



Technology Education Senior Years Technology Program

Grades 9 to 12 Welding Manitoba Curriculum Framework of Outcomes (July 2013 Unedited Draft)

Student Learning Outcomes Related to Sustainable Development

(Note that the Welding program is comprised of nine courses. The courses are structured using goals, General Learning Outcomes, and Specific Learning Outcomes)

Grade 9

8377 **Exploration of Welding Technology** 15S / 15E / 15M 10S / 10E / 10M

Goal 1: Describe and apply appropriate **health and safety** practices as they apply to welding.

GLO 1.1: Demonstrate adherence to **safe practices and procedures** for facilities, processes, tools and equipment used in welding.

Demonstrate adherence to safe practices and procedures for facilities, processes, tools and equipment used in welding.

Identify safety requirements as they apply to WHMIS. A1.a.9

Goal 5: Demonstrate the safe and appropriate **operation, cleaning, maintenance, and storage of equipment, tools, materials, products & consumable items.**

GLO 5.2: Demonstrate the safe and appropriate **cleaning, maintenance and storage** of equipment, tools, materials, products & consumable items.

Practice the appropriate cleaning maintenance, and storage of welding equipment, tools, materials, products, and consumable items.

Goal 7: Follow the **ethical and legal standards** that pertain to the welding industry.

GLO 7.1: Demonstrate an awareness of the **ethical and legal expectations** of welders.

Discuss ethical and legal standards.

Goal 9: Demonstrate awareness of **sustainability** as it pertains to the welding industry.

GLO 9.1: Describe the impact of **human sustainability** on the health and well-being of welders.

Identify ergonomics. A1.a.5

Discuss sustainability as it relates to the human health and well-being.

GLO 9.2: Describe the welding industry's **sustainability practices** and impact on the environment.

Identify the welding industry's sustainability practices and impact on the environment.

GLO 9.3: Describe the **sustainable business practices** within the welding industry.

Identify industries where welding is used.

Goal 11: Understand the **evolution, technological progression and emerging trends** in welding.

GLO 11.1: Demonstrate an understanding of the **evolution, technological progression, and emerging trends** in welding.

Discuss the evolution, technological progression, and emerging trends in welding.

Grade 10

8378 Introduction to Welding 20S / 20E / 20M

Goal 1: Describe and apply appropriate **health and safety** practices as they apply to welding.

GLO 1.1: Demonstrate adherence to **safe practices and procedures** for facilities, processes, tools and equipment used in welding.

Demonstrate adherence to safe practices and procedures for facilities, processes, tools and equipment used in welding.

Identify safety requirements as they apply to WHMIS. A1.a.9

Goal 5: Demonstrate the safe and appropriate **operation, cleaning, maintenance, and storage of equipment, tools, materials, products & consumable items.**

GLO 5.2: Demonstrate the safe and appropriate **cleaning, maintenance and storage** of equipment, tools, materials, products & consumable items.

Practice the appropriate cleaning maintenance, and storage of welding equipment, tools, materials, products, and consumable items.

Goal 7: Follow the **ethical and legal standards** that pertain to the welding industry.

GLO 7.1: Demonstrate an awareness of the **ethical and legal expectations** of welders.

Discuss ethical and legal expectations of welders.

Goal 9: Demonstrate awareness of **sustainability** as it pertains to the welding industry.

GLO 9.1: Describe the impact of **human sustainability** on the health and well-being of welders.

Identify ergonomics. A1.a.5

Define sustainability as it relates to the human health and well-being.

GLO 9.2: Describe the welding industry's **sustainability practices** and impact on the environment.

Discuss the importance of recycling metal used in the welding industry.

GLO 9.3: Describe the **sustainable business practices** within the welding industry.

Identify which industries hire welders.

Identify trades which utilize welding.

Goal 11: Understand the **evolution, technological progression and emerging trends** in welding.

GLO 11.1: Demonstrate an understanding of the **evolution, technological progression, and emerging trends** in welding.

Research the evolution, technological progression, and emerging trends in welding.

Grade 11

8414 **Metal Design / Fabrication & Oxy-Acetylene Procedures** 30S / 30E / 30M

Goal 1: Describe and apply appropriate **health and safety** practices as they apply to welding.

GLO 1.1: Demonstrate adherence to **safe practices and procedures** for facilities, processes, tools and equipment used in welding.

Demonstrate adherence to safe practices and procedures for facilities, processes, tools and equipment used in Metal Design / Fabrication & Oxy-Acetylene Procedures.

Identify safety requirements as they apply to WHMIS. A1.a.9

Goal 5: Demonstrate the safe and appropriate **operation, cleaning, maintenance, and storage of equipment, tools, materials, products & consumable items.**

GLO 5.2: Demonstrate the safe and appropriate **cleaning, maintenance and storage** of equipment, tools, materials, products & consumable items.

Follows safe procedures for cleaning and storing Oxy-Acetylene equipment.

Goal 9: Demonstrate awareness of **sustainability** as it pertains to the welding industry.

GLO 9.1: Describe the impact of **human sustainability** on the health and well-being of welders.

Identify ergonomics. A1.a.5

Appreciate the impact of sustainable practices on human health and well-being.

Discuss the importance of working conditions on human sustainability.

GLO 9.2: Describe the welding industry's **sustainability practices** and impact on the environment.

Discuss the importance of reducing waste in the welding industry.

GLO 9.3: Describe the **sustainable business practices** within the welding industry.

Discuss the influence of welding on the local economy.

8474 **Basic GMAW (MIG) Welding** 30S / 30E / 30M

Goal 1: Describe and apply appropriate **health and safety** practices as they apply to welding.

GLO 1.1: Demonstrate adherence to **safe practices and procedures** for facilities, processes, tools and equipment used in welding.

Demonstrate adherence to safe practices and procedures for facilities, processes, tools and equipment used in GMAW (MIG) procedures.

Identify safety requirements as they apply to WHMIS. A1.a.9

Goal 5: Demonstrate the safe and appropriate **operation, cleaning, maintenance, and storage of equipment, tools, materials, products & consumable items.**

GLO 5.2: Demonstrate the safe and appropriate **cleaning, maintenance and storage** of equipment, tools, materials, products & consumable items.

Practice the appropriate cleaning maintenance, and storage of GMAW (MIG) equipment, tools, materials, products, and consumable items.

Goal 9: Demonstrate awareness of **sustainability** as it pertains to the welding industry.

GLO 9.1: Describe the impact of **human sustainability** on the health and well-being of welders.

Identify ergonomics. A1.a.5

Identify sustainable factors that influence human health and well-being for welders.

Discuss sustainable factors in the welding industry that influence human health and well-being.

GLO 9.2: Describe the welding industry's **sustainability practices** and impact on the environment.

Demonstrate understanding of the appropriate reusing of materials in welding.

GLO 9.3: Describe the **sustainable business practices** within the welding industry.

Discuss the importance of working conditions on employee retention.

Goal 11: Understand the **evolution, technological progression and emerging trends** in welding.

GLO 11.1: Demonstrate an understanding of the **evolution, technological progression, and emerging trends** in welding.

Research the use of robotics in GMAW (MIG) welding.

8486 **Basic SMAW (ARC) Welding** 30S / 30E / 30M

Goal 1: Describe and apply appropriate **health and safety** practices as they apply to welding.

GLO 1.1: Demonstrate adherence to **safe practices and procedures** for facilities, processes, tools and equipment used in welding.

Demonstrate adherence to safe practices and procedures for facilities, processes, tools and equipment used in GMAW (ARC) procedures.

Identify safety requirements as they apply to WHMIS. A1.a.9

Goal 5: Demonstrate the safe and appropriate **operation, cleaning, maintenance, and storage of equipment, tools, materials, products & consumable items.**

GLO 5.2: Demonstrate the safe and appropriate **cleaning, maintenance and storage** of equipment, tools, materials, products & consumable items.

Practice the appropriate cleaning maintenance, and storage of SMAW (ARC) equipment, tools, materials, products, and consumable items.

Goal 7: Follow the **ethical and legal standards** that pertain to the welding industry.

GLO 7.1: Demonstrate an awareness of the **ethical and legal expectations** of welders.

Discuss legal requirements related to specialized welding such as pressure vessels and steering components.

Goal 9: Demonstrate awareness of **sustainability** as it pertains to the welding industry.

GLO 9.1: Describe the impact of **human sustainability** on the health and well-being of welders.

Identify ergonomics. A1.a.5

Discuss the sustainability of the welder's working conditions, including working hours and out-of-town travels, shift work.

Goal 11: Understand the **evolution, technological progression and emerging trends** in welding.

GLO 11.1: Demonstrate an understanding of the **evolution, technological progression, and emerging trends** in welding.

Discuss emerging trends in metal fusion.

Grade 12

8487 **Advanced GMAW (MIG) Welding Processes and Procedures** 40S / 40E / 40M

Goal 1: Describe and apply appropriate **health and safety** practices as they apply to welding.

GLO 1.1: Demonstrate adherence to **safe practices** and procedures for facilities, processes, tools and equipment used in welding.

Demonstrate adherence to safe practices and procedures for facilities, processes, tools and equipment used in Advanced GMAW (MIG) Welding processes and procedures.

Identify safety requirements as they apply to WHMIS. A1.a.9

Goal 5: Demonstrate the safe and appropriate **operation, cleaning, maintenance, and storage of equipment, tools, materials, products & consumable items.**

GLO 5.2: Demonstrate the safe and appropriate **cleaning, maintenance and storage** of equipment, tools, materials, products & consumable items.

Practice the appropriate cleaning, maintenance, and storage of GMAW (MIG) equipment, tools, materials, products, and consumable items.

Goal 9: Demonstrate awareness of **sustainability** as it pertains to the welding industry.

GLO 9.1: Describe the impact of **human sustainability** on the health and well-being of welders.

Identify ergonomics. A1.a.5

Discuss the long term health concerns related with welding different types of materials, such as stainless galvanized steels.

Research safety concerns related to different types of filler materials.

GLO 9.2: Describe the **welding industry's sustainability practices and impact on the environment.**

Discuss the environmental impact of welding work sites on the environment.

Goal 11: Understand the **evolution, technological progression and emerging trends** in welding.

GLO 11.1: evolution, technological progression, and emerging trends in welding.

Discuss the use of laser for cutting and welding.

8488 **Advanced SMAW (ARC) Welding Processes and Procedures** 40S / 40E / 40M

Goal 1: Describe and apply appropriate **health and safety** practices as they apply to welding.

GLO 1.1: Demonstrate adherence to **safe practices** and procedures for facilities, processes, tools and equipment used in welding.

Demonstrate adherence to safe practices and procedures for facilities, processes, tools and equipment used in Advanced SMAW (ARC) Welding processes and procedures.

Identify safety requirements as they apply to WHMIS. A1.a.9

Goal 5: Demonstrate the safe and appropriate **operation, cleaning, maintenance, and storage of equipment, tools, materials, products & consumable items.**

GLO 5.2: Demonstrate the safe and appropriate **cleaning, maintenance and storage** of equipment, tools, materials, products & consumable items.

Practice the appropriate cleaning, maintenance, and storage of SMAW (ARC) equipment, tools, materials, products, and consumable items.

Goal 9: Demonstrate awareness of **sustainability** as it pertains to the welding industry.

GLO 9.1: Describe the impact of **human sustainability** on the health and well-being of welders.

Identify ergonomics. A1.a.5

Analyze the effect of welding on human long -term health and well-being.

Discuss short-term and long-term effects of welding, grinding and metal work on hearing, respiratory system, and eye health.

GLO 9.2: Describe the **welding industry's sustainability practices and impact on the environment.**

Discuss the environmental impact of welding work sites on the environment.

GLO 9.3: Describe the **sustainable business practices** within the welding industry.

Discuss how the welding industry and welding products can adapt to a changing economy.

Goal 11: Understand the **evolution, technological progression and emerging trends** in welding.

GLO 11.1: evolution, technological progression, and emerging trends in welding.

Discuss the welding of exotic materials.

Research new technologies such as virtual welding devices used to teach welding.

8489 **Advanced Metal Design / Fabrication** 40S / 40E / 40M

Goal 1: Describe and apply appropriate **health and safety** practices as they apply to welding.

GLO 1.1: Demonstrate adherence to **safe practices** and procedures for facilities, processes, tools and equipment used in welding.

Demonstrate adherence to safe practices and procedures for facilities, processes, tools and equipment used in Advanced Metal Design / Fabrication.

Identify safety requirements as they apply to WHMIS. A1.a.9

Goal 5: Demonstrate the safe and appropriate **operation, cleaning, maintenance, and storage of equipment, tools, materials, products & consumable items.**

GLO 5.2: Demonstrate the safe and appropriate **cleaning, maintenance and storage** of equipment, tools, materials, products & consumable items.

Practice the appropriate cleaning, maintenance, and storage of equipment, tools, materials, products, and consumable items used in Advanced Metal Design / Fabrication.

Goal 9: Demonstrate awareness of **sustainability** as it pertains to the welding industry.

GLO 9.1: Describe the impact of **human sustainability** on the health and well-being of welders.

Identify ergonomics. A1.a.5

GLO 9.2: Describe the **welding industry's sustainability practices and impact on the environment.**

Discuss the environmental impact of welding work sites on the environment.

Goal 11: Understand the **evolution, technological progression and emerging trends** in welding.

GLO 11.1: **evolution, technological progression, and emerging trends in welding.**

Discuss technological progression and emerging trends in metal design and fabrication.

8503 Applied Specialties & Qualifications 40S / 40E / 40M

Goal 1: Describe and apply appropriate **health and safety** practices as they apply to welding.

GLO 1.1: Demonstrate adherence to **safe practices** and procedures for facilities, processes, tools and equipment used in welding.

Demonstrate adherence to safe practices and procedures for facilities, processes, tools and equipment used in Applied Specialties and Qualifications.

Identify safety requirements as they apply to WHMIS. A1.a.9

Goal 5: Demonstrate the safe and appropriate **operation, cleaning, maintenance, and storage of equipment, tools, materials, products & consumable items.**

GLO 5.2: Demonstrate the safe and appropriate **cleaning, maintenance and storage** of equipment, tools, materials, products & consumable items.

Practice the appropriate cleaning, maintenance, and storage of equipment, tools, materials, products, and consumable items used in Applied Specialties and Qualifications.

Goal 9: Demonstrate awareness of **sustainability** as it pertains to the welding industry.

GLO 9.1: Describe the impact of **human sustainability** on the health and well-being of welders.

Identify ergonomics. A1.a.5

GLO 9.2: Describe the **welding industry's sustainability practices and impact on the environment.**

Discuss the environmental impact of welding work sites on the environment.