



Metal Fabrication / Welding 120

2021

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Department of Education and Early Childhood Development
Curriculum Branch

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1. Introduction

1.1 Mission and Vision of Educational System

The New Brunswick Department of Education and Early Childhood Development is dedicated to providing the best public education system possible, wherein all students have a chance to achieve their academic best. The mission statement for New Brunswick schools is:

Each student will develop the attributes needed to be a lifelong learner, to achieve personal fulfillment and to contribute to a productive, just and democratic society.

1.2 New Brunswick Global Competencies

New Brunswick Global Competencies provide a consistent vision for the development of a coherent and relevant curriculum. The statements offer students clear goals and a powerful rationale for school work. They help ensure that provincial education systems' missions are met by design and intention. The New Brunswick Global Competencies statements are supported by curriculum outcomes.

New Brunswick Global Competencies are statements describing the knowledge, skills and attitudes expected of all students who graduate high school. Achievement of the New Brunswick Global Competencies prepares students to continue to learn throughout their lives. These Competencies describe expectations not in terms of individual school subjects but in terms of knowledge, skills and attitudes developed throughout the curriculum. They confirm that students need to make connections and develop abilities across subject boundaries if they are to be ready to meet the shifting and ongoing demands of life, work and study today and in the future.

See Appendix 6.1.

2. Pedagogical Components

2.1 Pedagogical Guidelines

Diverse Cultural Perspectives

It is important for teachers to recognize and honour the variety of cultures and experiences from which students are approaching their education and the world. It is also important for teachers to recognize their own biases and be careful not to assume levels of physical, social or academic competencies based on gender, culture, or socio-economic status.

Each student's culture will be unique, influenced by their community and family values, beliefs, and ways of viewing the world. Traditional aboriginal culture views the world in a much more holistic way than the dominant culture. Disciplines are taught as connected to one another in a practical context, and learning takes place through active participation, oral communication and experiences. Immigrant students may also be a source of alternate world views and cultural understandings. Cultural variation may arise from the differences between urban, rural and isolated communities. It may also arise from the different value that families may place on academics or athletics, books or media, theoretical or practical skills, or on community and church. Providing a variety of teaching and assessment strategies to build on this diversity will provide an opportunity to enrich learning experiences for all students.

Universal Design for Learning

The curriculum has been created to support the design of learning environments and lesson plans that meet the needs of all learners. Specific examples to support Universal Design for Learning for this curriculum can be found in the appendices. The **Planning for All Learners Framework** will guide and inspire daily planning.

See Appendix 6.2

English as an Additional Language Curriculum

Being the only official bilingual province, New Brunswick offers the opportunity for students to be educated in English and/or French through our public education system. The EECD provides leadership from K-12 to assist educators and many stakeholders in supporting newcomers to New Brunswick. English language learners have opportunities to receive a range of instructional support to improve their English language proficiency through an inclusive learning environment. EECD, in partnership with the educational and wider communities offer a solid, quality education to families with school-aged children.

2.2 Assessment Guidelines

Assessment Practices

Assessment is the systematic gathering of information about what students know and are able to do. Student performance is assessed using the information collected during the evaluation process. Teachers use their professional skills, insight, knowledge, and specific criteria that they establish to make judgments about student performance in relation to learning outcomes. Students are also encouraged to monitor their own progress through self-assessment strategies, such as goal setting and rubrics.

Research indicates that students benefit most when assessment is regular and ongoing and is used in the promotion of learning (Stiggins, 2008). This is often referred to as formative assessment. Evaluation is less effective if it is simply used at the end of a period of learning to determine a mark (summative evaluation).

Summative evaluation is usually required in the form of an overall mark for a course of study, and rubrics are recommended for this task. Sample rubrics templates are referenced in this document, acknowledging teachers may have alternative measures they will apply to evaluate student progress.

Some examples of current assessment practices include:

• Questioning	• Projects and Investigations
• Observation	• Checklists/Rubrics
• Conferences	• Responses to texts/activities
• Demonstrations	• Reflective Journals
• Presentations	• Self and peer assessment
• Role plays	• Career Portfolios
• Technology Applications	• Projects and Investigations

Formative Assessment

Research indicates that students benefit most when assessment is ongoing and is used in the promotion of learning (Stiggins, 2008). Formative assessment is a teaching and learning process that is frequent and interactive. A key component of formative assessment is providing ongoing feedback to learners on their understanding and progress. Throughout the process adjustments are made to teaching and learning.

Students should be encouraged to monitor their own progress through goal setting, co-constructing criteria and other self-and peer-assessment strategies. As students become more involved in the assessment process, they are more engaged and motivated in their learning.

Additional details can be found in the Formative Assessment document.

Summative Assessment

Summative evaluation is used to inform the overall achievement for a reporting period for a course of study. Rubrics are recommended to assist in this process. Sample rubrics templates are referenced in this document, acknowledging teachers may have alternative measures they will apply to evaluate student progress.

For further reading in assessment and evaluation, visit the Department of Education and Early Childhood Development's Assessment and Evaluation site [here](#).

Cross Curricular Literacy

Literacy occurs across learning contexts and within all subject areas. Opportunities to speak and listen, read and view, and write and represent are present every day -in and out of school.

3. Subject Specific Guidelines

3.1 Rationale

Metals Fabrication / Welding 120 presents advanced opportunities for students to use math and science in relevant and meaningful ways. This production-orientated course integrates concepts of appropriate material selection, significance of design, appropriate levels of precision, and the necessity to learn and adhere to safe practices when using hand tools and stationary equipment.

This course encourages students to use and develop the right side of the brain (expressive and creative side) while incorporating the analytical skills required to design and build products. Students will learn skills required to manipulate hand tools and stationary equipment, in addition to precision skills and opportunities to practice creativity.

Metals Fabrication / Welding 120 focuses on further advancing transferable skill sets useful to students who are planning to enter post-secondary education in the fields of engineering, mechanical technology, industrial mechanics, machinists, computer numerical control, welders/fitters, plumbing and heating, automotive, heavy equipment, or virtually any trade.

Numeracy, literacy and critical thinking are important components of this course. To cultivate numeracy, literacy and critical thinking skills, students will demonstrate application of skills through a capstone project.

3.2 Course Description

This course requires Metal Fabrication / Welding 110 as a pre-requisite or a blocked co-requisite with the same group of students.

Metal Fabrication / Welding 120 introduces students to advanced skills and practices, building upon the theory and practical skills obtained in Metal Fabrication / Welding 110. This advanced course encapsulates and reinforces theory in Math, SMAW, GMAW, PAW, OFC, all of which lead to a capstone project. Students will learn valuable safety procedures, tool skills and engage with the NB global competencies.

To successfully achieve the goals, set forth by this curriculum, class size is limited to a recommended maximum of twenty students. It must be noted that the class size may be further limited based on the physical space available to offer a safe working environment for students.

3.3 Curriculum Organizers and Outcomes

Outcomes

The New Brunswick Curriculum is stated in terms of general curriculum outcomes, specific curriculum outcomes and achievement indicators.

General Curriculum Outcomes (GCO) are overarching statements about what students are expected to learn in each strand/sub-strand. The general curriculum outcome for each strand/sub-strand is the same throughout the grades.

Specific Curriculum Outcomes (SCO) are statements that identify specific concepts and related skills underpinned by the understanding and knowledge attained by students as required for a given grade.

Learning Outcomes Summary Chart

GCO 1	Students will examine employment practices and Occupational Health and Safety legislation.
SCO 1.1	Students will examine safe and legal workplace procedures.
SCO 1.2	Students will describe ethical and legal workplace behavior.
SCO 1.3	Students examine employment opportunities, trades designations, and the Canadian Red Seal Certification program.

GCO 2	Students will review interdisciplinary hand tools, power tools, and fasteners.
SCO 2.1	Students will identify/select and care for basic hand tools.
SCO 2.2	Students will identify/select and care for basic power tools.
SCO 2.3	Students will identify and select proper fasters for the specific application.

GCO 3	Students will review and demonstrate proficiency in oxy-fuel systems, Plasma arc cutting, SMAW, GMAW
SCO 3.1	Students will review and demonstrate proficiency in oxy-fuel welding, brazing, and cutting & Plasma arc cutting
SCO 3.2	Students will review and demonstrate proficiency in Plasma Arc Cutting

SCO 3.3	Students will review and demonstrate proficiency in Gas Metal Arc Welding (GMAW)
SCO 3.4	Students will review and demonstrate proficiency in Shielded Metal Arc Welding (SMAW)

GCO 4	Students will develop and demonstrate advanced and out of position skills in Shielded Metal Arc Welding (SMAW)
SCO 4.1	Students will demonstrate fillet and groove welds in the horizontal position using SMAW
SCO 4.2	Students will demonstrate fillet and groove welds in the vertical position using SMAW
SCO 4.3	Students will demonstrate fillet and groove welds in the overhead position using SMAW
SCO 4.4	Students will demonstrate single and multi-pass welds in horizontal, vertical and overhead positions using SMAW

GCO 5	Students will develop and demonstrate advanced and out of position skills in Gas Metal Arc Welding (GMAW)
SCO 5.1	Students will demonstrate fillet and groove welds in the horizontal position using GMAW
SCO 5.2	Students will demonstrate fillet and groove welds in the vertical position using GMAW
SCO 5.3	Students will demonstrate fillet and groove welds in the overhead position using GMAW
SCO 5.4	Students will demonstrate single and multi-pass welds in horizontal, vertical and overhead positions using GMAW

GCO 6	Students will develop and demonstrate introductory skills in Gas Tugsten Arc Welding (GTAW)
SCO 6.1	Students will identify the components and safely set-up and tear down of GTAW equipment.
SCO 6.2	Students will be able to establish and maintain an arc using GTAW on mild steel in the flat position
SCO 6.3	Students will be able to establish and maintain an arc using GTAW on mild steel with the addition of filler rod (ER70S)

GCO 7	Students will propose, develop and synthesize a Capstone Project
SCO 7.1	Students will design a project that incorporates multi-process, multi-positions welds
SCO 7.2	Students will engage in project management activities (estimate costs of materials, quantity and availability.)
SCO 7.3	Students will layout and cut project using oxy-fuel and/or plasma arc cutting
SCO 7.4	Students will fabricate project which will contain 3 different positions comprised of multiple sized fillet and groove welds

4. Curriculum Outcomes

GCO 1 Students will examine employment practices and Occupational Health and Safety legislation.	
SCO 1.1 Students will examine safe and legal workplace procedures.	
Concepts and Content	I Can – exemplars:
<p>New Brunswick Construction Safety Association (NBCSA) online training courses in Workplace Hazardous Materials Information Systems (WHMIS) and Safety Orientation to learn safe work practices regarding WHMIS and the Employment Standards Act.</p> <p>Safe body mechanics (i.e. back safety, lifting, etc.).</p> <p>Basic First Aid.</p>	<p>I can identify potential consequences for unsafe procedures.</p> <p>I can interpret WHMIS symbols as identification for hazardous products.</p> <p>I can locate and properly use safety equipment.</p> <p>I can use Personal Protective Equipment (PPE).</p> <p>I can lockout and tag-out equipment with proper procedures.</p> <p>I can give examples of potential hazards with inappropriate clothing, footwear, and jewellery.</p> <p>I can understand back safety.</p> <p>I can use proper lifting techniques.</p> <p>I can demonstrate safe working loads.</p> <p>I can understand the importance of ergonomics and body mechanics.</p> <p>I can use proper body position when using tools.</p> <p>I can respond to potential hazard or injury.</p>

GCO 1: Students will examine employment practices and Occupational Health and Safety legislation.

Resources		
Video	Website	Document
	www.nbcsa.ca/NBCSAStudent/ Health and Safety, Acorn WS1.1 https://www.worksafenb.ca/	

SCO 1.2 Students will describe ethical and legal workplace behavior.	
Concepts and Content	I Can – exemplars:
<p>Interacting with customers’ property regarding appropriate responsible resource management.</p> <p>Obligations to an owner (e.g. bonding, liability, privacy).</p> <p>Examine codes of ethics of organizations and companies.</p>	<p>I can co-construct a description of appropriate workplace behavior based on my own and my peers’ experiences.</p>
Resources	
Video	Website
	https://www.eca.nb.ca/about/code-of-ethics/ http://www.cba.org/Publications-Resources/Practice-Tools/Ethics-and-Professional-Responsibility-(1)/Codes-of-Professional-Conduct http://www.cips.ca/ethics

GCO 1: Students will examine employment practices and Occupational Health and Safety legislation.

SCO 1.3 Students will examine employment opportunities, trades designations, and the Canadian Red Seal Certification program.		
Concepts and Content		I Can – exemplars:
<p>Job descriptions and employment opportunities in the skilled trades.</p> <p>Post secondary training options have grown in New Brunswick.</p> <p>There are some trades that are designated.</p> <p>The red seal certification program has a professional designation.</p>		<p>I can discuss employment opportunities and statistics for tradespeople.</p> <p>I can explore post secondary options or apprenticeship programs for trade training.</p> <p>I can identify a designated trade.</p> <p>I can explain the Red Seal Certification Program and its professional designation RSE.</p>
Resources		
Video	Website	Document
	<p>http://nbcc.ca/</p> <p>https://www.readyarc.ca/</p> <p>https://www.cwbgroup.org/</p> <p>https://www2.gnb.ca/content/gnb/en/departments/post-secondary_education_training_and_labour/Skills/content/ApprenticeshipAndTrades.html</p> <p>http://www.red-seal.ca/w.2lc.4m.2-eng.html</p>	

GCO 2: Students will review interdisciplinary hand tools, power tools, and fasteners.

GCO 2 Students will review interdisciplinary hand tools, power tools, and fasteners.

SCO 2.1 Students will identify/select and care for basic hand tools.		
Concepts and Content	I Can – exemplars:	
The safety precautions and types of hammers, clamping tools, pliers, cutting tools, wrenches, and sockets.	I can identify, care for, and safely use the appropriate: clamping devices, pliers, wrenches, screwdrivers, striking tools, chisels, saws, and files.	
Resources		
Video	Website Hand Tools and Power Tools, Acorn ST1.1	Document

SCO 2.2 Students will identify/select and care for basic power tools.		
Concepts and Content	I Can – exemplars:	
The safety precautions, types and classifications of: drills and drilling equipment, saws, and grinding equipment.	I can identify, care for, and safely use the appropriate: electric saws, drills and fastening devices. I can choose the appropriate pneumatic, electric, or battery-operated tool for the task at hand.	
Resources		
Video	Website Hand Tools and Power Tools, Acorn ST1.1	Document

SCO 2.3 Students will identify and select proper fasters for the specific application.		
Concepts and Content	I Can – exemplars:	
Types of fasteners and their uses. Classifications of threading equipment and thread designations.	I can identify and safely use the appropriate temporary, removable, or permanent fasteners for the application (screws, bolts, nuts, washers, clips, rivets, glues, and epoxies).	
Resources		
Video	Website	Document

GCO 3: Students will review and demonstrate proficiency in oxy-fuel systems, Plasma arc cutting, SMAW, GMAW.

GCO 3 Students will review and demonstrate proficiency in oxy-fuel systems, Plasma arc cutting, SMAW, GMAW

SCO 3.1 Students will review and demonstrate proficiency in oxy-fuel welding, brazing, and cutting		
Concepts and Content	I Can – exemplars:	
Review of the safe set-up, operation and tear down of oxy-acetylene equipment.	I can safely set-up an oxy-fuel equipment I can safely operate oxy-fuel welding equipment I can safely operate oxy-fuel cutting equipment I can control the puddle size and heat input	
Resources		
Video	Website Basic Oxy Fuel, ACORN (WP7.1)	Document

SCO 3.2 Students will review and demonstrate proficiency in Plasma Arc Cutting		
Concepts and Content	I Can – exemplars:	
Review of the safe set-up, operation and tear down of Plasma Arc cutting equipment.	I can safely set-up the plasma cutting equipment I can safely operate the plasma arc cutting equipment I can explain how the plasma cutting process works	
Resources		
Video	Website	Document

GCO 3: Students will review and demonstrate proficiency in oxy-fuel systems, Plasma arc cutting, SMAW, GMAW.

SCO 3.3 Students will review and demonstrate proficiency in Gas Metal Arc Welding (GMAW)		
Concepts and Content		I Can – exemplars:
Review of the safe set-up, operation and tear down of Gas Metal Arc Welding equipment.		I can safely set-up the GMAW equipment I can safely operate the GMAW equipment I can explain how the GMAW process works I can troubleshoot GMAW equipment I can identify common weld faults in the GMAW process
Resources		
Video	Website Basic GMAW, Acorn WP3.1	Document

SCO 3.4 Students will review and demonstrate proficiency in Shielded Metal Arc Welding (SMAW)		
Concepts and Content		I Can – exemplars:
Review of the safe set-up, operation and tear down of Shielded Metal Arc Welding equipment.		I can safely set-up the SMAW equipment I can safely operate the SMAW equipment I can explain how the SMAW process works I can identify common weld faults in the SMAW process I can identify the differences between F3 and F4 electrodes I can explain the differences between F3 and F4 electrodes
Resources		
Video	Website Basic SMAW, Acorn WP1.1	Document

GCO 4: Students will develop and demonstrate advanced and out of position skills in Shielded Metal Arc Welding (SMAW).

GCO 4 Students will develop and demonstrate advanced and out of position skills in Shielded Metal Arc Welding (SMAW)

SCO 4.1 Students will demonstrate fillet and groove welds in the horizontal position using SMAW		
Concepts and Content		I Can – exemplars:
Knowledge of the application of horizontal fillet and groove welds with the SMAW process. Identify acceptable standards in the application of horizontal fillet and groove welds in the SMAW process.		I can demonstrate a fillet weld in the horizontal position I can demonstrate a groove weld in the horizontal position I can identify weld faults common in the horizontal position I can correct weld faults common in the horizontal position
Resources		
Video	Website Basic SMAW, Acorn WP1.1	Document

SCO 4.2 Students will demonstrate fillet and groove welds in the vertical position using SMAW		
Concepts and Content		I Can – exemplars:
Knowledge of the application of vertical fillet and groove welds with the SMAW process. Identify acceptable standards in the application of vertical fillet and groove welds in the SMAW process.		I can demonstrate a fillet weld in the vertical position I can demonstrate a groove weld in the vertical position I can identify weld faults common in the vertical position I can correct weld faults common in the vertical position
Resources		
Video	Website Basic SMAW, Acorn WP1.1	Document

GCO 4: Students will develop and demonstrate advanced and out of position skills in Shielded Metal Arc Welding (SMAW).

SCO 4.3 Students will demonstrate fillet and groove welds in the overhead position using SMAW		
Concepts and Content		I Can – exemplars:
Knowledge of the application of overhead fillet and groove welds with the SMAW process. Identify acceptable standards in the application of overhead fillet and groove welds in the SMAW process.		I can demonstrate a fillet weld in the overhead position I can demonstrate a groove weld in the overhead position I can identify weld faults common in the overhead position I can correct weld faults common in the overhead position
Resources		
Video	Website Basic SMAW, Acorn WP1.1	Document

SCO 4.4 Students will demonstrate single and multi-pass welds in horizontal, vertical and overhead positions using SMAW		
Concepts and Content		I Can – exemplars:
Determine the correct size of weld required for the weldment from either plans or joint configuration.		I can comprehend fillet weld sizes from weld symbols I can determine the correct number of passes required for the specific fillet weld size
Resources		
Video	Website Basic SMAW, Acorn WP1.1	Document

GCO 5: Students will develop and demonstrate advanced and out of position skills in Gas Metal Arc Welding (GMAW).

GCO 5 Students will develop and demonstrate advanced and out of position skills in Gas Metal Arc Welding (GMAW)

SCO 5.1 Students will demonstrate fillet and groove welds in the horizontal position using GMAW		
Concepts and Content		I Can – exemplars:
Knowledge of the application of horizontal fillet and groove welds with the GMAW process. Identify acceptable standards in the application of horizontal fillet and groove welds in the GMAW process.		I can demonstrate a fillet weld in the horizontal position I can demonstrate a groove weld in the horizontal position I can identify weld faults common in the horizontal position I can correct weld faults common in the horizontal position
Resources		
Video	Website Basic GMAW, Acorn WP3.1	Document

SCO 5.2 Students will demonstrate fillet and groove welds in the vertical position using GMAW		
Concepts and Content		I Can – exemplars:
Knowledge of the application of vertical fillet and groove welds with the GMAW process. Identify acceptable standards in the application of vertical fillet and groove welds in the GMAW process.		I can demonstrate a fillet weld in the vertical position I can demonstrate a groove weld in the vertical position I can identify weld faults common in the vertical position I can correct weld faults common in the vertical position
Resources		
Video	Website Basic GMAW, Acorn WP3.1	Document

GCO 5: Students will develop and demonstrate advanced and out of position skills in Gas Metal Arc Welding (GMAW).

SCO 5.3 Students will demonstrate fillet and groove welds in the overhead position using GMAW		
Concepts and Content		I Can – exemplars:
Knowledge of the application of overhead fillet and groove welds with the GMAW process. Identify acceptable standards in the application of overhead fillet and groove welds in the GMAW process.		I can demonstrate a fillet weld in the overhead position I can demonstrate a groove weld in the overhead position I can identify weld faults common in the overhead position I can correct weld faults common in the overhead position
Resources		
Video	Website Basic GMAW, Acorn WP3.1	Document

SCO 5.4 Students will demonstrate single and multi-pass welds in horizontal, vertical and overhead positions using GMAW		
Concepts and Content		I Can – exemplars:
Determine the correct size of weld required for the weldment from either plans or joint configuration.		I can comprehend fillet weld sizes from weld symbols I can determine the correct number of passes required for the specific fillet weld size
Resources		
Video	Website Basic GMAW, Acorn WP3.1	Document

GCO 6: Students will develop and demonstrate introductory skills in Gas Tungsten Arc Welding (GTAW).

GCO 6 Students will develop and demonstrate introductory skills in Gas Tungsten Arc Welding (GTAW)

SCO 6.1 Students will identify the components and safely set-up and tear down of GTAW equipment.		
Concepts and Content		I Can – exemplars:
Demonstrate the safe set-up, operation and tear down of Gas Tungsten Arc Welding equipment.		I can identify the components of GTAW equipment I can set up the GTAW equipment I can safely shut down GTAW equipment
Resources		
Video	Website	Document

SCO 6.2 Students will be able to establish and maintain an arc using GTAW on mild steel in the flat position		
Concepts and Content		I Can – exemplars:
Demonstrate correct initiation of the arc and puddle control using the GTAW process. Determine the correct amperage for the material used.		I can successfully maintain an arc with the GTAW process I can adjust the amperage to control the heat input in the GTAW process
Resources		
Video	Website	Document

SCO 6.3 Students will be able to establish and maintain an arc using GTAW on mild steel with the addition of filler rod (ER70S)		
Concepts and Content		I Can – exemplars:
Demonstrate the correct technique required to maintain the arc and puddle control while adding a filler metal using the GTAW process. Determine the correct filler metal for the material used.		I can maintain an arc while adding a filler metal I can choose the correct filler metal for the task
Resources		
Video	Website	Document

GCO 7 Students will propose, develop and synthesize a Capstone Project

SCO 7.1 Students will design a project that incorporates multi-process multi-positions welds		
Concepts and Content		I Can – exemplars:
Demonstrate the ability to compose a draft for approval. Demonstrate basic drafting techniques and understandings including object lines, dimension lines, hidden lines, different projections, and the applicable welding symbols.		I can compose a draft drawing for criteria approval I can sketch a technical drawing I can interpret a technical drawing I can identify the processes needed I can assign proper welding symbols
Resources		
Video	Website	Document
	Welding Procedures, ACORN (PR1.1) Joint Design and Welding Symbols, ACORN (JS1.1)	

SCO 7.2 Students will engage in project management activities (estimate costs of materials, quantity and availability.)		
Concepts and Content		I Can – exemplars:
Demonstrate the ability to implement effective resource management for the capstone project. Demonstrate the ability to communicate the project ideas and costs.		I can select proper materials for the project I can source prices of materials I can demonstrate effective resource management I can prepare a materials list I can effectively communicate my project idea to others I can estimate the total project cost
Resources		
Video	Website	Document
	Welding Procedures, ACORN (PR1.1)	

GCO 7: Students will propose, develop and synthesize a Capstone Project

SCO 7.3 Students will layout and cut project using oxy-fuel and/or plasma arc cutting		
Concepts and Content		I Can – exemplars:
Demonstrate the ability to interpret and implement technical drawings.		I can apply the technical drawing to the project layout I can identify the best process to use to cut the material I can demonstrate efficient manual cutting skills
Resources		
Video	Website	Document
	Basic Oxy Fuel, ACORN (WP7.1) Joint Design and Welding Symbols, ACORN (JS1.1)	

SCO 7.4 Students will fabricate project which will contain 3 different positions comprised of multiple sized fillet and groove welds		
Concepts and Content		I Can – exemplars:
Demonstrate the ability to efficiently fabricate, using the appropriate welding processes. Demonstrate the ability to weld out of position. Demonstrate the correct processes for the application selected.		I can determine the correct assembly process I can apply the most efficient weld size for the appropriate joint I can control metal distortion through correct welding procedures I can weld in 3 or more positions I can choose the best welding process for the application
Resources		
Video	Website	Document
	Basic GMAW, Acorn WP3.1 Basic SMAW, Acorn WP1.1 Welding Procedures, ACORN (PR1.1)	

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Subject Specific

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6. Appendices

6.1 New Brunswick Global Competencies

Critical Thinking and Problem-Solving	Innovation, Creativity, and Entrepreneurship	Self-Awareness and Self-Management
<ul style="list-style-type: none"> • Engages in an inquiry process to solve problems • Acquires, processes, interprets, synthesizes, and critically analyzes information to make informed decisions (i.e., critical and digital literacy) • Selects strategies, resources, and tools to support their learning, thinking, and problem-solving • Evaluates the effectiveness of their choices • Sees patterns, makes connections, and transfers their learning from one situation to another, including real-world applications • Analyzes the functions and interconnections of social, ecological, and economic systems • Constructs, relates and applies knowledge to all domains of life, such as school, home, work, friends, and community • Solves meaningful, real-life, and complex problems by taking concrete steps to address issues and design and manage projects • Formulates and expresses questions to further their understanding, thinking, and problem-solving 	<ul style="list-style-type: none"> • Displays curiosity, identifies opportunities for improvement and learning, and believes in their ability to improve • Views errors as part of the improvement process • Formulates and expresses insightful questions and opinions to generate novel ideas • Turns ideas into value for others by enhancing ideas or products to provide new-to-the-world or improved solutions to complex social, ecological, and economic problems or to meet a need in a community • Takes risks in their thinking and creating • Discovers through inquiry research, hypothesizing, and experimenting with new strategies or techniques • Seeks and makes use of feedback to clarify understanding, ideas, and products • Enhances concepts, ideas, or products through a creative process 	<ul style="list-style-type: none"> • Has self-efficacy, sees themselves as learners, and believes that they can make life better for themselves and others • Develops a positive identity, sense of self, and purpose from their personal and cultural qualities • Develops and identifies personal, educational, and career goals, opportunities, and pathways • Monitors their progress • Perseveres to overcome challenges • Adapts to change and is resilient in adverse situations • Aware of, manages, and expresses their emotions, thoughts, and actions in order to understand themselves and others • Manages their holistic well-being (e.g., mental, physical, and spiritual) • Accurately self-assesses their current level of understanding or proficiency • Advocates for support based on their strengths, needs, and how they learn best • Manages their time, environment, and attention, including their focus, concentration, and engagement

Collaboration	Communication	Sustainability and Global Citizenship
<ul style="list-style-type: none"> • Participates in teams by establishing positive and respectful relationships, developing trust, and acting interdependently and with integrity • Learns from and contributes to the learning of others by co-constructing knowledge, meaning, and content • Assumes various roles on the team and respects a diversity of perspectives • Addresses disagreements and manages conflict in a sensitive and constructive manner • Networks with a variety of communities/groups • Appropriately uses an array of technology to work with others • Fosters social well-being, inclusivity, and belonging for themselves and others by creating and maintaining positive relationships with diverse groups of people • Demonstrates empathy for others in a variety of contexts 	<ul style="list-style-type: none"> • Expresses themselves using the appropriate communication tools for the intended audience • Creates a positive digital identity • Communicates effectively in French and/or English and/or Mi'kmaq or Wolastoqey through a variety of media and in a variety of contexts • Gains knowledge about a variety of languages beyond their first and additional languages • Recognizes the strong connection between language and ways of knowing the world • Asks effective questions to create a shared communication culture, attend to understand all points of view, express their own opinions, and advocate for ideas 	<ul style="list-style-type: none"> • Understands the interconnectedness of social, ecological, and economic forces, and how they affect individuals, societies, and countries • Recognizes discrimination and promotes principles of equity, human rights, and democratic participation • Understands Indigenous worldviews, traditions, values, customs, and knowledge • Learns from and with diverse people, develop cross-cultural understanding • Understands the forces that affect individuals and societies • Takes action and makes responsible decisions that support social settings, natural environments, and quality of life for all, now and in the future • Contributes to society and to the culture of local, national, global, and virtual communities in a responsible, inclusive, accountable, sustainable, and ethical manner • Participates in networks in a safe and socially responsible manner.
Foundation of Literacy and Numeracy		

6.2 Universal Design for Learning (UDL)

UDL helps meet the challenge of diversity by suggesting flexible instructional materials, techniques, and strategies that empower educators to meet these varied needs. UDL research demonstrates that the challenge of diversity can and must be met by making curriculum flexible and responsive to learner differences. UDL provides guidelines to minimize barriers and maximize learning for all.

Is there a form of assistive technology that could be used to enhance/facilitate this lesson?	General Examples	Example in your subject area
Are there materials which can appropriately challenge readers to enhance this learning?	Audiobooks, EBSCO, Worldbook Online	
Are there students in this group who cannot access this learning (PLP background) and whose needs I must revisit before teaching?	PLP information/considerations	
Are there other choices that can be provided in this learning opportunity?	Differentiation models (RAFTs...)	
Is there another/a variety of media available? Only paper-based? Can it be listening? Can I add a visual component?		
Can movement be involved?	Quantum techniques	

Grouping and regrouping?	Cooperative learning; team games and tournaments	
Teacher versus non- teacher centered? Instructional design strategies –...	web based lesson... project-based, student research based	
Contracts?		
Opportunities for students to propose variations to the assignments/projects?	Tic Tac Toe	
Use of art /music / technology?	Songs, Videos, URL, YouTube	
Can I use drama? Art....	Use of improvisation; Skits; reader's theater; Can we make something? Demonstrate understanding visually? Paint a painting?	
Is there a plan to support the student/s who might already know this subject matter? Enrichment	Triad Model	
Does the language level need to be adjusted for the student to access this learning?	Link to adjust language level of text; CEFR information... SIOP techniques for EL learners; use of alternate texts...	

<p>Is there an independent or collaborative activity-project that would be better meet the needs of one or more students?</p>		
<p>Are there any experts that I could bring into the classroom electronically or as a guest speaker?</p>	<p>Speakers list, Skype contacts, media links, television documentary, archived historical documents</p>	
<p>Have I linked the goal to as current event or a cultural event in the student's lives? Can I make the learning more relevant?</p>	<p>Can this be applied in real life? TED talk, news item; societal trend, popular song? Can we start the unit and adjust or create it based on the students, interests or direction?</p>	
<p>Is there a hands-on experience that we could do to launch this lesson or this learning?</p>		

7. Resources

<https://www.cwbgroup.org/acorn/acorn-secondary-schools>

ACORN online learning, Canadian Welding Bureau free secondary resources for welding programs in the province of New Brunswick.

For access contact your district Subject Co-ordinator or the Learning specialist for Skilled Trades at the Department of Education.