



Multiple Category Scope and Sequence: Scope and Sequence Report For Course Standards and Objectives, Content, Skills, Vocabulary

Wednesday, August 20, 2014, 2:17PM



| Unit | Course Standards and Objectives | Content | Skills | Vocabulary |
|--|--|---|--|---|
| <p>District Basic Welding Technician - Entry Level (48.0508) (District) 2014-2015 Collaboration</p> <p>Welding Overview and Safety (Week 1, 3 Weeks)</p> | <p>UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Welding Technician - Entry Level Standard 1 Student will understand welding orientation.</p> <ul style="list-style-type: none"> ▪ Objective 1 Identify welding processes. ▪ Objective 2 prepare time or job cards, reports, or records. ▪ Objective 3 Follow verbal instructions to complete work assignments. ▪ Objective 4 Follow written details to complete work assignments. <p>Standard 2 Student will understand and use welding safety and first aid.</p> <ul style="list-style-type: none"> ▪ Objective 1 Complete a student safety pledge (Disclosure Statement). ▪ Objective 2 Respond to first aid requirements. ▪ Objective 3 Follow safe practices. ▪ Objective 4 Perform housekeeping duties. ▪ Objective 5 Successfully complete safety tests on | <p><u>First Aid</u></p> <ul style="list-style-type: none"> ▪ How to stop bleeding ▪ How to use an eye wash station ▪ How to treat a burn ▪ How to work safely | <ul style="list-style-type: none"> ▪ Follow safe practices in the shop ▪ Perform housekeeping duties ▪ Pass Safety Test with 100% | <ul style="list-style-type: none"> ▪ Machine zone ▪ Safety zone ▪ ANZI Z87 Safety glasses ▪ Face shield ▪ Hearing Protection ▪ Personal Protective Equipment ▪ Pinch points ▪ Cutting path ▪ Electrical shock ▪ Ultra-violet light radiation ▪ Infrared light radiation ▪ Arc flash burn ▪ Safety color code ▪ OSHA ▪ Compressed Gases (flammable and non flammable) ▪ Fire Extinguisher types: A, B, C, D ▪ Fire triangle ▪ Machine safety |

equipment use.

Measurement in

Welding  (Week 3, 2 Weeks) 

UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Welding Technician - Entry Level Standard 4
Student will use basic math and measuring skills.

- Objective 1
Perform basic math conversions from fractions to decimals.
- Objective 2
Read and correctly use a tape measure, rule, and square.

- How to change a fraction to decimal.
- How to read tape measure.
- How to use a tri-square.
- How to estimate material.
- How to solve common layout problems.

- Solve a basic addition, subtraction, multiplication and division problem.
- Solve a math problem requiring a sequence of different operations.
- Use a calculator to convert fractions to decimals and decimals to fractions.

- Decimal
- Tenths
- hundredths
- thousandths
- Layout
- Fraction
- Division
- Addition
- Subtraction

Oxyfuel Cutting

 (Week 4, 1 Week) 

UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Welding Technician - Entry Level Standard 8
Student will use manual oxyfuel gas cutting processes.

- Objective 1
Perform safety inspections of equipment and accessories.
- Objective 2
Set up for manual oxyfuel gas cutting operations on carbon steel.

- What happens during the cutting process?
- How to safely set-up, oxy-fuel equipment.
- How to perform straight and shape cutting on carbon steel.
- What types of materials can oxy-fuel can cut?

- Set up and operate manual oxy-fuel gas cutting equipment.
- Perform straight cutting operations on carbon steel. Perform shape-cutting operations on carbon steel.
- Perform bevel-cutting operations on carbon steel.
- Pierce a hole through a carbon steel plate.

- Oxygen
- Acetylene
- Regulators
- Striker
- Cutting tip sizes
- Mixing barrel
- Proper eye protection
- Proper gas settings
- Leak detection
- Preheat
- Kerf
- Dross
- Flash back
- Flash back arestor
-

Shielded Metal Arc Welding 1F & 1G

(flat position)  (Week 4, 10 Weeks) 

UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Welding Technician - Entry Level Standard 7
Students will use shielded metal arc welding (SMAW) processes.

- Objective 1
Set up for SMAW operations on carbon steel.
- Objective 2
Start and restart an arc

What constitutes a quality weld?

What is welding?

what are the advantages of the (SMAW) process over the other welding processes?

- Make 1F (flat position-fillet weld) welds on carbon steel.
- Make 1G (flat position-groove weld) welds on carbon steel.
- Self evaluate and determine weld quality with visual inspection

Stringer bead

groove weld

Fillet weld

undercut

pourousity

- and run a bead on carbon steel.
- Objective 3
Build a weld pad on carbon steel in the flat position.
 - Objective 4
Make 1F (flat position-fillet weld) welds on carbon steel.
 - Objective 5
Make 2F (horizontal position-fillet weld) welds on carbon steel.

amperage
arc length (arc gap)
travel angle
travel speed
spatter
fusion
work angle
electrode
stinger
cracking
slag inclusion
striking an arc
crater
restarting bead
work clamp
welding leads
bead patterns
flux
slag
tensile strength
ductility
elasticity

Welding Tools and

Equipment  (Week
5, 3 Weeks) 

UT: CTE: Skilled and Technical
Sciences, UT: Grades 9-12,
Welding Technician - Entry Level
Standard 3

Students will identify welding
tools and equipment.

Be able to identify hand tools
and their proper uses.

identify common tools used in welding.

use these tools safely and for the correct
use.

- Objective 1
Identify basic welding
hand tools (e.g., safety
glasses, welding
helmet, chipping
hammer, etc.).
- Objective 2
Identify basic power
tools and equipment
(e.g., shielded metal arc
welder, gas metal arc
welder, bench grinder,
etc.).

electrode size

types of electrodes

Hammers

- chipping
- ball pen
- sledge
- Mallet

Striking tools

- cold chisel
- center-punch
- punch
- drift

Measurement and Layout

- try square
- combination
square
- tape measure
- square
- soapstone
- scribe
- steel rule

Power Hand Tools

- angle grinder
- portable drill
- die grinder

Hand Tools

- flat screw driver
- Phillips screw
driver
- Bastard file
- rasp
- rat tale file
- pliers
- vice grips
- end wrench
- box end wrench

Shielded Metal Arc

Weding 2G & 2F

(Week 11, 14 Weeks)



UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Welding Technician - Entry Level Standard 7

Students will use shielded metal arc welding (SMAW) processes.

- Objective 1
Set up for SMAW operations on carbon steel.
- Objective 2
Start and restart an arc and run a bead on carbon steel.
- Objective 5
Make 2F (horizontal position-fillet weld) welds on carbon steel.
- Objective 7
Make 2G (horizontal position-groove weld) welds on carbon steel.

What constitutes a quality weld?

What is welding?

what are the advantages of the (SMAW) process over the other welding processes?

How horizontal welding differs in technique.

Make 2F (horizontal position-fillet weld) welds on carbon steel.

Make 2G (horizontal position-groove weld) welds on carbon steel.

- Welpers

Power Machines

- Iron woker
- Drill Press
- Pedestal Grinder
- Wire Wheel

Stringer bead

groove weld

Fillet weld

undercut

porosity

amperage

arc length (arc gap)

travel angle

travel speed

spatter

fusion

work angle

electrode

stinger

cracking

slag inclusion

striking an arc

Blueprint Reading & Symbols  (Week 13, 10 Weeks) 

UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Welding Technician - Entry Level Standard 5
Students will read and interpret welding blueprints.

- Objective 1
Apply information found in the information block of the drawing.
- Objective 2
Identify basic views used in blueprints, including assembly, detail, and fit-up drawings.
- Objective 3
Identify common types of lines used in blueprints, including object, hidden, center,

Reading and Interpreting Welding Blueprints

- What a blueprint is
- Where and what an information block is
- Different views used in blueprints
- Types of Lines

Basic Welding Symbols

- Different welding symbols (square groove weld, fillet weld, field weld, reference line, etc.)

- Identify common types of lines used in blueprints
- Identify basic welding symbols
- Draw welding symbols for given specifications
- Interpret a welding print and welding procedure specifications

- crater
- restarting bead
- work clamp
- welding leads
- bead patterns
- flux
- slag
- tensile strength
- ductility
- elasticity
- electrode size
- types of electrodes
- penetration
 - Blueprint
 - Information block
 - Assembly drawing
 - Detail drawing
 - Fit-up drawing
 - Object line
 - Hidden line
 - Center line
 - Construction line
 - Square groove weld
 - Fillet weld
 - Field weld
 - Reference line
 - Welding procedure specification

and construction lines.

Standard 6
Students will identify and apply basic welding symbols.

- Objective 1
Identify and interpret basic welding symbols (e.g., square groove weld, fillet weld, field weld, reference line, etc.).
- Objective 2
Draw welding symbols for given specifications.
- Objective 3
Interpret a welding print and welding procedure specifications.

Gas Metal Arc Welding  (Week 18, 19 Weeks) 

UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Welding Technician - Entry Level Standard 9
Students will use gas metal arc welding (GMAW) processes.

- Objective 1
Set up for GMAW operations on carbon steel.
- Objective 2
Start and restart an arc and backfill at the edge while running a bead on carbon steel.
- Objective 3
Use Short Circuit Transfer welding process to make 1F (flat position-fillet weld) welds on carbon steel.
- Objective 4
Use Short Circuit Transfer welding process to make 2F (horizontal position-fillet weld) welds on carbon steel.
- Objective 5

- Distinguish GMAW from other welding processes.
- How to start and restart an arc on carbon steel.
- Explain characteristics of common GMAW equipment.
- Identify components of the GMAW gun.
- Explain the function of shielding gas and its applications.
- Demonstrate the short circuit transfer method.
- Demonstrate how to run a weld bead using GMAW.

1. Set up and operate Gas Metal Arc Welding (GMAW) processes:

- Use Short Circuit Transfer welding process to make 1F (flat position-fillet weld) welds on carbon steel.
- Use Short Circuit Transfer welding process to make 2F (horizontal position-fillet weld) welds on carbon steel.
- Use Short Circuit Transfer welding process to make 1F (flat position-fillet weld) multi-pass weld on carbon steel.
- Use Short Circuit Transfer welding process to make 1G (flat position-groove weld) welds on carbon steel.
- Use Short Circuit Transfer welding process to make 2G (horizontal position-groove weld) welds on carbon steel.

Amperage
Contact tip
Consumable electrode
Crater
Deposition rate
Duty cycle
Forehand Technique
Gas cylinder
Nozzle
Inert gas
Insulator
lpm

Use Short Circuit Transfer welding process to make 1F (flat position-fillet weld) multi-pass weld on carbon steel.

- Objective 6
Use Short Circuit Transfer welding process to make 1G (flat position-groove weld) welds on carbon steel.
- Objective 7
Use Short Circuit Transfer welding process to make 2G (horizontal position-groove weld) welds on carbon steel.

Porosity

Flowmeter

Short Circuit Transfer

Spatter

Shielding gas

Stickout

Stringer bead

Diffuser

Travel angle

Trigger

Welding gun

Wire feeder

Work Angle

See previous units

State Test Review



(Week 32, 5 Weeks)



UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Welding Technician - Entry Level Standard 1
Student will understand welding orientation.

See previous units

- Objective 1
Identify welding processes.
- Objective 2
prepare time or job cards, reports, or records.
- Objective 3
Follow verbal instructions to complete work assignments.
- Objective 4
Follow written details to complete work

assignments.

Standard 2

Student will understand and use welding safety and first aid.

- Objective 1
Complete a student safety pledge (Disclosure Statement).
- Objective 2
Respond to first aid requirements.
- Objective 3
Follow safe practices.
- Objective 4
Perform housekeeping duties.
- Objective 5
Successfully complete safety tests on equipment use.

Standard 3

Students will identify welding tools and equipment.

- Objective 1
Identify basic welding hand tools (e.g., safety glasses, welding helmet, chipping hammer, etc.).
- Objective 2
Identify basic power tools and equipment (e.g., shielded metal arc welder, gas metal arc welder, bench grinder, etc.).

Standard 4

Student will use basic math and measuring skills.

- Objective 1
Perform basic math conversions from fractions to decimals.
- Objective 2

- Read and correctly use a tape measure, rule, and square.
- Objective 3
Perform basic layout techniques.

Standard 5
Students will read and interpret welding blueprints.

- Objective 1
Apply information found in the information block of the drawing.
- Objective 2
Identify basic views used in blueprints, including assembly, detail, and fit-up drawings.
- Objective 3
Identify common types of lines used in blueprints, including object, hidden, center, and construction lines.

Standard 6
Students will identify and apply basic welding symbols.

- Objective 1
Identify and interpret basic welding symbols (e.g., square groove weld, fillet weld, field weld, reference line, etc.).
- Objective 2
Draw welding symbols for given specifications.
- Objective 3
Interpret a welding print and welding procedure specifications.

Standard 7
Students will use shielded metal arc welding (SMAW) processes.

- Objective 1
Set up for SMAW
operations on carbon
steel.
- Objective 2
Start and restart an arc
and run a bead on
carbon steel.
- Objective 3
Build a weld pad on
carbon steel in the flat
position.
- Objective 4
Make 1F (flat position-
fillet weld) welds on
carbon steel.
- Objective 5
Make 2F (horizontal
position-fillet weld)
welds on carbon steel.
- Objective 6
Make 1G (flat position-
groove weld) welds on
carbon steel.
- Objective 7
Make 2G (horizontal
position-groove weld)
welds on carbon steel.

Standard 8

Student will use manual oxyfuel
gas cutting processes.

- Objective 1
Perform safety
inspections of
equipment and
accessories.
- Objective 2
Set up for manual
oxyfuel gas cutting
operations on carbon
steel.
- Objective 3
Perform straight cutting
operations on carbon
steel.
- Objective 4
Perform shape-cutting
operations on carbon

- steel.
- Objective 5
Perform bevel-cutting operations on carbon steel.
- Objective 6
Pierce a hole through a carbon steel plate.

Standard 9

Students will use gas metal arc welding (GMAW) processes.

- Objective 1
Set up for GMAW operations on carbon steel.
- Objective 2
Start and restart an arc and backfill at the edge while running a bead on carbon steel.
- Objective 3
Use Short Circuit Transfer welding process to make 1F (flat position-fillet weld) welds on carbon steel.
- Objective 4
Use Short Circuit Transfer welding process to make 2F (horizontal position-fillet weld) welds on carbon steel.
- Objective 5
Use Short Circuit Transfer welding process to make 1F (flat position-fillet weld) multi-pass weld on carbon steel.
- Objective 6
Use Short Circuit Transfer welding process to make 1G (flat position-groove weld) welds on carbon steel.
- Objective 7
Use Short Circuit

Transfer welding
process to make 2G
(horizontal position-
groove weld) welds on
carbon steel.

