Energy and Power

8495 18 weeks

8448 36 weeks

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Course Description

Suggested Grade Level: 10 or 11 or 12

In this course, students analyze energy sources and explore the generation, transmission, and distribution of electricity using the Energy Industry Fundamentals modules from the Center for Energy Workforce Development (CEWD). The course provides math, science, and technical writing skills through hands-on application. Students have an opportunity to take the Energy Industry Fundamentals Certificate Assessment.

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	8448	8495	Tasks/Competencies
Introducing Energy			
39	⊕	⊕	Describe types of energy and their uses.
40	⊕	⊕	Describe the flow of energy from source to consumer.
41	⊕	⊕	Define *energy*.
42	⊕	⊕	Demonstrate the use of tools and applications common to jobs in energy industries.
43	⊕	⊕	Demonstrate the use of instruments to measure units.
44	⊕	⊕	Convert units of measure.
45	⊕	⊕	Analyze renewable and non-renewable sources of energy.
46	⊕	⊕	Explain energy conversion.
Exploring Sources of Energy			
47	⊕	⊕	Describe the procurement and reclamation processes (for each source).
48	⊕	⊕	Analyze continuous supply and intermittent supply.
49	⊕	⊕	Describe byproduct management associated with the use of each source.
Generating Electricity			
50	⊕	⊕	Describe the conversion of energy sources (all sources) to electricity.
51	⊕	⊕	Describe the electric power generation equipment and systems.

Transmitting Electricity and Energy Sources			
52	⊕	⊕	Describe the electric transmission network, or grid.
53	⊕	○	Distinguish among the various lines used for transmission typical to Virginia.
54	⊕	⊕	Analyze schemes for transmission and grid protection and management.
55	⊕	⊕	Describe the transmission of natural gas.
56	⊕	○	Describe pipes and pressure used in the transmission of natural gas.
57	⊕	⊕	Analyze schemes for protection and management of pipelines.
Distributing Electricity and Energy Sources			
58	⊕	⊕	Describe the electric distribution network.
59	⊕	○	Demonstrate the use of personal protective equipment used in distribution.
60	⊕	⊕	Analyze schemes for distribution system protection and management.
61	⊕	⊕	Describe distribution of natural gas.
62	⊕	⊕	Explain safety issues related to natural gas distribution.
63	⊕	⊕	Analyze schemes for protection and management of natural gas distribution systems.
Preparing for Careers in the Energy Industry			
64	⊕	⊕	Examine jobs related to energy.
65	⊕	○	Earn the OSHA 10 card.
66	⊕	⊕	Participate in a mock interview.
67	⊕	⊕	Prepare a résumé or portfolio.

Legend: ⊕Essential ○Non-essential ⊖Omitted

Curriculum Framework

Introducing Energy

Task Number 39

Describe types of energy and their uses.

Definition

Description should include the use of the following types of energy to produce electricity:

- Thermal (internal energy of a system in thermodynamic equilibrium by virtue of its temperature used for such things as home heating, transportation, cooking, water heating, industrial production, boilers, nuclear medicine, x-rays)
- Mechanical (energy associated with the motion and position of an object used for such things as transportation, power production, wind turbines, steam turbines,)
- Chemical (batteries, fuel, food, used for such things as transportation, computers, phones)
- Electrical (energy made available by the flow of electric charge through a conductor used for such things as home appliances, street lights, athletic field lighting, theme parks, electric cars)

Process/Skill Questions

- What are some common applications of chemical energy?
- How might you determine the type of energy to be used?
- How is electricity a result of thermal, mechanical, or chemical generation?
- What type of energy is used to power batteries? Why is that the best choice?
- What types of energy are used in the transportation industry?

ITEEA National Standards

1. The Characteristics and Scope of Technology

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2. The Core Concepts of Technology

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

Task Number 40

Describe the flow of energy from source to consumer.

Definition

Description should include the following components:

- Source/fuels
- Generation
- Transmission
- Distribution
- Consumer

Process/Skill Questions

- How is energy modified over the flow from source to consumer?
- Why is it important for the consumer to be knowledgeable about the flow of energy?
- What are some local sources of energy? Where does your electricity come from?

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Task Number 41

Define *energy*.

Definition

Definition should include concepts including

- power derived from the use of thermal, mechanical, or chemical resources
- kinetic vs. potential energy
- units of measure (e.g., watts, volts, rem, gpm, amps, rad, BTUs, calories, horsepower, PSI, torque, Fahrenheit, lbs/hr).

Process/Skill Questions

- What is the difference between power and energy?
- What are some examples of energy doing work? What do force and distance mean in the formula?
- How is power derived from alternate energy sources?

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Task Number 42

Demonstrate the use of tools and applications common to jobs in energy industries.

Definition

Demonstration should include

- basic hand tools (e.g., screwdriver, wire strippers, wire cutters, crimpers)
- multimeters
- applications such as gauging, measuring, connecting, terminating, and grounding.

Process/Skill Questions

- What are the consequences of not being able to use basic hand tools?
- When is a multimeter used? What does it measure?
- Why is it important to use specific tools for a specific job?

ITEEA National Standards

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Task Number 43

Demonstrate the use of instruments to measure units.

Definition

Use should collect data (wattage, voltage, amperage, torque, temperature, resistance, pressure) with instruments that may include the following:

- Multimeter (digital, analog)
- Ammeter
- Voltmeter
- Oscilloscope
- Geiger counter
- Dosimeter
- Torque wrench
- Pressure gauge
- Control valve
- Spring scale
- Thermometer (red alcohol, mercury, laser, probe)

Process/Skill Questions

- How would you verify current flow?
- Why should a torque wrench be used?
- In what industry would you use a Geiger counter? Why is it used?

ITEEA National Standards

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Task Number 44

Convert units of measure.

Definition

Converting should include the use of unit conversion charts and formulas (e.g., Watt's Law, Ohm's Law, Ideal Gas Law) to convert

- metric to standard, vice versa

- scientific notation (Kilo-, mega-, giga-, micro-, etc.).

Process/Skill Questions

- Why is it important to know the difference between metric and standard measurement systems? What are the consequences of not understanding the difference?
- What is the importance of being able to apply Ohm's Law when troubleshooting equipment?
- How is scientific notation used in converting units of measure?

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Task Number 45

Analyze renewable and non-renewable sources of energy.

Definition

Analysis should include the pros and cons of the following sources:

- Fossil
  - Coal
  - Natural gas
  - Oils
- Hydro (water)
- Nuclear (uranium)
- Alternative
  - Solar
  - Wind
  - Biomass

- Emerging
    - Tidal
    - Landfill gas
    - Geothermal (natural steam vents)
    - Corn/grain
    - Algae
    - Recycled oils

Process/Skill Questions

- What is the difference between a renewable source of energy and a non-renewable source?
- What are advantages and disadvantages of renewable and nonrenewable sources?
- Why are renewable and nonrenewable sources important to sustainability?

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Task Number 46

Explain energy conversion.

Definition

Explanation should include the relationship between the source and the final output and the concepts of

- efficiency--loss of energy in conversion process (put in 100%, never get 100% out)
- kinetic vs. potential energy.

Process/Skill Questions

- What are some examples of potential energy? Kinetic energy?
- What are some examples of losses in the energy conversion process? Why is it never 100% input and output?
- What factors could improve efficiency?

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Exploring Sources of Energy

Task Number 47

Describe the procurement and reclamation processes (for each source).

Definition

Description should include definitions of

- procurement--acquiring the source, processing/converting it so that it can be used, and transporting it to the end user (i.e., generation facility, industrial facility, home owner)
- reclamation--restoration of the affected environment after the source is procured

and the specific applications of both as they relate to

  - thermal energy (e.g., mining, drilling, hydraulic fracturing, water containment)
  - mechanical energy (e.g., facility construction, generators, turbines, transmission, transportation)
  - chemical energy (e.g., refining, processing, containment, combination, disposal).

Description should also include discussion of related

- compliance issues
- regulations
- permits.

Process/Skill Questions

- Why is it important for industry to restore affected environments after procurement?
- What is your local area's permitting process?
- What are some issues related to fracking?

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Task Number 48

Analyze continuous supply and intermittent supply.

Definition

Analysis should address the concept that some sources (i.e., fossil, nuclear, biomass) provide a continuous supply where other sources (i.e., hydro, solar, wind, battery) provide supply intermittently.

Process/Skill Questions

- Why are wind and solar considered intermittent supplies of energy?
- What sources are considered continuous? What makes them continuous?

- What does “off the grid” mean? Is it possible to receive continuous energy supply off the grid?
- What can the consumer do to conserve energy? What can producers use to conserve energy?

ITEEA National Standards

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Task Number 49

Describe byproduct management associated with the use of each source.

Definition

Description should include methods and issues related to the management of byproducts from

- thermal energy, such as
    - filtration
    - chemical treatment
    - cooling tanks

    - ventilation
- mechanical energy, such as
    - recycling
    - maintenance
    - replacement of parts
- chemical energy, such as
    - HazMat
    - disposal
    - containment
    - recycling.

Process/Skill Questions

- What are some means of disposing nuclear waste?
- What are some local resources for proper recycling and disposal?
- What are the consequences of failure to properly manage byproducts?

ITEEA National Standards

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Generating Electricity

Task Number 50

Describe the conversion of energy sources (all sources) to electricity.

Definition

Description should include the following processes:

- Thermal energy (e.g., steam) is converted to mechanical energy, which is converted to electrical energy.
- Mechanical energy (e.g., water wheel) is converted to electrical energy.
- Chemical energy is converted directly to electrical energy.

Process/Skill Questions

- What are different ways of spinning a turbine?
- Why is water so important to energy production?
- How do thermal, mechanical, and chemical compare to each other in terms of overall efficiency?

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Task Number 51

Describe the electric power generation equipment and systems.

Definition

Description should include

- generators
- turbines
- batteries
- photovoltaic cells.

Process/Skill Questions

- What are the components of a generator? Of a turbine?
- What are the advantages and disadvantages of photovoltaic cells?
- What are different types of batteries? How efficient is each?

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Transmitting Electricity and Energy Sources

Task Number 52

Describe the electric transmission network, or grid.

Definition

Description should include

- a definition of *transmission*--the movement of electricity over long distances via high voltage transmission lines (69-765 kv) from a power station to substations
- identification of basic symbols

- components of the transmission network, or grid
    - power station
    - step-up transformers
    - switchyard
    - towers
    - lines (overhead and underground)
    - transmission substation
    - step-down transformers
    - breakers/fuses.

Process/Skill Questions

- What is the role of each component in the transmission of electricity?
- What is the importance of step-up and step-down transformers in a grid/network?
- What are the pros and cons of overhead lines? Underground lines?

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Task Number 53

Distinguish among the various lines used for transmission typical to Virginia.

Definition

Distinction should include the following lines and their uses:

- 500-765 kv, used for bulk transmission (substation to substation)
- 15-230 kv, used for industrial applications (e.g., paper mill, data center, computer server farm)
- 69-115 kv, used for commercial and residential substations (e.g., shopping centers, neighborhoods).

Process/Skill Questions

- What are some resources for determining appropriate line size?
- What does the size of the transmission line have to do with the amount of energy being transferred?
- Why do industrial applications require larger lines than residential applications?

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Task Number 54

Analyze schemes for transmission and grid protection and management.

Definition

Analysis should include the roles and/or uses of the following:

- Sectionalization, which is the use of protective relays to isolate faulted portions of distribution grid
- Right-of-way management
- Blackout analysis
- SmartGrid, which is a computerized electric utility, controlling and monitoring the grid from a central location
- Integration of cybersecurity
- Reliability and security organizations and regulatory bodies (e.g., North American Electric Reliability Corporation, SERC Reliability Corporation)
- Regional transmission organizations (e.g., PJM Interconnection)

Process/Skill Questions

- Why is right-of-way management important to the landowner? The consumer?
- Why are regional transmission organizations needed? What is their role in energy transmission?
- What is the purpose of a blackout analysis?
- What are some threats to the power grid? How can they be mitigated?

ITEEA National Standards

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Task Number 55

Describe the transmission of natural gas.

Definition

Description should include

- definition of *transmission*--the movement of natural gas over long distances via pipelines
- identification of basic symbols
- components of transmission, such as
    - step-up compressors
    - pipelines
    - line pack
    - step-down compressors
    - breakers
    - processing facilities.

Process/Skill Questions

- What is line pack?
- What is the role of a step-up compressor? A step-down compressor?
- How is natural gas refined before transmission to the consumer?

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Task Number 56

Describe pipes and pressure used in the transmission of natural gas.

Definition

Description should include the materials (e.g., steel, metal bar stock) used in and the varying diameters (from 6 to 48 inches) of pipes used to transmit natural gas.

Process/Skill Questions

- How do the various materials used in pipes vary with regard to efficiency? With regard to maintenance?
- Where are the widest pipes used? The narrowest pipes?

ITEEA National Standards

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Task Number 57

Analyze schemes for protection and management of pipelines.

Definition

Analysis should include

- right-of-way management
- reliability and security organizations and regulatory bodies.

ITEEA National Standards

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

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5. The Effects of Technology on the Environment

Distributing Electricity and Energy Sources

Task Number 58

Describe the electric distribution network.

Definition

Description should include

- a definition of *distribution*--the delivery of electricity via lines (primary voltages from 2400 v to 34,520 v; secondary voltages from 120 v to 480 v) from substations to consumers
- identification of basic symbols
- components of distribution, such as
    - substation (step-down transformers, switches, breakers, buss work)
    - voltage regulators
    - poles
    - distribution lines (overhead and underground)
    - protective devices (e.g., fuses, breakers, reclosers, cut-outs, grounding system)
    - services
    - meters.

Process/Skill Questions

- Where might underground lines be used instead of overhead lines?
- What is the purpose of buss work in a substation?
- What are the consequences of failure of the grounding system?
- What is the difference between a fuse and a breaker?
- How are electric meters used in billing for energy consumption?

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Task Number 59

Demonstrate the use of personal protective equipment used in distribution.

Definition

Demonstration should include

- protective rubber gloves
- protective leather gloves
- protective rubber sleeves
- eye protection
- hard hat
- face mask, shields
- foot protection
- grounding probe.

Process/Skill Questions

- What is the purpose of using a grounding probe?
- What are the legal consequences of failure to wear personal protective equipment?
- What are different ratings for PPE?

ITEEA National Standards

12. Use and Maintain Technological Products and Systems

16. Energy and Power Technologies

Task Number 60

Analyze schemes for distribution system protection and management.

Definition

Analysis should include schemes such as

- right-of-way management
- systems operations and scheduled maintenance
- sectionalization
- rolling blackouts.

Process/Skill Questions

- Why are rolling blackouts used?
- What role does sectionalization play in protecting the distribution system?
- What are the components of systems operation?

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Task Number 61

Describe distribution of natural gas.

Definition

Description should include components that make up the final steps in the delivery of natural gas to the consumer, such as

- pipelines
- tanks
- truck delivery.

Process/Skill Questions

- What are some differences between delivery of gas in rural areas and delivery in urban areas?
- What are the benefits of propane tanks to the consumer? To the utility?

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Task Number 62

Explain safety issues related to natural gas distribution.

Definition

Explanation should include

- airborne, soilborne, and waterborne issues
- flammability
- pressure
- respiratory issues
- pipeline integrity
- grounding.

Process/Skill Questions

- Why does natural gas have a "rotten egg" odor?
- What precautions should be taken before digging in one's yard?

ITEEA National Standards

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Task Number 63

Analyze schemes for protection and management of natural gas distribution systems.

Definition

Analysis should include

- disaster recovery plan
- hotlines (e.g., Miss Utility)
- pressure monitoring devices.

Process/Skill Questions

- What are some helpful resources for the development of a disaster recovery plan?
- In what situations might it be necessary to call a hotline (e.g., Miss Utility)?

ITEEA National Standards

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Preparing for Careers in the Energy Industry

Task Number 64

Examine jobs related to energy.

Definition

Examination should focus on jobs associated with energy sources, energy generation, energy transmission, and energy distribution, as well as the levels of education and training required for each job. Resources may include the National Book of Jobs, Career Clusters, and the U.S. Bureau of Labor Statistics.

Examination may also include job projections and salary information related to energy jobs.

Process/Skill Questions

- What are some local job opportunities in energy industries?
- What is the future outlook for careers in energy industries?
- What are the opportunities for advancement in energy careers?

ITEEA National Standards

16. Energy and Power Technologies

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

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

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

Task Number 65

Earn the OSHA 10 card.

Definition

Earning an OSHA 10 card

- will recognize that one has acquired 10-hours of safety instruction
- will help teach national standards for personal safety within a lab environment
- will validate safety skills to the industry
- will help workers become more safety conscious and responsible.

Process/Skill Questions

- What are the benefits of earning the OSHA 10 card?
- What is OSHA and how are its standards validated?
- Why was OSHA established and how has it evolved?

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Task Number 66

Participate in a mock interview.

Definition

Participation should include the opportunity to practice interviewing skills prior to an actual interview. Students should play a variety of roles to illustrate interviewee behaviors both desirable (e.g., maintaining eye contact, asking informed questions) and undesirable (e.g., speaking too softly, failing to answer questions completely).

Process/Skill Questions

- How can a job applicant prepare questions to ask during an interview?
- When an interviewee fails to maintain eye contact, what might that indicate to the interviewer?

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Task Number 67

Prepare a résumé or portfolio.

Definition

Preparation may include a résumé and a combination of electronic and hardcopy documents that are representative of a student's qualifications (i.e., knowledge, skills, abilities).

Preparation should include writing and gathering materials that may include

- an introduction that lists the contents of the portfolio and summarizes the student's experience
- a career-development package that includes a résumé, references, and a sample employment application
- work samples that demonstrate the student's skills
- documentation of the student's practical or work experience.

Process/Skill Questions

- After graduation, how often should a résumé or portfolio be updated?
- What materials are suitable for a portfolio?

ITEEA National Standards

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SOL Correlation by Task

39	Describe types of energy and their uses.	English: 10.5, 11.5, 12.5 Science: PH.7
40	Describe the flow of energy from source to consumer.	English: 10.5, 11.5, 12.5 Science: PH.7
41	Define *energy*.	English: 10.3, 10.5, 11.3, 11.5, 12.3, 12.5 Mathematics: A.4, AII.3 Science: PH.6, PH.7
42	Demonstrate the use of tools and applications common to jobs in energy industries.	Science: PH.1
43	Demonstrate the use of instruments to measure units.	Science: PH.1
44	Convert units of measure.	Mathematics: A.4, AII.3 Science: CH.1
45	Analyze renewable and non-renewable sources of energy.	English: 10.5, 11.5, 12.5 History and Social Science: WG.1, WG.2, WG.3, WG.4 Science: ES.6
46	Explain energy conversion.	Mathematics: A.4, A.7, AII.3 Science: PH.6, PH.7
47	Describe the procurement and reclamation processes (for each source).	English: 10.5, 11.5, 12.5 History and Social Science: GOVT.9, GOVT.15, WG.1, WG.2, WG.3, WG.4
48	Analyze continuous supply and intermittent supply.	English: 10.5, 11.5, 12.5
49	Describe byproduct management associated with the use of each source.	English: 10.5, 11.5, 12.5 History and Social Science: GOVT.8, GOVT.9, GOVT.15, GOVT.16
50	Describe the conversion of energy sources (all sources) to electricity.	English: 10.5, 11.5, 12.5

		Science: PH.7
51	Describe the electric power generation equipment and systems.	English: 10.5, 11.5, 12.5 Science: PH.11
52	Describe the electric transmission network, or grid.	English: 10.3, 10.5, 11.3, 11.5, 12.3, 12.5 Mathematics: A.4
53	Distinguish among the various lines used for transmission typical to Virginia.	English: 10.5, 11.5, 12.5 Mathematics: A.4
54	Analyze schemes for transmission and grid protection and management.	English: 10.5, 10.8, 11.5, 11.8, 12.5, 12.8 History and Social Science: GOVT.8, GOVT.9, GOVT.15
55	Describe the transmission of natural gas.	English: 10.3, 10.5, 11.3, 11.5, 12.3, 12.5
56	Describe pipes and pressure used in the transmission of natural gas.	English: 10.5, 11.5, 12.5 Mathematics: A.4, AII.3
57	Analyze schemes for protection and management of pipelines.	English: 10.5, 11.5, 12.5 History and Social Science: GOVT.8, GOVT.9, GOVT.15
58	Describe the electric distribution network.	English: 10.3, 10.5, 11.3, 11.5, 12.3, 12.5 History and Social Science: GOVT.8, GOVT.9, GOVT.15
59	Demonstrate the use of personal protective equipment used in distribution.	Science: PH.1
60	Analyze schemes for distribution system protection and management.	English: 10.5, 11.5, 12.5
61	Describe distribution of natural gas.	English: 10.5, 11.5, 12.5 History and Social Science: GOVT.8, GOVT.9, GOVT.15
62	Explain safety issues related to natural gas distribution.	English: 10.5, 11.5, 12.5 History and Social Science: GOVT.8, GOVT.9, GOVT.15 Science: CH.1
63	Analyze schemes for protection and management of natural gas distribution systems.	English: 10.5, 11.5, 12.5 History and Social Science: GOVT.8, GOVT.9, GOVT.15
64	Examine jobs related to energy.	English: 10.8, 11.8, 12.8

		History and Social Science: VUS.13, VUS.14
65	Earn the OSHA 10 card.	History and Social Science: GOVT.8, GOVT.9, GOVT.15
66	Participate in a mock interview.	English: 10.1, 11.1, 12.1
67	Prepare a résumé or portfolio.	English: 10.6, 10.7, 11.6, 11.7, 12.6, 12.7

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+)
- Energy Industry Fundamentals Certificate Assessment
- 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.*

- Construction Technology (8431/36 weeks)
- Electronics Systems I (8416/36 weeks)
- Power and Transportation (8445/36 weeks)
- Power and Transportation (8444/18 weeks)
- Renewable Energy (8408/36 weeks)
- Sustainability and Renewable Technologies (8414/36 weeks)

Career Cluster: Science, Technology, Engineering and Mathematics	
Pathway	**Occupations**
Engineering and Technology	**Civil Engineer** **Civil Engineering Technician** **Electrical Drafter** **Electrical Engineer** **Electrical Engineering Technician** **Electro-Mechanical Technician** **Electronics Engineering Technician** **Industrial Engineer** **Industrial Engineering Technician** **Manufacturing Systems Engineer** **Mechanical Engineer** **Mechanical Engineering Technician** **Nuclear Engineer** **Petroleum Engineer** **Power Systems Engineer** **Systems Analyst**

Career Cluster: Science, Technology, Engineering and Mathematics	
Pathway	**Occupations**
Science and Mathematics	**Environmental Scientist** **Hydrologist** **Secondary School Teacher** **Technical Writer**

Career Cluster: Transportation, Distribution and Logistics	
Pathway	**Occupations**
Health, Safety and Environmental Management	**Health, Safety, and Environment Manager**
Logistics Planning and Management Services	**Logistics Analyst**
Sales and Service	**Customer Service Representative (CSR)**
Transportation Systems/Infrastructure Planning, Management and Regulation	**Civil Engineer** **Civil Engineering Technician** **Urban, Regional Planner**