

Construction Technology

8432 18 weeks

8431 36 weeks

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Course Description

Suggested Grade Level: 9 or 10 or 11 or 12

Students build structures and engage in hands-on projects exposing them to commercial, industrial, residential, public works and institutional technologies to help them understand construction careers. They learn proper safety procedures for tools and machinery, vocabulary and terms associated with construction, blueprint reading and symbols associated with architecture, and math concepts and principles used in construction.

As noted in [Superintendent's Memo #058-17 \(2-28-2017\)](#), this Career and Technical Education (CTE) course must maintain a maximum pupil-to-teacher ratio of 20 students to one teacher, due

to safety regulations. The 2016-2018 biennial budget waiver of the teacher-to-pupil ratio staffing requirement does not apply.

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	8431	8432	Tasks/Competencies
Exploring Types of Structures			
39	⊕	⊕	Describe how structures evolved from ancient times to the present.
40	⊕	⊕	Categorize structures/infrastructures as residential, commercial, industrial, institutional, transportation, and public works projects.
41	⊕	⊕	Identify construction techniques for transportation and public works.
42	⊕	○	Explain why dams are constructed.
43	⊕	⊕	Describe the features of a dam.
44	⊕	⊕	Create a model of a dam used to generate electricity.
45	⊕	⊕	Identify the major components of bridges.
46	⊕	⊕	Describe bridge types.
47	⊕	⊕	Create a model of a segmented concrete box girder, arched, trussed, or suspension bridge.
48	⊕	⊕	Describe considerations for planning and designing roads.
49	⊕	⊕	Explore trends in construction of buildings.
Examining the Impacts of Construction			
50	⊕	⊕	Perform a technology assessment of the impacts of residential structures on individuals, families, and communities.
51	⊕	⊕	Describe the impacts of public works construction.

52	+	○	Prepare a presentation distinguishing a civil, commercial, industrial, and/or institutional structure's impact.
Investigating Careers Associated with Construction			
53	+	+	Research careers associated with construction.
54	+	+	Deliver a presentation on career research.
Exploring Preconstruction			
55	+	+	Summarize preconstruction activities for construction systems.
56	+	+	Identify aspects of construction planning.
57	+	+	Create documents necessary for the construction process.
58	+	○	Document a site layout.
59	+	○	Perform a site survey.
60	+	+	Interpret architectural plans and symbols.
Exploring Construction Processes			
61	+	+	Identify residential construction materials and their properties.
62	+	+	Identify construction activities.
63	+	○	Prepare a residential home construction schedule.
64	+	○	Estimate a residential or site work construction project.
65	+	○	Use standard construction techniques to build a structure (e.g., model, cross-section of a wall, simple structure).
66	+	+	Compute units of measurement common in areas of construction.
67	+	+	Identify approvals/occupancy activities.
68	+	+	Justify all safety rules and procedures associated with construction and laboratory activities.

Legend: + Essential ○ Non-essential ⊖ Omitted

Curriculum Framework

Exploring Types of Structures

Task Number 39

Describe how structures evolved from ancient times to the present.

Definition

Description should include

- early shelters
- permanent developments
- types of materials
- innovative processes
- infrastructure.

Process/Skill Questions

- What are some of the early types of structural human habitats?
- When was the Public Works Administration (PWA) created? Why was it created?
- How have ancient construction tools defined modern day construction tools?
- What building materials used in ancient times are still used today? How have they changed?

ITEEA National Standards

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

11. Apply the Design Processes

2. The Core Concepts of Technology

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

8. The Attributes of Design

9. Engineering Design

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Computer-Aided Design (CAD), Engineering

Engineering Design

Essays on Technology

Extemporaneous Speech

Prepared Presentation

Structural Design and Engineering

System Control Technology

Technology Bowl

Task Number 40

Categorize structures/infrastructures as residential, commercial, industrial, institutional, transportation, and public works projects.

Definition

Categorization should include examples of

- structures
 - houses
 - apartment complexes
 - modular homes
 - schools
 - shopping centers
 - courthouses
 - libraries
 - fire stations
 - service stations

- post offices
- power plants
- infrastructures
 - roads
 - bridges
 - dams
 - tunnels
 - sewer systems
 - utilities.

Process/Skill Questions

- What is the sole purpose of a dwelling or a residential structure?
- What is the difference between a commercial and an industrial building?
- Who designs roads and highways?
- How do building codes affect the construction process of different structures?

ITEEA National Standards

18. Transportation Technologies

20. Construction Technologies

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

5. The Effects of Technology on the Environment

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

7. The Influence of Technology on History

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Computer-Aided Design (CAD), Engineering

Debating Technological Issues

Engineering Design

Essays on Technology

Prepared Presentation

Principles of Technology (Virginia only)

Structural Design and Engineering

System Control Technology

Technology Bowl

Task Number 41

Identify construction techniques for transportation and public works.

Definition

Identification should include

- surveying
- staking
- clearing sites/grubbing
- excavating
- filling
- packing
- paving
- laying pipe, conduit, cable.

Process/Skill Questions

- What is the importance of surveying during construction, and what are the impacts of correct/incorrect surveying procedures?
- What is the relationship between surveying and city records?
- Once the agreement to build a facility is made between customer and developer, what is the process for preparing the site to receive the facility?
- At what point during the preparation of a facility site are the first utilities installed, and what are they?
- What are the different types of paving, and when and how does paving take place during construction?

ITEEA National Standards

20. Construction Technologies

Task Number 42

Explain why dams are constructed.

Definition

Explanation should include efforts to

- control flooding
- provide water supply
- generate power
- control erosion
- provide recreation.

Process/Skill Questions

- What is hydroelectricity, when and where was it first used, and what are its impacts today?
- What justifies the building of a dam?
- How were dams first established and built? How have they transformed over time?
- What are the environmental and social effects of dams?
- What may be in the future for dams?

Task Number 43

Describe the features of a dam.

Definition

Description should include

- earthen or concrete embankment
- outlet works
- spillway.

Process/Skill Questions

- What are the names and characteristics of the four most popular dams in North America?
- Identify and describe the effects of a recent dam failure. What was the cause and what was the effect of the failure?

- What are outlet works, and how do they affect the structure of dams?
- What are spillways, where are they used, and what are the impacts if/when they malfunction?

Task Number 44

Create a model of a dam used to generate electricity.

Definition

Creation should include research into hydroelectric facilities.

Process/Skill Questions

- What is hydroelectric power, and what is a hydroelectric power plant?
- How is electricity generated from a hydroelectric power plant?
- What are the environmental impacts of creating hydroelectric power?
- What are the advantages and disadvantages of using hydroelectric power?

ITEEA National Standards

12. Use and Maintain Technological Products and Systems

9. Engineering Design

Task Number 45

Identify the major components of bridges.

Definition

Identification should include

- superstructure
- substructure, including abutment, piers, piles, footing.

Process/Skill Questions

- What are the names of support elements used in bridges?
- What materials are used when creating bridges?
- What are compression, tension, and shear forces?
- How do these forces (e.g., compression, tension, shear) affect bridge construction?

Task Number 46

Describe bridge types.

Definition

Description should include

- fixed bridges (e.g., slab, truss, arch, suspension, segmented concrete box girder)
- movable bridges (e.g., bascule, lift, swing).

Process/Skill Questions

- What materials are used in modern-day bridge construction?
- What are the environmental impacts caused by bridge development?
- How does the span affect the type of bridge to be built?
- Who is involved in the construction of a bridge?

ITEEA National Standards

12. Use and Maintain Technological Products and Systems

9. Engineering Design

Task Number 47

Create a model of a segmented concrete box girder, arched, trussed, or suspension bridge.

Definition

Creation should include

- abutments and superstructure
- calculations for slope
- length of ramp (if any)
- calculations for weight
- volume of material needed.

Process/Skill Questions

- How do different bridge designs transfer loads to support the traffic above?
- What factors determine the bridge design?
- Which design is best for a particular situation? Provide examples.

ITEEA National Standards

12. Use and Maintain Technological Products and Systems

9. Engineering Design

TSA Competitive Events

Structural Design and Engineering

Task Number 48

Describe considerations for planning and designing roads.

Definition

Description should include

- how much traffic is expected
- which route is most practical
- how much the road will cost
- how long it will take to build
- the city, state, and federal standards for such a road.

Process/Skill Questions

- What are safety considerations for a road?
- Where will material to build the road come from? How far away will the material be located?
- What potential problems may arise?
- What environmental concerns must be reviewed?
- What types of engineers will be involved in the design and construction process?

ITEEA National Standards

11. Apply the Design Processes

16. Energy and Power Technologies

18. Transportation Technologies

2. The Core Concepts of Technology

20. Construction Technologies

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

8. The Attributes of Design

9. Engineering Design

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Computer-Aided Design (CAD), Engineering

Debating Technological Issues

Engineering Design

Extemporaneous Speech

Prepared Presentation

Structural Design and Engineering

System Control Technology

Technology Bowl

Task Number 49

Explore trends in construction of buildings.

Definition

Exploration should include

- green methods
 - National Green Building Standard (NGBS)
 - Leadership in Energy and Environmental Design (LEED)
 - location and transportation
 - sustainable sites
 - water efficiency
 - energy and atmosphere
 - materials and resources
- alternative materials and methods
- accelerated construction
- urban planning
- design-build.

Process/Skill Questions

- What energy-efficient innovations are incorporated into today's structures?
- How are current trends affecting future development in construction?
- How is urban planning concerned with public welfare?

ITEEA National Standards

19. Manufacturing Technologies

5. The Effects of Technology on the Environment

TSA Competitive Events

Architectural Design

Debating Technological Issues

Engineering Design

Essays on Technology

Extemporaneous Speech

Geospatial Technology (Virginia only)

Prepared Presentation

Principles of Technology (Virginia only)

Technology Bowl

Examining the Impacts of Construction

Task Number 50

Perform a technology assessment of the impacts of residential structures on individuals, families, and communities.

Definition

Performance should include

- commute time
- traffic
- scenic views
- noise
- property value
- schools
- retail space
- stormwater management
- wastewater management.

Process/Skill Questions

- How could current transportation costs affect where one chooses to live or work?
- When might a municipal airport have a negative impact on an individual community?
- How might communities affect the environment?

ITEEA National Standards

2. The Core Concepts of Technology

20. Construction Technologies

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

5. The Effects of Technology on the Environment

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

TSA Competitive Events

Debating Technological Issues

Essays on Technology

Extemporaneous Speech

Prepared Presentation

Technology Bowl

Task Number 51

Describe the impacts of public works construction.

Definition

Description should include the environmental impacts and both positive and negative implications of the following factors:

- social
- historical
- cultural
- economic
- political
- technical.

Process/Skill Questions

- What characteristics define a project as public works?
- Why are some projects selected to be public works projects?
- What makes a public works project stand out?
- Whom do these projects usually benefit most and why?

ITEEA National Standards

11. Apply the Design Processes

16. Energy and Power Technologies

18. Transportation Technologies

2. The Core Concepts of Technology

20. Construction Technologies

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

8. The Attributes of Design

9. Engineering Design

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Computer-Aided Design (CAD), Engineering

Debating Technological Issues

Engineering Design

Essays on Technology

Extemporaneous Speech

Prepared Presentation

Structural Design and Engineering

System Control Technology

Technology Bowl

Task Number 52

Prepare a presentation distinguishing a civil, commercial, industrial, and/or institutional structure's impact.

Definition

Preparation should include both positive and negative impacts.

Process/Skill Questions

- What are the positive and negative impacts of a prison or a factory on a community?
- What are the positive and negative impacts of a large or small residential subdivision on a community?
- What are the positive and negative impacts of a commercial site (e.g., shopping center, business park) on a community?

ITEEA National Standards

2. The Core Concepts of Technology

20. Construction Technologies

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

5. The Effects of Technology on the Environment

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

TSA Competitive Events

Debating Technological Issues

Essays on Technology

Extemporaneous Speech

Prepared Presentation

Technology Bowl

Investigating Careers Associated with Construction

Task Number 53

Research careers associated with construction.

Definition

Research should include a variety of jobs and consider

- salaries
- education and training requirements
- job activities
- work environment.

Process/Skill Questions

- Where might one look to find job salaries?
- What education and/or certifications are required for different jobs in the construction field?
- How might similar jobs differ in different areas of the country?

ITEEA National Standards

15. Agricultural and Related Biotechnologies

16. Energy and Power Technologies

18. Transportation Technologies

20. Construction Technologies

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

TSA Competitive Events

Essays on Technology

Prepared Presentation

Technology Bowl

Task Number 54

Deliver a presentation on career research.

Definition

Delivery should include a digital slide show revealing

- information about education, salaries, work environment
- photos/graphics of activities involved in the jobs.

Process/Skill Questions

- Where can you find information regarding education, salaries, and work environment?
- Where can you find photos/graphics related to careers? What requirements, if any, must you follow to legally use them?
- What interested you in this career choice?

Exploring Preconstruction

Task Number 55

Summarize preconstruction activities for construction systems.

Definition

Summary should include activities such as

- site identification
- surveying
- utility access plan
- permitting process
- adherence to zoning regulations
- creation of facility design
- plans for bidding
- budgeting
- contracting
- landscape design.

Process/Skill Questions

- How do form, function, and cost affect the final structure?
- What is a construction loan?
- What is the responsibility of a zoning commission?

ITEEA National Standards

11. Apply the Design Processes

13. Assess the Impact of Products and Systems

20. Construction Technologies

3. The Relationships Among Technologies and the Connections Between Technology and Other Fields

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

5. The Effects of Technology on the Environment

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

TSA Competitive Events

Architectural Design

Essays on Technology

Extemporaneous Speech

Prepared Presentation

Structural Design and Engineering

Technology Bowl

Task Number 56

Identify aspects of construction planning.

Definition

Identification should include

- zoning requirements
- permitting process
- plan development (e.g., material estimation, hiring, contractor, subcontractors)
- inspection
- ongoing building maintenance and repair.

Process/Skill Questions

- What types of financing are available?
- What issues do zoning boards address?
- At what stage in the construction process are building permits necessary?

ITEEA National Standards

11. Apply the Design Processes

16. Energy and Power Technologies

18. Transportation Technologies

2. The Core Concepts of Technology

20. Construction Technologies

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

8. The Attributes of Design

9. Engineering Design

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Computer-Aided Design (CAD), Engineering

Debating Technological Issues

Engineering Design

Essays on Technology

Extemporaneous Speech

Prepared Presentation

Structural Design and Engineering

System Control Technology

Technology Bowl

Task Number 57

Create documents necessary for the construction process.

Definition

Creation should include

- budget
- financing plan
- design (site layout and structure)
- site development
- scheduling
- purchase orders
- construction timeline.

Process/Skill Questions

- What categories are required in a budget for a house?
- In what order would activities be scheduled?
- What is a construction timeline?

Task Number 58

Document a site layout.

Definition

Documentation should include

- topographic features

- boundaries
- benchmarks
- building location
- curb and gutter
- sidewalks
- stormwater inlets
- point of reference
- height of instrument
- backsight
- foresight
- facilities needed on site (e.g., security, parking, temporary facilities, emergencies routes)
- tools, machines, equipment, etc., needed on site.

Process/Skill Questions

- What is a site plan?
- Where do you begin to lay out a site?
- Where do you find surveying information?
- How are grades determined and measured?
- What are benchmarks, and why are they important?
- Why is it important to journal survey readings?
- What topographic features are represented on a site plan?
- What are setbacks, property lines, and utility lines?
- What is identified on a topographic survey?
- When are surveys required?
- What information is required to do a survey?

ITEEA National Standards

20. Construction Technologies

Task Number 59

Perform a site survey.

Definition

Performance should include

- surveying equipment
 - Geographic Positioning System (GPS)
 - measuring tape
 - theodolite

- transits
- tachymeter
- leveling rods
- plumb bob
- references
- field books.

Process/Skill Questions

- What is the purpose of surveying equipment?
- What equipment is necessary for different surveys?
- How do you use the surveying equipment?
- What is a boundary survey?
- How would you lay out a boundary? (e.g., soccer field, house, parking lot, etc.)
- How does one survey the boundary of an existing structure or site?
- What is a lot survey?

ITEEA National Standards

12. Use and Maintain Technological Products and Systems

Task Number 60

Interpret architectural plans and symbols.

Definition

Interpretation may include

- elevation
- floor plan
- structural drawings
- detail drawings
- electrical symbols
- plumbing symbols
- HVAC symbols
- survey symbols
- foundation plans
- site plans.

Process/Skill Questions

- What is a property line?

- What information is provided on a floor plan?
- How are elevations indicated on a set of plans?
- What are the differences between floor plans and foundation plans?
- What existing utilities should be considered for design?

ITEEA National Standards

12. Use and Maintain Technological Products and Systems

17. Information and Communication Technologies

2. The Core Concepts of Technology

20. Construction Technologies

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Exploring Construction Processes

Task Number 61

Identify residential construction materials and their properties.

Definition

Identification may include

- concrete type and grades
- mortar types
- lumber type and grades
- composite materials

- soils
- aggregates
- asphalt
- engineered materials
- insulation
- structural metals
- flooring
- interior wall coverings
- exterior structural coverings
- plumbing and electrical materials
- fasteners
- roofing materials.

Process/Skill Questions

- How are hardwoods different from softwoods in terms of characteristics for use/selection for a building project?
- What materials are used for roofing?
- How is R-value used to determine insulation choices?
- What is a floating floor?
- How have rough-in plumbing techniques changed?

ITEEA National Standards

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

19. Manufacturing Technologies

2. The Core Concepts of Technology

20. Construction Technologies

3. The Relationships Among Technologies and the Connections Between Technology and Other Fields

5. The Effects of Technology on the Environment

TSA Competitive Events

Architectural Design

Debating Technological Issues

Engineering Design

Essays on Technology

Prepared Presentation

Structural Design and Engineering

System Control Technology

Technology Bowl

Task Number 62

Identify construction activities.

Definition

Identification should include

- surveying
- site preparation/excavation
- footings and formwork
- foundation
- framing (e.g., walls, windows, doors)
- mechanical, electrical, plumbing (MEP) rough-ins
- exterior finishes (e.g., roofing, exterior insulation and finishing system (EIFS), siding)
- interior finishes (e.g., insulation, dry wall, painting, trim, cabinets, flooring)
- site infrastructure (e.g., roadways, utilities, stormwater systems)
- site completion
- project/site closeout.

Process/Skill Questions

- What types of machines are used in site excavation and preparation?
- What is a pier foundation?
- What is HVAC?
- What considerations in scheduling should be made?

ITEEA National Standards

12. Use and Maintain Technological Products and Systems

2. The Core Concepts of Technology

20. Construction Technologies

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Computer-Aided Design (CAD), Engineering

Essays on Technology

Extemporaneous Speech

Prepared Presentation

Structural Design and Engineering

System Control Technology

Technology Bowl

Task Number 63

Prepare a residential home construction schedule.

Definition

Preparation should include

- start and completion date for each of the following phases:
 - site survey
 - site plans created (i.e., existing topography, home plans added)
 - site preparation (e.g., cleaning, demolition, fill/excavation, erosion and sediment control)
 - site excavation
 - footings
 - foundation
 - utilities installed (underground/overhead)
 - framing (e.g., windows, walls, doors)
 - mechanical, electrical, and plumbing (MEP) rough-ins

- exterior finishes (e.g., roofing, siding)
- interior finishes (e.g., insulation, dry wall, painting, trim, cabinets, flooring)
- site completion
- materials, equipment, and lead times
- resources (e.g., manpower)
- weather
- inspections.

Process/Skill Questions

- What is a construction schedule? Why is it important?
- What contractors are needed from planning to completion?
- What possible complications could occur due to poor scheduling?

ITEEA National Standards

11. Apply the Design Processes

12. Use and Maintain Technological Products and Systems

17. Information and Communication Technologies

20. Construction Technologies

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

TSA Competitive Events

Architectural Design

Debating Technological Issues

Essays on Technology

Extemporaneous Speech

Prepared Presentation

Technology Bowl

Task Number 64

Estimate a residential or site work construction project.

Definition

Estimation should include a bill of materials and their costs, plus labor and equipment.

Process/Skill Questions

- What computer program could be used to prepare a bill of materials?
- What materials/labor/equipment is needed?
- How should the bill of materials be organized?
- How should the cost of labor be calculated?

ITEEA National Standards

17. Information and Communication Technologies

20. Construction Technologies

Task Number 65

Use standard construction techniques to build a structure (e.g., model, cross-section of a wall, simple structure).

Definition

Use may include

- footing and foundation construction
- assembly of structural members
- installation of utilities
- control of manual and power tools
- measurement devices.

Process/Skill Questions

- What is a frost line?
- How do you determine how much concrete is needed to pour a foundation?
- How is a roof pitch determined?
- What are examples of moisture barriers used in construction?
- What is the significance of 16 inches on center?

ITEEA National Standards

11. Apply the Design Processes

16. Energy and Power Technologies

2. The Core Concepts of Technology

20. Construction Technologies

5. The Effects of Technology on the Environment

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

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8. The Attributes of Design

9. Engineering Design

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

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Debating Technological Issues

Engineering Design

Essays on Technology

Extemporaneous Speech

Prepared Presentation

Structural Design and Engineering

System Control Technology

Technology Bowl

Task Number 66

Compute units of measurement common in areas of construction.

Definition

Computation should include units within the standard and the metric system for

- surveyors (distance, angles, etc.)
- architects/engineers (linear, scales, angles, ratios, etc.)
- contractors/plumbers (linear, area, volume, etc.)
- electricians (linear, voltage, amperage, watts, etc.)
- masons (linear, area, volume, etc.)

Process/Skill Questions

- What two measurements are used to measure distance?
- What common scales are used in construction?
- What unit of measurement is used to indicate amperage?

ITEEA National Standards

20. Construction Technologies

3. The Relationships Among Technologies and the Connections Between Technology and Other Fields

8. The Attributes of Design

9. Engineering Design

TSA Competitive Events

Architectural Design

Computer-Aided Design (CAD), Architecture

Computer-Aided Design (CAD), Engineering

Prepared Presentation

Principles of Technology (Virginia only)

Task Number 67

Identify approvals/occupancy activities.

Definition

Identification should include

- walk-through
- job-site cleanup
- landscaping
- final inspections/sign-offs
- certificate of occupancy
- financial closures
- title search
- structure title or deed transfer
- record drawings
- punch lists
- warranty service.

Process/Skill Questions

- Who issues the occupancy permit?
- What is the purpose of a mechanic's lien?
- What is the purpose of a punch list?

ITEEA National Standards

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

11. Apply the Design Processes

12. Use and Maintain Technological Products and Systems

17. Information and Communication Technologies

20. Construction Technologies

5. The Effects of Technology on the Environment

TSA Competitive Events

Debating Technological Issues

Essays on Technology

Extemporaneous Speech

Prepared Presentation

Technology Bowl

Task Number 68

Justify all safety rules and procedures associated with construction and laboratory activities.

Definition

Justification should include

- using, maintaining, and storing construction tools correctly
- maintaining a clean and well-organized workspace and jobsite
- wearing safety gear and clothing appropriate to the task
- adhering to state and federal safety rules regarding safe worksite practices.

Process/Skill Questions

- What agency sets the national standards for safety on construction sites?
- What are the potential consequences when one fails to follow safety procedures on a worksite?
- How often should electrical tools be inspected?

ITEEA National Standards

12. Use and Maintain Technological Products and Systems

2. The Core Concepts of Technology

20. Construction Technologies

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

5. The Effects of Technology on the Environment

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

TSA Competitive Events

Architectural Design

Debating Technological Issues

Essays on Technology

Prepared Presentation

Technology Bowl

SOL Correlation by Task

39	Describe how structures evolved from ancient times to the present.	English: 9.5, 10.5, 11.5, 12.5 History and Social Science: WHI.2, WHI.5, WHI.6, WHI.9
40	Categorize structures/infrastructures as residential, commercial, industrial, institutional, transportation, and public works projects.	History and Social Science: GOVT.9, GOVT.15, VUS.8, VUS.9, VUS.10, WG.16, WG.17, WHI.6, WHII.8
41	Identify construction techniques for transportation and public works.	English: 9.5, 10.5, 11.5, 12.5
42	Explain why dams are constructed.	English: 9.5, 10.5, 11.5, 12.5 Science: ES.7a
43	Describe the features of a dam.	Mathematics: G.3, G.4, G.5, G.13
44	Create a model of a dam used to generate electricity.	
45	Identify the major components of bridges.	Mathematics: G.2, G.3, G.5, G.6
46	Describe bridge types.	Mathematics: G.2, G.3, G.5
47	Create a model of a segmented concrete box girder, arched, trussed, or suspension bridge.	Mathematics: G.2, G.3, G.4, G.5, G.13

48	Describe considerations for planning and designing roads.	English: 9.5, 10.5, 11.5, 12.5 History and Social Science: GOVT.1, GOVT.9, GOVT.15, WG.3, WG.4, WG.16 Mathematics: A.3, A.4, G.5, G.13, G.14 Science: ES.6, ES.12
49	Explore trends in construction of buildings.	English: 9.5, 9.8, 10.5, 10.8, 11.5, 11.8, 12.5, 12.8 History and Social Science: GOVT.9, GOVT.15, WG.16, WG.17
50	Perform a technology assessment of the impacts of residential structures on individuals, families, and communities.	English: 9.5, 10.5, 11.5, 12.5 History and Social Science: GOVT.1, GOVT.9, GOVT.15, WG.16 Mathematics: A.3, A.4, A.5
51	Describe the impacts of public works construction.	English: 9.5, 10.5, 11.5, 12.5 History and Social Science: GOVT.1, GOVT.9, GOVT.15, VUS.9, VUS.10, WG.3, WG.4, WG.16 Mathematics: G.5, G.13, G.14
52	Prepare a presentation distinguishing a civil, commercial, industrial, and/or institutional structure's impact.	English: 9.5, 10.5, 11.5, 12.5
53	Research careers associated with construction.	English: 9.5, 9.8, 10.5, 10.8, 11.5, 11.8, 12.5, 12.8
54	Deliver a presentation on career research.	English: 9.1, 9.2, 9.5, 9.8, 10.1, 10.2, 10.5, 10.8, 11.1, 11.2, 11.5, 11.8, 12.1, 12.2, 12.5, 12.8
55	Summarize preconstruction activities for construction systems.	English: 9.5, 10.5, 11.5, 12.5 History and Social Science: GOVT.1, GOVT.9, GOVT.15, WG.3, WG.4, WG.16

		Mathematics: A.3, A.4, G.2, G.5, G.6, G.7, G.13
56	Identify aspects of construction planning.	History and Social Science: GOVT.1, GOVT.9, GOVT.15, WG.3, WG.4, WG.16 Mathematics: G.5, G.13, G.14
57	Create documents necessary for the construction process.	Mathematics: A.3, A.4, G.2, G.5, G.6, G.7, G.13
58	Document a site layout.	Mathematics: A.3, A.4, G.2, G.5, G.6, G.7, G.13 Science: ES.7, ES.1d
59	Perform a site survey.	Mathematics: A.3, A.4, G.2, G.5, G.13
60	Interpret architectural plans and symbols.	Mathematics: G.2, G.3, G.4, G.5
61	Identify residential construction materials and their properties.	English: 9.5, 10.5, 11.5, 12.5 Science: ES.8, PH.4, PH.11
62	Identify construction activities.	English: 9.5, 10.5, 11.5, 12.5
63	Prepare a residential home construction schedule.	English: 9.5, 9.6, 10.5, 10.6, 11.5, 11.6, 12.5, 12.6
64	Estimate a residential or site work construction project.	English: 9.5, 10.5, 11.5, 12.5 Mathematics: A.4, A.5, COM.1
65	Use standard construction techniques to build a structure (e.g., model, cross-section of a wall, simple structure).	Mathematics: G.2, G.3, G.4, G.5, G.7, G.13
66	Compute units of measurement common in areas of construction.	Mathematics: A.3, A.4, G.2, G.3, G.13 Science: PH.11
67	Identify approvals/occupancy activities.	English: 9.5, 10.5, 11.5, 12.5 Mathematics: A.3, A.4
68	Justify all safety rules and procedures associated with construction and laboratory activities.	English: 9.5, 10.5, 11.5, 12.5 History and Social Science: GOVT.9, GOVT.16

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.

Entrepreneurship Infusion Units

Entrepreneurship Infusion Units may be used to help students achieve additional, focused competencies and enhance the validated tasks/competencies related to identifying and starting a new business venture. Because the unit is a complement to certain designated courses and is not mandatory, all tasks/competencies are marked “optional.”

Appendix: Credentials, Course Sequences, and Career Cluster Information

Industry Credentials: Only apply to 36-week courses

- College and Work Readiness Assessment (CWRA+)
- Customer Service Specialist (CSS) Examination
- National Career Readiness Certificate Assessment
- Workplace Readiness Skills for the Commonwealth Examination

Concentration sequences: *A combination of this course and those below, equivalent to two 36-week courses, is a concentration sequence. Students wishing to complete a specialization may take additional courses based on their career pathways. A program completer is a student who has met the requirements for a CTE concentration sequence and all other requirements for high school graduation or an approved alternative education program.*

- Architectural Drawing and Design (8437/36 weeks)
- Energy and Power (8448/36 weeks)
- Entertainment Design and Technology (8489/36 weeks)
- Manufacturing Systems I (8425/36 weeks)
- Manufacturing Systems I (8426/18 weeks)
- Materials and Processes Technology (8433/36 weeks)
- Materials and Processes Technology (8478/18 weeks)
- Production Systems (8447/36 weeks)
- Production Systems (8446/18 weeks)
- Sustainability and Renewable Technologies (8414/36 weeks)

Career Cluster: Architecture and Construction	
Pathway	Occupations
Construction	Carpenter Construction and Building Inspector Construction Manager Drywall Installer Electrician General Contractor Mason Project Manager Roofer
Design/Pre-Construction	Architect Architectural Drafter Building Code Inspector Civil Engineer Cost Estimator

Career Cluster: Architecture and Construction	
Pathway	Occupations
	Interior Designer Landscape Architect Survey Technician Surveyor
Maintenance and Operations	Carpenter Construction and Building Inspector Construction Manager Electrician General Contractor Project Manager