system and decide when it can be used

**The Designed World**

   • Recognizing that technological advances have made it possible to create new devices, to repair or replace certain parts of the body, and to provide a means of mobility
   • Recognizing why vaccines are developed for use in immunization
   • Explaining how many tools and devices have been designed to help provide clues about health and provide a safe environment

15. Identify advances and innovations in agricultural and related biotechnologies.
   • Describing how artificial ecosystems are human-made environments that are designed to function as a unit and are comprised of humans, plants, and animals
   • Recognizing that most agricultural waste can be recycled
   • Explaining that many processes used in agriculture require different procedures, products, or systems

16. Identify advances and innovations in energy and power technologies.
   • Defining energy and power
   • Recognizing that energy comes in different forms
   • Describing how tools, machines, products, and systems use energy in order to do work
17. Identify advances and innovations in information and communications technologies.
   • Identifying the processing of information through the use of technology can be used to help humans make decisions and solve problems
   • Describing how information can be acquired and sent through a variety of technological sources, including print and electronic media
   • Identifying communication technology as the transfer of messages among people and/or machines over distances through the use of technology

18. Identify advances and innovations in transportation technologies.
   • Identifying how the use of transportation allows people and goods to move from place to place
   • Describing why a transportation system may lose efficiency or fail if one part is missing or malfunctioning or if a subsystem is not working

19. Identify advances and innovations in manufacturing technologies.
   • Describing how processing systems convert natural materials into products
   • Explaining that manufacturing processes include designing products, gathering resources, and using tools to separate, form, and combine materials in order to produce products
   • Explaining that the manufacturing enterprises exist because of a consumption of goods

20. Identify advances and innovations in construction technologies.
   • Describing that modern communities are usually planned according to guidelines
   • Explaining that structures need to be maintained
   • Classifying systems used in buildings

   • Describing how pathways lead students through secondary and postsecondary training towards a credential
   • Identifying employment opportunities associated with the clusters
   • Explaining employment skills for securing and keeping a job