

CTE CONTENT AREA: Technology Education
CONTENT MODULE TITLE: Technology and Society

MODULE DESCRIPTION

Through history, technology and society have moved forward hand in hand. As society determines needs and wants, technological innovations and inventions are developed to meet them. Conversely, technological developments may create new needs and wants. Technology impacts politics, culture, economies, and the environment in ways that may require that technological developments be constrained or controlled by society.

Historically, technological developments had widespread impacts that changed our society. As an example, prior to the invention of the telegraph, news and information traveled only as fast as a horse on land or a boat on water. The invention of the telegraph was beginning of a long chain of communications technologies through the telephone, radio, television, and cellular technologies that allow us to communicate and access information from anywhere in the world on a device that fits in our pocket. Each of these technological developments have driven new and divergent technologies and created new needs and wants. New societal issues have been created with respect to information access, privacy, and identity that were very different in the past. Further, the development of better measurement capabilities, applying mathematics for analysis, and scientific understanding through inquiry greatly extended our technological capabilities in recent times.

In this module, students will learn about how using technology affects society and the environment, how society influences the development of technology, and how technology has changed and evolved over the course of human history. Understanding these concepts will make the student more technologically literate about how technologies develop and evolve while making them better appreciate their role in a technological world.

This module is intended as the second of five modules that can be completed in sequence or integrated with content with the other technology modules through laboratory activities and problem-based assignments.

GUIDING QUESTION

What do students need to understand about how technology impacts the social, cultural, and environmental contexts of our ever-changing world?

MODULE CONTENT

Technology and Society

1. The Cultural, Social, Economic, and Political Effects of Technology
Students will
 - a) Describe how the use of technology affects humans' safety, comfort, choices, and attitudes

about the development and use of technologies

- b) Define how our choices to use products and systems can result in desirable and undesirable consequences
- c) Describe and discuss ethical issues associated with the selection and use of technologies
- d) Explore the economic, political, and cultural issues that are influenced by technological developments

2. The Effects of Technology on the Environment

Students will

- a) Identify social, health, and environmental issues resulting from waste produced by technological systems
- b) Propose how technologies can be applied toward repairing damage caused by natural disasters
- c) Describe how technology is applied toward breaking down waste produced by technological systems
- d) Evaluate how using technological developments causes competition between economic and environmental concerns

3. The Role of Society in the Development and Use of Technology

Students will

- a) Research and describe historical technological developments that resulted from the demands, values, and interests of individuals, businesses, industries, and societies
- b) Demonstrate how the use of inventions and innovations resulted in societal changes and creation of new needs and wants
- c) Describe how social and cultural priorities have impacted the development of technological devices
- d) Explain how societal expectations impact the acceptance and use of technological products and systems

4. The Influence of Technology and History

Students will

- a) Describe how inventions and innovations have evolved through methodical tests and refinements.
- b) Describe how specialization of products and systems have led to technological improvements.
- c) Evaluate how contemporary understanding of measurement, mathematics, and control systems have aided or promoted the development and refinement of technological devices and systems
- d) Demonstrate how the knowledge of science and mathematics has impacted invention and innovation in technological systems

ILLUSTRATIVE ACTIVITIES by Theme Module

Career and Community Connections

Community Safety Technologies

Students identify an occupation that focuses on safety in their communities that may include law enforcement, first response, firefighting, security, sanitation, medicine, or other

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occupations. Students investigate and report on the technologies that these workers use to do their jobs and explain how these technologies may protect the workers, make their jobs easier, or make the community safer. Students identify the special skills or training necessary for the workers in these occupations to use these technologies.

Communication and Interpersonal Relationships

Go on a Communication Vacation

Challenge students to disconnect for a day. Students keep a journal of the times that they reach for electronic communication devices such as cell phones, the television remote, or music player. For each of the entries, students record what alternative technologies or means of communication they used instead. Students reflect on how much time they spend each day using these communications technologies and the perceived and real losses that they experienced.

Financial and Consumer Literacy

Recycling Systems

Students develop a recycling program for the school that identifies the costs and benefits of recycled materials. Students identify a system for separating and sorting the materials and evaluate the value of the relative materials, including deposits on drink containers or selling scrap metals. Students will evaluate the costs associated with recycling including storage, transporting, and disposal of materials that could be recycled but are not.

Health, Safety, and Wellness

Research and Investigate GMOs

Students investigate and report on the use of GMOs from a business and economic standpoint by identifying the potential impacts on nutrition, the environment, biodiversity, and society as a whole. Students identify how these GMOs are being used in other markets, such as energy production, chemical compounds, manufacturing materials, waste treatment, and others that may compete with food production.

Problem Solving and Innovation

Product Upcycling

Students upcycle a product or material that would normally be discarded or recycled into a new product. Students utilize the design process to set goals for the design, including developing the product, testing the product, and evaluating the prototype for optimization. Students identify the new use of the product and how it can save resources and extend the lifecycle. Examples include bird feeders from beverage containers, plant growing containers for a garden, an outdoor play area, or a child's toy. Students evaluate the lifecycle of the material and how the product design and innovation changed that lifecycle.

Sustainability

Composting System

Students develop and evaluate a composting system as an alternative to throwing away bio-materials in the school, including vegetable scraps, waste paper, and other products that can be converted into valuable soil amendments. Students experiment with how fast materials compost as a function of moisture, aeration, temperature, or time to determine the optimal conditions for the composting system. Students experiment with different materials that are marked as biodegradable by manufacturers and report on how well they compost. Students

implement the system, build containers, and work with student government and administration to implement a school recycling and composting program.

STANDARDS ADDRESSED

New York State Career Development and Occupational Studies (CDOS) Standards
Intermediate Level

<http://www.p12.nysed.gov/cte/>

Standard 1: Career Development

Students will be knowledgeable about the world of work, explore career options, and relate personal skills, aptitudes, and abilities to future career decisions.

Standard 2: Integrated Learning

Students will demonstrate how academic knowledge and skills are applied in the workplace and other settings.

Standard 3a: Universal Foundation Skills

Students will demonstrate mastery of the foundation skills and competencies essential for success in the workplace.

Common Career Technical Core Standards

Career Ready Practices - www.careertech.org/career-ready-practices

1. Act as a responsible and contributing citizen and employee
2. Apply appropriate and academic and technical skills
3. Attend to personal health and financial well-being
4. Communicate clearly and effectively and with reason
5. Consider environmental, social, and economic impacts of decisions
6. Demonstrate creativity and innovation
7. Employ valid and reliable research strategies
8. Utilize critical thinking to make sense of problems and persevere in solving them
9. Model integrity, ethical leadership, and effective management
10. Plan education and career paths aligned to personal goals
11. Use technology to enhance productivity
12. Work productively in teams while using cultural global competence

International Technology and Engineering Education Association

Standards for Technological Literacy – www.iteea.org/39197.aspx

Standard 4: Students will develop an understanding of the cultural, social, economic, and political effects of technology.

Standard 5: Students will develop an understanding of the effects of technology on the environment.

Standard 6: Students will develop an understanding of the role of society in the development and use of technology.

Standard 7: Students will develop an understanding of the influence of technology on history.

RESOURCES

International Technology and Engineering Educators' Association

www.iteea.org

ITEEA is the international organization that represents technology and engineering educators. The organization supports an annual conference and publishes two journals, *Technology and Engineering Educator* and *Journal of Technology Education*. Many resources are available for classroom teachers including Engineering by Design. ITEEA developed and maintains the Standards for Technological Literacy.

New York State Technology and Engineering Educators' Association

www.nysteea.org

NYSTEEA represents technology and engineering educators across New York State. The website has important information on technology content, current developments in technology and engineering education, professional development opportunities, and other resources important to technology educators.

New York State Department of Labor

New York State Career Zone

<https://www.careerzone.ny.gov>

Career Zone is a no-cost online career exploration and planning tool developed by the New York State Department of Labor. It offers career and education information on thousands of careers, as well as, self-assessment and career planning tools. Career Zone is appropriate for users from middle school through adult.

United States Department of Labor

CareerOneStop

<https://www.careeronestop.org>

CareerOneStop is the career, training, and job search website for the U.S. Department of Labor. The website serves job seekers, businesses, students, and career advisors with a variety of free online tools, information and resources.

Association of Career and Technical Education

Career Planning Guide

https://www.acteonline.org/wp-content/uploads/2018/02/ACTE_CC_Paper_FINAL.pdf

Research has identified middle school as a time when students can benefit the most from career exploration, a process of building self-awareness, learning about potential careers, and developing a plan for reaching future goals.

AdvanceCTE

Middle Level Career Interest Inventory

<https://cte.careertech.org/sites/default/files/StudentInterestSurvey-English.pdf>

AdvanceCTE provides a Career Interest inventory worksheet to use with students in helping them identify the potential matches to the 16 career clusters available to them.

Career and Technical Education Technical Assistance Center of New York (CTE TAC)

<http://nyctecenter.org/>

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The Career and Technical Education Technical Assistance Center (CTE TAC) operates under a state contract to assist the New York State Education Department (NYSED) in carrying out its mission of improving the quality, access, and delivery of career and technical education through research-based methods and strategies resulting in broader CTE opportunities for all students.

NOVA – PBS

<http://www.pbs.org/wgbh/nova/>

<http://www.pbs.org/wgbh/nova/education/>

The NOVA series contains many videos and full-length programs that include current science and technology topics. The videos are available through both the general site and a special education section that has hundreds of engineering-related videos, lesson plans, and interactive activities.

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