WISELearn Resources

Career Academy Teacher Externship Program

Title: Oxy-Acetylene Torch Use Procedures

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Overview / Description:

The Oxygen-Acetylene Cutting Torch is an indispensable tool in the welding industry. OxyFuel cutting uses a fuel (in our case, acetylene) mixed with oxygen to heat the metal to its ignition point and blow it away under pressure. This method is often the easiest, most portable, and quickest way to cut metal. In this lesson plan, students will learn to light, adjust, cut with and properly extinguish an oxy-acetylene torch.

Subject(s):

Welding (Technology Education)

Grade Level(s):

Grades 7-12

Learning goals/objectives:

After completing this activity, students should be able to:

- Properly light an Oxy-Acetylene torch
- Properly adjust an Oxy-acetylene torch for the selected metal
- Perform a cut through the metal coupon
- Properly extinguish an oxy-acetylene torch

Workplace Readiness Skill:

- ❏ Social Skills
- ❏ Teamwork
- ❏ Attitude and Initiative
- ✓ Professionalism
- ❏ Critical Thinking
- ❏ Media Etiquette
- ❏ Planning and Organization
- ❏ Communication

Type of Activity (check all that apply):

- ✓ Individual
- ❏ Small Group
- ❏ Whole Class

Teaching Strategies (check all that apply or include new strategies)**:**

- ❏ Discussion
- ❏ Partner work
- ❏ Use of Technology
  Role Playing
- ❏ Simulation
- ✓ Performance Assessment
- ✓ Demonstration

Content Standards:

WIsconsin Standards for Technology and Engineering

Content Area: MNF/Manufacturing:

Standard: MNF1: Students will be able to select and use manufacturing technologies.

MNF1.g.11.h: Demonstrate safety and choose the proper safety equipment given the process being used (i.e., oxy-acetylene, GMAW, SMAW, GTAW, etc)

MNF1.h.6.h: Demonstrate the proper use and proper way to setup and close down oxy-acetylene equipment and check for leaking gases.

Model Academic Standards for School Counseling

Academic Development Domain

Content Standard C: Students will understand the relationship of academics to the world of work, and to life at home and in the community.

- Core Performance Standard 1: Understand how to relate school to life experiences

Length of Time and length of class periods:

20 minutes for teacher demonstration, 15 minutes per student

Materials List (linked if online resource please):

- Oxy-Acetylene Torch written procedures
- Oxy-Acetylene Torch setup
- Torch Striker
- Proper Personal Protective Equipment (PPE): flame retardant jacket, pants, closed toe leather shoes or boots, safety glasses, cutting goggles or cutting shield
- ⅜" mild steel plate practice coupons

Directions (Step-by-Step):

- Instructor will first distribute written procedure to students.
- Instructor will then demonstrate the proper lighting, extinguishing and shutdown procedure three times in front of students as a group while reading the procedure aloud.
- The instructor will then go through entire procedure again and perform a cut on a practice coupon.

- Students will then, one-by-one, demonstrate the proper procedure for lighting, cutting, extinguishing and shutdown of the oxy-acetylene torch in front of the instructor (Formative Assessment). Students are encouraged to refer back to written instructions during this demonstration. Student will repeat this task until instructor feels they are ready to move onto performance assessment.

Wrap-Up:

Students will perform lighting, cutting, extinguishing and shutdown procedure in front of instructor without referring to written instructions (Summative Assessment). Student must perform every step correctly to pass. If student fails any step, they must start over from the beginning. If student fails twice, they must return to formative assessment.

Formative/Summative Assessment:

Formative assessment:

- Teacher demonstration with questioning and checks for understanding
- Teacher will monitor students at all times when handling torch and watch for unsafe behavior or practices
- Student will demonstrate in front of teacher with ability to look at written procedure

Summative Assessment:

- Formal Performance Assessment without help from teacher or written procedure

Extension Activity for differentiation:

- More advanced students can light torch and adjust to maximum and minimum performance range of tip, or adjust cutting operation for thicker or thinner steel.
- A welder from a local company could visit the class to explain the importance of the oxy-acetylene torch and the connection between becoming skillful with this tool and the work a welder is required to perform.
- Struggling students may want to use this “How to” video for additional review: https://youtu.be/8oYs2T6shZc

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Oxy-Acetylene Torch written procedures

1. Check oxygen and acetylene tanks to be sure they are in undamaged condition and upright. Acetylene must always be stored in an upright position. Be sure they are chained in position, so they cannot tip over if pulled on.
2. Be sure regulators have been turned to the left until they move freely and gauges read zero.
3. Do not stand directly in front of regulator. Open the oxygen and acetylene tank valves slowly. Open the oxygen valve all the way. Open the acetylene valve ¼ turn.
4. Adjust the oxygen regulator adjusting screw until the gauge reaches 20psi.
5. Adjust the acetylene regulator adjusting screw until the gauge reaches 3 psi.
6. Open the acetylene needle valve on the torch ¼ turn.
7. While holding torch pointing down, hold torch striker approximately 1” in front of torch tip and squeeze torch striker to ignite gas.
8. Adjust the acetylene needle valve on the torch until the flame is jumping slightly away from tip and the black smoke has stopped.
9. Slowly open oxygen valve at base of torch.
10. Open oxygen needle valve on back of torch and adjust flame until it reaches neutral flame; the flame should have a sharply defined inner cone with no outer feathering.
11. Bring the tip of the torch to the metal to be cut. The tip of the inner cone should be 1/16” to ⅛” above the edge of the metal coupon.
12. Once the spot on the metal below the tip has turned cherry red, depress the oxygen-cutting lever.
13. Once cutting begins, move torch in the direction of cut at a steady speed, holding the torch perpendicular to the steel.
14. If restart is required, release oxygen cutting lever and allow metal to reheat to cherry red, depress oxygen-cutting lever to restart cut.
15. When cut is finished, close oxygen needle valve on torch.
16. Close acetylene needle valve on torch.
17. Close oxygen and acetylene valves on tanks.
18. Open both oxygen and acetylene needle valves on torch to release pressure in both lines.
19. Screw regulator adjusting screws out until they move freely to release pressure in regulator.