

Introduction to Technology

8480 6 weeks

8481 9 weeks

8484 12 weeks

8482 18 weeks

8483 36 weeks

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Course Description

Suggested Grade Level: 6 or 7 or 8

Students study technological resources through problem-solving processes and various hands-on activities. They relate the impact of technology on society, environment, and culture to future consequences and decisions.

Task Essentials Table

- Tasks/competencies designated by plus icons (⊕) in the left-hand column(s) are essential
- Tasks/competencies designated by empty-circle icons (○) are optional
- Tasks/competencies designated by minus icons (⊖) are omitted
- Tasks marked with an asterisk (*) are sensitive.

Task Number	8481	8484	8482	8483	8480	Tasks/Competencies
Six-week courses must include two of the following areas, nine-week courses must include three, 12-week courses must include four, 18-week courses must include five, and 36-week courses must include all seven areas.						
Introducing Technology						
31	⊕	⊕	⊕	⊕	⊕	Explain <i>technology</i> .
32	⊕	⊕	⊕	⊕	⊕	Identify examples of technology throughout history.
33	⊕	⊕	⊕	⊕	⊕	Describe inventions that have been important to society.
34	○	○	⊕	⊕	○	Research careers and the technologies used in them.
Investigating the Impacts of Technology						
35	⊕	⊕	⊕	⊕	⊕	Describe how society affects technology and technology affects society.
36	○	○	⊕	⊕	○	Identify emerging technologies.
37	⊕	⊕	⊕	⊕	⊕	Predict future technological changes.

Examining Resources of Technology						
38	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Identify resources used in technology.
39	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Identify the six simple machines.
40	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Differentiate between types of materials.
41	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Demonstrate safe use of a minimum of three tools and/or pieces of equipment.
42	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Demonstrate various types of measuring.
43	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Create sketches and drawings.
Solving Problems						
44	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Describe a problem-solving process.
45	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Apply a problem-solving process.
Examining Systems						
46	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Illustrate how processes change inputs to outputs in any system.
47	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Identify the parts of a system within a device.
Introducing Microcontrollers						
48	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Explain the coding system used for the microcontroller.
49	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Demonstrate the use of a microcontrolled robot.

Identifying the Designed World							
50	○	○	+	+	○	Identify the designed-world areas.	
51	+	+	+	+	+	Describe the energy and power area of technology.	
52	+	+	+	+	+	Describe the medical area of technology.	
53	+	+	+	+	+	Describe the agricultural and related biotechnologies area of technology.	
54	+	+	+	+	+	Describe the information and communication area of technology.	
55	+	+	+	+	+	Describe the architecture and construction area of technology.	
56	+	+	+	+	+	Describe the transportation area of technology.	
57	+	+	+	+	+	Describe the manufacturing area of technology.	

Legend: + Essential ○ Non-essential - Omitted

Six-week courses must include two of the following areas, nine-week courses must include three, 12-week courses must include four, 18-week courses must include five, and 36-week courses must include all seven areas.

Curriculum Framework

Introducing Technology

Task Number 31

Explain *technology*.

Definition

Explanation should include that technology is the study of the application of knowledge, creativity, and resources (i.e., tools, energy, materials, people, time, information, capital) to solve problems and extend human potential.

Process/Skill Questions

- Why is the study of technology important?
- How does technology impact your life?
- What is the difference between technology and science?

ITEEA National Standards

Relationships Among Technologies and the Connections Between Technology and Other Fields

The Characteristics and Scope of Technology

The Core Concepts of Technology

TSA Competitive Events

Challenging Technology Issues

Essays on Technology

Task Number 32

Identify examples of technology throughout history.

Definition

Identification should include basic and complex examples of technology that have impacted our lives at home, at school, at work, or in recreation.

Process/Skill Questions

- How have electronics enhanced our lives at home, at school, at work, or in recreation?
- What are non-electronic examples of technology?
- What kinds of technology might be used by a professional football team?

ITEEA National Standards

Relationships Among Technologies and the Connections Between Technology and Other Fields

The Characteristics and Scope of Technology

The Cultural, Social, Economic, and Political Effects of Technology

The Effects of Technology on the Environment

The Influence of Technology on History

The Role of Society in the Development and Use of Technology

TSA Competitive Events

Challenging Technology Issues

Essays on Technology

Task Number 33

Describe inventions that have been important to society.

Definition

Description should include inventions through history that have extended human potential.

Process/Skill Questions

- What inventions have had an impact on your life?
- What inventions have changed transportation? Communication?
- How has technology changed society?
- What are some desirable outcomes of technology?
- What are some undesirable outcomes of technology?

ITEEA National Standards

Relationships Among Technologies and the Connections Between Technology and Other Fields

The Characteristics and Scope of Technology

The Cultural, Social, Economic, and Political Effects of Technology

The Effects of Technology on the Environment

The Influence of Technology on History

The Role of Society in the Development and Use of Technology

TSA Competitive Events

Challenging Technology Issues

Essays on Technology

Prepared Speech

Tech Bowl

Task Number 34

Research careers and the technologies used in them.

Definition

Research should include job outlook, salary, education required, and characteristics important to each.

Process/Skill Questions

- What are some sources you could use to find out about a career?
- What skills will be necessary in your career?
- What is the difference between a job and a career?

ITEEA National Standards

Agricultural and Related Biotechnologies

Construction Technologies

Energy and Power Technologies

Information and Communication Technologies

Manufacturing Technologies

Medical Technologies

The Characteristics and Scope of Technology

Transportation Technologies

TSA Competitive Events

Career Prep

Investigating the Impacts of Technology

Task Number 35

Describe how society affects technology and technology affects society.

Definition

Description should include an explanation of the impacts of technology on society and the ways in which society creates the need for technology.

Process/Skill Questions

- In what ways are we dependent on technology?
- How does society react to new technologies?
- What are some positive and negative impacts of technology?
- How does society influence future technologies?
- How might technology influence society in the future?

ITEEA National Standards

Agricultural and Related Biotechnologies

Assess the Impact of Products and Systems

Construction Technologies

Energy and Power Technologies

Information and Communication Technologies

Manufacturing Technologies

Medical Technologies

Relationships Among Technologies and the Connections Between Technology and Other Fields

The Characteristics and Scope of Technology

The Cultural, Social, Economic, and Political Effects of Technology

The Effects of Technology on the Environment

The Influence of Technology on History

The Role of Society in the Development and Use of Technology

Transportation Technologies

TSA Competitive Events

Challenging Technology Issues

Task Number 36

Identify emerging technologies.

Definition

Identification should include developments in

- medicine
- agriculture
- energy and power
- information and communication
- transportation
- manufacturing
- construction.

Process/Skill Questions

- How has the entertainment industry been influenced by emerging technologies?
- How has gaming changed because of emerging technologies?
- What new careers are being created because of emerging technologies?
- How are robotics technologies changing our society?
- How can implant chips be used in medical technology?

ITEEA National Standards

Agricultural and Related Biotechnologies

Assess the Impact of Products and Systems

Construction Technologies

Energy and Power Technologies

Information and Communication Technologies

Manufacturing Technologies

Medical Technologies

Relationships Among Technologies and the Connections Between Technology and Other Fields

The Characteristics and Scope of Technology

The Cultural, Social, Economic, and Political Effects of Technology

The Influence of Technology on History

The Role of Society in the Development and Use of Technology

Transportation Technologies

TSA Competitive Events

Environmental Engineering

Medical Technology

Prepared Speech

Tech Bowl

Task Number 37

Predict future technological changes.

Definition

Predictions should be based on data and information about what is happening now and understanding the past and present to help us predict what will happen in the future.

Process/Skill Questions

- What is a trend?
- What is an example of a technology that is currently changing?
- What are some futuristic changes in the automotive industry? Housing industry?

ITEEA National Standards

Agricultural and Related Biotechnologies

Construction Technologies

Energy and Power Technologies

Information and Communication Technologies

Manufacturing Technologies

Medical Technologies

Relationships Among Technologies and the Connections Between Technology and Other Fields

The Characteristics and Scope of Technology

The Effects of Technology on the Environment

The Influence of Technology on History

Transportation Technologies

TSA Competitive Events

Biotechnology

Environmental Engineering

Medical Technology

Tech Bowl

Examining Resources of Technology

Task Number 38

Identify resources used in technology.

Definition

Identification should include

- tools and machines
- energy
- materials
- people
- time
- information
- capital.

Process/Skill Questions

- What is the difference between a tool and a machine?
- What is the difference between materials and equipment?
- What are some examples of each of the resources?
- What is the definition of an *exhaustible resource*?
- What are some examples of exhaustible resources?

ITEEA National Standards

Relationships Among Technologies and the Connections Between Technology and Other Fields

The Core Concepts of Technology

TSA Competitive Events

Biotechnology

Construction Challenge

Dragster

Flight

Mass Production

Problem Solving

Structural Engineering

Task Number 39

Identify the six simple machines.

Definition

Identification should include

- wheel and axle
- inclined plane
- wedge
- screw
- pulley
- lever.

Identification should include citing examples, which could include

- windmill, fan (wheel and axle)
- roller coaster, stairs (inclined plane)
- sledge hammer, chisels (wedge)
- door lock, drill (screw)
- flag pole, window blinds (pulley)
- seesaw, rake (lever).

Process/Skill Questions

- What are some examples of simple machines that you have used?
- How does a simple machine relate to a compound machine (e.g., bicycle)?
- What are some examples of each type of machine?

ITEEA National Standards

Assess the Impact of Products and Systems

Engineering Design

The Core Concepts of Technology

Use and Maintain Technological Products and Systems

TSA Competitive Events

Tech Bowl

Task Number 40

Differentiate between types of materials.

Definition

Differentiation may include types of woods, metals, and plastics and the characteristics of each.

Process/Skill Questions

- What are some material properties?
- How can materials be changed?
- How would you test the strengths of materials?
- What are renewable materials?

ITEEA National Standards

Assess the Impact of Products and Systems

Use and Maintain Technological Products and Systems

TSA Competitive Events

Tech Bowl

Task Number 41

Demonstrate safe use of a minimum of three tools and/or pieces of equipment.

Definition

Demonstration should include following Occupational Safety and Health Administration (OSHA) safety regulations and teacher's classroom safety policies in the safe and proper use of tools and equipment.

Process/Skill Questions

- How do you use a hand tool effectively?
- Why is it important to inspect a tool before using it?
- How do you select the proper tool for a given task?

ITEEA National Standards

Use and Maintain Technological Products and Systems

TSA Competitive Events

Dragster

Problem Solving

Structural Engineering

Task Number 42

Demonstrate various types of measuring.

Definition

Demonstration may include using ruler, thermometer, micrometer, and Volt-Ohm-Milliammeter (VOM). Measuring may include U.S. customary, metric, and other ways of measuring distance, volume, area, and weight.

Process/Skill Questions

- What is measurement?
- What are the basic units of measurement?
- What is a fraction?
- What does the denominator of a fraction represent?
- What does the numerator of a fraction represent?
- What types of tools and units would be used to measure distance? Thickness? Voltage? Temperature? Altitude?
- What led to the development of measurement systems?

ITEEA National Standards

Engineering Design

The Attributes of Design

The Influence of Technology on History

Use and Maintain Technological Products and Systems

TSA Competitive Events

Construction Challenge

Dragster

Flight

Problem Solving

Structural Engineering

Task Number 43

Create sketches and drawings.

Definition

Creating sketches and drawings may include using pencil, graph paper, T-square, triangle, protractor, and computer design software.

Process/Skill Questions

- Why is sketching important?
- What is the difference between a sketch and a drawing?
- What information might a drawing give?

ITEEA National Standards

Engineering Design

The Attributes of Design

Use and Maintain Technological Products and Systems

TSA Competitive Events

Construction Challenge

Dragster

Flight

Problem Solving

Structural Engineering

Solving Problems

Task Number 44

Describe a problem-solving process.

Definition

Description of the problem-solving process should include the following steps of a method, such as the IDEATE method:

- **I**dentify the problem.
- **D**efine the goal.
- **E**xplore the possible solutions.
- **A**ssess alternatives for best solutions.
- **T**ake action on solution.
- **E**valuate results with goal.

or, the engineering design process:

- Define the problem
- Research

- Brainstorm
- Choose the best solution and design
- Build/create
- Test and evaluate
- Redesign/rebuild
- Communicate results

Process/Skill Questions

- What is brainstorming?
- How do we evaluate a solution to a problem?
- What are some current technological problems in society?
- How can technology be used to solve a problem?
- How would you solve a social problem? What impact would your solution create?
- How might your solution have a positive effect or a negative effect on society?

ITEEA National Standards

Apply Design Processes

Assess the Impact of Products and Systems

Engineering Design

Relationships Among Technologies and the Connections Between Technology and Other Fields

The Role of Troubleshooting, Research and Development, Invention and Innovation, and Experimentation in Problem Solving

TSA Competitive Events

Biotechnology

Construction Challenge

Dragster

Flight

Mass Production

Problem Solving

Structural Engineering

Task Number 45

Apply a problem-solving process.

Definition

Application may include using the IDEATE method or engineering design process to solve a given problem. Documentation of the problem-solving process should be required.

Process/Skill Questions

- What can you do if your solution doesn't work?
- What is the purpose of feedback in the problem-solving process?
- Why is it important to fully understand a problem before beginning to solve it?
- What is the difference between criteria and constraints?
- Why is it important to consider unintended consequences?

TSA Competitive Events

Problem Solving

Examining Systems

Task Number 46

Illustrate how processes change inputs to outputs in any system.

Definition

Processes change input to output by separating, adding, forming, or changing the internal structure of the materials. Processes may also change how parts relate to each other.

Process/Skill Questions

- What are types of processes used in technological systems?
- How can altering or changing material solve a problem?
- How can changing how parts relate to each other improve a system?

ITEEA National Standards

Relationships Among Technologies and the Connections Between Technology and Other Fields

The Core Concepts of Technology

TSA Competitive Events

Mass Production

System Control Technology

Task Number 47

Identify the parts of a system within a device.

Definition

Identification should include the definition of *system* and *subsystem*, examples of each, and how the relation of parts is critical to the system.

Process/Skill Questions

- What are inputs of a system?
- What are some processes used in technological systems?
- What part does process play in a system?
- What are the outputs of a system?
- What is feedback?

ITEEA National Standards

Relationships Among Technologies and the Connections Between Technology and Other Fields

The Core Concepts of Technology

TSA Competitive Events

Mass Production

System Control Technology

Introducing Microcontrollers

Task Number 48

Explain the coding system used for the microcontroller.

Definition

Explanation should include the language used, whether it is symbol based or language based, and a basic explanation of syntax.

Process/Skill Questions

- What is symbol based coding called?
- What does syntax mean?
- Why does syntax matter when coding?

ITEEA National Standards

Information and Communication Technologies

TSA Competitive Events

Microcontroller Design

Task Number 49

Demonstrate the use of a microcontrolled robot.

Definition

Demonstration should include forward and backward motion, turning left or right, and use of sensors.

Process/Skill Questions

- How would you make a robot do what you want it to do?
- Why is timing important in coding?
- How does a line of code begin?

ITEEA National Standards

Information and Communication Technologies

Identifying the Designed World

Task Number 50

Identify the designed-world areas.

Definition

Identification should include the following areas:

- Medical Technologies
- Agricultural and Related Biotechnologies
- Energy and Power Technologies
- Information and Communication
- Transportation Technologies
- Manufacturing Technologies

- Architecture and Construction Technologies

Process/Skill Questions

- What are some systems that involve two or more designed-world systems?
- What are some subsystems within one designed-world system?
- What are some advances in a given designed-world system? Subsystem?
- How are specialized equipment and practices used in a given designed-world system?

ITEEA National Standards

Agricultural and Related Biotechnologies

Construction Technologies

Energy and Power Technologies

Engineering Design

Information and Communication Technologies

Manufacturing Technologies

Medical Technologies

The Attributes of Design

The Role of Troubleshooting, Research and Development, Invention and Innovation, and Experimentation in Problem Solving

TSA Competitive Events

Biotechnology

Challenging Technology Issues

Community Service Video

Construction Challenge

Dragster

Electrical Applications

Flight

Mass Production

Medical Technology

Tech Bowl

Task Number 51

Describe the energy and power area of technology.

Definition

Description should include

- types of energy and power systems:
 - Biological
 - Chemical
 - Mechanical
 - Solar
 - Hydraulic
- the function of an energy converter—to change one form of energy into a different energy form
- the five main types of converters—mechanical, thermal, chemical, solar, and fluid.

Process/Skill Questions

- What are different ways that energy can be converted?
- What are different forms of energy before and after conversion?
- How are these energies used?

ITEEA National Standards

Energy and Power Technologies

Engineering Design

The Attributes of Design

The Role of Troubleshooting, Research and Development, Invention and Innovation, and Experimentation in Problem Solving

Use and Maintain Technological Products and Systems

TSA Competitive Events

Electrical Applications

System Control Technology

Task Number 52

Describe the medical area of technology.

Definition

Description should include ways medical technologies are used for

- prevention of illnesses and injuries
- diagnosis of diseases and injuries
- treatment of illnesses and injuries.

Process/Skill Questions

- What is inoculation?
- What is the purpose of magnetic resonance imaging (MRI)?
- What technologies are used in exercise equipment?
- How does technology assist a pathologist?

ITEEA National Standards

Engineering Design

Medical Technologies

The Attributes of Design

The Role of Troubleshooting, Research and Development, Invention and Innovation, and Experimentation in Problem Solving

Use and Maintain Technological Products and Systems

TSA Competitive Events

Biotechnology

Medical Technology

Tech Bowl

Task Number 53

Describe the agricultural and related biotechnologies area of technology.

Definition

Description should include techniques used to create, improve, or modify plants, animals, and microorganisms.

Process/Skill Questions

- How can biotechnologies combat diseases in plants and animals?
- What are the positive and negative effects of biotechnologies?
- What is genetic engineering?
- What is aquaculture?
- What is the purpose of an artificial ecosystem?
- What is cloning?
- What is the purpose of stem cell research?

ITEEA National Standards

Agricultural and Related Biotechnologies

The Attributes of Design

The Role of Troubleshooting, Research and Development, Invention and Innovation, and Experimentation in Problem Solving

Use and Maintain Technological Products and Systems

TSA Competitive Events

Biotechnology

Environmental Engineering

Medical Technology

Tech Bowl

Task Number 54

Describe the information and communication area of technology.

Definition

Description should include ways of gathering, organizing, and reporting data so it is useful to people, and ways communication technology involves using technical equipment in the forms of symbols and signals, including coding/programming.

Process/Skill Questions

- How have computers changed the way we gather information?
- What contribution did Thomas Edison make to communication systems?
- What did Bill Gates contribute to the development of the computer?
- What did Steve Jobs contribute to the development of the computer?
- How do global positioning system (GPS) and geographic information system (GIS) technologies improve our daily lives?
- What is symbol-based coding called?
- What does syntax mean?
- Why does syntax matter when coding?

ITEEA National Standards

Engineering Design

Information and Communication Technologies

The Attributes of Design

The Role of Troubleshooting, Research and Development, Invention and Innovation, and Experimentation in Problem Solving

Use and Maintain Technological Products and Systems

TSA Competitive Events

Children's Stories

Community Service Video

Digital Photography

Geospatial Technology (Virginia only)

Microcontroller Design

Promotional Marketing

STEM Animation

System Control Technology

Video Game Design

Website Design

Task Number 55

Describe the architecture and construction area of technology.

Definition

Description should include the processes used in designing and constructing structures such as houses, commercial buildings, agricultural facilities, roads, and bridges.

Process/Skill Questions

- What are some examples of structures?
- What is an example of a temporary structure? A permanent structure?
- Why is the proper order of construction processes/steps important?

ITEEA National Standards

Construction Technologies

Engineering Design

The Attributes of Design

The Role of Troubleshooting, Research and Development, Invention and Innovation, and Experimentation in Problem Solving

Use and Maintain Technological Products and Systems

TSA Competitive Events

Construction Challenge

Tech Bowl

Task Number 56

Describe the transportation area of technology.

Definition

Description should include the ways passengers or goods are moved from one place to another.

Process/Skill Questions

- What is an example of an air transportation system? Space transportation system? Water transportation system? Land transportation system? Sea transportation system?
- How are transportation systems linked?
- How can plumbing be considered a transportation system?

ITEEA National Standards

Engineering Design

The Attributes of Design

The Role of Troubleshooting, Research and Development, Invention and Innovation, and Experimentation in Problem Solving

Transportation Technologies

Use and Maintain Technological Products and Systems

TSA Competitive Events

Dragster

Flight

Structural Engineering

Tech Bowl

Task Number 57

Describe the manufacturing area of technology.

Definition

Description should include ways raw materials are made into finished products, especially in large quantities.

Process/Skill Questions

- What is the difference between construction and manufacturing?
- What are the economic effects of importing and exporting?
- How are materials related to manufacturing?
- What is the difference between materials and tools/machines?

ITEEA National Standards

Engineering Design

Manufacturing Technologies

The Attributes of Design

The Role of Troubleshooting, Research and Development, Invention and Innovation, and Experimentation in Problem Solving

Use and Maintain Technological Products and Systems

TSA Competitive Events

Inventions and Innovations

Mass Production

Tech Bowl

SOL Correlation by Task

31	Explain <i>technology</i> .	English: 6.4, 7.4, 8.4
32	Identify examples of technology throughout history.	English: 6.6, 7.6, 8.6 History and Social Science: USII.2, USII.4, USII.6, USII.7, USII.8, USII.9
33	Describe inventions that have been important to society.	English: 6.6, 7.6, 8.6 History and Social Science: USII.2, USII.4, USII.6, USII.7, USII.8, USII.9
34	Research careers and the technologies used in them.	English: 6.9, 7.9, 8.9 History and Social Science: CE.14
35	Describe how society affects technology and technology affects society.	English: 6.6, 7.6, 8.6 History and Social Science: CE.11, USI.2, USI.4, USI.8, USII.8, USII.9 Mathematics: 7.9, 8.12
36	Identify emerging technologies.	English: 6.6, 6.9, 7.6, 7.9, 8.6, 8.9 History and Social Science: USI.2, USI.4, USI.8, USII.8, USII.9
37	Predict future technological changes.	English: 6.6, 7.6, 8.6 History and Social Science: USII.8, USII.9 Mathematics: 7.9, 8.12
38	Identify resources used in technology.	English: 6.6, 7.6, 8.6 History and Social Science: CE.4, CE.14 Science: 6.2
39	Identify the six simple machines.	English: 6.6, 7.6, 8.6

		History and Social Science: USII.2 Science: PS.10
40	Differentiate between types of materials.	English: 6.6, 7.6, 8.6 History and Social Science: USII.2, USII.8
41	Demonstrate safe use of a minimum of three tools and/or pieces of equipment.	English: 6.6, 7.6, 8.6 History and Social Science: CE.4
42	Demonstrate various types of measuring.	Mathematics: 6.2, 6.7, 6.9, 7.4, 7.5, 8.6 Science: 6.1, LS.1
43	Create sketches and drawings.	Mathematics: 6.2, 6.8, 6.9, 7.4, 7.5, 8.6, 8.7, 8.8, 8.9 Science: 6.1
44	Describe a problem-solving process.	English: 6.4, 6.6, 6.9, 7.4, 7.6, 7.9, 8.4, 8.6, 8.9 History and Social Science: CE.1, CE.4, WG.1 Mathematics: 6.5, 6.6, 7.2, 7.3, 7.4, 8.4, 8.6, 8.9, 8.10, 8.12, 8.14 Science: 6.1, LS.1
45	Apply a problem-solving process.	English: 6.6, 6.7, 7.6, 7.7, 8.6, 8.7 Science: 6.1, LS.1, PS.1
46	Illustrate how processes change inputs to outputs in any system.	Mathematics: 7.3, 8.6, 8.7, 8.15
47	Identify the parts of a system within a device.	English: 6.4, 7.4, 8.4 History and Social Science: USII.2, USII.8 Science: 6.1
48	Explain the coding system used for the microcontroller.	English: 6.4, 7.4, 8.4
49	Demonstrate the use of a microcontrolled robot.	
50	Identify the designed-world areas.	History and Social Science: USII.8, USII.9
51	Describe the energy and power area of technology.	English: 6.6, 7.6, 8.6 History and Social Science: USII.8, USII.9 Science: 6.2, 6.3, LS.6, PS.6

52	Describe the medical area of technology.	English: 6.6, 7.6, 8.6 History and Social Science: USII.8, USII.9
53	Describe the agricultural and related biotechnologies area of technology.	English: 6.6, 7.6, 8.6 History and Social Science: USI.2, USI.4, USI.8, USII.8, USII.9 Science: 6.9, LS.6
54	Describe the information and communication area of technology.	English: 6.6, 7.6, 8.6 History and Social Science: USI.2, USI.4, USI.8, USII.8, USII.9 Mathematics: 6.10, 7.9, 8.12, 8.13 Science: 6.1, LS.1, PS.1
55	Describe the architecture and construction area of technology.	English: 6.6, 7.6, 8.6 History and Social Science: USI.2, USI.5, USI.8, USII.8, USII.9 Mathematics: 6.7, 7.4, 7.5, 7.6, 8.6, 8.8, 8.9, 8.10
56	Describe the transportation area of technology.	English: 6.6, 7.6, 8.6 History and Social Science: USI.2, USI.4, USI.8, USII.8, USII.9
57	Describe the manufacturing area of technology.	English: 6.6, 7.6, 8.6 History and Social Science: USI.2, USI.4, USI.8, USII.8, USII.9

Green Building Infusion Units

The Green Building Infusion Unit (GBIU) was designed to encourage teachers to infuse instructional units on green building knowledge and skills into designated CTE courses. The infusion unit is not mandatory, and, as such, the tasks/competencies are marked as “optional,” to be taught at the instructor’s discretion.</p>

Teacher Resources

- **Admiral Richard E. Byrd Middle School Technology Education Website** This website provides a wide array of resources for middle school Technology and Engineering Education students and teachers. <https://goo.gl/H7T1Ak>
- **Alice** This website provides free resources for learning programming in a 3D environment. <http://www.alice.org/index.php>
- **Autodesk** This is free software for use in education (e.g., Fusion, Inventor, Autocad). <http://www.autodesk.com/education/free-software/featured>
- **Autodesk Homestyler** This is a free online architecture/home design program. <http://www.homestyler.com/>
- **Code.org** This website provides free resources and programs for coding. <https://code.org/>
- **Condé Systems** This is a good resource for dye sublimation needs. <http://www.conde.com/>
- **Edheads** This website provides engaging learning activities, including manufacturing, engineering design, simple machines, crime scene investigation, and surgery. <http://www.edheads.org>
- **Gimp** This resource provides free downloadable image manipulation software. In addition, there are many Gimp tutorials available on YouTube. <https://www.gimp.org/>
- **Google Sketchup** This is simple, yet powerful, 3D modeling software. There are both free and paid versions available; there is free Pro software for educators. <http://www.sketchup.com/>
- **Khan Academy** This is a free resource for learning just about anything, from calculus to JavaScript. <https://www.khanacademy.org/>
- **Nimbus Screenshot and Screencast** This is a free screen capture tool that allows you to capture a full web page or any part. In addition, you can edit screenshots, record screencasts, and record video from your screen. It is available for Chrome, Firefox, Android, and PC. <http://nimbus.everhelper.me/screenshot.php>
- **Planner 5D** This is an online architecture/home design program. Both free and paid options are available. <https://planner5d.com/>
- **Remind** This free resource can be used to send quick, simple messages to any device. <https://www.remind.com/>
- **Scratch** This resource offers free block-based programming language that can create games, animations, etc. <https://scratch.mit.edu/>
- **Thingiverse** This MakerBot resource offers downloadable 3D designs, design challenges, resources, and lessons for educators. <http://www.thingiverse.com/>
- **Whitebox Learning** This resource offers a standards-based STEM learning system for grades 6-12. Completely web-based, students can use the website to design, analyze, and simulate their designs from a web browser. They can also compete with other students throughout their district. This resource requires a subscription. <https://www.whiteboxlearning.com>

Appendix: Credentials and Career Cluster Information

Industry Credentials: Only apply to 36-week courses

- College and Work Readiness Assessment (CWRA+)

Career Cluster: Architecture and Construction	
Pathway	Occupations
Construction	Electrician

Career Cluster: Arts, Audio/Video Technology and Communications	
Pathway	Occupations
Audio and Video Technology and Film	Graphic Designer Multimedia Artist, Animator
Journalism and Broadcasting	Broadcast Technician
Printing Technology	Desktop Publisher
Visual Arts	Commercial Photographer Multimedia Artist, Animator

Career Cluster: Government and Public Administration	
Pathway	Occupations
Planning	Urban and Regional Planner

Career Cluster: Science, Technology, Engineering and Mathematics	
Pathway	Occupations
Engineering and Technology	Aerospace Engineer Aerospace Engineering Technician Agricultural Engineer Architect Assembler Biomedical Engineer Chemical Engineer Civil Engineer Civil Engineering Technician Commercial and Industrial Designer

Career Cluster: Science, Technology, Engineering and Mathematics

Pathway	Occupations
	<p> Computer Hardware Engineer Computer Programmer Computer Software Engineer Electrical Engineer Electrical Engineering Technician Electro-Mechanical Technician Electronics Engineering Technician Engineer Engineering Manager Engineering Technician Environmental Engineer Human Factors Engineer Industrial Engineer Industrial Engineering Technician Landscape Architect Machine Setter, Operator Manufacturing Systems Engineer Marine Engineer Materials Engineer Mechanical Drafter Mechanical Engineer Mechanical Engineering Technician Network and Computer Systems Administrator Network Systems and Data Communication Analyst Nuclear Engineer Petroleum Engineer Power Systems Engineer Production, Planning, Expediting Clerk Project Manager Quality Engineer Quality Technician Statistician Stockroom, Warehouse, or Storage Yard Stock Clerk Systems Analyst Technical Writer Telecommunications Specialist Transportation Manager </p>
<p>Science and Mathematics</p>	<p> Animal Nutritionist Animal Scientist Atmospheric Scientist Biologist Botanist Ecologist Economist Environmental Scientist Geoscientist Hydrologist Materials Scientist Oceanographer Plant Biologist Plant Breeder and Geneticist Plant Pathologist </p>

Career Cluster: Science, Technology, Engineering and Mathematics

Pathway	Occupations
	Research Chemist Secondary School Teacher Technical Writer Toxicologist Veterinarian Veterinary Assistant