Grade 12D Applied Specialities and Qualifications

Course Code	8503
Course Credit	1.0

Senior Years Technology Education Program

Discipline Overview

An approved technical-vocational education (TVE) program cluster comprises departmentally developed and/or approved courses in one specific trade or trained occupation that facilitates the transition from school to either post-secondary training (such as the training provided through Apprenticeship Manitoba) or entry into the workforce (often at an entry-level position).

When learners pursue their studies in an environment modelled after the workplace, they will acquire not only trade-related skills, but will also develop

- employability skills required to make an effective transition from school to work
- an understanding of career development and planning
- an understanding of the importance of becoming an autonomous, lifelong learner in order to adapt to the skills and knowledge needed in the future
- an awareness of safety in school, in the workplace, and at home
- an awareness of sustainability as it relates to the specific skilled trade area and society

Course Overview

In this course, learners will be preparing for and performing the Manitoba Welder Practical Examination Structural Level 1 (Canadian Welding Bureau). They will also continue to expand their expertise in the welding profession, including safety practices, tools and equipment, and the selection and use of materials and consumables.

This course focuses on the following units in the Apprenticeship Manitoba Level 1 technical training:

- A1 Learning About Work
- A2 Trade Safety Awareness
- A3 Tools and Equipment
- A4 Trade Related Communications
- A13 Welder Practical Examination I

Manitoba

The learning outcomes in this course may not follow a fixed sequence, as they are organized to align with Apprenticeship Manitoba standards. Only the outcomes relevant to this course are included. A complete list of learning outcomes can be found in the primary learning outcomes resource.

Global Competencies in Welding Technology

Critical Thinking

Critical thinking in welding technology involves the intentional process of synthesizing and analyzing ideas using criteria and evidence, making reasoned judgments, and reflecting on the outcomes and implications of those judgments.

When critical thinking as a competency is applied in welding technology, learners

- find and use sources strategically, efficiently, and effectively for the design and management of projects
- evaluate sources for bias, relevance, and reliability for use in training and occupations
- analyze and synthesize ideas using criteria and evidence that demonstrate awareness of emerging trends
- reflect on sources and experiences from multiple perspectives
- enhance comprehension, clarify meaning, make connections, and expand experiences through questioning
- make judgments based on observation, experience, and evidence
- weigh criteria to apply safe practices and make ethical decisions

Creativity

Creativity in welding technology involves exploring and playing with ideas and concepts in order to represent thinking, solve problems, explore opportunities, and innovate in unique ways. It is the interaction between intuition and thinking.

When creativity as a competency is applied in welding technology, learners

- demonstrate initiative, open-mindedness, inventiveness, flexibility, and a willingness to take prudent risks in thinking through projects/processes and recognizing safety protocols
- demonstrate curiosity by exploring new ideas, possibilities, and emerging trends, as well as by asking relevant questions
- use theoretical and applied strategies by making adaptations and adjustments to solve a problem and generate innovative ideas

- enhance innovative ideas by building on the ideas of others
- create a plan for a project and adjust it as needed to achieve the goal of successfully meeting a learning outcome
- research, develop, test, and adapt designs and ideas, as well as build on prior knowledge to persevere through obstacles
- reflect by welcoming feedback from others to enhance the process

Citizenship

Citizenship in welding technology involves engaging and working toward a more equitable, compassionate, and sustainable world by developing and valuing relationships to self, others, and the natural world.

When citizenship as a competency is applied in welding technology, learners

- understand their own perspective on issues related to economies on a global, regional, and local level
- recognize discrimination, principles of equity, and human rights in their world
- explore the interconnectedness of self, the workplace, and the natural world
- welcome diverse viewpoints, experiences, and world views and how they contribute to building relationships and practices
- empathize with multiple viewpoints to better understand consumers, markets, workplaces, teams, and co-workers
- connect with others in responsible, respectful, and inclusive ways, both in person and in digital contexts
- realize their potential in contributing to the betterment of community near and far
- evaluate factors such as the impact of diversity, equity, and inclusion in the workplace, and propose solutions to support well-being
- make ethical choices to promote healthy and sustainable outcomes

Connection to Self

Connection to self in welding technology involves awareness of the related nature of emotional, intellectual, physical, social, cultural, and spiritual aspects of living and learning, and the responsibility for personal growth, well-being, and well-becoming.

When connection to self as a competency is applied in welding technology, learners

- recognize personal strengths, gifts, and challenges to support their learning and well-being
- come to know the factors that shape their identity through exploration

- use workplace skills and practices to enhance self-regulation, personal comfort, sense of well-being, and efficiency
- reflect on own decisions, effort, and experiences, and others' feedback for improvement
- set goals to strengthen their career and personal aspirations
- create a personal plan that reflects their career goals, encompassing their strengths and interests
- value and practise resilience as they work through mistakes and overcome obstacles
- adapt and modify their planning when presented with obstacles or new information
- recognize and embrace their role in lifelong learning, well-being, and well-becoming

Collaboration

Collaboration in welding technology involves learning with and from others and working together with a shared commitment to a common goal.

When collaboration as a competency is applied in welding technology, learners

- welcome diverse viewpoints, experiences, and world views, and appreciate how they contribute to building relationships and practices
- build on each other's ideas through discussion, sharing stories, models, and simulations, and incorporate this learning into practical applications
- value and put trust in others' contributions when working together to ensure safe practices
- formulate questions of themselves and others to generate new ideas and deepen understanding
- work through differences and show a willingness to compromise or change perspective by demonstrating effective conflict resolution practices/strategies and appropriate workplace etiquette and protocols
- co-construct understanding of current practices and emerging technologies
- commit to their roles to co-construct, design, and manage projects

Communication

Communication in welding technology involves interacting with others and allowing for a message to be received, expressed, and understood in multiple ways and for a variety of purposes.

When communication as a competency is applied in welding technology, learners

- express ideas while using workplace conventions and professionalism
- understand context, adapting to different audiences, and conveying information clearly and concisely
- understand how their words and actions shape their identity or have an impact
- understand protocols and practices and use them to understand and interpret messages
- seek to understand others' ideas and instructions through active listening and questioning
- recognize that diverse perspectives (of language, culture, age, etc.) can influence understanding
- make meaning and deepen understanding through their language and the languages of clients and colleagues
- build relationships through meaningful interactions using inclusive and respectful language, and correct terminology, both in person and in digital contexts
- recognize the benefits of communication to build community

Enduring Understandings

Explore career opportunities.

Technical-vocational education supports learners to understand the unique characteristics, scope, working conditions, and career opportunities of various occupations to make informed choices.

Create safe, healthy, and effective workspaces.

Technical-vocational education provides learners with safe, healthy, and effective work practices and protocols that meet industry standards for technical competence and professionalism.

Navigate the world.

Technical-vocational education prepares learners with attitudes, skills, and knowledge to successfully navigate complex, competitive, and collaborative environments to develop an awareness of regulations, cultural competence, and ethical practices.

Experience connected and innovative learning.

Technical-vocational education readies learners to be entrepreneurial and innovative thinkers while making cross-curricular connections and transdisciplinary experiences (STEAM), utilizing industry standard digital tools and technologies, and fostering awareness of industry trends.

Promote inclusive and responsive systems.

Technical-vocational education promotes equity, diversity, and inclusion, is responsive to global challenges, and promotes environmental stewardship to prepare learners for an interconnected world.

Prepare for evolving economies.

Technical-vocational education equips learners with relevant and adaptable skills to become lifelong learners in an ever-changing world.

Learning Outcomes

With independence and an emerging ability to guide others, learners can achieve the following learning outcomes.

Strand A: Trade Safety (A2)

WEL-12D-A1 Define Manitoba safety and health requirements.

WEL-12D-A1-1 Define Manitoba safety and health requirements under The Workplace Safety and Health Act and Regulations for **workers' rights,** including

- the right to know
- the right to participate
- the right to refuse
- the right to protection from reprisal

WEL-12D-A1-2 Define Manitoba safety and health requirements under The Workplace Safety and Health Act and Regulations for **workers' responsibilities,** including

- taking reasonable care to protect themselves and others
- using safety equipment properly
- following safety rules and procedures
- cooperating with safety representatives and supervisors

WEL-12D-A1-3 Define and explain Manitoba safety and health requirements under The Workplace Safety and Health Act and Regulations for

- the rights and responsibilities of **supervisors**
- the rights and responsibilities of **employers**

WEL-12D-A1-4 Define and explain workplace **safety and health programs** and the roles of workers, including

- safety and health committee
- participation in investigation and inspection process

WEL-12D-A1-5 Define and explain the Manitoba safety and health requirements for various **public agencies**, including

- Workplace Safety and Health (Enforcement)
- SAFE Work Manitoba (Prevention)

WEL-12D-A2 Recognize, explain, and demonstrate personal protective equipment (PPE) requirements and standards in the workplace.

WEL-12D-A2-1 Recognize various **personal protective equipment** (PPE), including

- eye protection
- face protection
- hearing protection
- foot protection
- head protection
- hand protection
- skin protection
- respiratory protection
- protective clothing
- fall protection (trade-specific)

WEL-12D-A2-2 Explain various **personal protective equipment** (PPE), including

- selection of the appropriate PPE
- characteristics and key features
- application (i.e., role or utility in specific scenarios)
- limitations in scope or performance

WEL-12D-A2-3 Demonstrate how to use the required **personal protective equipment** (PPE), ensuring

- a proper fit
- a proper seal
- it is worn properly
- understanding of the procedures for reporting any damage or malfunctions

WEL-12D-A2-4 Recognize **hierarchy of control measures** and explain the requirements and standards, including

- elimination
- substitution
- engineering controls
- administrative controls
- personal protective equipment (PPE)

WEL-12D-A2-5 Explain each individual's responsibilities when using and managing **personal protective equipment** (PPE) at work or in training for **various roles**, including the

- employer

- supervisor
- worker
- teacher
- student

WEL-12D-A2-6 Explain requirements for **personal protective equipment** (PPE), including

- the name of the provider
- its proper maintenance
- required training
- the different types of gear
- procedures in place to guarantee regulations are upheld

WEL-12D-A3 Recognize and explain the Workplace Hazardous Material Information System (WHMIS) and procedures.

WEL-12D-A3-1 Explain how various hazardous materials are **identified**, including

- classification
- safety data sheets (SDS)
- labelling
- training
- access to information

WEL-12D-A3-2 Explain what **suppliers and workplaces** must do when labelling hazardous products, including

- using safety symbols
- classifying chemicals

WEL-12D-A3-3 Recognize various **safety data sheets** (SDS).

WEL-12D-A3-4 Recognize various **chemical and biological hazards.**

WEL-12D-A3-5 Explain how to deal with **chemical and biological hazards** safely, including

- how to wash off spills
- moving dangerous materials
- storing them properly

WEL-12D-A4 Recognize and explain safe work procedures (SWP).

WEL-12D-A4-1 Recognize a **safe work procedure** (SWP) that outlines specific steps to safely perform a task, including

- hazard identification

- risk assessment
- control measures

WEL-12D-A4-2 Explain a **safe work procedure** (SWP), including

- purpose
- scope
- procedure
- training

WEL-12D-A4-3 Recognize a hazard and explain the procedures to follow for **managing uncontrolled risks**, including

- unsecured tools or equipment
- improper use of machinery
- electrical hazards
- chemical exposure
- lack of personal protective equipment (PPE)
- poor housekeeping

WEL-12D-A4-4 Describe the **process of developing** a safe work procedure (SWP), including

- gathering information
- identifying hazards
- implementing controls
- documenting steps
- training workers

WEL-12D-A5 Recognize and explain injury prevention.

WEL-12D-A5-1 Recognize, explain, and demonstrate the **SAFE acronym**.

- **S**pot the hazard
- **A**ssess the risk
- **F**ind a safer way
- **E**very day

WEL-12D-A5-2 Recognize various **mental health risks** at work and school, such as

- stress
- bullying
- violence

WEL-12D-A5-3 Explain how to prevent various **mental health risks**, including

- respectful communication
- implementation of clear policies
- access to support systems

WEL-12D-A5-4 Demonstrate how to reduce various **mental health risks** at work and school, such as by

- promoting respect
- offering support
- proactively recognizing and managing issues such as stress or bullying

WEL-12D-A5-5 Recognize various methods to prevent injuries among **young workers**, such as through

- completion of the Young Worker Readiness Certificate Course
- mandatory safety orientation and training
- supervision by experienced workers
- implementation of SAFE Work Manitoba's Young Worker Injury Prevention Strategy
- use of personal protective equipment (PPE)
- encouraging reporting of unsafe conditions
- promoting awareness of workers' rights

WEL-12D-A5-6 Explain various methods to prevent injuries among **young workers**, such as the following:

- selection of the appropriate method
- characteristics and key features
- application (i.e., role or utility in specific scenarios)
- limitations in scope or performance

WEL-12D-A5-7 Recognize various **chemical and biological hazards**, including

- dust
- fumes
- gases

WEL-12D-A5-8 Explain how to prevent various **chemical and biological hazards**, such as by

- using proper ventilation
- using safety gear
- using personal protective equipment (PPE)
- implementing safe handling procedures

WEL-12D-A5-9 Explain how to prevent various injuries related to **electrical safety**, including

- using proper tools
- turning off power before repairs
- following lockout/tagout steps to make sure machines cannot be turned on accidentally

WEL-12D-A5-10 Demonstrate how to safely shut off and lock electrical equipment using a **lockout/tagout** procedure.

WEL-12D-A5-11 Recognize how to prevent various **fire injuries,** including

- recognizing different types of fires
- recognizing different kinds of fire extinguishers
- describing how to use fire extinguishers safely

WEL-12D-A5-12 Demonstrate knowledge of the **locations of various fire emergency safety equipment** and evacuation safety measures, including

- fire extinguisher
- alarm pull stations
- emergency exits
- muster points

WEL-12D-A5-13 Recognize various work-related **diseases and illness,** and explain how to prevent them, including examples such as

- asbestosis
- hearing loss
- carpal tunnel syndrome
- tendonitis
- lead poisoning

WEL-12D-A5-14 Recognize various **muscle and joint injuries,** and explain how to prevent them by using ergonomics prevention methods, including

- good posture
- proper workplace setup

WEL-12D-A5-15 Recognize various **confined spaces**.

WEL-12D-A5-16 Explain methods to prevent injuries during **confined space** entry.

WEL-12D-A6 Recognize and explain injury response.

WEL-12D-A6-1 Explain how to **manage a scene** when responding to an injury, such as by

- staying calm

- keeping the area safe
- providing support until trained help arrives

WEL-12D-A6-2 Explain how to **report an injury**, including reporting the injury to

- a teacher or supervisor
- Workers Compensation Board of Manitoba (WCB)

WEL-12D-A6-3 Demonstrate knowledge of the **locations of emergency safety equipment**, including

- first aid kit
- automated external defibrillator (AED)
- eyewash station

WEL-12D-A7 Demonstrate navigation of the SAFE Work Manitoba website.

WEL-12D-A7-1 Demonstrate how to navigate SAFE Work Manitoba's website, and retrieve and apply resources from key content, including

- legislation
- bulletins
- templates
- shop talk
- other resources

Strand B: Career Education (A1)

WEL-12D-B1 Explain the structure and scope of the welding trade.

WEL-12D-B1-1 Explain opportunities and future **career paths** in a trade, including

- becoming a specialist
- moving into leadership
- working in different locations
- growing with new technology

WEL-12D-B1-2 Explain **The Apprenticeship and Certification Act**, including

- support training
- the board
- trade committees
- rules for each trade
- policies about attendance
- continuing training

WEL-12D-B1-3 Explain the **Red Seal Occupational Standard (RSOS)**, including

- how it helps with training
- tracking work hours
- preparing for tests in a trade

WEL-12D-B2 Explain the levels of workplace competency.

WEL-12D-B2-1 Explain **job competencies** workers and learners need to know related to **workplace culture**, including

- understanding tools and materials
- using the right skills to do the job well

WEL-12D-B2-2 Explain the **social competencies** workers and learners need to know related to **workplace culture**, including

- working well with others
- using appropriate language
- respecting different beliefs
- understanding workplace rules
- supporting fairness and inclusion

WEL-12D-B3 Explain accommodation for apprentices with accessibility requirements.

WEL-12D-B3-1 Explain **The Accessibility for Manitobans Act** and how it supports apprentices with accessibility, including

- customer service
- communication
- buildings
- transportation
- training at work

Strand C: Trade-Related Communications (A4)

WEL-12D-C1 Explain and demonstrate techniques for effective verbal and non-verbal communication.

WEL-12D-C1-1 Explain how to communicate clearly and respectfully with various people at school and/or work, using both **words and body language**.

WEL-12D-C1-2 Demonstrate how to communicate clearly and respectfully with various people at school and/or work, using both **words and body language**.

WEL-12D-C2 Recognize workplace behaviours and communication that constitute bullying, as defined by the Canadian Human Rights Act and jurisdictional human rights laws.

WEL-12D-C2-1 Recognize what **respectful workplace** values look like and what kinds of behaviour are considered bullying, harassment, or discrimination under Canadian law.

WEL-12D-C3 Demonstrate effective communication skills, and practise active listening and response.

WEL-12D-C3-1 Demonstrate **effective communication and active listening,** including

- listening carefully
- responding clearly
- using appropriate body language
- asking questions
- being open to feedback

WEL-12D-C4 Recognize types of communication devices and explain their purpose and operation.

WEL-12D-C4-1 Recognize various types of **communication devices**, including

- telephones
- two-way radios
- computers
- smartphones
- tablets

WEL-12D-C4-2 Explain various purposes and operation of **communication devices**, such as their use for

- speaking
- sending messages
- sharing information

WEL-12D-C5 Demonstrate communication techniques using various communication devices.

WEL-12D-C5-1 Demonstrate good **communication skills** when using various communication devices to speak, send messages, or share information, including

- keeping the message concise
- articulating ideas precisely to avoid confusion
- remaining polite and professional

WEL-12D-C6 Recognize types of trade-related documents and explain their applications.

WEL-12D-C6-1 Recognize various **documents** used in trade, such as

- invoices
- shipping documents
- work orders
- cut lists
- order sheets

WEL-12D-C6-2 Explain various **documents** used in trade, such as

- selection of the appropriate documents
- characteristics and key features
- application (i.e., role or utility in specific scenarios)
- limitations in scope or performance

WEL-12D-C7 Explain the importance of communicating job requirements.

WEL-12D-C7-1 Explain the importance of clearly defining what a job entails so that each team member understands exactly what is expected of them.

Strand D: Trade-Related Mathematics (A5)

WEL-12D-D2 Demonstrate how to communicate measurements.

WEL-12D-D2-1 Demonstrate how to **measure.**

WEL-12D-D2-2 Demonstrate how to **measure** using both **metric and customary** (imperial) measurement systems, such as by

- measuring length
- measuring materials

WEL-12D-D2-3 Demonstrate how to provide **measurements,** including how much the measurements can vary (e.g., bead width).

Strand E: Tools and Equipment (A3)

WEL-12D-E1 Recognize, explain, and demonstrate an understanding of terminology associated with tools and equipment.

WEL-12D-E1-1 Recognize **key terms** and **names** of various tools and equipment.

WEL-12D-E1-2 Explain the **names** and **purposes** of various tools and equipment.

WEL-12D-E1-3 Demonstrate an understanding of the **names** and **purposes** of various tools and equipment.

WEL-12D-E2 Recognize the various hazards associated with tools and equipment, and explain and demonstrate the related safe work practices.

WEL-12D-E2-1 Recognize various **hazards of tools** and equipment, including

- harmful noise levels
- lacerations caused by sharp tools or materials
- crush injury hazards
- moving parts on machines that can catch and trap hands or garments
- flying debris hazards

WEL-12D-E2-2 Describe **safe work practices** for various tools and equipment, including

- wearing appropriate personal protective equipment (PPE)
- inspecting tools and equipment before use
- using the correct tool for the job
- keeping the work area clean and organized
- following manufacturer instructions and safety guidelines
- disconnecting power tools when not in use or during maintenance
- reporting and removing damaged tools from service
- staying alert and avoiding distractions while working
- using guards and safety devices as intended
- storing tools properly after use

WEL-12D-E2-3 Demonstrate **safe work practices** related to tools and equipment.

WEL-12D-E3 Recognize, explain, and demonstrate tools and equipment, including their selection, characteristics, applications, and limitations.

WEL-12D-E3-1 Recognize various **hand tools**.

WEL-12D-E3-2 Explain various **hand tools**, including

- selection of the appropriate hand tool
- characteristics and key features
- application (i.e., role or utility in specific scenarios)
- limitations in scope or performance
- procedures for conducting a thorough inspection
- procedures for regular maintenance
- guidelines for proper storage

WEL-12D-E3-3 Demonstrate how to safely and properly use various **hand tools**.

WEL-12D-E3-4 Recognize various tools used for **layout, measuring, and marking**.

WEL-12D-E3-5 Explain various tools used for **layout, measuring, and marking**, including

- selection of the appropriate tool used for layout, measuring, and marking
- characteristics and key features
- application (i.e., role or utility in specific scenarios)
- limitations in scope or performance
- procedures for conducting a thorough inspection
- procedures for regular maintenance
- guidelines for proper storage

WEL-12D-E3-6 Demonstrate how to safely and properly use various tools used for **layout, measuring, and marking**.

WEL-12D-E3-7 Recognize various **portable power tools**, including

- electric power tools
- hydraulic power tools
- pneumatic power tools

WEL-12D-E3-8 Explain various **portable power tools**, including

- selection of the appropriate portable power tool
- characteristics and key features
- application (i.e., role or utility in specific scenarios)
- limitations in scope or performance
- procedures for conducting a thorough inspection
- procedures for regular maintenance
- guidelines for proper storage

WEL-12D-E3-9 Demonstrate how to safely and properly use various **portable power tools**.

WEL-12D-E3-10 Recognize various **stationary power tools**, including

- drill press
- band saw
- pedestal grinder
- power roller
- belt sander
- cold cut saw

WEL-12D-E3-11 Explain various **stationary power tools**, including

- selection of the appropriate stationary power tool
- characteristics and key features
- application (i.e., role or utility in specific scenarios)
- limitations in scope or performance
- procedures for conducting a thorough inspection
- procedures for regular maintenance
- guidelines for proper storage

WEL-12D-E3-12 Demonstrate how to safely and properly use various **stationary power tools**.

WEL-12D-E3-13 Recognize various **stationary machinery**, including

- shear
- ironworker

WEL-12D-E3-14 Explain various **stationary machinery**, including

- selection of the appropriate stationary machinery
- characteristics and key features
- application (i.e., role or utility in specific scenarios)
- limitations in scope or performance
- procedures for conducting a thorough inspection
- procedures for regular maintenance
- guidelines for proper storage

WEL-12D-E3-15 Demonstrate how to safely and properly use various **stationary machinery**.

WEL-12D-E3-16 Recognize various **non-thermal cutting and grinding tools.**

WEL-12D-E3-17 Explain various **non-thermal cutting and grinding tools**, including

- selection of the appropriate non-thermal cutting and grinding tools
- characteristics and key features
- application (i.e., role or utility in specific scenarios)
- limitations in scope or performance
- procedures for conducting a thorough inspection
- procedures for regular maintenance
- guidelines for proper storage

WEL-12D-E3-18 Demonstrate how to safely and properly use various **non-thermal cutting and grinding tools**.

Strand F: Materials and Consumables

WEL-12D-F1 Share and discuss Indigenous perspectives and environmental impacts.

WEL-12D-F1-1 Share and discuss an **Indigenous perspective** on material selection, emphasizing sustainability, respect for natural resources, and cultural significance, such as

- principles of the honourable harvest
- four sacred elements (earth, wind, water, fire)
- inviting an Elder to teach sustainability

WEL-12D-F1-2 Share and discuss the **environmental impact** of selecting and disposing of various materials.

WEL-12D-F2 Recognize the various hazards associated with consumables and materials, and explain and demonstrate the related safe work practices.

WEL-12D-F2-1 Identify various **hazards** for welding consumables and materials, including

- burns
- lifting
- flux dust

WEL-12D-F2-2 Describe various **safe work practices** for consumables and materials, including

- wearing appropriate personal protective equipment (PPE)
- inspecting consumables and materials before use
- using the correct consumables and materials for the job
- keeping the work area clean and organized
- following manufacturer instructions and safety guidelines
- reporting and removing damaged consumables and materials from service
- staying alert and avoiding distractions while working
- storing consumables and materials properly after use

WEL-12D-F2-3 Demonstrate safe work practices related to **consumables and materials**.

Strand I: Weld Process and Quality Inspection (A8)

WEL-12D-I1 Identify, describe, and demonstrate an understanding of terminology associated with weld processes and quality inspection.

WEL-12D-I1-1 Identify an understanding of the **key terms, names** of different weld processes, and quality inspection.

WEL-12D-I1-2 Describe an understanding of the **names and purposes** of different weld processes and quality inspection.

WEL-12D-I1-3 Demonstrate an understanding of the **names and purposes** of different weld processes and quality inspection.

WEL-12D-I10 Identify and describe quality inspections, including their characteristics and applications.

WEL-12D-I10-13 Identify various quality inspection **non-destructive testing**, including

- radiography
- ultrasonic
- liquid penetrant
- magnetic particle examination
- hydro
- phased array

WEL-12D-I10-14 Describe various quality inspection **non-destructive testing**, including

- selection of the appropriate non-destructive testing
- characteristics and key features
- application (i.e., role or utility in specific scenarios)
- limitations in scope or performance

WEL-12D-I10-15 Identify various quality inspection **destructive testing**, including

- bend and tensile strength
- etching
- impact
- hardness

WEL-12D-I10-16 Describe various quality inspection **destructive testing**, including

- selection of the appropriate destructive testing
- characteristics and key features
- application (i.e., role or utility in specific scenarios)
- limitations in scope or performance

WEL-12D-I11 Demonstrate how to safely and properly use weld processes and quality inspections.

WEL-12D-I11-1 Demonstrate how to safely and properly use weld processes and quality inspections.

Strand N: Welder Practical Examination (A13)

WEL-12D-N1 Demonstrate cut welds using oxy-acetylene process.

WEL-12D-N1-1 Safely demonstrate various **cut welds** using oxy-acetylene process, including

- mild steel test plate
  - 120mm x 125mm x 12mm
- freehand straight-angled cut
  - 30° angle of cut
- freehand circular cut
  - locate hole position
  - 90° cut
  - to accept 25mm round bar
- freehand coping cut
  - to accept a 120mm channel
- following provided drawing and specifications
- testing procedure
  - visual examination

WEL-12D-N2 Demonstrate groove weld assembly using shielded metal arc welding (SMAW).

WEL-12D-N2-1 Safely demonstrate various **groove welds** using shielded metal arc welding (SMAW), including

- groove weld assembly
  - mild steel
- weld position
  - flat groove (1G)
- electrode
  - E-4312 (E-6012) root
  - E-4918 (E-7018) hotpass, fill and cap
- following provided drawing and specifications

- testing procedure
  - visual examination
  - destructive bend test

WEL-12D-N3 Demonstrate groove fillet weld assembly using gas metal arc welding (GMAW).

WEL-12D-N3-1 Safely demonstrate various **groove fillet** welds using gas metal arc welding (GMAW), including

- base metal
  - mild steel plate
- weld position
  - flat groove (1G)
  - flat fillet (1F)
- wire
  - ER49S (ER70S)
  - diameter = 0.035
- follow provided drawing and specifications
- testing procedure
  - visual examination
  - destructive bend test

Curriculum Implementation Resources

Curriculum implementation resources are frequently added. Please refer to https://edu.gov.mb.ca/k12/framework/sytep/welding/resources/index.html.