

Welding Shop Safety

Media Type: Video
Duration: 68 minutes

Goal: To recognize the importance of shop safety and apply it to school and workplace settings.

Description: When preparing to work in any welding shop, it is important for both students and instructors to be familiar with hazards and safety precautions in the shop. This production will address all aspects of shop safety, from the causes of the most common accidents in the shop to material handling safety to personal protective equipment. Follow along with Pete Stracener, Chairperson, Industrial Technology Department, Program Coordinator and Professor of Welding Technology at South Plains College, as he discusses shop safety.

Objectives:

1. To identify safety precautions in the welding shop.
2. To explain the proper methods of material handling and disposal.
3. To describe personal protective equipment used in the welding shop.
4. To summarize the federal agencies and regulations which monitor shop and job site safety.

Common Core Standards

Agriculture, Food & Natural Resources Career Cluster (AG)

Cluster	Standard
	Analyze how issues, trends, technologies and public policies impact systems in the Agriculture, Food & Natural Resources Career Cluster™.
	Evaluate the nature and scope of the Agriculture, Food & Natural Resources Career Cluster™ and the role of agriculture, food and natural resources (AFNR) in society and the economy.
	Examine and summarize the importance of health, safety and environmental management systems in AFNR businesses.
Agribusiness Systems Career Pathway (AG-BIZ)	Apply management planning principles in AFNR businesses.
	Manage cash budgets, credit budgets and credit for an AFNR business using generally accepted accounting principles.
	Develop a business plan for an AFNR business.
Power Structural & Technical Systems Career Pathway (AG-PST)	Apply physical science principles and engineering applications to solve problems and improve performance in AFNR power, structural and technical systems.
	Operate and maintain AFNR mechanical equipment and power systems.
	Use control, monitoring, geospatial and other technologies in AFNR power, structural and technical systems.

Architecture & Construction Career Cluster (AC)

Cluster	Standard
	Comply with regulations and applicable codes to establish and manage a legal and safe workplace.
	Describe career opportunities and means to achieve those opportunities in each of the Architecture & Construction Career Pathways.
Construction Career Pathway (AC-CST)	Apply practices and procedures required to maintain jobsite safety.
	Safely use and maintain appropriate tools, machinery, equipment and resources to accomplish construction project goals.
Maintenance/ Operations Career Pathway (AC-MO)	Recognize and employ universal construction signs and symbols to function safely in the workplace.
	Maintain and inspect building systems to achieve safe and efficient operation of buildings.

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College & Career Readiness Anchor Standards for Reading

Reading Standards for Informational Text

Key Ideas & Details	Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.	
	9-10.1	Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
Integration of Knowledge & Ideas	Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.	

College & Career Readiness Anchor Standards for Writing

Writing Standards

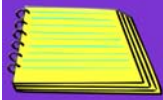
Production & Distribution of Writing	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	
	9-10.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
Research to Build & Present Knowledge	Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.	
	9-10.7	Conduct short as well as more sustained research projects to answer a question or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

College & Career Readiness Anchor Standards for Speaking and Listening

Speaking & Listening Standards

Comprehension & Collaboration	Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.	
	9-10.1	Initiate and participate effectively in a range of collaborative discussions with diverse partners on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.
Presentation of Knowledge & Ideas	Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.	
	Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.	
	9-10.4	Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.
	9-10.5	Make strategic use of digital media in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
	11-12.4	Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.
	11-12.5	Make strategic use of digital media in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

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Lesson Plan

Class 1: Distribute the *Recycling Materials Used in Welding Activity* and review with the class. Begin class by distributing the *Welding Shop Safety Worksheet* and *Vocabulary Handout*. Show students *Welding Shop Safety - Common Causes & Prevention of Accidents* and *Welding Shop Safety - Relationships of Shop Management & Shop Safety* segments. Divide the class into groups and hand out the *Safety Rules Project* and allow the remainder of the class for students to work.



Video
20 min.

Class 2: Show students the *Welding Shop Safety - Personal & Group Safety Rules*, *Welding Shop Safety - Compressed Gases* and *Welding Shop Safety - Handling Shop Materials* segments. Assign the *Shop Layout Activity* for in-class work. Distribute the *Hazard Communications Activity* for homework.



Video
13 min.

Class 3: Begin class by asking students if they are aware of any hazardous materials in the shop. Present students with the *Welding Shop Safety - Hazardous Materials*, *Welding Shop Safety - Safety Colors* and *Welding Shop Safety - Electrical Safety* segments. Remind students to reference their *Worksheet* and *Vocabulary Handouts*. Assign groups to work on the *Safety Colors Project* and begin work in class on the project.



Video
7 min.

Class 4: Show the *Welding Shop Safety - Fire Hazards & Safety*, *Welding Shop Safety - Emergency Plans & Procedures*, *Welding Shop Safety - Occupational Safety & Health Administration* and *Welding Shop Safety - Material Safety Data Sheet* segments to the class. Assign the *Emergency Plans Activity*.



Video
12 min.

Class 5: Present the *Welding Shop Safety - Hazard Communication*, *Welding Shop Safety - Environmental Protection Agency*, *Welding Shop Safety - Personal Protective Equipment* and *Welding Shop Safety - Ventilation*



Video
16 min.

segments. Assign the *Hazard Communications Activity* for in-class work and the *Personal Protective Equipment Project* for homework.

Class 6: Distribute the *Crossword* to students and have them complete it. Ask if there are any questions and distribute the *Welding Shop Safety Assessment* to be completed individually in class.

Class 7: Students should present their *Safety Rules Project* to the class.

Class 8: Students should take the *Safety Rules Project* test and turn in the remaining *Projects* and *Activities*.

Lesson Links

Occupational Health & Safety Administration

- <http://www.osha.gov>

Environmental Protection Agency

- <http://epa.gov>

American National Standards Institute

- <http://www.ansi.org/>

Career & Technical Student Organizations

FFA

- Agriculture Mechanics

Skills USA

- Job Skill Demonstration Open
- Sheet Metal
- Welding
- Welding Fabrication
- Welding Sculpture Demo

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Career Connections

Using the *Career Connections Activity*, allow students to explore the various careers associated with this lesson. See the *Activity* for more details. *If student licenses have been purchased:* Students will select the interviews to watch based on your directions. *If only a teacher license is purchased:* Show students all the career interviews and instruct them to only complete the interview form for the required number of interviews.

- iCEV50535, Mary Jo Emrick, Adjunct Welding Professor, Austin Community College
- iCEV50773, Dennis Klingman, Manager of Technical Training, Lincoln Electrical Welding School
- iCEV50001, Howard Alford, Welder, Self-Employed



Lab Activities

Recycling Materials Used in Welding

Directions:

Select a location in the shop where a material recycling bin can be safely placed. Instruct students to place all welding materials (scraps, electrodes, rejects, etc.), which can be recycled, into the bin. Students should actively gather and place materials in the recycling bin for the length of the *Welding Shop Safety* lesson. On the last day of the lesson, students should separate the materials by type (copper wire, aluminum, steel, etc.) and weigh each type of material. Contact a local recycling facility and arrange a time for students to deliver what has been collected. Lead a class discussion about welding waste and how recycling is important. Ask students if they were surprised at the amount of materials gathered as well as what can be done to help reduce welding waste. Also ask students if they think the recycling program should be continued and why.

Shop Layout

Directions:

It is vital to know where safety equipment is stored in the shop. Distribute the *Shop Safety Activity* to students. Instruct students to draw a blueprint of their classroom with all safety equipment locations labeled. Remind them to include items such as safety glasses, fire extinguishers and first aid kits.

Shop Layout

Directions:

Students will first locate three potentially hazardous materials used in welding and write a paragraph on the proper way to handle and dispose of each of the material. Next, students will locate three materials used in welding which can be recycled and write a paragraph on the proper way to recycle the material as well as the overall importance of recycling materials used in welding.

Emergency Plans

Directions:

All areas of the country are prone to natural and man-made disasters. Distribute the *Emergency Plans Activity* to students. Inform students they must choose either a natural or man-made disaster and design an emergency plan in response to the disaster. Examples of disasters include hurricanes, tornadoes, wildfires, explosions, gas leaks and shop fires. The activity sheet includes all parts students will need to include in their plan. Answers will vary.

Hazard Communications

Directions:

Using the *Hazard Communications Activity*, have students look around the shop and find three examples of hazard communications. These examples can be written on material containers or posted signs. Students must include all material notations as instructed and write a short paragraph on the importance of Right to Know Laws.

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Projects

Safety Rules

Directions:

Divide the class into five groups. Assign each group one of the following topics: National Science Teachers Association (NSTA); rules pertaining to electrical and welding safety; Occupational Safety & Health Administration (OSHA) Welding guidelines; American Society for Testing Materials, ANSI Z49.1 Safety and Welding, Cutting and Allied Processes or State & National Code Requirements - Welding. Using the Internet, library or any other available resource, students should research their topic, select the top 10 safety rules and create a Microsoft® PowerPoint® presentation which will define the safety rules utilized within the topic area. **You must approve the selected safety rules prior to groups creating the presentation.** The presentation must include the following: definition/interpretation of each rule; photos or drawings illustrating the rule; a scenario where each rule would apply and a tip to help students remember the rule and when it should be used. Students will also create a 10 question, multiple choice test which will be combined with the other groups questions to create a 50 question final test to verify both knowledge and understanding of all safety rules presented. Groups should share their presentations with the class. Once all groups have presented, distribute the test for students to take.

Safety Colors

Directions:

Safety colors are not only present in the school shop, but in the workplace as well. Assign students to groups of three to four. Instruct groups to research the use of colors in the workplace, even if students in the group are choosing not to enter a shop related field. Each group must create a list of pros and cons of the use of safety colors.

Personal Protective Equipment

Directions:

Explain to students they are starting their own independent small business, contracting welding jobs. They must purchase all of the materials and equipment to start their business. For this project they need to calculate the cost of the personal protective equipment required. Students must purchase all of the listed required equipment, though how much they budget for items is up to them. Item descriptions must be detailed and include the retail location or site, price and any associated accessories for the item.