

Introduction to Technology Education

Career Cluster	STEM
Course Code	21051
Prerequisite(s)	None
Credit	.5
Program of Study and Sequence	Foundational course
Student Organization	None
Coordinating Work-Based Learning	Field trips
Industry Certifications	None
Dual Credit or Dual Enrollment	None
Teacher Certification	Architecture & Construction Cluster Endorsement; Manufacturing Cluster Endorsement; STEM Cluster Endorsement; Transportation, Distribution & Logistics Cluster Endorsement; 7-12 Technology Education Endorsement
Resources	http://www.iste.org/standards/ISTE-standards/standards-for-students ; www.google.com

Course Description: Technology is a significant part of society. Most careers call for some type of technology skills, knowledge, and abilities. Technology education brings deeper meaning to core content concepts while introducing students to various technologies, technical skills, critical thinking processes, and hands-on experiences. Students will increase their technological literacy, problem solving, and creative/critical thinking skills. Within this course the following topics of study will be addressed: nature of technology, technology and society, design process, energy and power, manufacturing, construction, transportation, communication, professionalism, health, safety and the environment.

Program of Study Application- This is a STEM Cluster Course in the STEM Engineering Pathway. It is recommended that the course be preceded by a series of foundation courses and a cluster course(s) in STEM, and followed by a more specialized pathway course such as Industrial and Bioprocess Engineering, Mechanical Drafting & Design, Architectural Drafting, and/or Robotics.

Note: Each standard has been addressed at four Webb levels. This differentiation may be used to determine appropriateness for grade level use or progression of learning.

Course Standards**Indicator # ITE 1 Analyze the scope and nature of technology**

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
	ITE.1.1 Examine the relationship between technology and other areas of study.	
	<u>Examples:</u>	
Level 2: Skill/ Concept	Conduct investigations to examine the relationship between technology and other areas of study.	
Level 1: Recall	Describe how technology has impacted life and or society.	
Level 2: Skill/ Concept	Construct a technological product and identify scientific principles in the design.	
Level 3: Strategic Thinking	Demonstrate an understanding of technology by evaluating the use of multiple technologies.	
Level 4: Extended Thinking	Evaluate the impact of technological advances and/or innovation on history.	American history, world history

	ITE.1.2. Understand the effects of technology on the natural environment.	
	<i>Examples:</i>	
Level 1: Recall	Understand how technology affects the natural environment.	
Level 1: Recall	List ways technology positively and negatively affects the natural environment.	Environmental science
Level 2: Skill/ Concept	Identify five types of energy and a primary source of each of these energy types.	Energy, renewable/non-renewable resources, Earth Science
Level 3: Strategic Thinking	Assess the relationship between technology and/or energy source and pollution production.	Environmental science
Level 4: Extended Thinking	Strategize ways to reduce adverse effects of pollution on the environment.	Environmental science

	ITE.1.3. Examine the relationship between the cultural, social, economic, and political effects of technology on society.	
	<i>Examples:</i>	
Level 3: Strategic Thinking	Observe and analyze connections between technology and cultural, social, economic and political aspects of society and vice versa.	
Level 1: Recall	Identify current technological factors that have influenced societal, economic or political decision making.	
Level 2: Skill/ Concept	Identify the relationship between a law, policy or best practice involving technology and its impact on culture, society, economics and/or political issues.	
Level 3: Strategic Thinking	Investigate an invention and its impact on society.	
Level 4: Extended Thinking	Design a technological invention that would have a positive cultural, social, economic or political benefit.	

Notes:

Indicator # ITE 2 Apply the system-thinking model (the feedback loop) to technology

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
	ITE.2.1 Apply the design process to engineering design process.	
	<i>Examples:</i>	
Level 2: Skill/ Concept	Demonstrate understanding of an appropriate engineering design process.	
Level 1: Recall	Draw, label and define the components of the system-thinking model.	Engineering
Level 2: Skill/ Concept	Propose improvement to the design of a simple technological product based on performance data.	
Level 3: Strategic Thinking	Construct a product based upon specification and build a prototype.	
Level 4: Extended Thinking	Create an original design.	Teamwork, engineering, graphing, math, algebra

Notes:

Indicator # ITE 3 Solve problems using innovation, research, experimentation and design

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
	ITE.3.1 Use research and experimentation methods to solve problems.	
	<i>Examples:</i>	
Level 2: Skill/ Concept	Apply data and information to solve a problem.	
Level 1: Recall	Use existing information to identify a problem within a system to be solved.	
Level 2: Skill/ Concept	Utilize data to find possible solutions to a problem.	Teamwork, communication, analysis, computer skills, math, statistics, problem solving
Level 3: Strategic Thinking	Compare and contrast a functional and non-functional problem solving system.	
Level 4: Extended Thinking	Design a research method and conduct research to collect and analyze data.	Data collection, analyzation, physical science

	ITE.3.2. Use innovative and/or troubleshooting methods to solve problems.	
	<i>Examples:</i>	
Level 2: Skill/ Concept	Examine a problem and find an appropriate solution using innovative and/or troubleshooting methods.	
Level 1: Recall	Identify potential troubleshooting techniques.	Troubleshooting, problem solving
Level 2: Skill/ Concept	Apply appropriate troubleshooting techniques	Troubleshooting, problem solving
Level 3: Strategic Thinking	Troubleshoot a system that is malfunctioning and use tools and/or systems to repair it.	Scientific methods, data collections, survey, social sciences
Level 4: Extended Thinking	Analyze a problem and implement a troubleshooting method using a given set of materials	

Notes:

Indicator # ITE 4 Apply appropriate skill sets to various ranges of technology

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
	ITE.4.1. Understand biotechnologies	
	<i>Examples:</i>	
Level 2: Skill/ Concept	Demonstrate an understanding of biotechnology and its applications.	
Level 1: Recall	Define biotechnology and identify specific areas of application.	
Level 2: Skill/ Concept	Identify industrial uses of bacteria and yeast.	Microbiology, chemistry, life science, high school/college microbiology visit
Level 3: Strategic Thinking	Design and implement an experiment to show differences in growing conditions for fuel crops.	Ag education, field visit
Level 4: Extended Thinking	Conduct an experiment to produce ethanol from food crops.	

	ITE.4.2 Understand energy and power technologies	
	<i>Examples:</i>	
Level 2: Skill/ Concept	Understand the sources and application of power technologies	
Level 1: Recall	Define the law of conservation of energy.	
Level 2: Skill/ Concept	Demonstrate or explain how one source of energy can be used for multiple applications.	
Level 3: Strategic Thinking	Compare and contrast different sources of energy and power	
Level 4: Extended Thinking	Design and construct a solar collector from household items	Engineering
	ITE.4.3 Understand information and communication technologies	
	<i>Examples:</i>	
Level 3: Strategic Thinking	Evaluate a situation to identify the appropriate digital communication.	
Level 1: Recall	Demonstrate use of different means of digital communication.	Communication skills
Level 2: Skill/ Concept	Determine the appropriate means of communication based on tasks given, e.g., email, text, interpersonal, social media, networking and interaction.	Communication skills
Level 3: Strategic Thinking	Distinguish between reliable and non-reliable digital information.	Language arts

Level 4: Extended Thinking	Design a webpage or audiovisual presentation to communicate information.	Software development, software use, English, art and design
	ITE.4.4 Understand transportation technologies	
	<i>Examples:</i>	
Level 2: Skill/ Concept	Demonstrate understanding of the connection between technology and transportation needs.	
Level 1: Recall	Explain different types of transportation needed to get an agricultural product from the field to consumer	
Level 2: Skill/ Concept	Compare the cost differences between personal and public transportation.	Math, geography
Level 3: Strategic Thinking	Create a student traffic pattern to improve the safety of student traffic around the parking lots of the high school.	Math, design, google earth
Level 4: Extended Thinking	Design a transportation plan and cost analysis for storing and delivering a perishable product over an extended time period.	Ice cream/cold storage manufacturing visit
	ITE.4.5 Understand manufacturing technologies and materials	
	<i>Examples:</i>	
Level 2: Skill/ Concept	Apply different manufacturing technologies to meet a given situation.	
Level 1: Recall	List different types of manufacturing technologies.	
Level 2: Skill/ Concept	Compare and contrast manufacturing technologies to determine appropriate system for a process.	
Level 3:	Evaluate how an assembly line system can affect the efficiency of a	Visit manufacturing

Strategic Thinking	manufacturing process	industry with/without assembly line
Level 4: Extended Thinking	Construct a simple cost benefit analysis for a given product	
	ITE.4.6 Understand construction technologies	
	<i>Examples:</i>	
Level 2: Skill/ Concept	Evaluate and apply construction methods to build the necessary infrastructure component(s).	
Level 1: Recall	List multiple types of construction for infrastructure, e.g., types of construction needed to build a new city.	
Level 2: Skill/ Concept	Estimate the amount of material needed to build a structure.	
Level 3: Strategic Thinking	Assess the effectiveness of using the same materials for different structures.	
Level 4: Extended Thinking	Given a budget, design and construct a bridge that can hold the most weight, using available materials	

Notes:

Indicator # ITE 5 Understand ethics and professionalism in technology

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
	ITE.5.1 Investigate and demonstrate understanding of professionalism and ethics in the technological environment.	
<i>Examples:</i>		
Level 3: Strategic Thinking	Investigate and demonstrate understanding of professionalism and ethics in the technological environment.	
Level 1: Recall	Identify different technological work environments and recognize appropriate professional attire.	Health, hygiene, personal attire
Level 2: Skill/ Concept	Demonstrate an understanding of ethics issues such as plagiarism, copyright and intellectual property rights in technological environments.	Language arts, English Teamwork
Level 3: Strategic Thinking	Differentiate between possible ethical choices. Role play to model different possible outcomes. Compare and contrast outcomes of different ethical situations in a work environment.	ethics
Level 4: Extended Thinking	Brainstorm potential responses to various workplace ethics violations.	Sensitivity training

Notes:

Indicator # ITE 6 Understand safety and health in technology

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
	ITE.6.1. Understand implication of health and public safety standards	
	<i>Examples:</i>	
Level 2: Skill/ Concept	Communicate the importance of health and safety standards in technological environment.	
Level 1: Recall	List the safety procedures and equipment used in various technology sectors.	
Level 2: Skill/ Concept	Demonstrate and understand the importance and use of safety equipment.	
Level 3: Strategic Thinking	Evaluate the effectiveness of safety tools available for a given task.	
Level 4: Extended Thinking	Analyze potential consequences to self and others of not following health and safety standards. <ul style="list-style-type: none"> • Design a plan to improve the safety of a work environment. 	Work place visit

Notes: Please refer to OSHA safety guidelines for more information and resources