

TEACHING STRATEGIES:

Discuss how welding affects the building industry.

Discuss where our world would be without welding.

Name the different types of welding. (Arc welding, gas welding, plastic welding, laser welding, electron beam welding, ultrasound welding.) Have the class research the different types and report back on how they differ and how industry uses them.

Have the class discuss the safety aspects of welding before and after the video is watched. Note the differences.

Welding should be performed only with what type of Personal Protective Equipment. Have the class describe the reasons they are to wear the equipment when welding. Discuss the future of welding. Does the class think that welding is going to be used more in the future as we look for other materials to replace steel.

Welding is relatively new process, patented in the 1880's when electricity came into widespread use. Discuss how welding has grown from the 1880's to the present. Name advances that could not have taken place without welding. (Modern shipbuilding, skyscrapers, airplanes, automobiles) Discuss the welding process. How the metal heats up and the materials coalesce together.

Discuss how dangerous welding can be if not done properly. Have the class determine how a buggy wheel from the 1800's was made from steel. (forging, blacksmith)

CONCEPTS AND TERMS TO LISTEN AND WATCH FOR:

Alternating Current

Amperage

Arc

Arc flash

Burn

Conductor

Current

Direct Current

Fabrication

Ground

High Voltage

Hot gas

Oxyacetylene

Personal Protective equipment

Resistance

Safety Equipment

CAREER OPPORTUNITIES FOR THOSE WORKING DIRECTLY WITH ELECTRICITY:

Fabrication Engineer

Designer

Welder

Piping Welder

Shipbuilder

Repairman

Automotive Body Repairman

Machine Operator

Steelworker

Inventor

Underwater Welder

Construction Worker

Power Plant Operator

QUESTIONS FOR THOUGHT, DISCUSSION & FURTHER STUDY:

Describe how a blacksmith welded.

What are some of the things that spawned from the invention of welding?

Name 3 things that are not welded together in building construction?

What is soldering?

What is brazing?

Can you weld copper?

How hot is a steel welding flame?

Why should you use a welding hood when you weld?

What is a conductor?

What is a heat treated weld?

Why do welds sometimes fail?

Name some types of welding joints?

What is the heat affected zone?

What is the chemical reaction that makes welding possible?

What type of fuel did a blacksmith use to heat up the metal?

What type of testing do welds endure?

What is a cutting torch?

How do you weld a plastic material?

What is spot welding?

What is a welding rod?

GLOSSARY:

Anode- Is an electrode through which (positive) electric current flows into a polarized electrical device.

Anvil- A manufacturing tool, made of a hard and massive block of stone or metal used as a support for chiseling and hammering other objects, such as in forging iron and steel items

Brazing- Is a joining process whereby a non-ferrous filler metal or alloy is heated to melting temperature above 800°F (425)°C and distributed between two or more close-fitting parts by capillary action.

WORKSHOP SAFETY SERIES

Cathode- Is an electrode through which (positive) electric current flows out of a polarized electrical device.

Coalescence- Is the process by which two or more droplets or particles merge during contact to form a single daughter droplet (or bubble).

Destructive testing- Tests are carried out to the item's destruction or failure.

Diode is a device possessing two electrodes except that thermionic diodes may also have one or two ancillary terminals for a heater.

Electric arc- An electrical breakdown of a gas which produces an ongoing plasma discharge, resulting from a current flowing through normally nonconductive media such as air.

Electrode- Is an electrical conductor used to make contact with a nonmetallic part of a circuit

Electron beam welding- A fusion welding process in which a beam of high-velocity electrons is applied to the materials being joined.

Flux- A substance which facilitates soldering, brazing, and welding by chemically cleaning the metals to be joined

Forging- Is the term for shaping metal by using localized compressive forces. Cold forging is done at room temperature or near room temperature. Hot forging is done at a high temperature, which makes metal easier to shape and less likely to fracture.

Friction welding- Is a class of solid-state welding processes that generates heat through mechanical friction between a moving workpiece and a stationary component, with the addition of a lateral force called "upset" to plastically displace and fuse the materials

Gas metal arc welding- Sometimes referred to by its subtypes metal inert gas MIG welding or metal active gas MAG welding, is a semi-automatic or automatic arc welding process in which a continuous and consumable wire electrode and a shielding gas are fed through a welding gun.

Laser beam welding- A welding technique used to join multiple pieces of metal through the use of a laser.

Metal- Materials that are usually lustrous, ductile, malleable, and good conductors of electricity

Metallurgy - Is a branch of materials science that studies the physical and chemical behavior of metallic elements

PPE- Personal Protective Equipment used to protect one from potential accidents.

Resistance welding- Refers to a group of welding processes that produce coalescence of faying surfaces where heat to form the weld is generated by the resistance of the welding current through the workpieces.

Shielding gases- Inert or semi-inert gases that are commonly used in several welding processes, most notably gas metal arc welding and gas tungsten arc welding. Their purpose is to protect the weld area from atmospheric gases, such as oxygen, nitrogen, carbon dioxide, and water vapor.

Soldering- A process in which two or more metal items are joined together by melting and flowing a filler metal into the joint, the filler metal having a relatively low melting point

Spot welding- Is a popular resistance welding method used to join two to four overlapping metal sheets.

Thermoplastic- A plastic that melts to a liquid when heated and freezes to a brittle, very glassy state when cooled sufficiently

Ultrasonic welding- Is an industrial technique whereby high-frequency ultrasonic acoustic vibrations are used to weld objects together, usually plastics, and especially for joining dissimilar materials.

Weldability- Of a material refers to its ability to be welded.

K4405DVD

Welding Class



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