



Grades 11 and 12 Dental Technology

Manitoba Technical-Vocational
Curriculum Framework
of Outcomes



GRADES 11 AND 12
DENTAL TECHNOLOGY

Manitoba Technical-Vocational Curriculum
Framework of Outcomes

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Available in alternate formats upon request.

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TECHNICAL-VOCATIONAL EDUCATION OVERVIEW

In 2013, Manitoba Education released the document *Technical-Vocational Education Overview* to provide the philosophical and pedagogical underpinnings for curriculum development and the teaching of courses in the Senior Years Technology Education Program. This overview presents educators with the vision and goals of technical-vocational education (TVE) in Manitoba.

Topics include the following:

- curriculum revitalization and renewal
- curriculum framework and implementation
- articulation of programming
- assessment and reporting
- safety
- employability/essential skills and career development
- sustainable development

The TVE curriculum includes courses in a variety of areas, including dental technology.

DENTAL TECHNOLOGY OVERVIEW

Introduction

Grades 11 and 12 Dental Technology: Manitoba Technical-Vocational Curriculum Framework of Outcomes identifies the goals, general learning outcomes (GLOs), and specific learning outcomes (SLOs) for eight dental technology courses. This framework is intended for use in all Manitoba schools teaching dental technology courses as part of the Senior Years Technology Education Program.

Curriculum Description

Students who complete the dental technology courses can seek employment as entry-level dental technologists. *Dental technologists* are trained specialists who provide a valuable service to dentists, denturists, and other health professionals. They design, plan, construct, fabricate, and manufacture a variety of custom-made fixed or removable dental devices prescribed by dentists or by appropriate clinical professionals. They also repair, replace, and make alterations to fixed and removable appliances that have been broken or chipped, or that need adjustment.

This two-year dental technology curriculum provides the technical training that enables students to develop the knowledge and skills required to design and fabricate dental appliances. The emphasis on practical laboratory work helps prepare students for employment in the dental technology profession, while offering an authentic approach

to learning. With this approach, all work is custom-made, with specialized materials, requiring specialized, integrated equipment.

Students receive instruction related to

- mouthguards
- occlusal rims
- custom impression trays
- construction of complete dentures
- relining and rebasing of dentures
- anatomical tooth carving
- bruxism appliances
- temporomandibular joint (TMJ) appliances
- model preparations
- crowns and bridges
- gold inlays and onlays
- porcelain-fused-to-metal substructures
- casting alloys
- all-ceramic and composite restorations
- partial denture designs
- orthodontic appliances
- custom bleaching trays
- anatomy and physiology
- dental terminology
- computer-aided design/computer-aided manufacturing (CAD/CAM) technology in design and milling

Dental Technology Areas

Students receive instruction in the following three dental technology areas:

- **Fixed dental restorations:** A fixed dental restoration is an appliance designed to replace one or more teeth that have been lost or damaged by injury, caries, or other oral diseases. These restorations are distinguishable from other restorations in that once they have been placed by a dentist the patient cannot remove them. Such restorations include crowns, bridges, veneers, fixed implants, inlays, onlays, and CAD/CAM technology. This area of dental technology also includes ceramics and aesthetic dentistry appliances.
- **Removable dental restorations:** A removable dental restoration or dental appliance is designed to replace one or more tooth structures that have been completely lost. Ideally, these restorations remain stable with normal function, but they can be removed by the patient for cleaning. Removable restorations are retained by the patient's soft tissue (as with full dentures), supported by other teeth (as with partial dentures and overdentures), or supported by implant attachments (as with implants retained over dentures and partial dentures).
- **Orthodontics:** Orthodontic technologists make removable orthodontic appliances with wires, springs, and screws, prescribed by orthodontists either to move teeth to form a more harmonious occlusion and aesthetic appearance of teeth or to maintain the position of previously moved teeth.

Dental Technology Delivery

To receive a Senior Years Technical Education diploma, a student must complete eight departmentally developed courses from an approved technical-vocational cluster, together with 16 compulsory credits and six optional credits. The grade level at which the courses are offered are a local school-based decision, but it is highly recommended that the sequencing of credits follow the schedule set out in this document.

Learning outcomes dealing with the following topics are integrated into most of the dental technology courses:

- health and safety practices
- sustainability
- ethical and legal standards
- employability skills
- career opportunities
- evolution, technological progression, and emerging trends

Cross-curricular learning outcomes from a variety of subject areas are to be integrated into the authentic learning activities of the dental technology courses. These include, but are not limited to, learning outcomes from the following subject areas: art, English language arts, information and communication technology, mathematics, physical education/health education, science, and social studies.

In the TVE curriculum, the emphasis is on applied learning activities. For instructional purposes, the sequence of learning outcomes can vary, based on the learning activities within a course. Teachers are advised to select the learning activities best suited to addressing the learning outcomes, based on a variety of factors, including access to resources and regional needs. In light of rapid changes in technology, teachers are encouraged to update their learning activities to meet the needs of students.

Career Opportunities

Students who complete the dental technology courses can seek employment in the following areas:

- dental offices with laboratories
- denturist clinics
- dental laboratories
- dental distributors
- dental sales
- dental research and development
- medical establishments
- materials research and development
- dental education and training

Graduates can also use the knowledge and skills they gained in the dental technology curriculum to further their education in the fields of dentistry, denturism, and dental hygiene, or in medical areas.

Dental Technology Goals and General Learning Outcomes (GLOs)

The specific learning outcomes for each dental technology course are based on the following curriculum goals and general learning outcomes (GLOs).

Goal 1: Describe and apply appropriate **health and safety** practices as they relate to dental technology.

GLO 1.1: Create and maintain a **safe working environment** in a dental laboratory.

Goal 2: Demonstrate the safe and appropriate **operation, cleaning, maintenance, management, handling, and storage** of **equipment, tools, and materials**.

GLO 2.1: Demonstrate the safe and appropriate **operation** of **equipment and tools**.

GLO 2.2: Demonstrate the safe and appropriate **cleaning, maintenance, and management** of **equipment and tools**.

GLO 2.3: Demonstrate the safe and appropriate **handling and storage** of restorative dental **materials**.

Goal 3: Demonstrate an understanding of the **science and characteristics** of various **restorative dental materials**.

GLO 3.1: Demonstrate an understanding of the **science and characteristics** of various **restorative dental materials**.

GLO 3.2: Demonstrate an understanding of **metallurgy and the characteristics of acrylics** used in dental appliances.

Goal 4: Demonstrate the **functional design** of dental appliances.

GLO 4.1: Demonstrate the **functional design** of dental appliances.

Goal 5: Demonstrate the **fabrication** of dental appliances.

GLO 5.1: Demonstrate the **fabrication of the components** used in dental appliances.

GLO 5.2: Demonstrate the **fabrication** of dental appliances from their various components.

Goal 6: Demonstrate the **repair and adjustment** of dental appliances.

GLO 6.1: Demonstrate an awareness of **problems** associated with dental appliances.

GLO 6.2: **Repair** dental appliances.

GLO 6.3: **Adjust** dental appliances.

Goal 7: Describe and demonstrate transferable **cross-curricular knowledge and skills** as they relate to dental technology.

GLO 7.1: **Read, interpret, and communicate** information related to dental technology.

GLO 7.2: Apply knowledge and skills related to dental technology from **mathematics**.

GLO 7.3: Apply knowledge and skills related to dental technology from **anatomy and physiology**.

GLO 7.4: Apply knowledge and skills related to dental technology from **physics**.

GLO 7.5: Apply knowledge and skills related to dental technology from **other subject areas** (art, physical education/health education, information and communication technology, social studies).

Goal 8: Demonstrate an understanding of **career opportunities** in dental technology.

GLO 8.1: Describe **education and career opportunities** and **professional organizations** in dental technology and associated fields.

Goal 9: Demonstrate an awareness of **sustainability** as it pertains to dental technology.

GLO 9.1: Describe the impact of **sustainability** on the **health and well-being** of dental technologists and their clients.

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

GLO 9.3: Describe **sustainable business practices** within dental technology.

Goal 10: Demonstrate an awareness of **ethical and legal standards** as they pertain to dental technology.

GLO 10.1: Practise **ethical and legal standards** as they pertain to dental technology.

Goal 11: Demonstrate **employability skills** related to dental technology.

GLO 11.1: Demonstrate **fundamental employability skills**.

GLO 11.2: Demonstrate an understanding of the **business operation** of a dental laboratory.

Goal 12: Demonstrate an understanding of the **evolution** of dental technology, including its **progression** and **emerging trends**.

GLO 12.1: Describe the **evolution** of dental technology, including its **progression** and **emerging trends**.

Specific Learning Outcomes (SLOs)

Grades 11 and 12 Dental Technology: Manitoba Technical-Vocational Curriculum Framework of Outcomes identifies specific learning outcomes (SLOs) for use in all Manitoba schools teaching the Grades 11 and 12 dental technology courses as part of the Senior Years Technology Education Program. SLO statements define what students are expected to achieve by the end of a course.

It is essential for students to learn and to demonstrate safety practices and employability skills; therefore, some SLOs related to safety and to employability skills are repeated in the various dental technology courses.

Course Descriptions

Course titles, descriptions, and codes for the eight dental technology courses follow. For an explanation of the codes, refer to the *Subject Table Handbook: Technology Education: Student Records System and Professional School Personnel System* (Manitoba Education and Advanced Learning).

8624 Introduction to Dental Technology and Removable Prosthesis 30S/30E/30M

This course introduces students to the topics of safety, anatomy, physiology, model preparation, the mechanics and movements of the jaw, and the preparation of waxing for denture construction.

**8625 Design and Fabrication of Removable
Prostheses 30S/30E/30M**

This course addresses the topics of safety, anatomy, physiology, and the design and fabrication of removable dental appliances, as well as the repair of these appliances. It includes the study of partial denture design and fabrication.

8626 Introduction to Orthodontics 30S/30E/30M

This course includes a review of safety and the science of dental procedures, while introducing the skills required for manipulating wires and acrylic to fabricate orthodontic appliances. The anatomical study helps students understand tooth repositioning and the appliances associated with orthodontics.

**8627 Design and Fabrication of Orthodontic
Appliances 30S/30E/30M**

This course focuses on anatomy and the science of dental materials at an advanced level, as well as on the design and fabrication of functional orthodontic appliances, bruxism appliances, bleaching trays, and apnea devices.

**8628 Introduction to Fixed Prosthodontics:
Crown and Bridge Technology 40S/40E/40M**

This course addresses the topics of safety, anatomy, physiology, the science of dental materials, and model preparation. The study of metallurgy and its function provides the foundation for crown and bridge construction.

**8629 Design and Fabrication of Fixed Prostheses:
Crown and Bridge Technology 40S/40E/40M**

This course focuses on the topics of safety, anatomy, physiology, and the design, fabrication, and repair of fixed dental appliances. It also includes the study of long-span bridge fabrication and advanced substructure design.

**8670 Introduction to Dental Ceramic
Technology 40S/40E/40M**

This course introduces the study of dental ceramic technology. Students manipulate materials to construct a variety of ceramic-fused-to-metal restorations. The course includes the study of anatomy, aesthetics, function, and colour to help introduce the science of various dental restorations.

**8671 Design and Fabrication of Dental
Ceramic Restorations 40S/40E/40M**

Studies in this course progress into advanced all-ceramic restorations and multiple-unit restorations. This area also incorporates computer-aided design/computer-aided manufacturing (CAD/CAM) technology in design and milling techniques.

Curriculum Implementation Dates

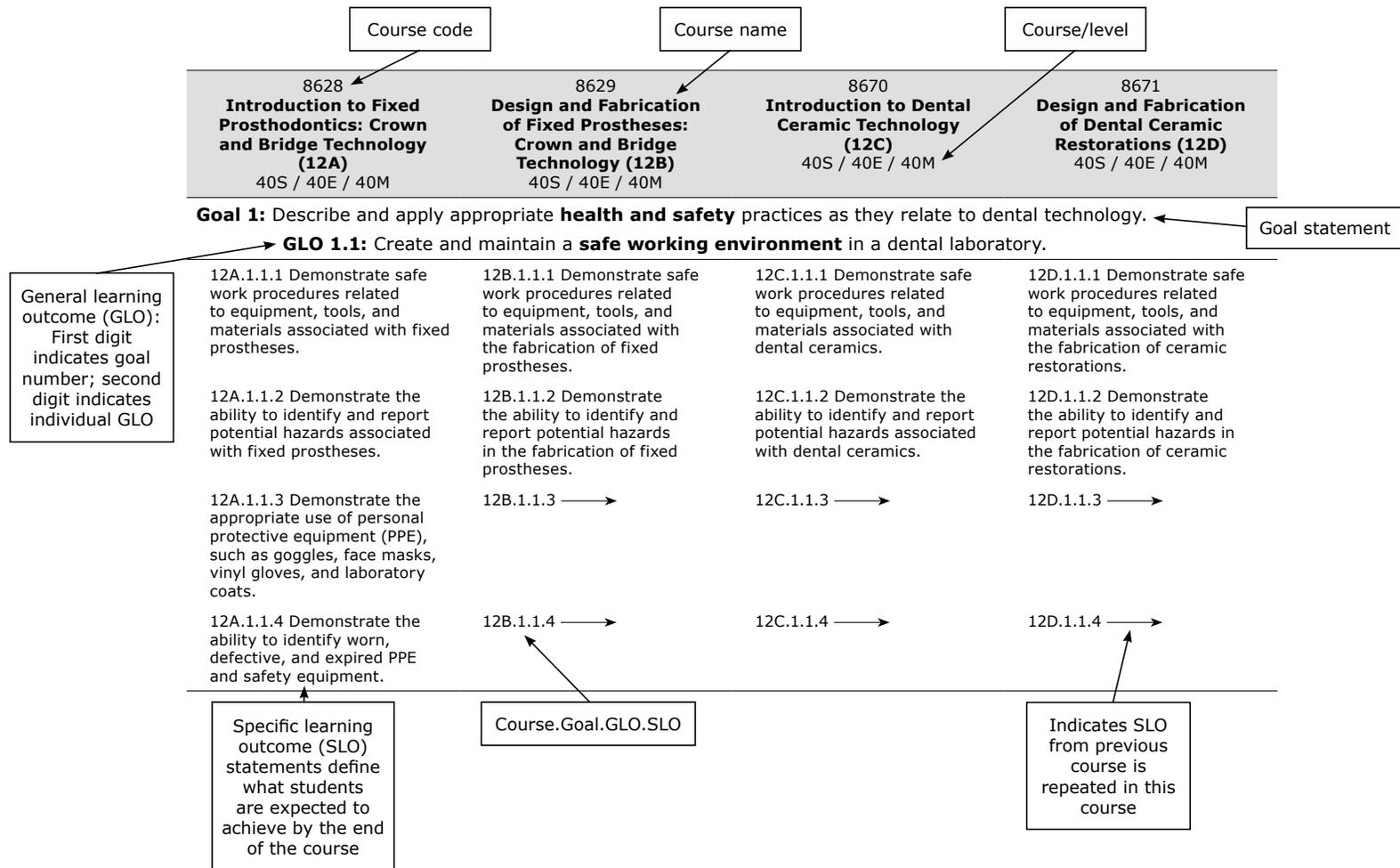
During **voluntary implementation**, teachers have the option of teaching the entire new draft curriculum as soon as Manitoba Education and Advanced Learning releases it on the *Technology Education* website. They also have the option of teaching the courses from the previous curriculum. Teachers who implement courses before system-wide implementation need to ensure that students who are already taking courses from the previous curriculum achieve all SLOs with a minimum of redundancy.

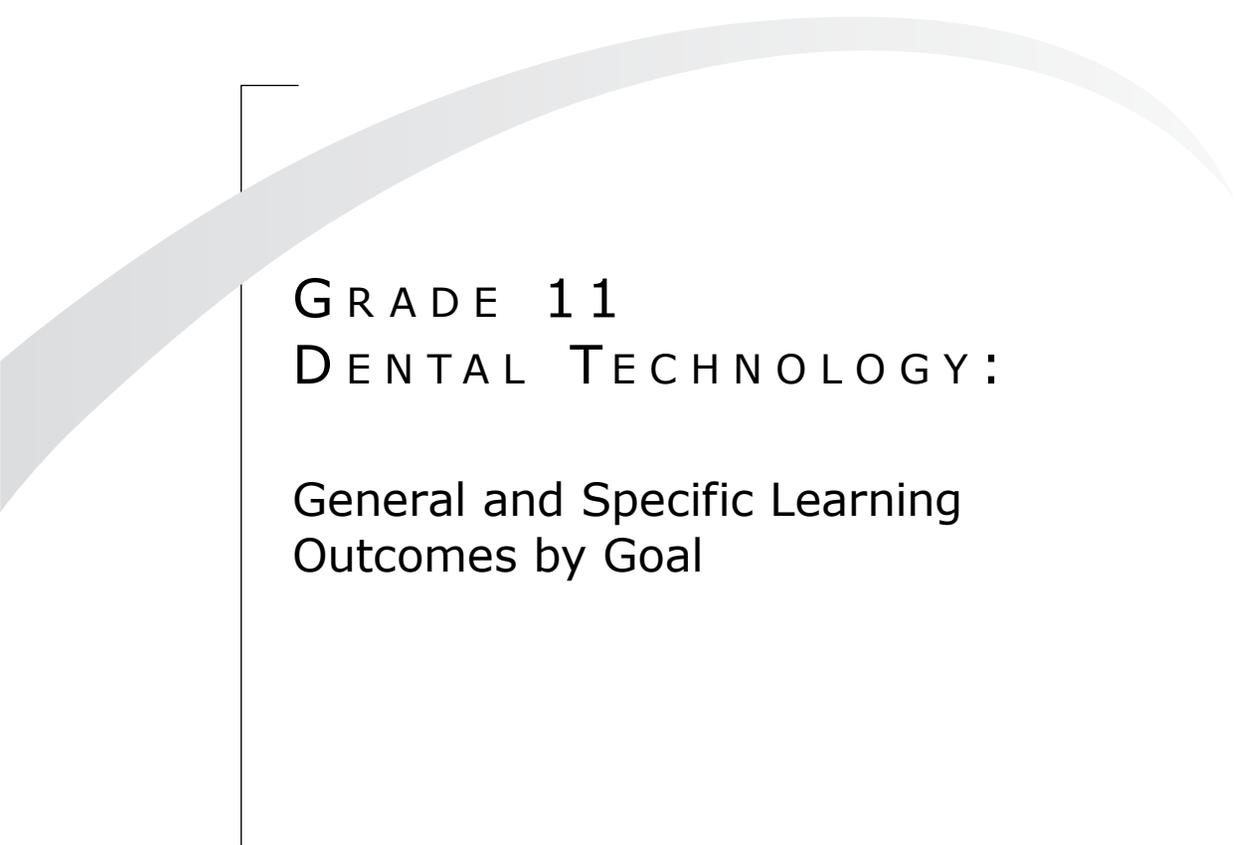
Voluntary implementation of all dental technology courses began in the fall of 2013 and will continue until their respective system-wide implementation dates.

Date	System-Wide Implementation
Fall 2014	Grade 11
Fall 2015	Grade 12

Under **system-wide implementation**, all teachers in Manitoba teach the new curriculum and use the new course codes. Teachers will no longer be able to use the previous course codes. Course codes are found in the *Subject Table Handbook: Technology Education*.

Guide to Reading Dental Technology Goals and Learning Outcomes





GRADE 11
DENTAL TECHNOLOGY:

General and Specific Learning
Outcomes by Goal

GRADE 11 DENTAL TECHNOLOGY: GENERAL AND SPECIFIC LEARNING OUTCOMES BY GOAL

8624 Introduction to Dental Technology and Removable Protheses (11A) 30S / 30E / 30M	8625 Design and Fabrication of Removable Protheses (11B) 30S / 30E / 30M	8626 Introduction to Orthodontics (11C) 30S / 30E / 30M	8627 Design and Fabrication of Orthodontic Appliances (11D) 30S / 30E / 30M
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Goal 1: Describe and apply appropriate **health and safety** practices as they relate to dental technology.

GLO 1.1: Create and maintain a **safe working environment** in a dental laboratory.

<p>11A.1.1.1 Demonstrate safe work procedures related to equipment, tools, and materials associated with dental technology and removable protheses.</p> <p>11A.1.1.2 Demonstrate the ability to identify and report potential hazards associated with removable protheses.</p> <p>11A.1.1.3 Demonstrate the appropriate use of personal protective equipment (PPE), such as goggles, face masks, vinyl gloves, and laboratory coats.</p> <p>11A.1.1.4 Demonstrate the ability to identify worn, defective, and expired PPE and safety equipment.</p> <p>11A.1.1.5 Demonstrate knowledge of safety equipment, such as a fire extinguisher, a first aid kit, and an eyewash station.</p>	<p>11B.1.1.1 Demonstrate safe work procedures related to equipment, tools, and materials associated with the fabrication of removable protheses.</p> <p>11B.1.1.2 Demonstrate the ability to identify and report potential hazards in the fabrication of removable protheses.</p> <p>11B.1.1.3 —————></p> <p>11B.1.1.4 —————></p> <p>11B.1.1.5 Describe knowledge of safety equipment, such as a fire extinguisher, a first aid kit, and an eyewash station.</p>	<p>11C.1.1.1 Demonstrate safe work procedures related to equipment, tools, and materials associated with orthodontics.</p> <p>11C.1.1.2 Demonstrate the ability to identify and report potential hazards associated with orthodontics.</p> <p>11C.1.1.3 —————></p> <p>11C.1.1.4 —————></p> <p>11C.1.1.5 Demonstrate knowledge of safety equipment, such as a fire extinguisher, a first aid kit, and an eyewash station.</p>	<p>11D.1.1.1 Demonstrate safe work procedures related to equipment, tools, and materials associated with the fabrication of orthodontic appliances.</p> <p>11D.1.1.2 Demonstrate the ability to identify and report potential hazards in the fabrication of orthodontic appliances.</p> <p>11D.1.1.3 —————></p> <p>11D.1.1.4 —————></p> <p>11D.1.1.5 Describe knowledge of safety equipment, such as a fire extinguisher, a first aid kit, and an eyewash station.</p>
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8624 Introduction to Dental Technology and Removable Protheses (11A) 30S / 30E / 30M	8625 Design and Fabrication of Removable Protheses (11B) 30S / 30E / 30M	8626 Introduction to Orthodontics (11C) 30S / 30E / 30M	8627 Design and Fabrication of Orthodontic Appliances (11D) 30S / 30E / 30M
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Goal 1: Describe and apply appropriate **health and safety** practices as they relate to dental technology. *(continued)*

GLO 1.1: Create and maintain a **safe working environment** in a dental laboratory. *(continued)*

11A.1.1.6 Demonstrate the safe use of rotary tools and dental lathes.	11B.1.1.6 Demonstrate the safe use of rotary tools and lathes in the fabrication of removable dental appliances.	11C.1.1.6 Demonstrate the safe use of rotary tools and lathes associated with orthodontics.	11D.1.1.6 Demonstrate the safe use of rotary tools and lathes in the fabrication of orthodontic appliances.
11A.1.1.7 Demonstrate the safe use of sharp tools, such as scalpels and carving instruments.	11B.1.1.7 →	11C.1.1.7 →	11D.1.1.7 →
11A.1.1.8 Demonstrate and use infection-control techniques and apply universal safety precautions to prevent cross-contamination.	11B.1.1.8 Demonstrate and use infection-control techniques and apply universal safety precautions to prevent cross-contamination in a laboratory environment.	11C.1.1.8 Demonstrate and use infection-control techniques and apply universal safety precautions to prevent cross-contamination.	11D.1.1.8 Demonstrate and use infection-control techniques and apply universal safety precautions to prevent cross-contamination in a laboratory environment.
11A.1.1.9 Demonstrate the safe use of Bunsen burners and alcohol torches.	11B.1.1.9 →	11C.1.1.9 →	11D.1.1.9 →
11A.1.1.10 Discuss the role of workplace health and safety and the procedures to follow in case of an incident (e.g., slips and falls, improper lifting).	11B.1.1.10 Discuss workplace health and safety.	11C.1.1.10 →	11D.1.1.10 →
11A.1.1.11 Describe how <i>The Workers Compensation Act</i> relates to the workplace.	11B.1.1.11 Describe <i>The Workers Compensation Act</i> .	11C.1.1.11 →	11D.1.1.11 →

8624 Introduction to Dental Technology and Removable Protheses (11A) 30S / 30E / 30M	8625 Design and Fabrication of Removable Protheses (11B) 30S / 30E / 30M	8626 Introduction to Orthodontics (11C) 30S / 30E / 30M	8627 Design and Fabrication of Orthodontic Appliances (11D) 30S / 30E / 30M
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Goal 1: Describe and apply appropriate **health and safety** practices as they relate to dental technology. *(continued)*

GLO 1.1: Create and maintain a **safe working environment** in a dental laboratory. *(continued)*

11A.1.1.12 Demonstrate knowledge of safety regulations and of the Workplace Hazardous Materials Information System (WHMIS), and demonstrate the ability to access WHMIS information.

11A.1.1.13 Describe the purpose of material safety data sheets (MSDS).

11A.1.1.14 Describe the importance of emergency-planning procedures.

11C.1.1.12 Describe the Workplace Hazardous Materials Information System (WHMIS) as it pertains to dentistry within the laboratory environment.

11C.1.1.13 Describe the purpose of material safety data sheets (MSDS).

8624 Introduction to Dental Technology and Removable Protheses (11A) 30S / 30E / 30M	8625 Design and Fabrication of Removable Protheses (11B) 30S / 30E / 30M	8626 Introduction to Orthodontics (11C) 30S / 30E / 30M	8627 Design and Fabrication of Orthodontic Appliances (11D) 30S / 30E / 30M
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Goal 2: Demonstrate the safe and appropriate **operation, cleaning, maintenance, management, handling, and storage of equipment, tools, and materials.**

GLO 2.1: Demonstrate the safe and appropriate **operation** of **equipment and tools.**

11A.2.1.1 Demonstrate safe work procedures and the appropriate operation of equipment and tools associated with dental technology and removable protheses.	11B.2.1.1 Demonstrate safe work procedures and the appropriate operation of equipment and tools associated with the design and fabrication of removable protheses.	11C.2.1.1 Demonstrate safe work procedures and the appropriate operation of equipment and tools associated with orthodontic appliances.	11D.2.1.1 Demonstrate safe work procedures and the appropriate operation of equipment and tools associated with the design and fabrication of orthodontic appliances.
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GLO 2.2: Demonstrate the safe and appropriate **cleaning, maintenance, and management** of **equipment and tools.**

11A.2.2.1 Demonstrate the appropriate cleaning, maintenance, and management of equipment and tools associated with dental technology and removable protheses.	11B.2.2.1 Demonstrate the appropriate cleaning, maintenance, and management of equipment and tools associated with the design and fabrication of removable protheses.	11C.2.2.1 Demonstrate the appropriate cleaning, maintenance, and management of equipment and tools associated with orthodontic appliances.	11D.2.2.1 Demonstrate the appropriate cleaning, maintenance, and management of equipment and tools associated with the design and fabrication of orthodontic appliances.
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GLO 2.3: Demonstrate the safe and appropriate **handling and storage** of restorative dental **materials.**

11A.2.3.1 Demonstrate the appropriate handling and storage of restorative dental materials associated with dental technology and removable protheses.	11B.2.3.1 Demonstrate the appropriate handling and storage of restorative dental materials associated with the design and fabrication of removable protheses.	11C.2.3.1 Demonstrate the appropriate handling and storage of restorative dental materials associated with orthodontic appliances.	11D.2.3.1 Demonstrate the appropriate handling and storage of restorative dental materials associated with the design and fabrication of orthodontic appliances.
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8624 Introduction to Dental Technology and Removable Protheses (11A) 30S / 30E / 30M	8625 Design and Fabrication of Removable Protheses (11B) 30S / 30E / 30M	8626 Introduction to Orthodontics (11C) 30S / 30E / 30M	8627 Design and Fabrication of Orthodontic Appliances (11D) 30S / 30E / 30M
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Goal 3: Demonstrate an understanding of the **science and characteristics** of various **restorative dental materials**.

GLO 3.1: Demonstrate an understanding of the **science and characteristics** of various **restorative dental materials**.

<p>11A.3.1.1 Demonstrate an understanding of the physical characteristics and appropriate use of various restorative dental materials associated with dental technology and removable protheses.</p> <p>11A.3.1.2 Demonstrate an understanding of the chemical characteristics and appropriate use of various restorative dental materials associated with dental technology and removable protheses.</p> <p>11A.3.1.3 Demonstrate an understanding of the mechanical characteristics and appropriate use of various restorative dental materials associated with dental technology and removable protheses.</p>	<p>11B.3.1.1 Demonstrate an understanding of the physical characteristics and appropriate use of various acrylic and gypsum materials associated with the design and fabrication of removable protheses.</p> <p>11B.3.1.2 Demonstrate an understanding of the chemical characteristics and appropriate use of various acrylic and gypsum materials associated with the design and fabrication of removable protheses.</p> <p>11B.3.1.3 Demonstrate an understanding of the mechanical characteristics and appropriate use of various acrylic and gypsum materials associated with the design and fabrication of removable protheses.</p>	<p>11C.3.1.1 Demonstrate an understanding of the physical characteristics and appropriate use of various orthodontic wires and acrylic and gypsum materials associated with orthodontic appliances.</p> <p>11C.3.1.2 Demonstrate an understanding of the chemical characteristics and appropriate use of various orthodontic wires and acrylic and gypsum materials associated with orthodontic appliances.</p> <p>11C.3.1.3 Demonstrate an understanding of the mechanical characteristics and appropriate use of various orthodontic wires and acrylic and gypsum materials associated with orthodontic appliances.</p>	<p>11D.3.1.1 Demonstrate an understanding of the physical characteristics and appropriate use of various orthodontic wires, expansion screws, and acrylic materials associated with orthodontic appliances.</p> <p>11D.3.1.2 Demonstrate an understanding of the chemical characteristics and appropriate use of various orthodontic wires, expansion screws, and acrylic materials associated with orthodontic appliances.</p> <p>11D.3.1.3 Demonstrate an understanding of the mechanical characteristics and appropriate use of various orthodontic wires, expansion screws, and acrylic materials associated with orthodontic appliances.</p>
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8624 Introduction to Dental Technology and Removable Protheses (11A) 30S / 30E / 30M	8625 Design and Fabrication of Removable Protheses (11B) 30S / 30E / 30M	8626 Introduction to Orthodontics (11C) 30S / 30E / 30M	8627 Design and Fabrication of Orthodontic Appliances (11D) 30S / 30E / 30M
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Goal 3: Demonstrate an understanding of the **science and characteristics** of various **restorative dental materials**.
(continued)

GLO 3.2: Demonstrate an understanding of **metallurgy and the characteristics of acrylics** used in dental appliances.

11A.3.2.1 Demonstrate an understanding of and the manipulation of acrylics and alloys used in the design and fabrication of removable and partial removable protheses.	11B.3.2.1 Demonstrate the handling and manipulation of acrylics and alloys used in the design and fabrication of removable protheses.	11C.3.2.1 Demonstrate an understanding of and the manipulation of wires and acrylics used in the design and fabrication of orthodontic appliances.	11D.3.2.1 Demonstrate the handling and manipulation of wires and acrylics used in the design and fabrication of orthodontic appliances.
11A.3.2.2 Demonstrate an understanding of heat treatment, annealing, deformation, the molecular and crystalline behaviour of metals, melting points, and the specific gravity of various alloys associated with removable prosthetic dentistry.	11B.3.2.2 →	11C.3.2.2 Demonstrate an understanding of heat treatment, annealing, deformation, the molecular and crystalline behaviour of metals, melting points, and the specific gravity of various alloys associated with orthodontic protheses.	11D.3.2.2 →
11A.3.2.3 Demonstrate an understanding of organic and inorganic compounds, chemical change, and chemical reaction.	11B.3.2.3 →	11C.3.2.3 →	11D.3.2.3 →
11A.3.2.4 Demonstrate an understanding of tension and tensile strength, shear strength, yield strength, and chemical and mechanical cohesion.	11B.3.2.4 →	11C.3.2.4 →	11D.3.2.4 →
11A.3.2.5 Demonstrate and describe galvanic action and corrosion as they apply to removable protheses.	11B.3.2.5 →	11C.3.2.5 Demonstrate and describe galvanic action and corrosion as they apply to orthodontics.	11D.3.2.5 →

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Goal 4: Demonstrate the **functional design** of dental appliances.

GLO 4.1: Demonstrate the **functional design** of dental appliances.

<p>11A.4.1.1 Demonstrate an understanding of the importance of proper functional design and set-ups in the fabrication of removable protheses.</p> <p>11A.4.1.2 Demonstrate an understanding of properly designed occlusal rims and stabilizing rims.</p>	<p>11B.4.1.1 Demonstrate an understanding of the application of functional designs and set-ups in the fabrication of removable protheses.</p> <p>11B.4.1.2 Apply the principles of design through all stages of creating a removable prosthetic device, from concept to fabrication.</p>	<p>11C.4.1.1 Demonstrate an understanding of the importance of proper functional design of acrylics and the construction of various orthodontic clasps.</p> <p>11C.4.1.2 Demonstrate an understanding of the importance of proper functional design in the fabrication of removable orthodontic appliances.</p> <p>11C.4.1.3 Demonstrate an understanding of the importance and proper design of expansion appliances.</p>	<p>11D.4.1.1 Demonstrate an understanding of the application of acrylic designs and clasp constructions of orthodontic appliances.</p> <p>11D.4.1.2 Demonstrate an understanding of the application of proper functional design in the fabrication of removable and fixed orthodontic appliances.</p> <p>11D.4.1.3 Demonstrate an understanding of and incorporate the principles of functional design for orthodontic appliances that use expansion screws.</p>
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8624 Introduction to Dental Technology and Removable Protheses (11A) 30S / 30E / 30M	8625 Design and Fabrication of Removable Protheses (11B) 30S / 30E / 30M	8626 Introduction to Orthodontics (11C) 30S / 30E / 30M	8627 Design and Fabrication of Orthodontic Appliances (11D) 30S / 30E / 30M
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Goal 5: Demonstrate the **fabrication** of dental appliances.

GLO 5.1: Demonstrate the **fabrication of the components** used in dental appliances.

<p>11A.5.1.1 Demonstrate the fabrication of edentulous pouring models required for a full denture set-up.</p> <p>11A.5.1.2 Demonstrate an understanding of the design and fabrication of occlusal rims according to measurement.</p> <p>11A.5.1.3 Demonstrate the fabrication of pouring models required for a partial denture set-up.</p> <p>11A.5.1.4 Demonstrate the articulation of fabricated occlusal rims on plain line articulators.</p>	<p>11B.5.1.1 Demonstrate the articulation of removable appliances.</p> <p>11B.5.1.2 Demonstrate the fabrication of a dental appliance set-up from prescription to completion.</p> <p>11B.5.1.3 Demonstrate the design and application of clasps and major and minor connectors for a partial denture set-up.</p> <p>11B.5.1.4 →</p>	<p>11C.5.1.1 Demonstrate the fabrication of pouring models required for the application of orthodontic cases or appliances.</p> <p>11C.5.1.2 Demonstrate the preparation of models prior to clasp design and application.</p> <p>11C.5.1.3 Demonstrate safe wire-bending practices using orthodontic pliers.</p> <p>11C.5.1.4 Demonstrate the application of self-curing acrylic.</p>	<p>11D.5.1.1 Demonstrate the design and fabrication of Adams clasps for a Hawley retainer appliance.</p> <p>11D.5.1.2 Demonstrate the fabrication of a labial bow for a Hawley retainer appliance.</p> <p>11D.5.1.3 Demonstrate the fabrication of various clasps and the placement of the expansion screw for a Swartz appliance.</p> <p>11D.5.1.4 Demonstrate the preparation of wires for spot welding.</p>
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8624 Introduction to Dental Technology and Removable Protheses (11A) 30S / 30E / 30M	8625 Design and Fabrication of Removable Protheses (11B) 30S / 30E / 30M	8626 Introduction to Orthodontics (11C) 30S / 30E / 30M	8627 Design and Fabrication of Orthodontic Appliances (11D) 30S / 30E / 30M
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Goal 5: Demonstrate the **fabrication** of dental appliances. *(continued)*

GLO 5.2: Demonstrate the **fabrication** of dental appliances from their various components.

11A.5.2.1 Demonstrate the placement of anterior teeth for the maxillary and mandibular occlusal rims.	11B.5.2.1 Demonstrate the selection, application, and placement of anterior and posterior teeth, as well as tissue carving on maxillary and mandibular rims.	11C.5.2.1 Demonstrate the use of monomers and polymers in relation to orthodontic appliances.	11D.5.2.1 Demonstrate the placement of clasps and labial bows for a Hawley retainer on prepared orthodontic models.
11A.5.2.2 Demonstrate the placement of posterior teeth for the maxillary and mandibular occlusal rims.	11B.5.2.2 Demonstrate the flasking and acrylizing stages of the denture-fabrication process.	11C.5.2.2 Demonstrate the trimming, pumicing, and polishing of acrylic.	11D.5.2.2 Demonstrate the fabrication of an athletic mouthguard.
11A.5.2.3 Demonstrate a completed functional and balanced set-up of a removable prosthetic.	11B.5.2.3 Demonstrate the deflasking, trimming, and polishing of an acrylic removable appliance.	11C.5.2.3 Demonstrate the fabrication of various Adams clasps used in orthodontic appliances.	11D.5.2.3 Demonstrate the fabrication of a functional and removable orthodontic appliance.
11A.5.2.4 Demonstrate anatomical carving and festooning.	11B.5.2.4 Demonstrate the use of burs and stones for trimming an acrylic appliance.	11C.5.2.4 Demonstrate the fabrication of labial bows for maxillary and mandibular casework or projects.	11D.5.2.4 Demonstrate the fabrication of an appliance that advances the mandible.
	11B.5.2.5 Demonstrate a bilateral balanced functional set-up of a removable appliance.	11C.5.2.5 Demonstrate cold-cure procedures using a pressure pot.	11D.5.2.5 Demonstrate the fabrication of a bruxism appliance.
	11B.5.2.6 Demonstrate a partial denture wax-up based on the Kennedy classification.		11D.5.2.6 Demonstrate an orthodontic appliance that functions in harmony with opposing dentition.

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Goal 6: Demonstrate the **repair and adjustment** of dental appliances.

GLO 6.1: Demonstrate an awareness of **problems** associated with dental appliances.

11A.6.1.1 Demonstrate knowledge of limitations associated with dental appliances, including material limitations and durability.	11B.6.1.1 Demonstrate knowledge of oral health, age, and illness, and of how to accommodate these aspects in making adjustments to dental appliances.	11C.6.1.1 Demonstrate knowledge of limitations associated with dental appliances, including material limitations and durability.	11D.6.1.1 Demonstrate knowledge of oral health and tooth movement, and of how to accommodate these aspects in making adjustments to dental appliances.
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GLO 6.2: Repair dental appliances.

11A.6.2.1 Demonstrate knowledge of repairing a fractured denture.	11B.6.2.1 Demonstrate repairing a denture, a fracture, and a tooth replacement.	11C.6.2.1 Demonstrate knowledge of repairing fractured orthodontic appliances.	11D.6.2.1 Demonstrate the replacement of clasps in orthodontic appliances.
	11B.6.2.2 Demonstrate the relining and rebasing of dentures.	11C.6.2.2 Demonstrate knowledge of preparing an orthodontic appliance for repair.	11D.6.2.2 Demonstrate the replacement or addition of acrylic in an orthodontic appliance.

GLO 6.3: Adjust dental appliances.

11A.6.3.1 Demonstrate knowledge of adjusting dentures.	11B.6.3.1 Demonstrate the adjustment and spot grinding of occlusal contacts to create a balanced functional occlusion.		11D.6.3.1 Demonstrate the adjustment and replacement of clasps in a dental appliance.
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8624 Introduction to Dental Technology and Removable Protheses (11A) 30S / 30E / 30M	8625 Design and Fabrication of Removable Protheses (11B) 30S / 30E / 30M	8626 Introduction to Orthodontics (11C) 30S / 30E / 30M	8627 Design and Fabrication of Orthodontic Appliances (11D) 30S / 30E / 30M
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Goal 7: Describe and demonstrate transferable **cross-curricular knowledge and skills** as they relate to dental technology.

GLO 7.1: Read, interpret, and communicate information related to dental technology.

11A.7.1.1 Read, interpret, and communicate anatomy, physiology, and prescription terminology related to dental technology.	11B.7.1.1 →	11C.7.1.1 Read, interpret, and communicate anatomy, physiology, and prescription terminology related to dental technology and orthodontics.	11D.7.1.1 →
11A.7.1.2 Read, interpret, and demonstrate the application of information about the science of various dental materials associated with dental technology.	11B.7.1.2 Read, interpret, and demonstrate the application of information about reversible and irreversible hydrocolloids associated with dental technology.	11C.7.1.2 Read, interpret, and demonstrate the application of information about elastomeric materials and composites associated with dental technology.	

GLO 7.2: Apply knowledge and skills related to dental technology from **mathematics**.

11A.7.2.1 Convert between imperial and metric systems of measurement.	11B.7.2.1 →	11C.7.2.1 →	11D.7.2.1 →
11A.7.2.2 Calculate and apply volume, weights, measurements, temperatures, and ratios.	11B.7.2.2 →	11C.7.2.2 →	11D.7.2.2 →

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Goal 7: Describe and demonstrate transferable **cross-curricular knowledge and skills** as they relate to dental technology. *(continued)*

GLO 7.3: Apply knowledge and skills related to dental technology from **anatomy and physiology**.

11A.7.3.1 Locate, identify, and describe anatomical landmarks of the teeth and associated structures.	11B.7.3.1 Locate, identify, and describe anatomical landmarks of the edentulous oral cavity and cranial anatomy.	11C.7.3.1 Locate, identify, and describe the anatomical landmarks and growth of permanent, deciduous (primary), and mixed dentition.	11D.7.3.1 Identify and describe mixed dentition, odontoblastic and odontoclastic processes, and the principles of the tipping, pushing, and pulling aspects of tooth repositioning, periodontal ligaments, and associated structures.
11A.7.3.2 Identify and describe anatomical landmarks and structures of the teeth and the various numbering systems used for identification and communication.	11B.7.3.2 Locate, identify, and describe head and neck skeletal structures and musculature, such as the muscles of facial expression and the muscles of mastication. 11B.7.3.3 Demonstrate and explore the function of the circulatory system, such as veins, arteries, and capillaries, and the function of the lymphatic system.	11C.7.3.2 Locate the temporomandibular joint, describe its function, and identify disorders associated with this area.	11D.7.3.2 —→

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Goal 7: Describe and demonstrate transferable **cross-curricular knowledge and skills** as they relate to dental technology. *(continued)*

GLO 7.4: Apply knowledge and skills related to dental technology from **physics**.

11A.7.4.1 Demonstrate an awareness of functional and balanced occlusion related to removable protheses.	11B.7.4.1 Apply and demonstrate bilateral balance principles in the construction of removable dental appliances and excursive pathways.	11C.7.4.1 Demonstrate an awareness of force and fulcrum principles in the process of shifting and repositioning teeth.	11D.7.4.1 Demonstrate an awareness of muscle reprogramming associated with a variety of orthodontic appliances.
11A.7.4.2 Demonstrate knowledge of retention, bracing, and fulcrum principles in the fabrication of partial denture designs.	11B.7.4.2 Demonstrate knowledge of retention and bracing principles in the fabrication of partial denture designs.	11C.7.4.2 Demonstrate knowledge of retention and fulcrum principles in the fabrication of orthodontic clasp designs.	11D.7.4.2 Demonstrate knowledge of retention and bracing principles in the fabrication of various orthodontic appliances.

GLO 7.5: Apply knowledge and skills related to dental technology from **other subject areas** (art, physical education/health education, information and communication technology, social studies).

11A.7.5.1 Demonstrate an understanding of tooth loss due to improper hygiene, disease, nutrition, decay, and accident.	11B.7.5.1 →	11C.7.5.1 Demonstrate an understanding of the psychological factors associated with bruxism (teeth clenching and grinding).	11D.7.5.1 →
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8624 Introduction to Dental Technology and Removable Protheses (11A) 30S / 30E / 30M	8625 Design and Fabrication of Removable Protheses (11B) 30S / 30E / 30M	8626 Introduction to Orthodontics (11C) 30S / 30E / 30M	8627 Design and Fabrication of Orthodontic Appliances (11D) 30S / 30E / 30M
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Goal 8: Demonstrate an understanding of **career opportunities** in dental technology.

GLO 8.1: Describe **education and career opportunities** and **professional organizations** in dental technology and associated fields.

11A.8.1.1 Demonstrate knowledge of and discuss career opportunities within the scope of dental technology.	11B.8.1.1 Demonstrate knowledge of and discuss the various provincial guidelines, regulations, and acts pertaining to labour mobility in the dental technology industry.	11C.8.1.1 Demonstrate knowledge of and discuss the legislation that governs the professional aspects of the dental technology profession.	11D.8.1.1 Demonstrate knowledge of and discuss the range of career opportunities in the dental and health professions and the post-secondary education and advanced training required for these professions.
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Goal 9: Demonstrate an awareness of **sustainability** as it pertains to dental technology.

GLO 9.1: Describe the impact of **sustainability** on the **health and well-being** of dental technologists and their clients.

11A.9.1.1 Discuss the positive influence of dental technology on people's sense of well-being, health, and enjoyment of quality of life.	11B.9.1.1 Discuss the positive influence of removable protheses on people's sense of well-being, health, and enjoyment of quality of life.	11C.9.1.1 Discuss the positive influence of orthodontics on people's sense of well-being, health, and enjoyment of quality of life.	11D.9.1.1 ———>
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GLO 9.2: Describe the dental technology industry's **sustainability practices** and their impact on the **environment**.

11A.9.2.1 Discuss safe practices for handling dental impressions.	11B.9.2.1 Discuss recycling within the laboratory environment.	11C.9.2.1 Discuss the safe disposal of chemicals and excess materials used in orthodontics.	
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GLO 9.3: Describe **sustainable business practices** within dental technology.

11A.9.3.1 Describe laboratory management and continuing education opportunities available for dental technologists.	11B.9.3.1 Discuss the cost of various dental materials.	11C.9.3.1 Discuss new cosmetic products related to the orthodontic industry.	11D.9.3.1 Discuss the need for affordable dental appliances, alternative materials, and adaptability to changing markets and economic trends.
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Goal 10: Demonstrate an awareness of **ethical and legal standards** as they pertain to dental technology.

GLO 10.1: Practise **ethical and legal standards** as they pertain to dental technology.

11A.10.1.1 Describe the code of conduct and the scope of practice of various dental technologists' associations.

11B.10.1.1 Discuss the ethical implications of using approved, quality dental materials.

11C.10.1.1 Discuss the ethical implications of displaying good work habits.

Goal 11: Demonstrate **employability skills** related to dental technology.

GLO 11.1: Demonstrate **fundamental employability skills**.

11A.11.1.1 Demonstrate employability skills (e.g., being prepared for work on time, setting up workstations, staying on task, accepting responsibility for own actions).

11B.11.1.1 Demonstrate an understanding of the importance of a professional dress code.

11C.11.1.1 Demonstrate the skills required to work as a member of a team.

11D.11.1.1 Demonstrate initiative in performing and completing tasks.

11A.11.1.2 Demonstrate the ability to communicate with professionals, co-workers, and suppliers.

11B.11.1.2 Demonstrate the ability to communicate effectively with supervisors/ teachers, co-workers, and customers.

GLO 11.2: Demonstrate an understanding of the **business operation** of a dental laboratory.

11A.11.2.1 Discuss and demonstrate an understanding of the business operation of a dental laboratory.

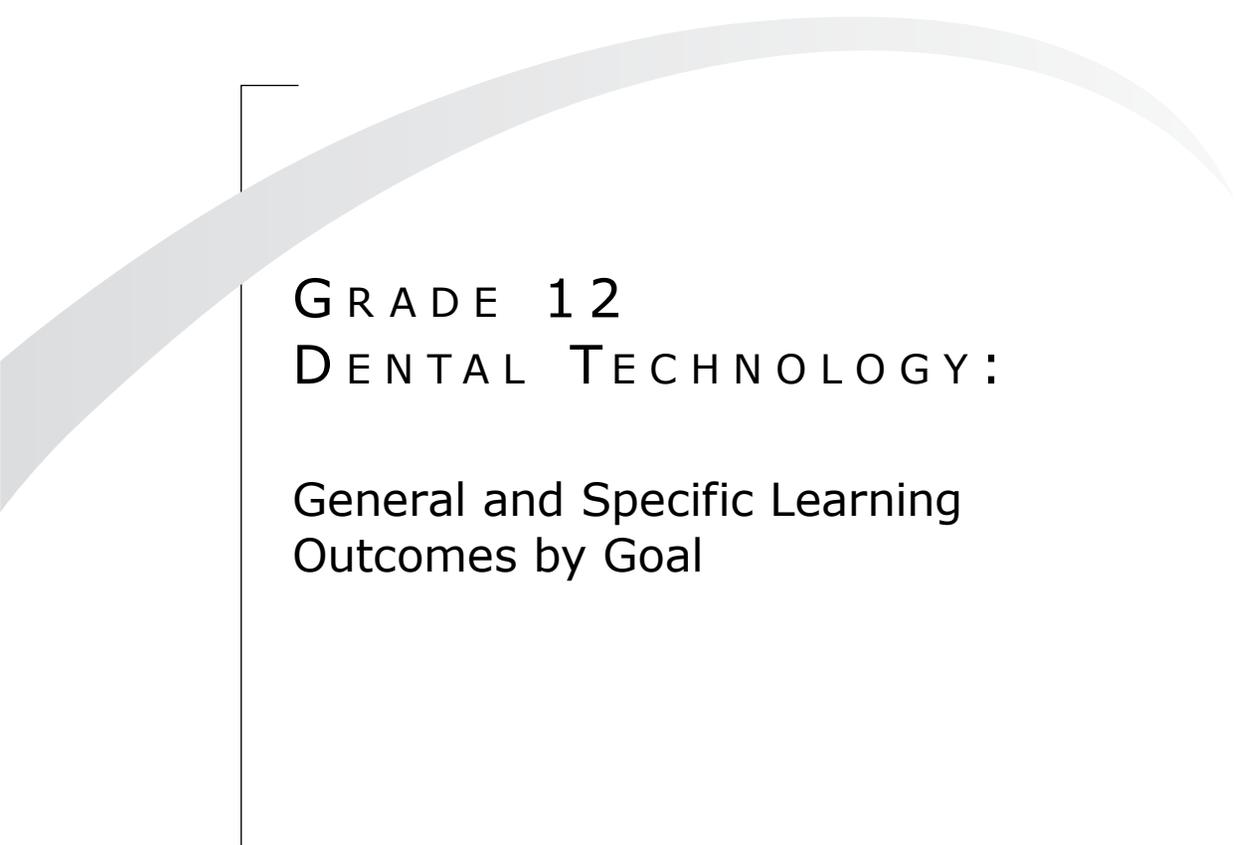
11C.11.2.1 Discuss and demonstrate stock ordering, equipment maintenance, and business promotion to potential clients.

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Goal 12: Demonstrate an understanding of the **evolution** of dental technology, including its **progression** and **emerging trends**.

GLO 12.1: Describe the **evolution** of dental technology, including its **progression** and **emerging trends**.

11A.12.1.1 Discuss the evolution of removable protheses, including their technological progression and emerging trends.	11B.12.1.1 Demonstrate an understanding of historical and cultural perspectives of removable dental appliances.	11C.12.1.1 Discuss the evolution of orthodontics, including its technological progression and emerging trends.
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GRADE 12
DENTAL TECHNOLOGY:

General and Specific Learning
Outcomes by Goal

GRADE 12 DENTAL TECHNOLOGY: GENERAL AND SPECIFIC LEARNING OUTCOMES BY GOAL

8628 Introduction to Fixed Prosthodontics: Crown and Bridge Technology (12A) 40S / 40E / 40M	8629 Design and Fabrication of Fixed Prosthodontics: Crown and Bridge Technology (12B) 40S / 40E / 40M	8670 Introduction to Dental Ceramic Technology (12C) 40S / 40E / 40M	8671 Design and Fabrication of Dental Ceramic Restorations (12D) 40S / 40E / 40M
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Goal 1: Describe and apply appropriate **health and safety** practices as they relate to dental technology.

GLO 1.1: Create and maintain a **safe working environment** in a dental laboratory.

12A.1.1.1 Demonstrate safe work procedures related to equipment, tools, and materials associated with fixed prostheses.	12B.1.1.1 Demonstrate safe work procedures related to equipment, tools, and materials associated with the fabrication of fixed prostheses.	12C.1.1.1 Demonstrate safe work procedures related to equipment, tools, and materials associated with dental ceramics.	12D.1.1.1 Demonstrate safe work procedures related to equipment, tools, and materials associated with the fabrication of ceramic restorations.
12A.1.1.2 Demonstrate the ability to identify and report potential hazards associated with fixed prostheses.	12B.1.1.2 Demonstrate the ability to identify and report potential hazards in the fabrication of fixed prostheses.	12C.1.1.2 Demonstrate the ability to identify and report potential hazards associated with dental ceramics.	12D.1.1.2 Demonstrate the ability to identify and report potential hazards in the fabrication of ceramic restorations.
12A.1.1.3 Demonstrate the appropriate use of personal protective equipment (PPE), such as goggles, face masks, vinyl gloves, and laboratory coats.	12B.1.1.3 →	12C.1.1.3 →	12D.1.1.3 →
12A.1.1.4 Demonstrate the ability to identify worn, defective, and expired PPE and safety equipment.	12B.1.1.4 →	12C.1.1.4 →	12D.1.1.4 →

8628 Introduction to Fixed Prosthodontics: Crown and Bridge Technology (12A) 40S / 40E / 40M	8629 Design and Fabrication of Fixed Protheses: Crown and Bridge Technology (12B) 40S / 40E / 40M	8670 Introduction to Dental Ceramic Technology (12C) 40S / 40E / 40M	8671 Design and Fabrication of Dental Ceramic Restorations (12D) 40S / 40E / 40M
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Goal 1: Describe and apply appropriate **health and safety** practices as they relate to dental technology. *(continued)*

GLO 1.1: Create and maintain a **safe working environment** in a dental laboratory. *(continued)*

12A.1.1.5 Demonstrate knowledge of safety equipment, such as a fire extinguisher, a first aid kit, and an eyewash station.	12B.1.1.5 Describe knowledge of safety equipment, such as a fire extinguisher, a first aid kit, and an eyewash station.	12C.1.1.5 Demonstrate knowledge of safety equipment, such as a fire extinguisher, a first aid kit, and an eyewash station.	12D.1.1.5 Describe knowledge of safety equipment, such as a fire extinguisher, a first aid kit, and an eyewash station.
12A.1.1.6 Demonstrate the safe use of rotary tools and dental lathes.	12B.1.1.6 Demonstrate the safe use of rotary tools and lathes in the fabrication of fixed dental appliances.	12C.1.1.6 Demonstrate the safe use of rotary tools and lathes associated with dental ceramics.	12D.1.1.6 Demonstrate the safe use of rotary tools and lathes in the fabrication of ceramic restorations.
12A.1.1.7 Demonstrate the safe use of sharp tools, such as scalpels and carving instruments.	12B.1.1.7 —→	12C.1.1.7 —→	12D.1.1.7 —→
12A.1.1.8 Demonstrate and use infection-control techniques and apply universal safety precautions to prevent cross-contamination.	12B.1.1.8 Demonstrate and use infection-control techniques and apply universal safety precautions to prevent cross-contamination in a laboratory environment.	12C.1.1.8 Demonstrate and use infection-control techniques and apply universal safety precautions to prevent cross-contamination.	12D.1.1.8 Demonstrate and use infection-control techniques and apply universal safety precautions to prevent cross-contamination in a laboratory environment.
12A.1.1.9 Demonstrate the safe use of Bunsen burners and alcohol torches.	12B.1.1.9 —→	12C.1.1.9 —→	12D.1.1.9 —→

8628 Introduction to Fixed Prosthodontics: Crown and Bridge Technology (12A) 40S / 40E / 40M	8629 Design and Fabrication of Fixed Protheses: Crown and Bridge Technology (12B) 40S / 40E / 40M	8670 Introduction to Dental Ceramic Technology (12C) 40S / 40E / 40M	8671 Design and Fabrication of Dental Ceramic Restorations (12D) 40S / 40E / 40M
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Goal 1: Describe and apply appropriate **health and safety** practices as they relate to dental technology. *(continued)*

GLO 1.1: Create and maintain a **safe working environment** in a dental laboratory. *(continued)*

<p>12A.1.1.10 Discuss the role of workplace health and safety and the procedures to follow in case of an incident (e.g., slips and falls, improper lifting).</p> <p>12A.1.1.11 Describe how <i>The Workers Compensation Act</i> relates to the workplace.</p> <p>12A.1.1.12 Demonstrate knowledge of safety regulations and of the Workplace Hazardous Materials Information System (WHMIS), and demonstrate the ability to access WHMIS information.</p> <p>12A.1.1.13 Describe the purpose of material safety data sheets (MSDS).</p> <p>12A.1.1.14 Describe the importance of emergency-planning procedures.</p>	<p>12B.1.1.10 Discuss workplace health and safety.</p>	<p>12C.1.1.10 ———→</p> <p>12C.1.1.11 Describe how <i>The Workers Compensation Act</i> relates to the workplace.</p> <p>12C.1.1.12 Describe the Workplace Hazardous Materials Information System (WHMIS) as it pertains to the dental laboratory environment.</p> <p>12C.1.1.13 Describe the purpose of material safety data sheets (MSDS).</p> <p>12C.1.1.14 Review emergency-planning procedures.</p>	<p>12D.1.1.10 ———→</p>
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Goal 2: Demonstrate the safe and appropriate **operation, cleaning, maintenance, management, handling, and storage of equipment, tools, and materials.**

GLO 2.1: Demonstrate the safe and appropriate **operation** of **equipment and tools.**

12A.2.1.1 Demonstrate safe work procedures and the appropriate operation of equipment and tools associated with fixed prosthodontics.	12B.2.1.1 Demonstrate safe work procedures and the appropriate operation of equipment and tools associated with the design and fabrication of crown and bridge appliances.	12C.2.1.1 Demonstrate safe work procedures and the appropriate operation of equipment and tools associated with ceramic technology.	12D.2.1.1 Demonstrate safe work procedures and the appropriate operation of equipment and tools associated with the design and fabrication of ceramic appliances.
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GLO 2.2: Demonstrate the safe and appropriate **cleaning, maintenance, and management** of **equipment and tools.**

12A.2.2.1 Demonstrate the appropriate cleaning, maintenance, and management of equipment and tools associated with crown and bridge technology.	12B.2.2.1 Demonstrate the appropriate cleaning, maintenance, and management of equipment and tools associated with the design and fabrication of fixed protheses.	12C.2.2.1 Demonstrate the appropriate cleaning, maintenance, and management of equipment and tools associated with ceramic technology.	12D.2.2.1 Demonstrate the appropriate cleaning, maintenance, and management of equipment and tools associated with the design and fabrication of ceramic restorations.
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GLO 2.3: Demonstrate the safe and appropriate **handling and storage** of restorative dental **materials.**

12A.2.3.1 Demonstrate the appropriate handling and storage of restorative dental materials associated with crown and bridge technology.	12B.2.3.1 Demonstrate the appropriate handling and storage of restorative dental materials associated with the design and fabrication of fixed protheses.	12C.2.3.1 Demonstrate the appropriate handling and storage of restorative dental materials associated with ceramic technology.	12D.2.3.1 Demonstrate the appropriate handling and storage of restorative dental materials associated with the design and fabrication of ceramic restorations.
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Goal 3: Demonstrate an understanding of the **science and characteristics** of various **restorative dental materials**.

GLO 3.1: Demonstrate an understanding of the **science and characteristics** of various **restorative dental materials**.

<p>12A.3.1.1 Demonstrate an understanding of the physical characteristics and appropriate use of various restorative dental materials associated with crown and bridge technology.</p> <p>12A.3.1.2 Demonstrate an understanding of the chemical characteristics and appropriate use of various restorative dental materials associated with crown and bridge technology.</p> <p>12A.3.1.3 Demonstrate an understanding of the mechanical characteristics and appropriate use of various restorative dental materials associated with crown and bridge technology.</p>	<p>12B.3.1.1 Demonstrate an understanding of the physical characteristics and appropriate use of various alloys, waxes, and gypsum materials associated with the design and fabrication of fixed protheses.</p> <p>12B.3.1.2 Demonstrate an understanding of the chemical characteristics and appropriate use of various gypsum and investment materials associated with the design and fabrication of fixed protheses.</p> <p>12B.3.1.3 Demonstrate an understanding of the mechanical characteristics and appropriate use of various alloys and gypsum materials associated with the design and fabrication of fixed protheses.</p>	<p>12C.3.1.1 Demonstrate an understanding of the physical characteristics and appropriate use of various ceramic, refractory, and gypsum materials associated with ceramic technology.</p> <p>12C.3.1.2 Demonstrate an understanding of the chemical characteristics and appropriate use of various stains, metal oxides, and ceramic, investment, and gypsum materials associated with ceramic technology.</p> <p>12C.3.1.3 Demonstrate an understanding of the mechanical characteristics and appropriate use of various materials associated with ceramic technology.</p>	<p>12D.3.1.1 Demonstrate an understanding of the physical characteristics and appropriate use of various ceramic materials associated with dental restorations.</p> <p>12D.3.1.2 Demonstrate an understanding of the chemical characteristics and appropriate use of various stains and ceramic materials associated with dental restorations.</p> <p>12.3.1.3 Demonstrate an understanding of the mechanical characteristics and appropriate use of various ceramic materials associated with dental restorations.</p>
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Goal 3: Demonstrate an understanding of the **science and characteristics** of various **restorative dental materials**.
(continued)

GLO 3.2 Demonstrate an understanding of **metallurgy and the characteristics of acrylics** used in dental appliances.

12A.3.2.1 Demonstrate an understanding of and the manipulation of alloys (noble and base) used in the design and fabrication of crowns, bridges, and substructures.	12B.3.2.1 Demonstrate the handling and manipulation of alloys used in the design and fabrication of crowns, bridges, and substructures, and in osseointegration.	12C.3.2.1 Demonstrate an understanding of and the manipulation of various ceramic materials used in the design and fabrication of ceramic restorations and composites.	12D.3.2.1 Demonstrate the handling and manipulation of ceramic materials used in the design and fabrication of ceramic restorations.
12A.3.2.2 Demonstrate an understanding of heat treatment, annealing, deformation, the molecular and crystalline behaviour of metals, melting points, and the specific gravity of various alloys associated with fixed prosthetic dentistry.	12B.3.2.2 →	12C.3.2.2 Demonstrate an understanding of the structures of ceramic and composite materials, fusing points, and layering effects associated with ceramic technology.	12D.3.2.2 Demonstrate an understanding of the structures of ceramic materials, fusing points, and layering effects associated with ceramic technology.
12A.3.2.3 Demonstrate an understanding of organic and inorganic compounds, chemical change, and chemical reaction.	12B.3.2.3 →	12C.3.2.3 Demonstrate an understanding of organic and inorganic elements in ceramic and composite materials.	12D.3.2.3 Demonstrate an understanding of organic and inorganic elements in ceramic materials.
12A.3.2.4 Demonstrate an understanding of tension and tensile strength, shear strength, yield strength, and chemical and mechanical cohesion.	12B.3.2.4 →	12C.3.2.4 Demonstrate an understanding of tension and tensile strength, shear strength, yield strength, and chemical and mechanical cohesion with regard to porcelain-fused-to-metal structures.	12D.3.2.4 Demonstrate an understanding of shear strength and yield strength in all-ceramic restorations.

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Goal 3: Demonstrate an understanding of the **science and characteristics** of various **restorative dental materials**.
(continued)

GLO 3.2 Demonstrate an understanding of **metallurgy and the characteristics of acrylics** used in dental appliances.
(continued)

12A.3.2.5 Demonstrate and describe galvanic action and corrosion as they apply to crown and bridge technology.	12B.3.2.5 Demonstrate and describe galvanic action and corrosion as they apply to the design and fabrication of crown and bridge technology.	12C.3.2.5 Demonstrate and describe the coefficient of thermal expansion as it applies to ceramic fusing techniques.	12D.3.2.5 →
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Goal 4: Demonstrate the **functional design** of dental appliances.

GLO 4.1: Demonstrate the **functional design** of dental appliances.

12A.4.1.1 Demonstrate an understanding of the importance of proper functional and aesthetic design in full crown wax-ups.	12B.4.1.1 Demonstrate an understanding of the application of functional and aesthetic design in full crown wax-ups, including lateral and protrusive excursions.	12C.4.1.1 Demonstrate an understanding of the importance of proper application of opaque, dentin, and enamel in single-unit restorations.	12D.4.1.1 Demonstrate an understanding of the importance of proper application of opaque, dentin, and enamel in multiple-unit restorations.
12A.4.1.2 Demonstrate an understanding of shape and contour in single posterior full metal crowns.	12B.4.1.2 Demonstrate an understanding of the principles of design and their application to the morphology and function of posterior full metal crowns.	12C.4.1.2 Demonstrate an understanding of shape and contour in anterior restorations.	12D.4.1.2 Demonstrate an understanding of the principles of functional design and their application to multiple-unit ceramic bridges.
	12B.4.1.3 Demonstrate an understanding of shape and contour in substructure designs for porcelain-fused-to-metal restorations.	12C.4.1.3 Demonstrate an understanding of the importance of proper functional design in the fabrication of multiple-unit ceramic bridges.	12D.4.1.3 Demonstrate an understanding of the importance of proper functional design in all-ceramic restorations.

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Goal 4: Demonstrate the **functional design** of dental appliances. *(continued)*

GLO 4.1: Demonstrate the **functional design** of dental appliances. *(continued)*

12B.4.1.4 Demonstrate an understanding of the design of dental attachments and implants.

12D.4.1.4 Demonstrate an understanding of the use of computer-aided design and computer-aided manufacturing (CAD/CAM) technology in designing and milling a dental restoration.

Goal 5: Demonstrate the **fabrication** of dental appliances.

GLO 5.1: Demonstrate the **fabrication of the components** used in dental appliances.

12A.5.1.1 Demonstrate the fabrication of pouring models and the articulation required for crown and bridge restorations.

12B.5.1.1 Demonstrate the functional wax-ups of various full gold crowns.

12C.5.1.1 Demonstrate the application of ceramics to metal substructures.

12D.5.1.1 Demonstrate the design and anatomical adaptation of ceramic material, using stones and burs.

12A.5.1.2 Demonstrate an understanding of investing and casting full metal restorations.

12B.5.1.2 Demonstrate the fabrication of a variety of posterior bridge restorations.

12C.5.1.2 Demonstrate the preparation of alloy substructures during the thermocycling stage.

12D.5.1.2 Demonstrate the application of ceramics on multiple-unit substructures.

12B.5.1.3 Demonstrate the application of pontic design on waxed bridges.

12D.5.1.3 Demonstrate the design of porcelain margins.

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Goal 5: Demonstrate the **fabrication** of dental appliances. *(continued)*

GLO 5.2: Demonstrate the **fabrication** of dental appliances from their various components.

<p>12A.5.2.1 Demonstrate the fabrication of a full gold maxillary molar aesthetic wax-up.</p> <p>12A.5.2.2 Demonstrate the fabrication of a full gold mandibular molar aesthetic wax-up.</p> <p>12A.5.2.3 Demonstrate the complete investing, burnout, and casting of molars, using induction casting techniques.</p> <p>12A.5.2.4 Demonstrate the deinvesting, fitting, finishing, and polishing of cast crowns.</p>	<p>12B.5.2.1 Demonstrate the wax fabrication of maxillary and mandibular functional molars.</p> <p>12B.5.2.2 Demonstrate the wax fabrication of full metal posterior bridges.</p> <p>12B.5.2.3 Demonstrate the fabrication of single posterior and anterior substructures, using burnout, induction, and centrifugal casting techniques.</p> <p>12B.5.2.4 Demonstrate the use of burs and stones for trimming and preparing substructures.</p> <p>12B.5.2.5 Demonstrate the fabrication of multiple-unit substructures.</p> <p>12B.5.2.6 Demonstrate the application of a semi-precision attachment in a restoration.</p> <p>12B.5.2.7 Demonstrate implant (osseointegration) substructure design.</p>	<p>12C.5.2.1 Demonstrate the use of ceramics and their application to single anterior substructures.</p> <p>12C.5.2.2 Demonstrate the trimming and shaping of ceramic materials.</p> <p>12C.5.2.3 Demonstrate staining, glazing, and firing techniques.</p> <p>12C.5.2.4 Demonstrate the polishing and completion of dental restorations.</p> <p>12C.5.2.5 Demonstrate the use of refractory dyes for all-ceramic restorations.</p> <p>12C.5.2.6 Demonstrate the duplication process of dental models.</p>	<p>12D.5.2.1 Demonstrate the use of ceramics and their application to multiple-unit substructures.</p> <p>12D.5.2.2 Demonstrate the adjusting, shaping, staining, and glazing of ceramic dental appliances.</p> <p>12D.5.2.3 Demonstrate the fabrication of all-ceramic inlay and onlay restorations.</p> <p>12D.5.2.4 Demonstrate the fabrication of anterior all-ceramic restorations.</p> <p>12D.5.2.5 Demonstrate CAD/CAM scanning and design of posterior restorations.</p> <p>12D.5.2.6 Demonstrate CAD/CAM scanning and design of anterior restorations.</p> <p>12D.5.2.7 Demonstrate CAD/CAM scanning of multiple-unit restorations, including implant abutments.</p>
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Goal 6: Demonstrate the **repair and adjustment** of dental appliances.

GLO 6.1: Demonstrate an awareness of **problems** associated with dental appliances.

12A.6.1.1 Demonstrate knowledge of limitations associated with dental appliances, including material and structural limitations and durability.	12B.6.1.1 Demonstrate knowledge of limitations associated with various long-span bridge designs and of how to overcome them.	12C.6.1.1 Demonstrate knowledge of limitations associated with ceramic material and its durability.	12D.6.1.1 —→
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GLO 6.2: Repair dental appliances.

12A.6.2.1 Demonstrate knowledge of soldering contacts to gold restorations.	12B.6.2.1 Demonstrate knowledge of soldering bridgework.	12C.6.2.1 Demonstrate knowledge of soldering in a ceramic furnace, using gold solder.	12D.6.2.1 Demonstrate knowledge of soldering substructures with semi-precious alloys, using powder metal.
	12B.6.2.2 Demonstrate knowledge of soldering occlusal pinholes, using platinum foil techniques.	12C.6.2.2 Demonstrate knowledge of ceramic application to repair or adjust a restoration.	12D.6.2.2 Demonstrate knowledge of opaque and ceramic repair of restorations.
			12D.6.2.3 Demonstrate the adjustment of stains and glazing.

GLO 6.3: Adjust dental appliances.

12A.6.3.1 Demonstrate knowledge of adjusting full metal structures.	12B.6.3.1 Demonstrate the adjustment and spot grinding of substructures.	12C.6.3.1 Demonstrate knowledge of adjusting ceramic restorations.	12D.6.3.1 Demonstrate the adjustment and replacement of ceramic restorations.
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Goal 7: Describe and demonstrate transferable **cross-curricular knowledge and skills** as they relate to dental technology.

GLO 7.1: Read, interpret, and communicate information related to dental technology.

12A.7.1.1 Read, interpret, and communicate information and terminology related to dental technology and fixed prosthodontics.	12B.7.1.1 Read, interpret, and communicate information and terminology related to advanced fixed dental technology.	12C.7.1.1 Read, interpret, and communicate information and terminology related to dental technology and ceramics.	12D.7.1.1 Read, interpret, and communicate information and terminology related to dental technology and advanced ceramics and CAD/CAM technology.
12A.7.1.2 Read, interpret, and demonstrate an understanding of information about dental metals associated with dental technology.	12B.7.1.2 →		

GLO 7.2: Apply knowledge and skills related to dental technology from **mathematics**.

12A.7.2.1 Convert between imperial and metric systems of measurement.	12B.7.2.1 →	12C.7.2.1 →	12D.7.2.1 →
12A.7.2.2 Calculate and apply volume, weights, measurements, temperatures, and ratios.	12B.7.2.2 →	12C.7.2.2 →	12D.7.2.2 →

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Goal 7: Describe and demonstrate transferable **cross-curricular knowledge and skills** as they relate to dental technology. *(continued)*

GLO 7.3: Apply knowledge and skills related to dental technology from **anatomy and physiology**.

12A.7.3.1 Locate, identify, and describe anatomical landmarks of the occlusal structures.	12B.7.3.1 Locate and identify anatomical landmarks of anterior and posterior teeth, and describe the morphology of a tooth.	12C.7.3.1 Locate, identify, and describe anatomical landmarks specific to anterior facial identification, including horizontal growth lines (e.g., perikymata).	12D.7.3.1 Identify and describe halo effects, translucency, transparency, maverick deposits, and horizontal and vertical check lines.
12A.7.3.2 Locate, identify, and describe functional occlusal contact points.	12B.7.3.2 Demonstrate the location and function of excursive pathways.		12D.7.3.2 Locate, identify, and describe the lingual anatomical points, including the cingulum and the Carabelli cusp.

GLO 7.4: Apply knowledge and skills related to dental technology from **physics**.

12A.7.4.1 Demonstrate an awareness of functional and balanced occlusion related to fixed prosthetics.	12B.7.4.1 Apply and demonstrate excursive pathways on a semi-adjustable articulator.	12C.7.4.1 Demonstrate an awareness of the movement of the mandible in sagittal and horizontal planes.	12D.7.4.1 Demonstrate an awareness of the gothic arch with regard to mandibular movements.
	12B.7.4.2 Demonstrate an awareness of centric stops and occlusion.		12D.7.4.2 Demonstrate an awareness of centric stops and occlusion.
	12B.7.4.3 Demonstrate an awareness of fulcrum application to long-span bridge design.		12D.7.4.3 Demonstrate an awareness of fulcrum application to long-span bridge design.

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Goal 7: Describe and demonstrate transferable **cross-curricular knowledge and skills** as they relate to dental technology. *(continued)*

GLO 7.5: Apply knowledge and skills related to dental technology from **other subject areas**. (art, physical education/health education, information and communication technology, social studies)

12A.7.5.1 Demonstrate an understanding of tooth loss due to improper hygiene, disease, nutrition, decay, and accident.	12B.7.5.1 →	12C.7.5.1 Demonstrate an understanding of the psychological factors associated with bruxism (teeth clenching and grinding).	12D.7.5.1 →
		12C.7.5.2 Read, interpret, and demonstrate an understanding of information about the science of colour and shade taking associated with dental technology.	12D.7.5.2 →

Goal 8: Demonstrate an understanding of **career opportunities** in dental technology.

GLO 8.1: Describe **education and career opportunities** and **professional organizations** in dental technology and associated fields.

12A.8.1.1 Demonstrate knowledge of and discuss career opportunities within the scope of dental technology and associated fields.	12B.8.1.1 Demonstrate knowledge of and discuss the various provincial guidelines, regulations, and acts pertaining to labour mobility in the dental technology industry.	12D.8.1.1 Demonstrate knowledge of and discuss the range of career opportunities in the dental and health professions and the post-secondary education and advanced training required for these professions.
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Goal 9: Demonstrate an awareness of **sustainability** as it pertains to dental technology.

GLO 9.1: Describe the impact of **sustainability** on the **health and well-being** of dental technologists and their clients.

12A.9.1.1 Discuss the positive influence of dental technology on people’s sense of well-being, health, and enjoyment of quality of life.	12B.9.1.1 Discuss ergonomic practices as they pertain to dental technology.	12C.9.1.1 Discuss the positive influence of dental technology on people’s sense of well-being, health, and enjoyment of quality of life.	12D.9.1.1 Discuss practices that promote long-term health and well-being for dental technologists.
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GLO 9.2: Describe the dental technology industry’s **sustainability practices** and their impact on the **environment**.

12A.9.2.1 Discuss safe practices for handling dental impressions.	12B.9.2.1 Discuss recycling within the laboratory environment.	12C.9.2.1 Discuss the safe disposal of chemicals and excess materials used in ceramic restorations.	
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GLO 9.3: Describe **sustainable business practices** within dental technology.

12A.9.3.1 Describe the management of a dental laboratory and the further training and continuing education available for dental technologists.	12B.9.3.1 Discuss the cost of dental materials.	12C.9.3.1 Discuss new cosmetic products related to ceramic restorations.	12D.9.3.1 Discuss the need for affordable dental appliances, alternative materials, and adaptability to changing markets and economic trends.
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Goal 10: Demonstrate an awareness of **ethical and legal standards** as they pertain to dental technology.

GLO 10.1: Practise **ethical and legal standards** as they pertain to dental technology.

12A.10.1.1 Describe the code of conduct and the scope of practice of various dental technologists’ associations.	12B.10.1.1 Discuss the importance of using certified dental materials (e.g., metals certified by the International Organization for Standardization).	12C.10.1.1 Demonstrate and discuss legislative acts that govern the dental technology profession.	
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Goal 11: Demonstrate **employability skills** related to dental technology.

GLO 11.1: Demonstrate **fundamental employability skills**.

<p>12A.11.1.1 Demonstrate employability skills (e.g., being prepared for work on time, setting up workstations, staying on task, accepting responsibility for own actions).</p> <p>12A.11.1.2 Demonstrate the ability to communicate with professionals, co-workers, and suppliers.</p>	<p>12B.11.1.1 Demonstrate an understanding of the importance of a professional dress code.</p> <p>12B.11.1.2 Demonstrate the ability to communicate effectively with supervisors/teachers, co-workers, and customers.</p>	<p>12C.11.1.1 Demonstrate the skills required to work as a member of a team.</p>	<p>12D.11.1.1 Demonstrate initiative in performing and completing tasks.</p>
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GLO 11.2: Demonstrate an understanding of the **business operation** of a dental laboratory.

<p>12A.11.2.1 Discuss and demonstrate an understanding of the business operation of a dental laboratory.</p>	<p>12C.11.2.1 Discuss and demonstrate stock ordering, equipment maintenance, and business promotion to potential clients.</p>
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Goal 12: Demonstrate an understanding of the **evolution** of dental technology, including its **progression** and **emerging trends**.

GLO 12.1: Describe the **evolution** of dental technology, including its **progression** and **emerging trends**.

<p>12A.12.1.1 Discuss the evolution of fixed prosthodontics, including its technological progression and emerging trends.</p>	<p>12B.12.1.1 Demonstrate an understanding of historical and cultural perspectives of fixed dental appliances.</p>	<p>12C.12.1.1 Discuss the evolution of dental ceramic technology, including its progression and emerging trends.</p>	<p>12D.12.1.1 Discuss the evolution of dental ceramic technology and CAD/CAM technology, including their progression and emerging trends.</p>
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