

Ganado Unified School District (Welding I)

PACING Guide SY 2017-2018

Timeline & Resources	AZ College and Career Readiness Standard	Essential Question (HESS Matrix)	Learning Goal	Vocabulary (Content/Academic)
<p><u>1st QTR:</u> NCCER-CONTREN LEARNING SERIES Welding Level One Module 29201-09 Welding Symbols</p>	<p>STANDARD 1.0 – LAYOUT AND FIT UP PROJECT FROM BLUEPRINTS</p> <p>1.1 Interpret drawings, symbols, and procedures. 1.2 Use measuring devices. 1.3 Lay out projects from blueprints. 1.4 Measure and cut materials 1.5 Tack materials into position for welding</p>	<p>How can we keep our shop a safe environment?</p> <p>What is one example of appropriate PPE?</p> <p>Describe the risks and dangers tools and equipment</p>	<p>Students will be able to:</p> <ul style="list-style-type: none"> • Identify and explain the various parts of a welding symbol. • Identify and explain fillet and groove weld symbols. • Read welding symbols on drawings, specifications, and welding procedure specifications. • Interpret welding symbols from a print. 	<ul style="list-style-type: none"> ○ Arrow line ○ Countersink ○ Reference line ○ Weld symbol ○ Welding Symbol
<p>NCCER-CONTREN LEARNING SERIES Welding Level One Module 29202-09 Reading Welding Detail Drawings</p>	<p>STANDARD 1.0 – LAYOUT AND FIT UP PROJECT FROM BLUEPRINTS</p> <p>1.6 Interpret drawings, symbols, and procedures. 1.7 Use measuring devices. 1.8 Lay out projects from blueprints. 1.9 Measure and cut materials 1.10 Tack materials into position for welding</p>		<p>Students will be able to:</p> <ul style="list-style-type: none"> • Identify and explain a welding detail drawing. • Identify and explain lines, material fills, and sections. • Identify and explain object views. • Identify and explain dimensioning. • Identify and explain notes and bill of materials. • Interpret basic elements of a welding detail drawing. 	<ul style="list-style-type: none"> ○ Blind hole ○ Counterbore ○ Elevation ○ Isometric view ○ Mark ○ Orthographic Projection ○ Scale ○ Tolerance



2nd QTR:


**NCCER-
CONTREN
LEARNING
SERIES
Welding
Level One**
Module 29203-09
Physical
Characteristics and
Mechanical
Properties of Metals

Does not have Standards

			<p>Students will be able to:</p> <ul style="list-style-type: none">• Identify and explain the composition and classification of base metals.• Explain and demonstrate field identification methods for base metals.• Identify and explain the physical characteristics and mechanical properties of metal.• Identify and explain forms and shapes of structural metals. <p>Explain metallurgical considerations for welding metals.</p>	<ul style="list-style-type: none">○ Alloy○ American Iron and Steel Institute (AISI)○ American Society for Testing Materials International (ASTM)○ Anneal○ Austenitizing○ Casting○ Coefficient○ Ductile○ Ductility○ Ferrous○ Flange○ Gas Metal Arc Welding (GMAW)○ Gas tungsten arc welding (GTAW)○ Hardenability○ Heat-affected zone (HAZ)○ Hot shortness○ Interpass Temperature○ Malleable○ Mechanical properties○ Metallic Nonferrous metal○ Notch Toughness○ Oxide○ Postweld heat treatment (PWHT)○ Quench○ Residual stress○ Society of Automotive Engineers (SAE)○ Shielded metal arc welding (SMAW)○ Tempering○ Tensile strength○ Underbead cracking
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NCCER-CONTREN LEARNING SERIES Welding Level One Module 29204-09 Preheating and Postheating of Metals	Does not have Standards		Students will be able to: <ul style="list-style-type: none"> • Explain and demonstrate how to preheat metals. • Describe maintaining interpass temperature. • Explain postweld heat treatment of metals. • Explain the effects of preheat and postheat on metals <ul style="list-style-type: none"> - Heat Affected Zone (HAZ) - Cracking 	<ul style="list-style-type: none"> ○ Cold working ○ Constituents ○ Critical temperature ○ Crystalline ○ Martensite ○ Preheat weld treatment (PHWT) ○ Strain hardening ○ Work Hardening
3rd QTR: NCCER-CONTREN LEARNING SERIES Welding Level One Module 29105-09 Base Metal Preparation	STANDARD 8.0 USE AUXILIARY EQUIPMENT AND TOOLS 8.1 Use power saw/abrasive wheel to cut material 8.2 Use power equipment to wire brush metal 8.3 Use multi-purpose shear and punch 8.4 Use metal brake 8.5 Use metal roller 8.6 Use drilling equipment		Students will be able to: <ul style="list-style-type: none"> • Clean base metal for welding or cutting • Identify and explain joint design. • Explain joint design considerations • Mechanically bevel the edge of a mild steel plate. • Thermally bevel the end of a mild steel plate. Select the proper joint design based on a welding procedure specification (WPS) instructor direction.	<ul style="list-style-type: none"> ○ Backing ○ Base metal ○ Code ○ Distortion ○ Load ○ Melt-through ○ Nonferrous metal ○ Oxide ○ Peen ○ Piping porosity ○ Porosity ○ Root face ○ Root opening ○ Surfacing ○ Transverse ○ Weathering steel ○ Welding procedure specifications (WPS) Weldment
NCCER-CONTREN	STANDARD 9.0 PERFORM WELDMENT TESTING		Students will be able to: <ul style="list-style-type: none"> • Identify and explain codes governing welding 	<ul style="list-style-type: none"> ○ Defect ○ Discontinuity ○ Embrittled

<p>LEARNING SERIES Welding Level One Module 29106-09 Weld Quality</p>	<p>9.1 Describe nondestructive test 9.2 Perform destructive test</p>		<ul style="list-style-type: none"> • Identify and explain weld imperfections and their causes • Identify and explain nondestructive examination practices • Identify and explain welder qualification tests • Explain the importance of quality workmanship • Identify common destructive testing methods • Perform a visual inspection of fillet welds 	<ul style="list-style-type: none"> ○ Hardenable materials ○ Homogeneity ○ Inclusion ○ Laminations ○ Procedure qualification ○ Procedure qualification record (PQR) ○ Radiographic ○ Underbead cracking
<p>4th QTR: NCCER-CONTREN LEARNING SERIES Welding Level One Module 29107-09 SMAW – Equipment and Setup</p>	<p>STANDARD 3.0 SET UP AND USE SHEILDED METAL ARC WELDING (SMAW) EQUIPMENT 3.1 Set up SMAW equipment.</p>		<p>Students will be able to:</p> <ul style="list-style-type: none"> • Identify and explain shielded metal arc welding (SMAW) safety. • Explain welding electrical current. • Identify welding power supplies and their characteristics. • Explain how to set up welding power supplies. • Set up a machine for welding. • Identify tools used for weld cleaning. 	<ul style="list-style-type: none"> ○ Alternating current (AC) ○ Amperage ○ Arc ○ Direct current (DC) ○ Electrode ○ Polarity ○ Primary current ○ Step-down transformer ○ Voltage
<p>NCCER-CONTREN LEARNING SERIES Welding Level One Module 29108-09 Shielded Metal Arc</p>	<p>STANDARD 3.0 SET UP AND USE SHEILDED METAL ARC WELDING (SMAW) EQUIPMENT 3.1 Identify and use types, storage, and handling of electrodes</p>		<p>Students will be able to:</p> <ul style="list-style-type: none"> • Identify factors that affect electrode selection. • Explain the American Welding Society (AWS) and the American Society of Mechanical Engineers (ASME) filler metal classification system. 	<ul style="list-style-type: none"> ○ Alloy ○ Condensation ○ Ductile ○ Flux ○ Heat-affected zone ○ Hermetically sealed ○ Low-hydrogen electrode ○ Notch toughness

Welding – Electrodes			<ul style="list-style-type: none"> • Identify different types of filler metals. • Explain the storage and control of filler metals. • Explain filler metal traceability requirements and how to use applicable code requirements. <p>Identify and select the proper electrode for an identified welding task.</p>	<ul style="list-style-type: none"> ○ Traceability ○ Vertical welding
		