Lesson One – Careers in Building Trades: Carpenter

Lesson Overview

In this lesson, students will be introduced to the career of carpentry within building trades.

Lesson Objectives

After completing this lesson, participants will be able to:

- Identify career opportunities available to carpenters
- Articulate the educational requirements, typical job duties, occupational outlook, and becoming a carpenter

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	• *What Makes a Good Carpenter* handout	1. Print/photocopy *What Makes a Good Carpenter* handout (one per pair)	10 minutes
LEARN	• *Job Description Project* instructions • *Job Postings* handout	1. Print/photocopy the *Job Description Project* instructions and *Job Postings* handout (one for each participant)	30-90 minutes
REVIEW	• *Carpentry Skills Self-Assessment* handout • *Careers Relating to Carpentry* handout • Questions for the panel (optional)	1. Print/photocopy the *Carpentry Skills Self-Assessment and Careers Relating to Carpentry* handout (one for each participant) 2. Contact local professionals, inviting them to participate in the panel discussion 3. Set up the room with panel seating in the front and audience facing the panel	5-10 minutes (optional activity 60-90 minutes)

Lesson One – Careers in Building Trades: Carpenter

FOCUS: Carpenter Skills and Abilities

10 minutes

Purpose:

Careers in Building Trades include carpentry. This lesson will take a closer look at the variety of opportunities available today for those wishing to pursue a career in this area.

Materials:

- *What Makes a Good Carpenter* handout

Facilitation Steps:

1. Share the information below with the class:

   Instructor information: Building trades encompass a variety of construction jobs, including carpentry, flooring, masonry, and plumbing. If you want to begin work immediately and have some basic skills, you can land a job as a painter, landscaper, or carpet installer with very little training or experience. As you learn the trade, you may decide to open your own business or move into a larger company. If you want to become an electrician, plumber, pipefitter, or welder, you will need to go to vocational school and complete an apprenticeship. For example, becoming an electrician requires learning the trade, becoming an apprentice, and practicing alongside a certified electrician prior to becoming licensed. This journey may take five years, but you will be paid while in training.

   This lesson will focus specifically on the carpentry area.

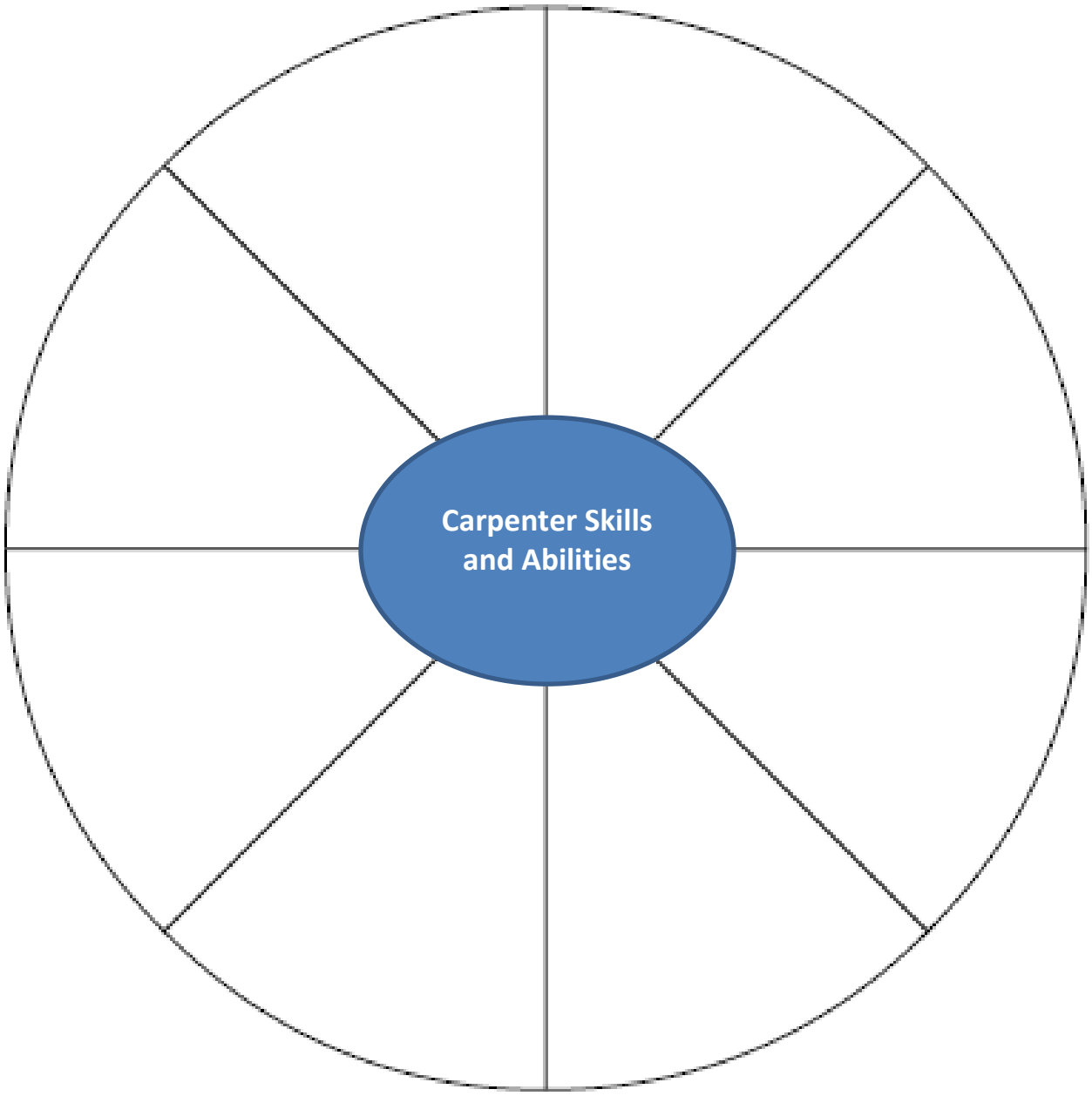
   Give students the *What Makes a Good Carpenter* handout. Have students pair up and give them five minutes to brainstorm and write down as many skills and abilities as possible.

2. Call the class back together and ask students the following question: What skills and abilities should a successful employee have as a carpenter?
3. Write student responses on a master list on a whiteboard or similar item. Continue calling upon students until every group has had a chance to contribute to the list.
4. Share a list of carpenter skills and abilities from a career or occupational website such as:

   https://www.onetonline.org/link/summary/47-2031.00

What Makes a Good Carpenter

List as many skills and abilities you can think of in the spaces provided that successful employees working as a carpenter would possess.



Lesson One – Careers in Building Trades: Carpenter

LEARN: Job Description Project

30-90 minutes

Purpose:

The purpose of this activity is to have participants take a closer look at several different careers in carpentry.

Materials:

- Library and internet resources
- *Job Description Project* instructions
- *Job Postings* handout

Facilitation Steps:

1. Give students the *Job Description Project* instructions. Tell them that they can use the internet or other sources in the library for their research. Here are a few helpful websites:
    - www.bls.gov
    - http://www.bls.gov/ooh/
    - www.careerinfonet.org
    - www.careervoyages.gov
    - http://careerplanning.about.com/od/occupations/a/car
    - http://www.myplan.com/careers/index.phpeer_briefs.htm
    - http://www.onetonline.org/find/career?c=10&g=Go
2. Give students one or two class periods to complete their research. You can also assign this as homework. Students should prepare a job posting for four positions listed in the instructions. You may give the students the *Job Postings* handout for this task.
3. The suggested grading rubric for the *Job Description Project* is 25 points for each completed job posting if all information is complete. Deduct points for missed information in required sections.

Job Description Project

Scenario: You are the Director of Human Resources for a new construction company that provides many types of building services. Your task is to hire four new employees that will work in your company. You will be completing job postings for four positions. Choose from: Carpenter, Carpenter Assistant, Framer, Cabinet Maker, Rough Carpenter, Dry Wall, and Ceiling Tile Installer (or other related titles of choice in this pathway). For each job posting, you must include the following information:

- Job title
- Degree, certification, or licenses required
- Summary of the general nature and level of the job
- List of duties or tasks performed critical to success
- Job location where the work will be conducted (environment)
- Equipment used in the performance of the job (if any)
- Starting salary range (per year or hour)

You may photocopy and use the *Job Postings* handout. Prepare four different job postings, one for each position that you need to hire.

Job Postings

Job Title	
Degree, certification, or licenses required	
Summary and level of the job	
List of duties or tasks	
Job location and work environment	
Equipment to be used – if anything specific	
Starting salary (per year or hour)	

Lesson One – Careers in Building Trades: Carpenter

REVIEW: Carpenter Skills Self-Assessment

5-10 minutes (optional activity 60-90 minutes)

Purpose:

To review what students have learned about career opportunities relating to carpentry and see if they possess the qualities to succeed in this occupational area.

Materials:

- *Carpentry Skills Self-Assessment*
- *Careers Relating to Carpentry*

Facilitation Steps:

1. Give each student the *Carpentry Skills Self-Assessment.* Give them five to ten minutes to complete it.
2. Have students add up the total number of boxes they have checked in the "Yes" column and the "No" column. If you have more yes boxes checked than no boxes, you may make a good carpenter.
3. Pass out the *Careers Relating to Carpentry* handout to those interested.

Extension Activity: Contact a variety of local employers that relate to careers in this occupational area. Invite them to attend a panel discussion in your class.

On the day of the panel discussion, set up your space with a table and seating for all panel members at the front of the room. If sound is an issue, have a microphone available.

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.

Carpentry Skills Self-Assessment

Check Yes or No, reflecting on your skills and abilities.

Yes No

___ ___ Strong critical thinking skills

___ ___Ability to monitor the performance of yourself and others, making improvements or corrective action when needed

___ ___ Effective communication skills

___ ___ Ability to read, understand and apply industry information

___ ___ Flexible and adaptable on the job

___ ___ Strong active listening skills

___ ___ Strong time management skills

___ ___ Able to use a variety of strategies in unpredictable circumstances

___ ___ Strong visualization skills, able to see how something will look

___ ___ Strong math skills

___ ___ Ability to problem solve and make decisions

___ ___ Enjoy working with your hands

___ ___ The ability to remain calm and focused in difficult situations

___ ___ The ability to work well on a team or independently with equal success

Total "Yes" _____ "No" _____

Careers Relating to Carpentry

Cabinet Maker
Carpenter (self-employed)
Concrete Carpenter
Construction Worker
Form Carpenter
Site Foreman
General Contractor
Apprentice carpenters
Beam builders
Brattice builders
Building carpenters
Carpenter apprentices
Commercial carpenters
Construction carpenters
Counter installers
Finish carpenters
Custom wood stair builders
Hardwood floor installers
House carpenters
Industrial carpenters
Residential carpenters
Rough carpenters
Wood floor layers
Framer
Assembler
Bridge Carpenter
Bridge Repair Crew Person
Brickmasons and Blockmasons
Terrazzo Workers and Finishers
Drywall and Ceiling Tile Installers

Lesson Two – Careers in Building Trades: Electrician

Lesson Overview

In this lesson, students will be introduced to the career of being an electrician. They will hear about what it takes to become an electrician as well as related occupational opportunities available.

Lesson Objectives

After completing this lesson, participants will be able to:

- Identify several professions related to the electrician career area
- Consider if becoming an electrician is a good choice for them to pursue

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	• *Careers Related to an Electrician Career Pathway* • *Food Products & Processing Services Pathway Classification* handout	1. Print/photocopy *Careers Related to an Electrician Career Pathway* 2. and *Food Products & Processing Services Pathway Classification* handout (one per participant)	10 minutes
LEARN	• Library and internet resources • *Career Exploration Research Summary* handout	1. Print/photocopy the *Career Exploration Research Summary* handout (one per participant)	30-90 minutes
REVIEW	• Questions for panel (optional)	1. Contact 3-5 food products and processing systems-related professionals inviting them to participate in the panel discussion 2. Set up the room with panel seating in the front with the audience facing the panel	45-60 minutes

Lesson Two – Careers in Building Trades: Electrician

FOCUS: Defining the Available Career Paths

10 minutes

Purpose:

Participants will learn the variety of occupational areas related to electricians and how this translates into career opportunities.

Materials:

- *Related Careers in an Electrician Career Pathway*
- *Electrician Career Pathway Classification* handout

Facilitation Steps:

1. Give each student the list of *Related Careers in an Electrician Career Pathway.* Explain that this is a list of occupations that are related to this pathway. Divide the class into small groups. Have each group look at the list of careers and try to classify or categorize like-type of occupations together.
2. Give the small groups the *Electrician Career Pathway Classification* handout and 5 minutes to develop some potential classifications of job types within the electrician pathway. They should be prepared to discuss why they grouped things as they did.
3. Explain that there is no finite right or wrong way to classify this pathway.
    - Here are suggested categories that students may have used:
        - Sales
        - Job or Project Management
        - Electrician Technical Skills
        - Safety
        - Education
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

Careers Related to an Electrician Career Pathway

Electrician's Helper: An electrician's helper is an optimal way to see if a career as an electrician is a good fit. You don't need to be licensed or take classes. Your job duties may include hauling materials, drilling holes for wires, pulling wires, and cutting holes for outlets and switches. Your boss may ask you to test wires with a voltage meter and even disconnect old and faulty components. You will surely build muscle by digging trenches by hand.

Apprentice Electrician: On-the-job training is a proven approach to learning. An apprentice works under the direct supervision of a licensed electrician while also taking approved classes. A significant benefit is getting paid while you learn.

Journeyman Electrician: Gain experience in residential, commercial and/or industrial jobs. Prove yourself a valuable employee as you install, repair, and maintain electrical systems. You'll learn to read blueprints and provide cost estimates, troubleshoot wiring and equipment, and interact with other tradespeople on a professional level.

Foreman: Coordinate and oversee the workings of a job site, including the crew. Strong leadership skills are needed.

Supervisor: Assist in planning and scheduling work. You'll manage meetings, team-building and ensure compliance to laws, safety, and work orders.

Project Manager: Be highly involved in relationships with customers. Read drawings/specs to determine the scope of projects. Monitor progress of job sites and ensure adherence to contract documents. You must have the ability to solve practical problems.

Estimator: Analyze plans/drawings and specifications to prepare time, cost, and labor estimates for projects. Identify omissions or inaccuracies in subcontractor bids.

Sales Representative: Give presentations, proposals, and quotes to customers. Implement sales plans. Be self-motivated with strong negotiation and relationship-building skills.

Sales Manager: Establish sales objectives and direct the quote and pricing process. Oversee all sales representatives. Liaise with customer and project staff, assisting with scope changes, design modifications, and various project needs.

Purchasing Agent: Employ procedures that obtain top-quality products a the most competitive price. Process purchase orders/requisitions. Schedule and coordinate delivery of materials and equipment to job sites.

Inspector: Examine and test electrical systems for conformance with local code, specification, and ordinance requirements. Must have the ability to interpret codes in the field and provide code-compliant solutions. Prepare and submit reports.

Instructor/Trainer: Provide quality instruction through well-prepared classes and labs. Demonstrate electrical practices to engineering standards and electrical codes. Document student progress. Must have a high ability to communicate accurately.

Project Engineer: Design and troubleshoot electrical control systems. Provide evaluations and recommendations for proposed plans. Design circuitry for any special sequences of operation requested by customers. Must have a good mechanical inclination.

Superintendent: Oversee and be responsible for all electrical project functions, including budget, resources, and schedule. Coordinates with contractors and sub-contractors. You will need excellent communication skills.

Master Electrician: Licensed Master electricians have extensive job knowledge and proficient understanding of the National Electrical Code. They are the electricians that have the authority to pull permits for jobs. In rare cases, a journeyman may pull a permit. At this point on the electrician's career path, you should see an increase in your wages and have wider opportunities.

Business Owner/Electrical Contractor: If desired, you can own your own electrical contracting company. Some states require a master electrician to be affiliated with your company, while others require you to only have a contractor's license.

Electrician Career Pathway Classification

Category Description	Occupations within the Category
Example: Sales	

Lesson Two – Careers in Building Trades: Electrician

LEARN: Research Project

30-90 minutes

Purpose:

The purpose of this activity is to have participants take a closer look at related electrician 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* handout

Facilitation Steps:

1. Have students choose one of the careers to explore further. Give students the *Career Exploration Research Summary* handout. Tell them that they can use the internet or other sources in the library for their research. Here are a few helpful websites:

    5. www.bls.gov
    6. http://www.bls.gov/ooh/
    7. www.careerinfonet.org
    8. www.careervoyages.gov
    9. http://careerplanning.about.com/od/occupations/a/car
    10. http://www.myplan.com/careers/index.phpeer_briefs.htm

2. Give students one or two class periods to complete their research. You can also assign this as homework. Students should prepare a short five-minute presentation about this career, including the information on the summary sheet.

3. Have each student present their chosen electrician-related 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* handout

    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 an Electrician-Related 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 Two – Careers in Building Trades: Electrician

REVIEW: Career Panel Discussion

45-60 minutes

Purpose:

To hear from electrician professionals who work in a variety of careers within the related pathway

Materials:

- A panel of 3-5 local professionals who are electricians, apprentices, business owners, sales, and similar occupations

Facilitation Steps:

1. Contact local electrician-related professionals and invite them to attend a panel discussion in your class. Electricians, apprentices, business owners, sales, and similar occupations would be great resources for students to have access to. Also, local professionals from various types 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 Three – Careers in Mechanical Trades: A Day in the Life of an Automobile Mechanic

Lesson Overview

In this lesson, students will be introduced to the career of being an automobile mechanic. They will hear about what it takes to become an auto mechanic as well as related occupational opportunities available.

Lesson Objectives

After completing this lesson, participants will be able to:

- Identify work tasks that automobile mechanics do on the job and the working conditions relating to the occupation
- Consider if an automobile mechanic career is a good fit for them
- Identify a variety of career opportunities as they relate to automobile mechanics

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	• *Career Exploration K-W-L* handout	1. Print/photocopy *Career Exploration K-W-L* handout (one per group)	10 minutes
LEARN	• Video clips about automobile mechanic careers • *List of Occupations Relating to Automobile Mechanics* • *Career Exploration Research Summary* handout	1. Choose the video clip(s) you wish to show about automobile mechanic careers and have available online 2. Print/photocopy the *List of Occupations Relating to Automobile Mechanics* and *Career Exploration Research Summary* handout (one per participant)	30-90 minutes
REVIEW	• *Career Exploration K-W-L* handout	1. Have the *Career Exploration K-W-L* handouts available 2. Contact local businesses for setting up a field trip	5-10 minutes

Lesson Three – Careers in Mechanical Trades: A Day in the Life of an Automobile Mechanic

FOCUS: K-W-L Activity

10 minutes

Purpose:

Many different occupations relate to automobile mechanics. Some of these include automotive technicians, automobile mechanics, automobile body and glass repair, and many more. This lesson will help your students become more aware of what breadth/variety of skills and education they need to work in this area. Students may be unaware of the many opportunities available to them if they wish to follow this career path.

Materials:

- *Career Exploration K-W-L* handout

Facilitation Steps:

1. Begin by defining what an automobile mechanic is and does. Share this definition with the class:

   Automotive service technicians and mechanics inspect, maintain, and repair cars and light trucks. Most automotive service technicians and mechanics work in well-ventilated and well-lit repair shops. Although technicians often identify and fix automotive problems with computers, they commonly work with greasy parts and tools, sometimes in uncomfortable positions.

2. Divide the class into pairs to work together. Hand each pair the *Career Exploration K-W-L* handout. Explain the purpose of the activity and give the pairs five minutes to complete it.

3. After five minutes, call the class back together. Ask each pair to share one thing they already know about automobile mechanic work and one thing they'd like to learn about this career pathway. Write these on a master list on a whiteboard or similar item. Continue calling upon each pair until everyone has had a chance to contribute to the K and W class chart.

Career Exploration K-W-L

Directions: With your partner, complete the “K” and “W” columns, saving the “L” column for later in the lesson. In the “K” column, identify what you already know careers relating to automobile mechanics. In the “W” column, write down what you would like to learn about a potential career in this area.

K	W	L

Lesson Three – Careers in Mechanical Trades: A Day in the Life of an Automobile Mechanic

LEARN: Research Project

30-90 minutes

Purpose:

The purpose of this activity is to have participants take a closer look at jobs relating to automobile mechanics. Participants will research one specific field of occupation and prepare a class presentation.

Materials:

- Library and internet resources
- *List of Occupations Relating to Automobile Mechanics*
- *Career Exploration Research Summary* handout

Facilitation Steps:

1. To learn more about becoming an automobile mechanic as a career choice, watch a short career video on YouTube. Here are a few suggestions, or you can keyword search "auto technician or auto mechanic.

   https://www.youtube.com/watch?v=Hl-fuWnhK_w

   https://www.youtube.com/watch?v=OUNOVPWre34

   https://www.youtube.com/watch?v=BDmQpsKwTmE

   Review the list of titles that are related to auto mechanics. Have each student choose one of the careers to explore further. Depending on how many participants are in your class, you can decide whether to allow multiple students to research the same field.

2. Give students the *Career Exploration Research Summary* handout. Tell them that they can use the internet or other sources in the library for their research. Here are a few helpful websites:

   - www.bls.gov
   - http://www.bls.gov/ooh/
   - www.careerinfonet.org
   - www.careervoyages.gov
   - http://careerplanning.about.com/od/occupations/a/car
   - http://www.myplan.com/careers/index.phpeer_briefs.htm
   - http://www.onetonline.org/find/career?c=10&g=Go

3. Give students one or two class periods to complete their research. You can also assign this as homework. Students should prepare a short five-minute presentation about this career, including the information on the summary sheet.

4. Have each student present their chosen automobile mechanics-related career to the group.

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

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

   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 minutes presentation

List of Automotive Mechanic-Related Occupations

Automotive Service Technician

Automobile Mechanic

Aircraft and Avionics Equipment Mechanics and Technicians

Automotive Body and Glass Repairers

Diesel Service Technicians and Mechanics

Heavy vehicle and mobile equipment service technicians

Small Engine Mechanics

Bus and Truck Mechanics

Industrial Electronics Repairers

Farm Equipment Mechanics

Heavy Equipment Mechanics

Motorcycle Mechanics

Building Maintenance Workers

Electric Motor Repairers

Industrial Machinery Mechanics

Machinists

Mechanic and Repairer Helpers

Motorboat Mechanics

Automotive Electronics Installers

Career Exploration Research Summary

Identify and research an automobile mechanic-related occupation. 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:

_____

_____

_____

_____

_____

How does this job involve nutrition or wellness?

_____

_____

_____

_____

Lesson Three – Careers in Mechanical Trades: A Day in the Life of an Automobile Mechanic

REVIEW: What have you learned…?

5-10 minutes

Purpose:

To have participants review what they have learned about career opportunities relating to becoming an automobile mechanic or automotive technician.

Materials:

- *Career Exploration K-W-L* handout

Facilitation Steps:

1. Have students pair up with the person they worked with at the beginning of the lesson to complete the handout K-W sections.
2. Have students complete the "L" column on the handout, identifying things they have learned about automobile mechanics and automotive service-related jobs. Give students five minutes to complete this task.
3. After five minutes, call the class back together.

   Ask each pair to share one thing they learned about automotive maintenance as a career option. Write these on a master list on a whiteboard or similar item. Continue calling upon each pair until everyone has had a chance to contribute to the "L" class chart.

Extension Activity: Contact local automotive-related professionals and ask if you could take a field trip to their place of business to see what the work environment is like for these employees, to be able to ask employees questions about their job, and to observe professionals in action if possible.

Lesson Four – Careers in Mechanical Trades: HVAC Professionals

Lesson Overview

In this lesson, students will be introduced to the career of being an HVAC professional. They will hear about what it takes to become an HVAC professional as well as related occupational opportunities available.

Lesson Objectives

After completing this lesson, participants will be able to:

- Identify the tasks that are typical for HVAC professions
- Research and identify the qualifications, including education and training, that is required to become an employee in a variety of related HVAC service occupations
- Write a clearly written cover letter

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	• Support services video clips • *HVAC List of Related Occupations* handout	1. Choose the video clip(s) you wish to show about HVAC occupations and have available online 2. Print/photocopy the *HVAC List of Related Occupations* handout (one per participant)	10 minutes
LEARN	• Library and internet access • *HVAC Career Education and Training Plan* handout	1. Print/photocopy the *HVAC Career Education and Training Plan* handout (one per participant)	30-90 minutes
REVIEW	• *Cover Letter Format* handout • Job listings for a support services position • *Cover Letter Assessment Rubric*	1. Have the *Cover Letter Format* handouts available (one per participant)	60-90 minutes

Lesson Four – Careers in Mechanical Trades: HVAC Professionals

FOCUS: How do you ensure a high-quality HVAC services staff?

10 minutes

Purpose:

The HVAC services pathway includes occupations that involve installation and maintenance of Heating, Air Conditioning, and Refrigeration units. It includes technical and professional careers. Participants will be introduced to the important role that these career opportunities play in our lives.

Materials:

- Support services video clips
- *HVAC List of Related Occupations* handout

Facilitation Steps:

1. Begin by sharing this information with students: Heating, air conditioning, and refrigeration mechanics and installers work on heating, ventilation, cooling, and refrigeration systems. HVAC technicians work mostly in homes, schools, hospitals, office buildings, or factories. Their worksites may be very hot or cold because the heating and cooling systems they must repair may not be working properly and because some parts of these systems are located outdoors. Working in cramped spaces and during irregular hours is common.

   Because HVACR systems have become increasingly complex, employers generally prefer applicants with postsecondary education or those who have completed an apprenticeship. Some states and localities may require technicians to be licensed.

   Show a short video introducing this pathway. Go to YouTube and use keywords, "HVAC occupations" or similar. Here are links to a few examples:

   - https://www.youtube.com/watch?v=7Fodfxo8D1I
   - https://www.youtube.com/watch?v=vHZ0PhkVCq0
   - https://www.youtube.com/watch?v=noITT7eKfFU

2. Share the *HVAC List of Related Occupations* with students. Ask for any impressions of these types of jobs. Are there any on the list that are a surprise, or are there any that they don't recognize?

HVAC List of Related Occupations

HVAC professionals (Heating, Air Conditioning, and Refrigeration) Mechanics and Installers work on heating, ventilation, cooling, and refrigeration systems.

Boilermakers assemble, install, maintain, and repair boilers, closed vats, and other large vessels or containers that hold liquids and gases.

Electricians install, maintain, and repair electrical power, communications, lighting, and control systems.

General maintenance and repair workers fix and maintain machines, mechanical equipment, and buildings.

Plumbers, pipefitters, and steamfitters install and repair piping fixtures and systems.

Sheet metal workers fabricate or install products that are made from thin metal sheets.

Solar photovoltaic (PV) installers assemble, set up, and maintain rooftop or other systems that convert sunlight into energy.

Stationary engineers and boiler operators control stationary engines, boilers, or other mechanical equipment.

Wind Turbine Technicians install, maintain, and repair wind turbines.

LEARN: Research Project

30-90 minutes

Purpose:

The purpose of this activity is to have participants take a closer look at what it takes to become an HVAC-related services professional. Students will put together an education and training plan for a support services occupation of their choice

Materials:

- Library and internet access
- *HVAC Career Education and Training Plan* handout

Facilitation Steps:

1. Tell students that they are each going to complete a short research project about the required qualifications for becoming an HVAC or related professional.
2. Give students the *HVAC Career Education and Training Plan* handout. Tell them that they can use the internet or other sources in the library for their research. Here are a few helpful websites:
    - http://www.bls.gov/ooh/
    - www.careerinfonet.org
    - www.careervoyages.gov
    - http://careerplanning.about.com/od/occupations/a/car http://www.myplan.com/careers/index.phpeer_briefs.htm
    - http://www.onetonline.org/find/career?c=10&g=Go
3. Give students one class period to complete their research. You can also assign this as homework.

HVAC Career Education and Training Plan

Scenario: You have decided to choose an HVAC-related career. You must put together a plan to help you meet all education and training requirements needed for this occupation. You will start your plan for high school then through college and any additional certifications or exams you will need to take. The goal is to successfully be hired in this occupation of choice.

Recommended High School Courses	
Higher Education: Name one degree that you could get and name three schools in your state that you could attend to obtain that degree.	
Work Experience: List two jobs that would help you get experience	
List any national or state associations relating this occupation	

Required certification exam(s) for becoming a worker in this area	
Optional endorsements you can obtain	
Explain any recertification requirements that exist, if any	

Lesson Four – Careers in Mechanical Trades: HVAC Professionals

REVIEW: Writing a Cover Letter

60-90 minutes

Purpose:

Students will use what they have learned about what it takes to pursue the HVAC-related occupation of their choosing and write a cover letter applying for that position.

Materials:

- *Cover Letter Format* handout
- Job listing for an HVAC-related position
- *Cover Letter Assessment Rubric*

Facilitation Steps:

1. Introduce business letters. Tell students that an important skill in the job application process is knowing how to write a proper cover letter.
2. Give each student the *Cover Letter Format* handout. Review the standard parts of a cover letter with students:
    - Heading
    - Date
    - Inside Address
    - Subject
    - Salutation
    - Body Paragraphs

      Special Note: The body paragraphs should describe what you have to offer the employer. Convince the reader that they should grant you an interview. Make a strong connection between your abilities and their needs. Mention specifically how your education, skills, and experience (create a work history that you know would be appropriate) match the job you are applying for. Try to support each statement you make with a piece of evidence.

    - Closing and Signature
    - Enclosure
3. Have students research and find a real job listing for a job relating to HVAC occupations. This is the position they should be applying for with the cover letter they write.

   After each student has completed an initial draft of their cover letter, they should have another peer edit their draft. Peer editors should follow the template, make sure that each part is included in the draft, and check spelling and grammar.
4. Have students prepare the final cover letter and turn it in as part of their grade for this lesson. Use the attached *Cover Letter Assessment Rubric* for your convenience.

Cover Letter Format

When writing a cover letter, follow the format below.

Heading – Your Address
Name
Street Address
City, State, ZIP

Skip 1

Date

Skip 2

Inside Address
Mr./Mrs./Ms./Dr. Full name of Recipient
Job Title of Recipient (if applicable)
Name of the Company/Organization (if applicable)
Street Address
City, State. ZIP

Skip 1

Subject:

Skip 1

Salutation
(Dear Ms./Mrs./Mr. and Last Name and a colon at the end)

Skip 1

Body Paragraphs
This is the content of the letter. The paragraphs should be single spaced with one line skipped between each paragraph.

Body Paragraph 1

Body Paragraph 2

Body Paragraph 3

Skip 1

Closing (Sincerely,)

Skip 3

Your Typed Name (Handwritten Signature Above)
Your Typed Title

Skip 1

Enclosure
Use this if your letter includes another document other than the letter itself. If it is more than one, you would type "Enclosures."

Cover Letter Assessment Rubric

Topic (Weight)	1	2	3	4
Return Address & Date	❑ Return address or letterhead is missing. ❑ Date is missing. ❑ 4 or more spelling, capitalization, or punctuation errors.	❑ Return address or letterhead is missing some information. ❑ Date is there but format is incorrect. ❑ 3 spelling, capitalization, or punctuation errors.	❑ Return address or letterhead is complete & accurate. ❑ Date is complete & positioned correctly. ❑ 1-2 spelling, capitalization, or punctuation errors.	❑ Return address or letterhead is complete & accurate. ❑ Date is complete & positioned correctly. ❑ No spelling, capitalization, or punctuation errors.
Inside Address & Salutation	❑ Inside address is missing. ❑ Salutation is missing. ❑ Subject line is missing. ❑ More than 3 spelling, capitalization, or punctuation errors.	❑ Inside address is missing information. ❑ Salutation is inappropriate. ❑ Subject line information is misleading. ❑ 3 spelling, capitalization, or punctuation errors.	❑ Inside address is complete & accurate. ❑ Salutation is appropriate but incomplete. ❑ A subject line needed or added correctly. ❑ 1 - 2 spelling, capitalization, or punctuation errors.	❑ Inside address is complete & accurate. ❑ Salutation is appropriate & complete. ❑ A subject line needed or added correctly. ❑ No spelling, capitalization, or punctuation errors.
Content Organization & Accuracy	❑ No organization pattern is apparent. ❑ Paragraph order does not follow suggested format. ❑ Message has enough missing or incorrect information to be ineffective in meeting the writer's goal.	❑ Organization is not appropriate to the writer's purpose. ❑ Paragraph order is close to the suggested model. ❑ Two pieces of information are missing or incorrect.	❑ Organization is appropriate to the writer's purpose. ❑ Paragraph order is close to the suggested model. ❑ One piece of information is missing or incorrect.	❑ Organization is appropriate to the writer's purpose. ❑ Paragraph order follows the suggested model. ❑ Message is complete and correct.
Closing, Signature, & other End Matter	❑ More than two pieces are missing or inaccurate.	❑ Two pieces are missing or inaccurate.	❑ One piece is missing or inaccurate.	❑ Closing is appropriate. ❑ Written & typed signatures are present. ❑ Reference initials & enclosure reminder are included if needed.
Word Choice	❑ Word choice is unprofessional.	❑ Word choice is inappropriate for audience. ❑ Writer sometimes uses action verbs. ❑ Too much use of passive voice.	❑ Word choice is mostly appropriate for audience. ❑ Writer uses action verbs. ❑ Use of passive voice ONLY as needed.	❑ Word choice is appropriate for audience. ❑ Writer uses action verbs. ❑ Use of passive voice ONLY as needed.
Sentences Fluency, Paragraphs, & Mechanics	❑ More than 2 sentence fragments. ❑ Message is lost in poor construction. ❑ Paragraphs do not follow suggested format. ❑ Spelling, capitalization, or punctuation errors make message unclear. ❑ Grammar & usage errors makes message unclear.	❑ Two sentence fragments. ❑ Message is there, but underdeveloped. ❑ Awkward paragraph construction clouds the message. ❑ 3-4 spelling, capitalization, or punctuation errors. ❑ 3 – 4 grammar & usage errors.	❑ Some variation in sentence length. One fragment. ❑ Paragraph divisions are somewhat effective. ❑ Main purpose of the message is clear. ❑ 1-2 spelling, capitalization, or punctuation errors. ❑ 1-2 grammar & usage errors.	❑ Complete sentences of varying length. ❑ Paragraph divisions are effective. ❑ Number of paragraphs fits suggested format. ❑ Main purpose of the message is clear. ❑ No spelling, capitalization, or punctuation errors. ❑ Grammar & usage are correct.

Source: http://rubistar.4teachers.org 7/6/03

Lesson Five – Careers in Industrial Trades: Ironworkers

Lesson Overview

In this lesson, students will be introduced to the career of being an ironworker. They will hear about what it takes to become an ironworker as well as related occupational opportunities available.

Lesson Objectives

- After completing this lesson, participants will be able to:
- Identify the types of occupations that relate to this area
- Research and identify the qualifications, working conditions, job duties, advancement opportunities, and occupational outlook

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	• Ironworker occupations video clips	1. Choose the video clip(s) you wish to show about ironworker-related careers and have available	10 minutes
LEARN	• Library and internet access • *Ironworker-Related List of Occupations* • *Ironworker Scavenger Hunt handout*	1. Print/photocopy the *Ironworker-Related List of Occupations* handout and *Ironworker Scavenger Hunt* handout (one per pair)	30-90 minutes
REVIEW	• Ironworker job listings	1. Have sample ironworker-related job listings available for students	10 minutes

Lesson Five – Careers in Industrial Trades: Ironworkers

FOCUS: What is an Ironworker?

10 minutes

Purpose:

Working as an ironworker may offer career opportunities that are unknown to many students. This activity will introduce students to a variety of related careers.

Materials:

- Ironworker occupations video clips

Facilitation Steps:

1. Begin by sharing this information with students:

   Choose a career that utilizes advancements in science and technology to augment treatment and diagnostic capabilities in health care.

   What Ironworkers Do

   Ironworkers install structural and reinforcing iron and steel to form and support buildings, bridges, and roads. Ironworkers perform physically demanding and dangerous work, often at great heights. Workers must wear safety equipment to reduce the risk of falls or other injuries. Most ironworkers learn through an apprenticeship or on-the-job training.

   The common misperception is that ironworkers only erect buildings and bridges, but the fact of the matter is, ironworking is a multi-faceted trade. Most ironworkers do more than one type of ironwork, and each has its challenges and required skills.

   Most ironwork is done outdoors and can be carried on year-round except in very severe weather. In many cases, however, there is indoor work that is coordinated to correspond with bad weather. Safety devices such as nets, safety belts, and scaffolding are used to reduce the risk of injury, and there is a great deal of climbing, balancing, and reaching.

   The following list is a sample of the type of work that ironworkers perform:

   Structural Buildings and Bridges
   Reinforcing and Post Tensioning
   Ornamental
   Rigging and Machinery Moving
   Welding and Burning
   Amusement Equipment and Rides
   Architectural and Structural Precast
   Bank Vaults and Doors
   Canopies
   Conveyors
   Detention Facilities (Jail Cells)
   Doors – Metal and Roll-up
   Drilling Platforms – Offshore
   Geodesic Domes
   Metal Buildings
   Overhead Cranes
   Plant Maintenance
   Towers

2. Show a short video, if possible, about ironworkers. Go to YouTube and use keywords to search. Here are links to a few examples:

   https://www.youtube.com/watch?v=3IChCWE0kok

   https://www.youtube.com/watch?v=6CzXksSCvRg

   https://www.youtube.com/watch?v=pgfqsrX8SBg

   Tell students that they are going to learn more about this interesting career.

Lesson Five – Careers in Industrial Trades: Ironworkers

LEARN: Scavenger Hunt

30-90 minutes

Purpose:

The purpose of this activity is to have participants work in pairs to discover various facts about ironworkers. Each pair will share their findings to enable others to learn more about this interesting occupation.

Materials:

- Library and internet access
- *Ironworker Scavenger Hunt* handout
- *Ironworker-Related List of Occupations*

Facilitation Steps:

1. Give students the *Ironworker Scavenger Hunt* handout.
2. Divide the class into pairs of students. Have each pair choose one occupation related to ironworkers from the *Ironworker-Related List of Occupations*.
3. Give students 10-15 minutes on the internet to research and find answers to the questions. Students should write down the answers and be ready to share them.
4. Call the class back together. Have each pair share the results of their research.

Ironworker Scavenger Hunt

Each pair should be assigned one ironworker-related occupation to research. Do your research online to find the answers to the questions you have been given below. Good Luck! Possible sources to consider could include the Bureau of Labor Statistics website, Occupational Outlook Handbook website, college websites from biotech programs, other career-related websites on the internet.

Occupation assigned: _____

1. Define this occupation. What is it? Give a short description.

2. What degree or education and training is required?

3. What licenses or certifications are required if any?

4. What is the average length of time it takes to complete training or earn degrees?

5. What is the average starting salary?

6. What is the average workday like in terms of hours?

7. What is the projected job outlook for the next decade?

8. What tasks would you include in a job description for this occupation?

9. What skills should a person have to be successful in this career?

10. What is the work environment like?

11. What equipment is used on the job, if any?

12. What are the rewards or benefits of this career?

13. What are the opportunities for advancement?

14. Is this occupation available locally (in your city, in your state)?

Ironworker-Related List of Occupations

Structural Ironworker

Reinforcing and Post Tensioning Ironworker

Ornamental Ironworker

Rigging and Machinery Moving

Welding and Burning

Assemblers and Fabricators

Boilermakers

Carpenters

Construction Laborers and Helpers

Masonry Workers

Cutters, Solderers, and Brazers

Lesson Five – Careers in Industrial Trades: Ironworkers

REVIEW: What have you learned…

10 minutes

Purpose:

To review what participants have learned about career opportunities relating to ironworkers.

Materials:

- Ironworker job listings

Facilitation Steps:

1. Give each student a few minutes to find a real job listing for an ironworker position.
2. Have students share their listings. Is there anything in the listing that surprises them? Are the qualifications similar to what they learned about in the scavenger hunt exercise? Do the job duties line up with their understanding of what these workers do? Is the pay range what they expected to find?

Lesson Six – Careers in Industrial Trades: Metal Fabricator

Lesson Overview

In this lesson, participants will be introduced to careers relating to metal fabrication. Participants will research and explore what a variety of related careers in this area.

Lesson Objectives

After completing this lesson, participants will be able to:

- Identify several occupations relating to the metal fabrication area
- 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	• *None*	1. Defining various metal fabrication career paths	10 minutes
LEARN	• *Career Exploration Research Summary* handout	1. Print/photocopy the *Career Exploration Research Summary* handout – one for each participant	30-90 minutes
REVIEW	• Questions for panel - optional	1. Contact 3-5 local metal fabrication-related professionals inviting them to participate in the panel discussion. 2. Set up the room with panel seating in the front with the audience facing the panel.	45 minutes

Lesson Six – Careers in Industrial Trades: Metal Fabricator

FOCUS: Defining the Occupation

10 minutes

Purpose:

In order to understand what fabricators do on the job, one must first understand what is meant by "metal fabrication." Participants will learn the definition of metal fabrication and how this translates into career opportunities.

Materials:

- Metal fabrication definition

Facilitation Steps:

1. The Bureau of Labor Statistics Occupational Outlook Handbook says that fabricators and assemblers are predicted to grow 4% through 2022. However, "Qualified applicants, including those with technical vocational training and certification, should have the best job opportunities in the manufacturing sector, particularly in growing, high-technology industries, such as aerospace and electro-medical devices."

   http://www.bls.gov/ooh/Production/Assemblers-and-fabricators.htm

2. Share the following definition of metal fabrication found on http://en.wikipedia.org/wiki/Metal_fabrication

   Metal fabrication is the building of metal structures by cutting, bending, and assembling processes:

   Cutting is done by sawing, shearing, or chiseling (all with manual and powered variants); torching with hand-held torches (such as oxy-fuel torches or plasma torches); and via numerical control (CNC) cutters (using a laser, mill bits, torch, or water jet).

   Bending is done by hammering (manual or powered) or via press brakes and similar tools. Modern metal fabricators utilize press brakes to either coin or air-bend metal sheet into form. CNC-controlled backgauges utilize hard stops to position cut parts in order to place bend lines in the correct position.

   Assembling (joining of the pieces) is done by **welding**, binding with adhesives, riveting, threaded fasteners, or even yet more bending in the form of a crimped seam. Structural steel and sheet metal are the usual starting materials for fabrication, along with the welding wire, flux, and fasteners that will join the cut pieces**. As with other manufacturing processes, both human labor and automation are commonly used**. The product resulting from fabrication may be called a fabrication. Shops that specialize in this type of metal work are called **fab shops**.

3. Explain to students that fabricators and fitter welders do different tasks in fabrication shops.

   Here are the basic job descriptions:

   Fitter Welder: Lays out, fits and fabricates metal components to assemble structural forms, such as machinery frames, bridge parts and pressure vessels, using knowledge of welding techniques, metallurgy and engineering requirements. Includes experimental welders who analyze engineering drawings and specifications to plan welding operations where procedural information is unavailable.

   Fabricator: Fabricates and assembles metal products, such as window sashes, casements, doors, awning frames, shells, cases and tubular products, such as golf carts or furniture, as specified by work orders, diagrams, and templates, using hand tools, power tools, and metalworking machinery. Operates machines, such as arbor presses, riveting press, brazing machine, and resistance-welding machines, to complete assembly. May weld components together.

Lesson Six – Careers in Industrial Trades: Metal Fabricator

LEARN: Research Project

30-90 minutes

Purpose:

The purpose of this activity is to have participants take a closer look at metal fabrication career options. Participants will research either fabricators or fitter welders. Information learned from the research will be shared with the group via a brief presentation.

Materials:

1. Library and Internet resources
2. *Career Exploration Research Summary* handout

Facilitation Steps:

Part 1 – Research Project

1. Have students choose one of the careers to explore further. Give students the *Career Exploration Research Summary* handout. Tell them that they can use the internet or other sources in the library for their research. Here are a few helpful websites:

   www.bls.gov

   http://www.bls.gov/ooh/

   www.careerinfonet.org

   www.careervoyages.gov

   http://careerplanning.about.com/od/occupations/a/car
   http://www.myplan.com/careers/index.phpeer_briefs.htm

2. Give students one or two class periods to complete their research. You can also assign this as homework. Students should prepare a short five-minute presentation about this career, including the information on the summary sheet.
3. Have each student present their chosen fabrication-related 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* handout

   20 points – Prepared for the presentation

   20 points – The 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

Part 2 – The Labor Movement and Union Organization

Many occupations are considered 'blue collar' and employees may belong to a union. The union many metal fabricators belong to is the Sheet Metal Workers International Association.

1. Lead a discussion regarding organized labor.
   A. Ask your students to raise their hands if they are currently working or have held jobs in the past. Make a list of jobs they held and write their answers on the board. How much did they make per hour? Write those answers on the board.
   B. Ask students if they know what the minimum wage is for their area and their job? What are the limits on the number of hours students can work, and what safety regulations are in place?
   C. Ask students if they can explain the origins of the minimum wage and the 40-hour workweek.
2. Divide the class into pairs and give students 5 minutes to research the following questions.
   - When was the federal minimum wage created?
   - What kind of work week have labor unions pushed for?

- What actions did workers and activists take to make sure a minimum wage was established in law, and was enforced?
- What tactics did supporters of the minimum wage and the limited workweek use to achieve their goals?
- What tactics did opponents use?

3. Share a video on the history of labor unions.

   https://www.youtube.com/watch?v=V3kJ6OticrY

   https://www.youtube.com/watch?v=4pC56qMSDMs

   https://www.youtube.com/watch?v=dykVdrCEwiQ

Career Exploration Research Summary

Name: _____ Date: _____

Identify and research one career relating to metal fabrication. 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 Six – Careers in Industrial Trades: Metal Fabricator

REVIEW: Career Panel Discussion

45-60 minutes

Purpose:

To hear from real professionals who work as metal fabricators or related positions.

Materials:

1. A panel of local professionals who work in metal fabrication (3-5)

Facilitation Steps:

1. Contact local fabrication businesses and invite them to attend a panel discussion in your class. Fitter welders, fabricators, and fabrication shop supervisors would be great resources for students to have access to. Also, local professionals from a variety of different 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.