RealCareer®
Welding Career Exploration

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Common Career Technical Core Standards – Career Ready Practices

4, 7, 10

Lesson Structure

Each lesson begins with an overview, lesson objectives, and a *Lesson-at-a-Glance* table, which lists the lesson activities, materials required, suggested preparation steps, and approximate class time.

Lesson Sections

The overview is following by the actual lesson, which will contain some of the sections described below. Most lessons are designed to be completed within 45 minutes.

- **FOCUS**

  Every lesson begins with a FOCUS activity intended to capture students' attention. This may be in the form of a small or large class discussion, game, review of previous lesson information, or demonstration. During this activity, students are introduced to the topic of the lesson.

- **LEARN**

  The LEARN activity in each lesson varies in its presentation mode. It may be a PowerPoint® presentation, group activity, or demonstration.

- **SUMMARIZE**

  The majority of lessons end with a SUMMARIZE activity intended to briefly review the lesson's key messages or main points; or, if it is the last lesson in the unit, the SUMMARIZE activity will serve as the unit formative assessment. Participant scores on these short assessments will help you determine what concepts or skills may need reinforcement or review.

Lesson – Careers in Manufacturing and Production Welding

Lesson Overview

In this lesson, students will be introduced to careers relating to manufacturing and production welding. A variety of occupations relating to this area will be explored.

Lesson Objectives

After completing this lesson, participants will be able to:

- Identify career opportunities relating to welding in production and manufacturing
- Articulate the educational requirements, typical job duties, occupational outlook and more for each explored profession

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	• *What Makes a Good Production Welder* handout	1. Print/photocopy *the What Makes a Good Production Welder* handout – one for each 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	30-90 minutes
REVIEW	• *Self-Assessment* • Questions for panel - optional	1. Print/photocopy the *Self-Assessment* handout – one for each 2. Contact local professionals inviting them to participate in the panel discussion. 3. Set up the room with panel seating in the front with audience facing the panel.	10 minutes

Lesson – Careers in Manufacturing and Production Welding

FOCUS: Production Welder Skills and Abilities

10 minutes

Purpose:

The world has long relied on the skills of welders to enrich our lives. Welding is widely used in many areas including construction, manufacturing and other industries. Because of the many areas welders are needed in, there will always be a demand and need for skilled welders. This lesson will take a closer look at welding in manufacturing and the variety of opportunities available today.

Materials:

- *What Makes a Good Production Welder?* handout

Facilitation Steps:

1. Share the information below with the class.

Instructor information:
The definition of a production welder is someone who joins pieces of metal, often using intense heat or other methods of fusing separate metal pieces together. The work can be done outdoors, inside and underwater sometimes. Working conditions are potentially dangerous; therefore, workers need to wear protection such as goggles and gloves. Production welders work with a variety of materials as well as in a variety of conditions so they must make the appropriate adjustments as needed.

2. Give students the *What Makes a Good Production Welder?* handout. Have students pair up and give students five minutes to brainstorm and write down as many skills and abilities that they can think of.

3. Call the class back together and ask students the following question: What skills and abilities should a success production welder have?

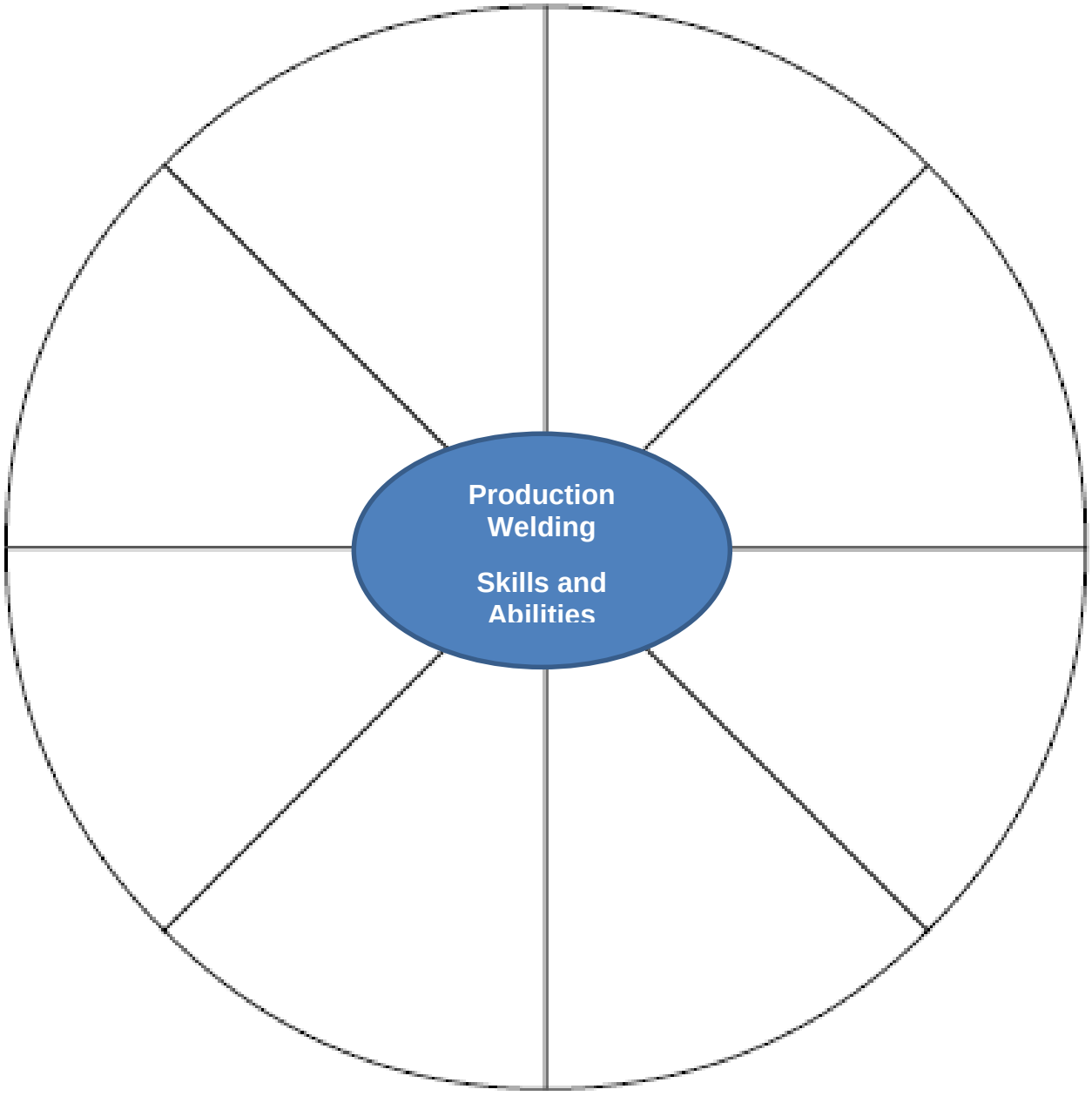
4. Write these on a master list on a white board or similar item. Continue calling upon students until every group has had a chance to contribute to the list.

5. Share a list of skills and abilities for general welders from a career or occupational website such as O*NET OnLine - (http://www.onetonline.org/link/summary/51-4121.06

6. A few more specific production welding skills and abilities might be: strong reading, math, and communication skills, the ability to read and understand blueprints, flexibility in making adjustments for welding conditions and materials, follow safety procedures, have good eye-hand coordination and physical stamina.

What Makes a Good Production Welder?

List as many skills and abilities you can think of in the spaces provided that successful production welders in manufacturing would possess.



Lesson – Careers in Manufacturing and Production Welding

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 that involve welding in manufacturing: production welder, weld shop supervisor, STICK welder, MIG welder, welding production manager, robotic welder (this is not an exhaustive list).

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.php
   eer_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 of the completed job postings if all information is complete. Deduct points if information is missed in required sections.

Job Description Project

Scenario: You are the Director of Human Resources for a large, new manufacturing facility that produces a variety of products. Your task is to hire four new employees that will work in your facility. You will be completing job postings for four positions. Choose from: production welder, weld shop supervisor, STICK welder, MIG welder, welding production manager or robotic welder. 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 performed (environment)
- Equipment to be used in the performance of the job (if any)
- Starting salary range (per year or per 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 per hour)	

Lesson – Careers in Manufacturing and Production Welding

REVIEW: Self-Assessment

5-10 minutes

Purpose:

To review what srudents have learned about career opportunities relating to welding in manufacturing and production and see if they possess the qualities to be successful in this occupation.

Materials:

- *Production Welder Self-Assessment*

Facilitation Steps:

1. Give each student the *Production Welder 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 production welder.

Extension Activity: Contact a local manufacturing facility that employs welders in various roles, inviting them to attend a panel discussion in your class.

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.

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.

Production Welder Self-Assessment

Check Yes or No reflecting on your skills and abilities.

Yes No

___ ___ Strong reading skills.

___ ___ Strong math skills.

___ ___ Effective communication skills.

___ ___ Ability to read and understand blueprints.

___ ___ Flexible on the job.

___ ___ Able to read conditions and make adjustments.

___ ___ Able to follow established safety procedures.

___ ___ Have good eye-hand coordination.

___ ___ Possess physical stamina.

___ ___ Ability to see details at a close range.

___ ___ Ability to quickly and repeatedly adjust the controls of a machine to precise positions.

___ ___ The ability to tell when something is wrong or likely to go wrong.

___ ___ The ability to quickly move your hands to grasp, manipulate and assemble objects.

___ ___ The ability to concentrate on a task over a period of time without being distracted.

Total "Yes" _____ "No" _____

Lesson – Career Opportunities in Welding Fabrication

Lesson Overview

In this lesson, participants will be introduced to a career in welding fabrication. Participants will research and explore what a fabricator or fitter welder does on the job.

Lesson Objectives

After completing this lesson, participants will be able to:

- Identify several professions in the fabrication welding field
- 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. Access metal fabrication definition	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 welding fabrication professionals inviting them to participate in the panel discussion. 2. Set up the room with panel seating in the front with audience facing the panel.	45 minutes

Lesson – Career Opportunities in Welding Fabrication

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 handtools, 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 – Career Opportunities in Welding Fabrication

LEARN: Research Project

30-90 minutes

Purpose:

The purpose of this activity is to have participants take a closer look at welding 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:

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

Career Exploration Research Summary

Name: _____ Date: _____

Identify and research one career relating to welding 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 – Career Opportunities in Welding Fabrication

REVIEW: Career Panel Discussion

45-60 minutes

Purpose:

To hear from real welding professionals who work as a fabricator or fitter welder.

Materials:

1. Panel of local professionals who work in welding 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.

Lesson – A Day in the Life of a Welding Engineer

Lesson Overview

In this lesson, participants will be introduced to the welding engineer career. Participants will gain a better understanding of what life on the job looks like.

Lesson Objectives

After completing this lesson, participants will be able to:

- Identify work tasks that welding engineers do on the job and he working conditions
- Consider if the welding engineer career is a fit for them
- Identify a variety of fields that use welding engineers

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 for each group)	10 minutes
LEARN	• Video clips of about welding engineering • *Career Exploration Research Summary* handout	1. Choose the video clip(s) you wish to show about welding engineering and have available online 2. Print/photocopy the *Career Exploration Research Summary* handout – one for each	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	45 minutes

Lesson – A Day in the Life of a Welding Engineer

FOCUS: K-W-L Activity

10 minutes

Purpose:

There are many different fields that welding engineers can work within. Some of these include automotive, nuclear, aerospace, defense, shipbuilding and many more. This lesson will help your students become more aware of what welding engineers deal with and the breadth/variety of skills and education they need to become one. Students may be unaware of the many opportunities that are 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 a welding engineer is. Share this definition with the class:

   A welding engineer is a person with the demonstrated education, experience, and knowledge in specialized fields of welding, brazing, cutting and materials joining. Welding engineering is a broad field that covers fields from automotive and shipbuilding to nuclear power, aerospace and mining. If there is joining of metals involved then there is probably a welding engineer involved the in the process.

   A welding engineer is qualified for directing those operations associated with weldments and other types of joints that are completed in compliance with the appropriate contract documents, codes, and other standards to produce a satisfactory product. The welding engineer's activities begins before production or construction welding and continues through the production process then ending when the production process is complete.

   Most welding engineers need coursework in general engineering, including calculus-based foundation course work in mathematics, physical metallurgy, physics, chemistry, engineering mechanics, thermodynamics and fluids.

2. Divide the class into pairs to work together. Make a photocopy for each pair of the *Career Exploration K-W-L* handout. Explain the purpose of the activity, distribute the handout and give 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 welding engineering and one thing they'd like to learn about this career. Write these on a master list on a white board 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 about welding engineering. In the "W" column, write down what you would like to learn about a potential career as a welding engineer.

K	W	L

Lesson – A Day in the Life of a Welding Engineer

LEARN: Research Project

30-90 minutes

Purpose:

The purpose of this activity is to have participants take a closer look at welding engineering as an occupation. Participants will research one specific field of welding engineering and prepare a class presentation.

Materials:

- Library and Internet resources
- *Career Exploration Research Summary* handout

Facilitation Steps:

1. To learn more about welding engineering as a career, watch a short career video on YouTube. Here are a few suggestions, or you can keyword search "welding engineering":

   https://www.youtube.com/watch?v=7LYO_izbVGw
   https://www.youtube.com/watch?v=77uVVJ6vt0E
   https://www.youtube.com/watch?v=QUM9De8a0Qw
   https://www.youtube.com/watch?v=hOUfduzWeiE

2. Review the list of fields that use welding engineers. Have each student choose one of the careers to explore further. Depending on how many participants are in your class, you can decide whether or not to allow multiple students to research the same field.

   - Aerospace
   - Shipbuilding
   - Mining
   - Nuclear
   - Automotive

3. 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

4. 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.

5. Have each student present their chosen welding engineer career field to the group.

6. 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 minutes presentation

Career Exploration Research Summary

Identify and research the welding engineer career in your chosen field. Complete this worksheet for your welding engineer field 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 welding?

_____

_____

_____

_____

Lesson – A Day in the Life of a Welding Engineer

REVIEW: What have you learned…?

5-10 minutes

Purpose:

To have participants review what they have learned about career opportunities relating to welding engineering.

Materials:

- *Career Exploration K-W-L* handout

Facilitation Steps:

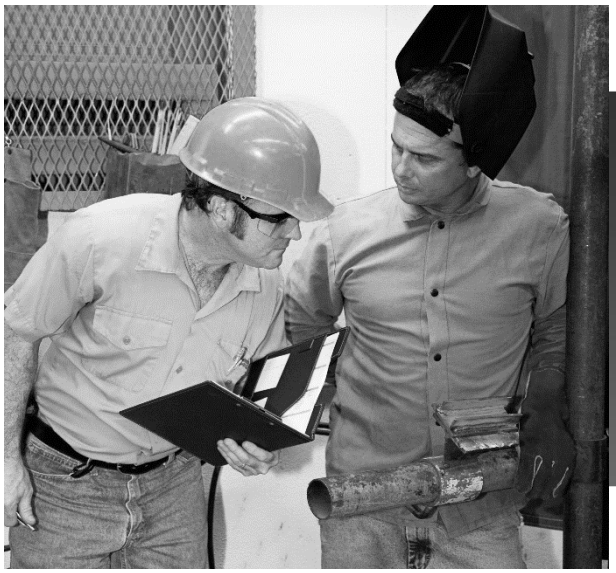
1. Have students pair up with the person they worked with at the beginning of the lesson to complete the K-W sections of the handout.

2. Have students complete the "L" column on the handout, identifying things they have learned about welding engineering. 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 welding engineering as a career option. Write these on a master list on a white board 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 businesses that may employ welding engineers. Ask if you could take a field trip to their place of business to see what the work environment is like for a welding engineering, to be able to ask welding engineers questions about their job and to watch welding engineers in action if possible. It is recommended to bring in welding engineers from a variety of different fields if possible.

Lesson – Exploring a Career in Welding Quality Assurance or as a Certified Welding Inspector



Lesson Overview

In this lesson, participants will be introduced to the welding quality assurance career pathway. Participants will gain greater knowledge of what it takes to become a Certified Welding Inspector (CWI) and the type of work in this career.

Lesson Objectives

After completing this lesson, participants will be able to:

- Identify the tasks that welding inspectors perform on the job
- Research and identify the qualifications, including education and training that is require to become a Certified Welding Inspector
- Write a clearly written cover letter

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	• Welding inspection video clips	1. Choose the video clip(s) you wish to show about welding inspection and have available online	10 minutes
LEARN	• Internet access • *CWI Pathway Education and Training Plan* handout	1. Print/photocopy the *CWI Pathway Education and Training Plan* handout – one per student	30-90 minutes
REVIEW	• *Cover Letter Format* handout • Job listings • Cover Letter Assessment Rubric	1. Have the *Cover Letter Form* handouts available – one per student	60-90 minutes

Lesson – Exploring a Career in Welding Quality Assurance or as a Certified Welding Inspector (CWI)

FOCUS: How do you ensure a high quality weld?

10 minutes

Purpose:

Quality assurance in welding is very important. Certified Welding Inspectors need a great deal of education and experience in order to become a successful welding inspector. Participants will be introduced to the important role that welding inspectors play in the world of welding.

Materials:

- Welding inspection video clips

Facilitation Steps:

1. Begin by sharing this information with students:

   Welding is a complex process. To ensure the proper quality of a welded product, the process must be controlled from the very start. In order to do this you should have an established quality assurance system.

   There are several steps to take in welding quality assurance:
   - Hire competent welders
   - Use written welding instructions called Welding Procedure Specifications (WPS) in ensure a consistent quality
   - Use a Certified Welding Inspector to assure that welders adhere to strict guidelines and safety rules that keep everyone safe

2. Show a short video, if possible, about being a welding inspector. Go to YouTube and use keywords, "welding inspector" or "welding quality" or similar. Here is a link to one example: https://www.youtube.com/watch?v=aUbhrbbA_8k&list=PLB99DB3594CA04510&index

3. Ask students the following question, "What types of tasks should welding inspectors be able to do?" Write their answers on a whiteboard making a list. Share the following short list of expected tasks that inspectors should be able to perform:
   - Welding performance and procedure qualification
   - Surface crack detection
   - Visual inspection
   - Radiographic testing
   - Ultrasonic weld inspection
   - Destructive weld testing

Lesson – Exploring a Career in Welding Quality Assurance or as a Certified Welding Inspector (CWI)

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 a Certified Welding Inspector (CWI). Students will put together an education and training plan that those wishing to pursue the quality assurance field would have to follow to become a CWI.

Materials:

- Library and internet access
- *CWI Pathway 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 a CWI.
2. Give students the *CWI Pathway 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:

   - www.aws.org
   - http://education-portal.com/certified_welding_inspector.html
   - 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 class periods to complete their research. You can also assign this as homework.

CWI Pathway Education and Training Plan

Scenario: You have decided to become a Certified Welding Inspector (CWI). You must put together a plan that will help you meet all of the education and training requirements needed to become a CWI. You will start your plan for high school, and then through college and any additional certifications or exams you will need to take. The goal is to successfully become a CWI.

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 types of welding you should be familiar with	

Required certification exam(s) for Associated Certified Welding Inspector, Certified Welding Inspector and Senior Certified Welding Inspector	
Optional endorsements you can obtain	
Explain any recertification requirements that exist, if any	

Lesson – Exploring a Career in Welding Quality Assurance or as a Certified Welding Inspector (CWI)

REVIEW: Writing a Cover Letter

60-90 minutes

Purpose:

Students will use what they have learned about what it take to become a CWI to write a cover letter applying for that position.

Materials:

- *Cover Letter Format* handout
- Job listing for a Certified Welding Inspector
- *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 certified welding inspector. This is the position they should be applying for with the cover letter they write.

4. 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 and make sure that each part is included in the draft, along with checking on spelling and grammar.

5. 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 – Looking Into a Career as a Pipe Welder

Lesson Overview

In this lesson, participants will be introduced to pipe welding as a career. Participants will research a variety of information regarding work as a pipe welder and consider whether this is of personal interest.

Lesson Objectives

After completing this lesson, participants will be able to:

- Identify the tasks that pipe welders perform on the job
- 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	• Pipe welding video clips	1. Choose the video clip(s) you wish to show about pipe welding and have available online	10 minutes
LEARN	• Internet access • *Pipe Welder Scavenger Hunt* handout • *Pipe Welder Fact Sheet*	1. Print/photocopy the *Pipe Welder Scavenger Hunt* handout – one for each pair 2. *Pipe Welder Fact Sheet* – one for the recorder	30-90 minutes
REVIEW	• Pipe welder job listings	1. Have sample pipe welder job listings available for students	10 minutes

Lesson – Looking Into a Career as a Pipe Welder

FOCUS: What is pipe welding?

10 minutes

Purpose:

Working as pipe welder may be a career opportunity that is unknown to many students. This activity will introduce students to pipe welding as an occupation.

Materials:

- Pipe welding video clips

Facilitation Steps:

1. Begin by sharing this information with students:

   Pipe welding refers to work done by a professional welder, joining of pieces of metal. Welding is one of the most cost-effective ways of joining multiple sections of pipe and involves heating pieces of metal and joining them so that the resulting product becomes a single piece. This generally requires welders to learn several ways of connecting pipes and to understand the factors that affect the quality of the connections that they intend to perform. Many of the individuals who engage in pipe welding are certified professionals who specialize in this area of metal work.

2. Show a short video, if possible, about being a pipe welder. Go to YouTube and use keywords, "pipe welder" or "pipe welding" or similar. Here is a link to one example entitled "So you want to be a pipe welder…"

   https://www.youtube.com/watch?v=TWGzPACg2Fg

3. Tell students that today they are going to learn more about this interesting welding occupation.

Lesson – Looking Into a Career as a Pipe Welder

LEARN: Scavenger Hunt

30-90 minutes

Purpose:

The purpose of this activity is to have participants take work in pairs to discover various facts about the pipe welding profession. Each pair will contribute to a master class-wide *Pipe Welder Fact Sheet* that will be given to students to learn more about this interesting occupation.

Materials:

- Library and internet access
- *Pipe Welder Scavenger Hunt* handout
- *Pipe Welder Fact Sheet*

Facilitation Steps:

1. Give students the *Pipe Welder Scavenger Hunt* handout.

2. Divide the class into pairs of students. Depending on the number of students, assign each pair one or more of the scavenger hunt questions to research until all questions have been assigned.

3. Give students 10-15 minutes on the internet to research and find answer to the question(s) assigned to them. Students should write down the answers and be ready to share them.

4. Call the class back together. Start with question 1 on the *Pipe Welder Scavenger Hunt* handout. Have the pair assigned to that question give you the answer. Write that down. You will be creating a master fact sheet from the answers given. Go through the remainder of scavenger hunt questions.

5. Assign one student to be the recorder to document as answers are read off. This should be typed into one document.

6. Give students the master *Pipe Welder Fact Sheet* that was gathered from all of the answers given from the research.

Pipe Welder Scavenger Hunt

Each pair should be assigned one or more of the questions below. Do your research on-line to find the answer to the question(s) you have been assigned. Good Luck! Possible sources to consider could Bureau of Labor Statistics website, Occupational Outlook Handbook website and American Welding Society website, other career-related websites on the internet.

1. What is pipe welding?
2. What is a pipe welder?
3. What degree is required to become a pipe welder?
4. What licenses or certifications are required to become a pipe welder?
5. What is the average length of time it takes to complete training or earn degrees?
6. What is the average starting salary?
7. What is the average workday like in terms of hours?
8. What is the projected job outlook for pipe welders in the next decade?
9. What tasks would you include in job description for pipe welders?
10. What skills a person should have to be successful in this career?
11. What is the work environment like for a pipe welder?
12. What equipment is used on the job (if any)?
13. What are the rewards or benefits of this career?
14. What are the opportunities for advancement?
15. List other occupations that are similar or related.
16. Is this occupation available locally (in your city, in your state)?

Pipe Welder Fact Sheet

(Record answers from research)

1. What is pipe welding?

2. What is a pipe welder?

3. What degree is required to become a pipe welder?

4. What licenses or certifications are required to become a pipe welder?

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

6. What is the average starting salary?

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

8. What is the projected job outlook for pipe welders in the next decade?

9. What tasks would you include in job description for pipe welders?

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

11. What is the work environment like for a pipe welder?

12. What equipment is used on the job (if any)?

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

14. What are the opportunities for advancement?

15. List other occupations that are similar or related.

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

Lesson – Looking Into a Career as a Pipe Welder

REVIEW: What have you learned…

10 minutes

Purpose:

To review what they have learned about career opportunities relating to pipe welding.

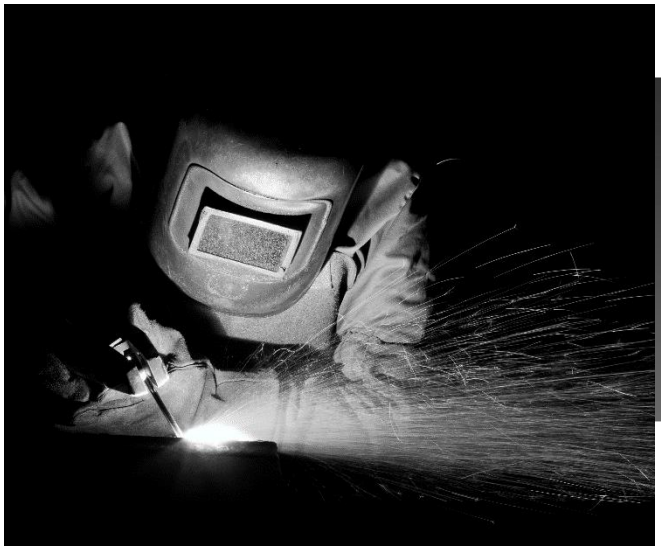
Materials:

- Sample pipe welder job listings

Facilitation Steps:

1. Give each students a few minutes to find a real job listing for a pipe welding 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 pipe welders do? Is the pay range what they expected to find?

Lesson – Exploration of Other Welding-Related Careers



Lesson Overview

In this lesson, participants will be introduced to various careers relating to welding that haven't already been studied. Participants will research and explore a variety of welding career pathways.

Lesson Objectives

After completing this lesson, participants will be able to:

- Identify several occupations related to welding
- Consider if any of the occupations covered in class are appropriate for them and of interest

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	• *Career Exploration Brainstorming Web* handout	1. Print/photocopy *Career Exploration Brainstorming Web* handout (one for each group)	10 minutes
LEARN	• List of welding-related careers from brainstorming activity • *Career Exploration Graphic Organizer* handout	1. Have the list of careers available from the brainstorming activity as well as the list in this lesson. 2. Print/photocopy the *Career Exploration Graphic Organizer* handout – one for each	30-90 minutes
REVIEW	• Questions for panel - optional	1. Contact 3-5 local welding professionals inviting them to participate in the panel discussion. 2. Set-up the room with panel seating in the front with audience facing the panel	45 minutes

Lesson – Exploration of Other Welding-Related Careers

FOCUS: Brainstorming Activity

10 minutes

Purpose:

There are many occupations that involve welding in some capacity. Participants may be unaware of the many career opportunities that exist. This activity will get participants to begin thinking about careers that are available and may be of interest.

Materials:

- *Career Exploration Brainstorming Web* handout

Facilitation Steps:

1. If your students enjoy the thought of working in welding in a career capacity, they need to be aware of the many opportunities available.

2. Divide the class into five groups. Make a photocopy for each group of the *Career Exploration Brainstorming Web* handout. After welcoming participants to the class, explain the purpose of the activity, distribute it and give participants five minutes to complete it.

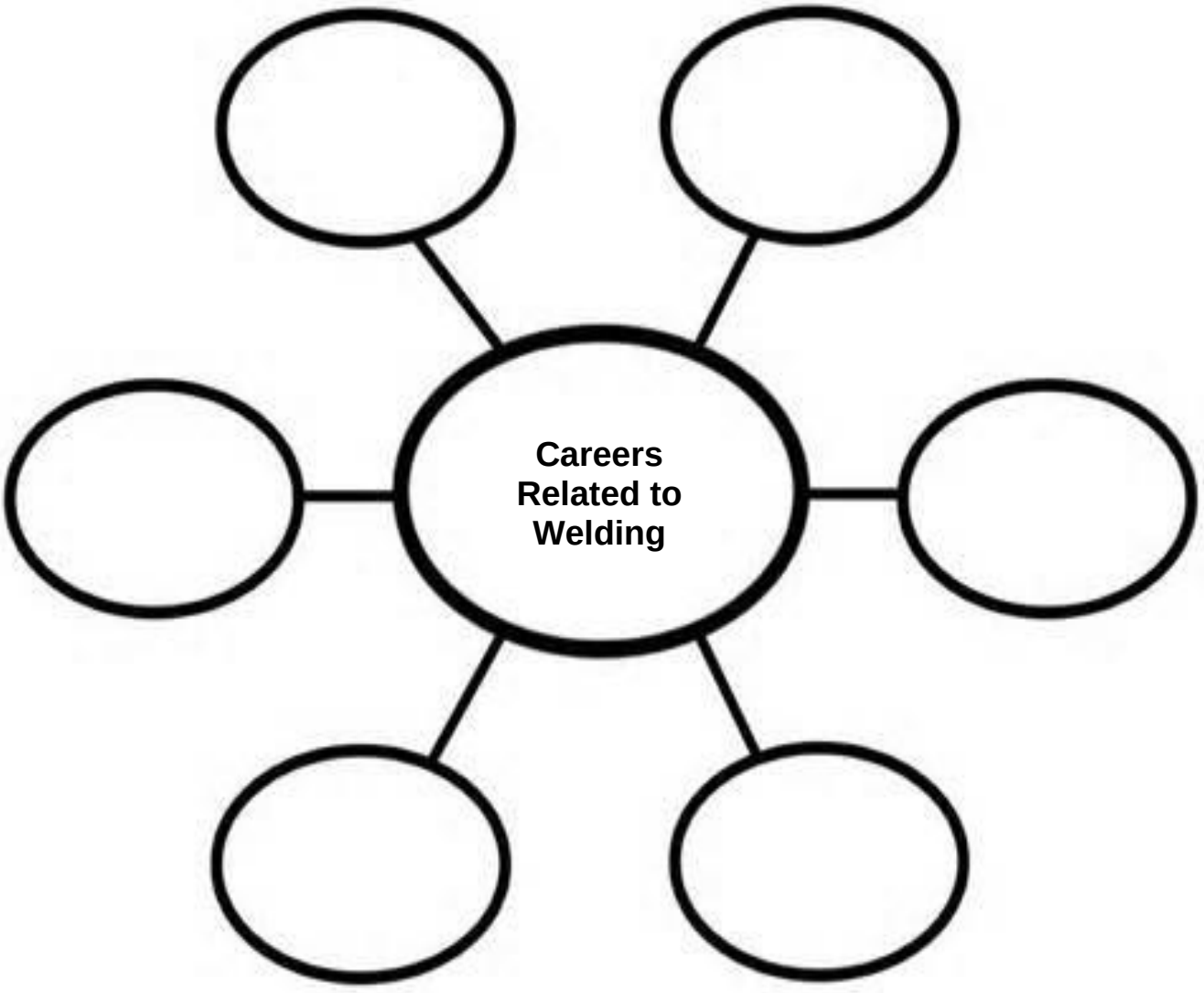
3. After five minutes, call the groups back together. Ask each group to share one of the careers they identified as relating to welding in their brainstorming session. Write n a master list on a white board or similar item. Continue calling upon each group until all careers that were brainstormed are written down on the master list.

Extension Activity:
If your students are interested in learning if they are a good match for working in the welding, find a career skills inventory or survey on the internet. Here is an example of a general career interest inventory:

http://www.iseek.org/careers/clusterSurvey

Career Exploration Brainstorming Web

Directions: With your group, brainstorm as many occupations related to welding as you can in five minutes. Write each career identified in a circle. Draw additional circles as needed.



Lesson – Exploration of Other Welding-Related Careers

LEARN: Compare and Contrast Careers Project

30-90 minutes

Purpose:

The purpose of this activity is to have participants take a closer look at welding-related career options. Participants will research and compare/contrast two careers of interest. Information learned from the research will be shared with the class via a brief presentation.

Materials:

- List of welding-related careers (from the brainstorming session)
- Library and internet resources
- *Career Exploration Graphic Organizer* handout

Facilitation Steps:

1. Review the list of welding-related occupations from the brainstorming activity. Have students choose two of the careers to explore further. Depending on how many participants are in your class, you can decide whether or not to allow multiple students to compare and contrast the same careers. You may also decide whether or not to allow students to research a career already taught in a previous lesson.

2. Give students the *Career Exploration Graphic Organizer* 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 these careers including the information on the graphic organizer.

4. Have each student present their welding-related careers to the group.

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

   50 points – Completed all information on the *Career Exploration Graphic Organizer* handout

   10 points – Prepared for the presentation

   10 points – The presentation content was clear, concise and gave a good understanding of the chosen careers

   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

Career Exploration Graphic Organizer

Name: _____ **Date:** _____

Compare and contrast two careers working in welding. Possible sources for information include your school library, public library, Bureau of Labor Statistics website, Occupational Outlook Handbook website, American Welding Society and other career-related websites on the internet.

	Career #1 -	**Career #2 -**
Degree or licenses required		
Length of time to complete training or earn degrees		
Average starting salary per year		
Average hourly wage		
Job outlook		
5 skills needed for this job		
Describe the job setting		
What are the primary job duties?		
Do you work alone or with people?		
What needs or wants does this occupation fill?		
What is one thing an employer would expect from someone in this position?		
What kinds of people will be successful in this career?		

List of Welding-Related Occupations

This is a list of potential careers relating to working in the world of welding. Add any additional careers that participants may have brainstormed during the activity that are not on the list. Some similar/same occupations may listed under different titles.

- Welder
- Fabricator
- Fabrication Shop Owner
- Fitter Welder
- Production Welder
- Custom Welder
- Maintenance Welder
- Millwright
- Pipe Welder
- Construction Worker/Welder
- Structural Welder
- Installation worker/Welder
- Welding Engineer
- Certified Welding Inspector
- Welding Quality Assurance Manager
- Weld Shop Supervisor
- Weld Shop Owner
- Welding Production Manager
- MIG Welder
- TIG Welder
- Welding Testing Lab Worker
- Research and Development Associate
- Welding Instructor or Teacher
- Welding Equipment Sales
- Welding Technician
- Cutter
- Solderer
- Brazer

Lesson – Exploration of Other Welding-Related Careers

REVIEW: Career Panel Discussion

45-60 minutes

Purpose:

To hear from real professionals who work in welding-related careers.

Materials:

- Panel of local professionals who work in a variety of related careers (3-5)

Facilitation Steps:

1. Contact local welding professionals from a variety of settings such as fabrication shops, manufacturing, sales, production welding and management inviting them to attend a panel discussion in your class.
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.