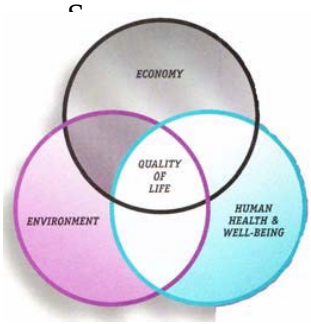

Technology Education Senior Years Technology Program

Grades 9 to 12 Carpentry: Manitoba Technical-Vocational Curriculum Framework of Outcomes (2013)

Student Learning Outcomes Related to Sustainable Development

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

Grade 9

Grade 9: Introduction to Carpentry

Goal 1: Describe the **building process** from plans to products.

GLO 1.1: Interpret blueprints, plans, and sketches**.**

9.S.1.1.2 Create a basic materials list.

Goal 6: Consider **sustainability** as it pertains to carpentry.

GLO 6.2 Describe and apply efficient material usage practices.

9.F.6.2.1 Demonstrate a basic knowledge of efficient material usage to reduce waste and its impact on the environment.

9.S.6.2.1 Create a cutting plan that maximizes material usage.

Goal 7: Explain the **evolution of carpentry, including its technological progression and emerging trends**.

GLO 7.1 Explain developing trends in construction.

9.F.7.1.1 Demonstrate a basic knowledge of developing trends in construction.

GLO: 7.2 Identify examples of emerging technologies in construction.

9.F.7.2.1 Demonstrate a basic knowledge of the evolving technology of tools, materials, and processes in construction.

Goal 8: Demonstrate a knowledge of and ability to recognize and apply appropriate **health and safety requirements and practices** to maintain a safe workplace.

GLO 8.2 Describe and follow health and safety laws and regulations as they relate to carpentry.

9.P.8.2.1 Identify WHMIS symbols and terminology, and follow WHMIS guidelines.

9.P.8.2.2 Comply with health and safety legislation and practices for the construction industry.

Grade 10

Grade 10 Carpentry Fundamentals

Goal 1: Describe the **building process** from plans to products.

GLO 1.2 Determine material requirements.

10.S.1.2.1 Create a basic materials list.

Goal 6: Consider **sustainability** as it pertains to carpentry.

GLO 6.2 Describe and apply efficient material usage practices.

10.F.6.2.1 Demonstrate a basic knowledge of efficient material usage to reduce waste and its impact on the environment.

10.S.6.2.1 Create a cutting plan that maximizes material usage.

Goal 7: Explain the **evolution of carpentry, including its technological progression and emerging trends**.

GLO 7.1 Explain developing trends in construction.

10.F.7.1.1 Demonstrate a basic knowledge of developing trends in construction.

GLO: 7.2 Identify examples of emerging technologies in construction.

10.F.7.2.1 Demonstrate a basic knowledge of the evolving technology of tools, materials, and processes in construction.

Goal 8: Demonstrate a knowledge of and ability to recognize and apply appropriate **health and safety requirements and practices** to maintain a safe workplace.

GLO 8.1 Describe and apply safety procedures and knowledge of health and safety rights and responsibilities.

10.P.8.1.3 Identify hazards (e.g., electrical, ergonomic, material-handling, chemicals) related to materials, processes, tools, and equipment used in construction, as well as resources and methods for reducing these hazards.

10.P.8.1.5 Follow safe practices and procedures for facilities, processes, materials, tools, and equipment used in construction.

GLO 8.2 Describe and follow health and safety laws and regulations as they relate to carpentry.

10.P.8.2.1 Identify WHMIS symbols and terminology, and follow WHMIS guidelines.

10.P.8.2.2 Comply with health and safety legislation and practices for the construction industry.

GLO 8.3 Demonstrate knowledge of the *Trade Safety Awareness Manual*.

10.8.3.13 Explain the Workplace Hazardous Material Information System (WHMIS).
(TSA 13)

Grade 11

Grade 11 A: Foundations and Floor Framing

Goal 1: Describe the **building process** from plans to products.

GLO 1.2 Determine material requirements.

11A.S.1.2.2 Create a basic materials list for foundation and framing.

Goal 6: Consider **sustainability** as it pertains to carpentry.

GLO 6.1 Describe the sustainability practices of construction industries (e.g., forestry, concrete) and their impact on the environment.

11A.F.6.1.1 Identify environmental practices for surplus concrete disposal and recycling.

11A.F.6.1.2 Identify the benefits of engineered lumber products in relation to sustainability.

11A.F.6.1.3 Identify energy efficiency construction practices used in foundation forming (e.g., ICFs).

11A.F.6.1.4 Describe passive solar construction practices (e.g., orientation).

11A.F.6.1.5 Identify environmental practices for the recycling of lumber offcuts.

GLO 6.2 Describe and apply efficient material usage practices.

11A.S.6.2.1 Apply efficient material usage practices to reduce waste and its impact on the environment.

Goal 7: Explain the **evolution of carpentry, including its technological progression and emerging trends**.

GLO 7.1 Explain developing trends in construction.

11A.F.7.1.1 Identify developing trends in foundation systems and floor framing (e.g., ICFs).

GLO: 7.2 Identify examples of emerging technologies in construction.

11A.F.7.2.1 Identify the evolving technology of tools, materials, and processes in foundation systems and floor framing.

Goal 8: Demonstrate a knowledge of and ability to recognize and apply appropriate **health and safety requirements and** practices to maintain a safe workplace.

GLO 8.2 Describe and follow health and safety laws and regulations as they relate to carpentry.

11A.P.8.2.1 Use, handle, and store materials in accordance with WHMIS guidelines.

11A.P.8.2.2 Identify and comply with the laws, regulations, standards, regulatory agencies, and industry associations related to health and safety in the construction industry.

Grade 11B: Wall and Basic Roof Framing

Goal 1: Describe the **building process** from plans to products.

GLO 1.2 Determine material requirements.

11B.S.1.2.2 Create a basic materials list for walls and gable roofs.

Goal 6: Consider **sustainability** as it pertains to carpentry.

GLO 6.1: Describe the sustainability practices of construction industries (e.g., forestry, concrete) and their impact on the environment.

11B.F.6.1.1 Describe the benefits of engineered lumber products in relation to sustainability.

11B.F.6.1.2 Describe environmental practices for the recycling of lumber offcuts.

11B.F.6.1.3 Describe energy efficiency practices in framing walls and roofs.

GLO 6.2 Describe and apply efficient material usage practices.

11B.S.6.2.1 Apply efficient material usage practices to reduce waste and its impact on the environment.

Goal 7: Explain the **evolution of carpentry, including its technological progression and emerging trends**.

GLO 7.1 Explain developing trends in construction.

11B.F.7.1.1 Identify developing trends in wall and gable roof framing (e.g., structural insulated panels).

11B.F.7.1.2 Identify a pre-engineered gable truss.

GLO: 7.2 Identify examples of emerging technologies in construction.

11B.F.7.2.1 Identify the evolving technology of tools, materials, and processes in wall and gable roof framing.

Goal 8: Demonstrate a knowledge of and ability to recognize and apply appropriate **health and safety requirements and practices** to maintain a safe workplace.

GLO 8.2 Describe and follow health and safety laws and regulations as they relate to carpentry.

11B.P.8.2.2 Identify and comply with the laws, regulations, standards, regulatory agencies, and industry associations related to health and safety in the construction industry.

Grade 11C: Millwork

Goal 1: Describe the **building process** from plans to products.

GLO 1.2 Determine material requirements.

11C.F.1.2.2 Identify practices to maximize yield from materials.

Goal 6: Consider **sustainability** as it pertains to carpentry.

GLO 6.1: Describe the sustainability practices of construction industries (e.g., forestry, concrete) and their impact on the environment.

11C.F.6.1.1 Identify considerations in material selection in relation to sustainable development.

11C.F.6.1.2 Identify environmental practices for the recycling of lumber offcuts.

11C.F.6.1.3 Describe the environmental impact of products (e.g., paints, finishes) used in the production of millwork.

GLO 6.2 Describe and apply efficient material usage practices.

11C.F.6.2.1 Identify recycling processes for materials related to millwork.

11C.S.6.2.1 Apply efficient material usage practices to reduce waste and its impact on the environment.

Goal 7: Explain the **evolution of carpentry, including its technological progression and emerging trends.**

GLO 7.1 Explain developing trends in construction**.**

11C.F.7.1.1 Identify developing trends in the millwork industry.

GLO: 7.2 Identify examples of emerging technologies in construction.

11C.F.7.2.1 Identify the evolving technology of tools, materials, and processes in the millwork industry.

Goal 8: Demonstrate a knowledge of and ability to recognize and apply appropriate **health and safety requirements and practices** to maintain a safe workplace.

GLO 8.2 Describe and follow health and safety laws and regulations as they relate to carpentry.

11C.P.8.2.2 Identify and comply with the laws, regulations, standards, regulatory agencies, and industry associations related to health and safety in the construction industry.

Grade 12

Grade 12A: Advanced Framing

Goal 1: Describe the **building process** from plans to products.

GLO 1.2 Determine material requirements.

12A.S.1.2.2 Create a basic materials list for floors, walls, and gable roofs.

Goal 6: Consider **sustainability** as it pertains to carpentry.

GLO 6.1: Describe the sustainability practices of construction industries (e.g., forestry, concrete) and their impact on the environment.

12A.F.6.1.1 Describe the benefits of engineered lumber products in relation to sustainability.

12A.F.6.1.2 Describe energy efficiency practices in framing walls and roofs.

12A.S.6.1.1 Follow environmental practices for the recycling of lumber offcuts.

GLO 6.2 Describe and apply efficient material usage practices.

12A.S.6.2.1 Apply efficient material usage practices to reduce waste and its impact on the environment.

Goal 7: Explain the **evolution of carpentry, including its technological progression and emerging trends**.

GLO 7.1 Explain developing trends in construction.

12A.F.7.1.1 Identify developing trends in floor, wall, and gable roof framing (e.g., structural insulated panels).

GLO: 7.2 Identify examples of emerging technologies in construction.

12A.F.7.2.1 Identify evolving technology of tools, materials, and processes in floor, wall, and gable roof framing.

Goal 8: Demonstrate a knowledge of and ability to recognize and apply appropriate **health and safety requirements and practices** to maintain a safe workplace.

GLO 8.1 Describe and apply safety procedures and knowledge of health and safety rights and responsibilities.

12A.P.8.1.1 Describe and demonstrate adherence to safe work practices when using construction

materials, processes, tools, and equipment.

12A.P.8.1.6 Assess hazards (e.g., electrical, ergonomic, material-handling, chemical) related to production materials, processes, tools, and equipment, and describe the precautions that should be taken to avoid these hazards.

GLO 8.2 Describe and follow health and safety laws and regulations as they relate to carpentry.

12A.P.8.2.1 Describe the WHMIS guidelines, and use, handle, and store materials accordingly.

12A.P.8.2.2 Describe and comply with health and safety legislation and practices for the construction industry (e.g., Workplace Safety and Health Act).

Goal 10: Follow the **ethical and legal standards** (e.g., national building code) in carpentry.

GLO 10.1 Identify and follow local and national building codes.

12A.P.10.1.1 Identify local and national standards related to framing floors, walls, and gable roofs.

GLO 10.3 Follow the ethical expectations of professional carpenters.

12A.P.10.3.2 Demonstrate an awareness of local and national building codes as minimum standards in construction.

Grade 12B: Exterior Finishing

Goal 1: Describe the **building process** from plans to products.

GLO 1.2 Determine material requirements.

12B.S.1.2.3 Create a basic materials list for exterior finishing.

Goal 6: Consider **sustainability** as it pertains to carpentry.

GLO 6.1: Describe the sustainability practices of construction industries (e.g., forestry, concrete) and their impact on the environment.

12B.F.6.1.1 Appreciate the need for recycling and reclaiming exterior finish products.

12B.F.6.1.2 Describe environmental practices for the recycling of exterior finish offcuts.

12B.F.6.1.3 Describe building envelope and emerging materials, technology, and practices related to energy efficiency (e.g., window exposure, cold transfer, airtightness).

12B.F.6.1.4 Identify sustainable green building and development practices and certifications (e.g., LEED).

GLO 6.2 Describe and apply efficient material usage practices.

12B.S.6.2.1 Apply efficient material usage practices to reduce waste and its impact on the environment.

Goal 7: Explain the **evolution of carpentry, including its technological progression and emerging trends**.

GLO 7.1 Explain developing trends in construction.

12B.F.7.1.1 Identify developing trends in exterior finishes (e.g., acrylic stucco, cement-based products, cultured stone).

GLO: 7.2 Identify examples of emerging technologies in construction.

12B.F.7.2.1 Identify the evolving technology of tools and processes in exterior finishes.

Goal 10: Follow the **ethical and legal standards** (e.g., national building code) in carpentry.

GLO 10.1 Identify and follow local and national building codes.

12B.P.10.1.2 Demonstrate an awareness of developer requirements (e.g., architectural, landscaping) related to exterior finish.

GLO 10.3 Follow the ethical expectations of professional carpenters.

12B.P.10.3.2 Demonstrate an awareness of local and national building codes as minimum standards in construction.

Grade 12C: Interior Finishing

Goal 1: Describe the **building process** from plans to products.

GLO 1.2 Determine material requirements.

12C.S.1.2.3 Create a basic materials list for interior finishing.

Goal 6: Consider **sustainability** as it pertains to carpentry.

GLO 6.1: Describe the sustainability practices of construction industries (e.g., forestry, concrete) and their impact on the environment.

12C.F.6.1.1 Appreciate the need for recycling and reclaiming interior finish products.

12C.F.6.1.2 Describe interior finishing and emerging materials, technology, and practices related to energy efficiency (e.g., window exposure, cold transfer, airtightness).

12C.F.6.1.3 Identify sustainable green building and development practices and certifications (e.g., LEED).

GLO 6.2 Describe and apply efficient material usage practices.

12C.S.6.2.1 Apply efficient material usage practices to reduce waste and its impact on the environment.

Goal 7: Explain the **evolution of carpentry, including its technological progression and emerging trends**.

GLO 7.1 Explain developing trends in construction.

12C.F.7.1.1 Identify developing trends in interior finishes (e.g., pre-finished products, epoxy paints).

GLO: 7.2 Identify examples of emerging technologies in construction.

12C.F.7.2.1 Identify the evolving technology of tools and processes in interior finishes.

Goal 10: Follow the **ethical and legal standards** (e.g., national building code) in carpentry.

GLO 10.3 Follow the ethical expectations of professional carpenters.

12C.P.10.3.2 Demonstrate an awareness of local and national building codes as minimum standards in construction.

Grade 12D: Advanced Millwork

Goal 1: Describe the **building process** from plans to products.

GLO 1.2 Determine material requirements.

12D.S.1.2.1 Create a cutting list based on drawings.

12D.S.1.2.2 Estimate materials requirements based on a cutting list and considering maximum yield, aesthetics, and cost.

Goal 6: Consider **sustainability** as it pertains to carpentry.

GLO 6.1: Describe the sustainability practices of construction industries (e.g., forestry, concrete) and their impact on the environment.

12D.F.6.1.1 Describe the impact the manufacturing of construction materials has on the environment, cost, and limited resources.

12D.F.6.1.2 Identify considerations in material selection related to sustainable development.

12D.F.6.1.3 Identify environmental practices for the recycling of lumber offcuts.

12D.F.6.1.4 Describe the environmental impact of products (e.g., paints, finishes) used in millwork.

GLO 6.2 Describe and apply efficient material usage practices.

12D.F.6.2.1 Describe how the manufacturing process (e.g., CNC) has an impact on raw material usage.

12D.F.6.2.2 Describe processes used to recycle materials related to millwork.

Goal 7: Explain the **evolution of carpentry, including its technological progression and emerging trends**.

GLO 7.1 Explain developing trends in construction.

12D.F.7.1.1 Describe developing trends in the millwork industry.

GLO: 7.2 Identify examples of emerging technologies in construction.

12D.F.7.2.1 Describe evolving technology of tools, materials, and processes in the millwork industry.

Goal 10: Follow the **ethical and legal standards** (e.g., national building code) in carpentry.

GLO 10.1 Identify and follow local and national building codes.

12D.P.10.1.1 Describe commonly used standards for millwork.

GLO 10.3 Follow the ethical expectations of professional carpenters.

12D.P.10.3.1 Describe and follow generally accepted building practices.