

Exploring Careers in Power, Structural and Technical Systems Curriculum



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Curriculum Structure

The *Exploring Careers in Power, Structural and Technical Systems Curriculum* is composed of the following lessons. Approximate lesson times are included.

Lesson	Title	Approximate Time
One	Careers in Power, Structural and Technical Systems	80-160 minutes
Two	A Power/Energy Career	70-85 minutes
Three	A Career in Structural and Technical Systems	65-75 minutes
	Total	3.5–5.5 hours

Lesson One – Careers in Power, Structural and Technical Systems

Lesson Overview

In this lesson, participants will be introduced to careers relating to power, structural and technical systems. Participants will research and explore a variety of related careers in this pathway.

Lesson Objectives

After completing this lesson, participants will be able to:

- Identify several professions in the Power, Structural and Technical Systems pathway
- Consider if any of the occupations covered in class are appropriate for them to pursue

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	• <i>Sample Careers in the Power, Structural and Technical Systems Career Pathway</i> • <i>Power, Structural and Technical Systems Pathway Classification</i>	• Print/photocopy <i>Sample Careers in the Power, Structural and Technical Systems Career Pathway</i> and <i>Power, Structural and Technical Systems Pathway Classification</i> (one per participant).	10 minutes
LEARN	• Library and internet resources • <i>Career Exploration Research Summary</i>	1. Print/photocopy the <i>Career Exploration Research Summary</i> (one for each participant).	30-90 minutes
REVIEW	• Questions for panel (optional)	1. Contact 3-5 power, structural and technical systems-related professionals, inviting them to participate in the panel discussion. 2. Set up the room with panel seating in the front and the audience facing the panel.	45-60 minutes

Lesson One – Career Opportunities in Power, Structural and Technical Systems

FOCUS: Defining the Available Career Paths

10 minutes

Purpose:

Participants will learn the variety of occupational areas that fall within the power, structural and technical systems pathway classification and how this translates into career opportunities.

Materials:

- *Sample Careers in the Power, Structural and Technical Systems Career Pathway*
- *Power, Structural and Technical Systems Pathway Classification*

Facilitation Steps:

1. Give each student the list of *Sample Careers in the Power, Structural and Technical Systems Career Pathway*. Explain that this is a list of occupations that fall within this pathway. Divide the class into small groups. Have each group look at the list of careers and try to classify or categorize similar occupations together.
2. Give the small groups the *Power, Structural and Technical Career Pathway Classification* and allow 5 minutes for them to come up with some potential classifications of job types within the Power, Structural and Technical Systems pathway. They should be prepared to discuss why they grouped the jobs as they did.
3. Explain that there is no right or wrong way to classify this pathway. They should take notes while you share the following thoughts of the diagnostic services pathway.

Here are suggested categories that students may have used:

- Power
- Structures
- Controls

- Geospatial Technology
- Computer Systems
- Electronics
- Hydraulics
- Pneumatics

4. To learn more about the job outlook for each of these types of occupational areas you can go to websites like the following:

<https://www.onetonline.org/find/career?c=1&g=Go>

Sample Careers in the Power, Structural and Technical Systems Career Pathway

Machine Operators

Electronics Systems Technicians

Agricultural Engineers

Agricultural Extension Engineering Specialists

Heavy Equipment Maintenance Technicians

Recycling Technicians

Waste Water Treatment Plant Operators

Equipment/Parts Managers

Welders

Machinists

Communication Technicians

Agricultural Applications Software Developers/Programmers

Database Administrators

Computer Service Technical Support Technicians

Information Lab Specialists

GPS Technicians

Remote Sensing Specialist

Agricultural Educator

**Power, Structural and Technical Systems Career
Pathway Classification**

Category Description	Occupations within the Category

Lesson One – Career Opportunities in Power, Structural and Technical Systems

LEARN: Research Project

30-90 minutes

Purpose:

The purpose of this activity is to have participants take a closer look at related power, structural and technical systems career options. Participants will research an occupation of their choice. Information learned from the research will be shared with the group via a brief presentation.

Materials:

- Library and internet resources
- *Career Exploration Research Summary*

Facilitation Steps:

1. Have students choose one of the careers to explore further. Give students the *Career Exploration Research Summary*. Tell them that they can use the internet or other sources in the library for their research. Here are a few helpful websites:
 1. www.bls.gov
 2. <http://www.bls.gov/ooh/>
 3. www.careerinfonet.org
2. Give students one or two class periods to complete their research. You can also assign this as homework. Students should prepare a five-minute presentation about this career including the information on the summary sheet.
3. Have each student present their chosen career to the group.

4. Here is a suggested grading rubric for the class presentation:

30 points – Completed all information on the *Career Exploration Research Summary*

20 points – Prepared for the presentation

20 points – Presentation content was clear, concise, and gave a good understanding of the chosen career

20 points – Demonstrated the ability to think critically, taking information from other sources to create something new

10 points – Demonstrated time management skills by delivering a well-planned, five-minute presentation

Name: _____ Date: _____

Career Exploration Research Summary

Identify and research one career in the Power, Structural and Technical Systems Pathway. Complete this worksheet for your career choice. Possible sources for information include your school library, public library, Bureau of Labor Statistics website, Occupational Outlook Handbook website, and other career-related websites on the internet.

Career name: _____

Degree or licenses required: _____

Length of time to complete training or earn degrees: _____

Average starting salary: _____

Job outlook: _____

Short job description:

Skills a person should have to be successful in this career:

Sources used for this project:

Lesson One – Career Opportunities in Power, Structural and Technical Systems

REVIEW: Career Panel Discussion

45-60 minutes

Purpose:

To hear from professionals who work in a variety of careers that fall within the power, structural and technical systems pathway.

Materials:

- Panel of 3-5 local professionals who are welders, machine operators, software technicians, and similar occupations

Facilitation Steps:

1. Contact local power, structural and technical systems professionals and invite them to attend a panel discussion in your class. Local professionals from a variety of related businesses would provide additional and interesting perspectives.
2. The day of the panel discussion, set up your space so that there is a table with seating for all panel members at the front of the room. If sound is an issue, have a microphone available.
3. Invite participants in the audience to ask questions to panel members. Remind participants ahead of time to keep questions relevant to work. You may ask participants to submit questions in advance if desired.

Lesson Two – A Power/Energy Career

Lesson Overview

Careers related to energy and power are roles that involve using natural and renewable resources to complete tasks and potentially help the environment. Many of these careers often use advanced technology to find solutions for enhancing energy efficiencies, decreasing pollution, and conserving energy. Students will participate in a variety of activities to better understand what a power or energy career looks like.

Lesson Objectives

After completing this lesson, participants will be able to:

- Define what a power or energy professional is
- Describe what a power or energy professional does on a typical workday
- Discuss the impact of power and energy on our lives

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	• Energy and power career videos • <i>Occupation Profile – Energy and Power Careers</i> • Internet access	1. Print/photocopy <i>Occupation Profile – Energy and Power Careers</i> (one per participant).	15 - 20 minutes
LEARN	• <i>A Day in the Life of a Power or Energy Professional</i> • Markers	1. Print/photocopy <i>A Day in the Life of a Power or Energy</i> (one per participant).	45 minutes
REVIEW	• <i>Why Do They Matter?</i>	1. Print/photocopy <i>Why Do They Matter?</i> (one per participant).	10 - 20 minutes

Lesson Two – A Power/Energy Career

FOCUS: Occupation Profile

15-20 minutes

Purpose:

Let's explore what's possible in energy or power.

Materials:

- Energy and power career videos
- *Occupation Profile – Power or Energy Careers*

Facilitation Steps:

1. Share these statistics with the participants:

The 2022 USEER analysis shows that energy jobs have rebounded, after sharply declining in 2020 due the COVID-19 pandemic and subsequent economic fallout. In 2021, energy jobs grew 4.0% from 2020, outpacing overall U.S. employment, which climbed 2.8% in the same time period. The energy sector added more than 300,000 jobs, increasing the total number of energy jobs from 7.5 million in 2020 to more than 7.8 million in 2021.

Overall employment of power plant operators, distributors, and dispatchers is projected to decline 15 percent from 2021 to 2031.

Despite declining employment, about 3,200 openings for power plant operators, distributors, and dispatchers are projected each year, on average, over the decade. All of those openings are expected to result from the need to replace workers who transfer to other occupations or exit the labor force, such as to retire.

2. Have participants access the *Occupation Profile* worksheet. They should research the information on their own and complete the sheet.
3. Play the power or energy career videos. Here are a few to choose from.

[MN FFA Foundation Career Connectors Power, Structural, & Technical Systems Pathway - YouTube](#)

[Power, structural and Tech systems - YouTube](#)

[4 Power, Structural & Technical Systems - YouTube](#)

4. After participants complete the *Occupation Profile* worksheet, have them share their answers. Explain to participants that they will use their *Occupation Profile* worksheet in the LEARN portion of the lesson.

Occupation Profile – Power or Energy Careers

Job Title:
Job Outlook:
Typical Duties:
Salary:

Required Education:

Lesson Two – A Power/Energy Career

LEARN: A Day in the Life of...

45 minutes

Purpose:

The purpose of this activity is to have participants better understand what a typical day is like for a power or energy professional

Materials:

- *A Day in the Life of a Power or Energy Professional*
- Markers

Facilitation Steps:

1. To help students understand what a typical day on the job is like working as in power or energy and share one or more of the following day in the life videos:

[Hired or Fired: Working At A Power Plant For A Day - YouTube](#)

[Day in the Life: Electrical Engineer - YouTube](#)

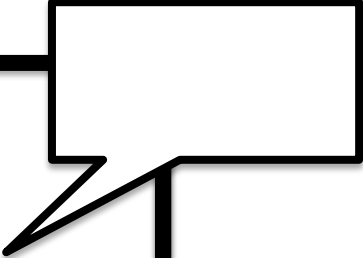
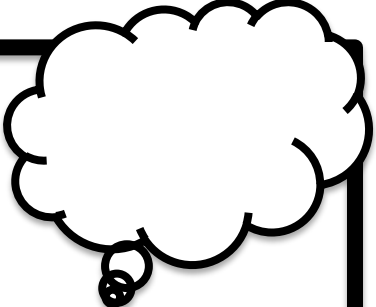
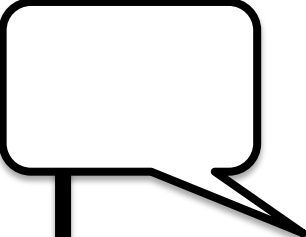
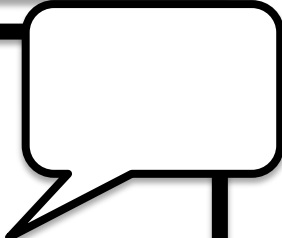
[Day In The Life of a Lineman - YouTube](#)

[Day at Work: Solar Design Engineer - YouTube](#)

[“A Day in the Life of...” a Clean Energy Specialist - YouTube](#)

2. Have participants access *A Day in the Life of Power or Energy Professional* worksheet.
3. Have participants use their completed *Occupation Outlook* worksheets to create a comic strip that typifies a day in the life of a power or energy professional.
4. Have participants create their comic strip using the *A Day in the Life of a Power or Energy Professional* worksheet. Alternatively, they may create a comic strip layout on plain paper if desired.
5. Have participants share their finished comic strips aloud. Then have them post their comic strips in a public place in the room.

A Day in the Life of a Power or Energy Professional

Lesson Two: A Power/Energy Career

REVIEW: Reflection

10-20 minutes

Purpose:

Participants will reflect on a power or energy career.

Materials:

- *Why Do They Matter?*

Facilitation Steps:

1. Explain to participants that they are going to reflect on their learning throughout this lesson.
2. Have participants access the *Why Do They Matter?* worksheet. Discuss the instructions and allow participants to ask any questions.
3. Allow participants to complete the *Reflection* part of the lesson.
4. Take time to review the participants' answers. Allow participants to share what they learned about a career in power or energy.

Why Do They Matter?



Directions: In the space provided, write at least five sentences about the benefits or impact that power or energy professionals have on society.

Lesson Three – A Career in Structural and Technical Systems

Lesson Overview

A structural engineer is a professional who designs and oversees the construction of buildings and other structures, ensuring their safety and durability. They use computer-aided design software, analyze loads and pressures, collaborate with contractors, and monitor on-site construction. Technical systems engineers are responsible for developing, maintaining, and supporting technical infrastructure, hardware, and system software components. They troubleshoot problems to find the best possible solutions. This lesson will expose students to these very important and rewarding career choices.

Lesson Objectives

After completing this lesson, participants will be able to:

- Compare and contrast the roles and requirements of structural and technical systems careers
- Understand the typical job duties performed by a structural or technical systems professional
- Discuss the requirements needed to become a structural or technical systems professional

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	• <i>Compare and Contrast</i> • Internet access	1. Print/photocopy the <i>Compare and Contrast</i> worksheet (one per participant).	10-15 minutes
LEARN	• <i>Job Search 101</i> • Internet access	1. Print/photocopy the <i>Job Search 101</i> worksheet (one per participant). 2. Create a sample copy of the <i>Job Search 101</i> worksheet to model with participants.	45 minutes
REVIEW	• <i>Training 101</i> worksheet • Internet access	1. Have participants access the <i>Training 101</i> worksheet .	10-15 minutes

Lesson Three – A Career in Structural and Technical Systems

FOCUS: Compare and Contrast

10-15 minutes

Purpose:

This activity will explore the similarities and differences between structural and technical systems careers.

Materials:

- *Compare and Contrast*
- Internet access

Facilitation Steps:

1. Share these statistics with the participants:
The job outlook for structural engineers is positive. According to the U.S. Bureau of Labor Statistics, the employment of structural engineers is projected to grow 5 percent from 2019 to 2029, faster than the average for all occupations. Job opportunities should be best for those with a bachelor's degree in civil engineering with a specialty in structural engineering.

The job market for this career pathway is expected to grow between 10% and 22% in the near future, especially for engineers in the field. Workers are needed to advance and maintain systems that are vital to agriculture.

2. Have participants access the *Compare and Contrast* worksheet. Instruct them to research more information about each profession and record similarities and differences on the chart.
3. After participants complete the *Compare and Contrast* worksheet, discuss their answers.

Lesson Three – A Career in Structural and Technical Systems

LEARN: Job Search 101

45 minutes

Purpose:

This activity aims to have participants better understand what skills are needed to become a good structural or technical systems professional.

Materials:

- *Job Search 101*
- Internet access

Facilitation Steps:

1. Share one or more videos about being structural or technical systems professional so that students understand what the job is like.

Here are a few suggested videos:

[Agriculture Science & Technology Power Structural & Technical Systems with Mr. and Mrs. Bozarth - YouTube](#)

[Power, structural and Tech systems - YouTube](#)

[Agriculture Power, Structure and Technology - YouTube](#)

2. Explain to participants that they are going to complete the *Job Search 101* worksheet.
3. Encourage participants to use internet access to look for a job advertisement for a structural or technical engineer. They should include a list of reasons they would be good candidates for the position. Alternatively, they should also list some reasons why they would be bad candidates for the job.
4. You may want to complete one example of the *Job Search 101* worksheet as a personal example to share with participants.
5. After completion, divide participants into groups of three or four. Have them discuss whether they would be well suited for this career or not.
6. Bring the entire group back together to share their responses.

Job Search 101

Directions: Look online to find a job description for a structural or technical engineer. Copy the advertisement into the space provided. Then list as many reasons as you can think of that make you a good candidate for the position. Alternatively, list any reasons you can think of that make you a poor candidate for the position.

Job Title/Advertisement:	I would be a good fit for this job because:
	I would be a poor fit for this job because:

Lesson Three – A Career in Structural and Technical Systems

REVIEW: Reflection

10-15 minutes

Purpose:

Participants will reflect on what is required to become a structural or technical systems professional.

Materials:

- *Training 101*
- Internet access

Facilitation Steps:

1. Distribute the *Training 101* worksheet.
2. Have participants research the required information for this position.
3. Allow participants to reflect on this career choice. Ask them to think about the impact these professionals have.

Training 101

Directions: Review the the job requirements needed to become a structural or technical systems professional.

Job Title:

Educational and Training Requirements:

Typical Job Duties:

Specific Skills Needed:

Approximately Salary: