

# Knowledge-Based Assessment Master Blueprint

The competencies and performance indicators shown below define the body of content to be examined using the Knowledge-Based Assessment (KBA). These indicators and the competencies that they are aligned to are *knowledge-based*, and therefore suitable for assessment using the computer-based format of the KBA.

Blueprint *weights* apply to the KBA in two ways. First, each **Competency Unit** from the National Essential Competencies for Dental Technology Practice in Canada, 2019 (NEC) is assigned a weight describing its relative importance in assessing entry-to-practice. The weights were determined based on the collective judgment of a nationally representative group of RDTs. Second, weights are assigned to individual competencies and indicators based on both the **frequency** of performance of the competencies/indicators by RDTs and their **importance** for safe and/or effective practice. A correspondingly larger number of questions on the assessment are tied to more frequently performed and more important indicators.

<b>Unit 1: Foundational Knowledge</b>	<b>30%</b>
<b>1.1: Demonstrate knowledge of biology and of head and neck anatomy related to dental technology practice.</b>	
1.1.a Identify basic biological systems and their function relevant to dental technology.	
1.1.b Identify the basic elements of human anatomy, physiology, and pathology relevant to dental technology and appliances.	
1.1.c Identify the craniofacial anatomy to provide the working boundaries of dental prostheses and appliances.	
<b>1.2 Apply knowledge of oral structures, tooth morphology, and oral pathology to dental technology.</b>	
1.2.a Define the structure and function of the teeth and supporting tissues, tooth arrangement, and tooth numbering systems.	
1.2.b Identify occlusal interdigitations of teeth.	
1.2.c Identify and demonstrate knowledge of aspects of occlusion and Angle's classification of occlusion.	
1.2.d Recognize diseases and abnormalities that may impact dental health.	
1.2.e Demonstrate an understanding of the impact of dental health and functionality on a patient's overall health.	
1.2.f Apply knowledge of the mechanics and movement of the mandible and of the mechanical devices that simulate it.	
<b>1.3 Apply basic principles of physics and chemistry to the practice of dental technology.</b>	
1.3.a Explain basic physics and chemistry principles as they relate to dental technology, including dental materials.	
1.3.b Apply knowledge of force, heat, electricity, light, sound, chemical elements, mechanics, and other principles that are related to dental technology.	
<b>1.4 Apply foundational knowledge of materials commonly used in Canadian dental technology practice.</b>	
1.4.a Identify the different classifications of materials used in the design, fabrication, and repair of dental prostheses and appliances.	
1.4.b Demonstrate awareness of dental-materials and medical device restrictions under the regulatory authority of the Health Protection Branch of Health Canada.	
1.4.c Summarize the characteristics and the physical and mechanical properties of dental materials.	
1.4.d Select and utilize dental materials best suited for specific dental prostheses and appliances, considering the materials' characteristics and properties.	
1.4.e Explain the effects of manipulation on different types of dental materials.	
1.4.f Recognize and remedy possible defects which can result from the manipulation of dental materials.	
<b>1.5 Apply basic mathematical principles to design and fabricate functional dental prostheses and appliances.</b>	
1.5.a Demonstrate knowledge of basic geometry in all aspects of design and fabrication.	

1.5.b Perform accurate calculations and measurements, in accordance with manufacturer's instructions, to ensure precision of the dental prosthesis or appliance.	
<b>1.6 Demonstrate awareness of the common oral and maxillofacial-related prostheses and appliances.</b>	
1.6.a Recognize oral and maxillofacial health conditions and surgical procedures that necessitate the design and fabrication of various dental prostheses and appliances.	
1.6.b Identify the basic steps in the design and fabrication of related prostheses and appliances for oral and maxillofacial treatment options.	
<b>1.7 Demonstrate knowledge of key design and fabrication principles and technical skills used in dental technology.</b>	
1.7.a Describe indications and contraindications for and limitations of dental prostheses and appliances.	
1.7.b Identify different components of dental prostheses and appliances.	
1.7.c Analyze the design, fabrication, and material requirements of functional dental prostheses and appliances.	
1.7.e Apply digital technology skills to support the design and fabrication of dental prostheses and appliances.	
1.7.f Apply the principles of shade matching and colour measurement, and communicate colour parameters.	
<b>Unit 2: Environmental Safety and Use of Laboratory and Equipment</b>	<b>15%</b>
<b>2.1 Demonstrate knowledge of key design and fabrication principles and technical skills used in dental technology.</b>	
2.1.a Apply knowledge of pathogenic diseases and of microbiology in the transmission of disease related to the practice of dental technology.	
2.1.b Follow laboratory infection-prevention and -control principles in accordance with provincial and federal regulations and manufacturers' requirements.	
2.1.c Use the appropriate reprocessing procedures to clean and disinfect all instruments, equipment, and work surfaces.	
2.1.d Follow Standard Precautions to reduce the risk of transmission of bloodborne diseases and other pathogens from both recognized and unrecognized sources.	
<b>2.2 Undertake activities that support safe use and handling of dental materials and reduce risk in the environment.</b>	
2.2.a Identify and manage the potential dangers associated with the use of dental materials and bio-hazardous materials.	
2.2.c Demonstrate knowledge of Workplace Hazardous Materials Information System (WHMIS) standards, including classifications, labelling of chemicals, and safety data sheets.	
2.2.d Follow WHMIS standards when using chemicals and if a chemical incident occurs.	
2.2.e Follow health and safety practices as they relate to dental technology.	
2.2.f Follow manufacturers' instructions and demonstrate proper handling and storage of materials and solutions.	
2.2.g Identify and act to reduce potential or real risks in the laboratory environment (e.g.: falls due to spills, injury due to faulty equipment, unsafe use of equipment, unsafe handling of bio-hazardous materials).	
<b>2.3 Use laboratory equipment safely and competently to ensure work efficiency and to reduce harm to self and others.</b>	
2.3.a Identify potential or real risks and take the necessary steps to reduce risk to self and others when using laboratory equipment.	
2.3.c Follow manufacturers' instructions for the proper use and cleaning of equipment.	
2.3.e Recognize equipment breakdown and faulty operation, and take corrective actions.	

## Unit 3: Design, Fabrication, and Repair of Dental Technology Prostheses and Appliances

40%

### 3.1 Analyze the healthcare practitioner's prescription and patient's information to plan the design and materials selection for the fabrication of the dental prosthesis and/or appliance.

- 3.1.a Understand the clinical application of the prescription and recognize effects of any technical limitations on prescribed dental prosthesis and/or appliance.
- 3.1.b Identify and communicate any limitations and contraindications of the proposed treatment plan to the healthcare practitioner.
- 3.1.c Obtain clarification of the prescription and request additional information about the treatment plan, when needed.
- 3.1.d Ensure a final complete prescription is received from the responsible healthcare practitioner.
- 3.1.e Determine the appropriateness of the materials prescribed or selected.
- 3.1.f Verify the quality of the received impressions and models and the completeness and accuracy of supplemental documentation.
- 3.1.g Read provided radiographic images to identify the patient's anatomy for case planning; ensure accurate design of the dental prosthetic and appliance; and identify normal and abnormal presentations.

### 3.2 Design various types of dental prostheses and appliances.

- 3.2.a Assess oral anatomy and structure from the model, cast, and radiographic images to ensure harmonized design in relationship the prescription.
- 3.2.b Apply knowledge of foundational sciences when designing dental prostheses and appliances.
- 3.2.c Identify tooth-preparation requirements for various types of dental prostheses and dental material requirements.
- 3.2.d Select various components of the dental prosthesis or appliance and choose materials appropriate to the design, prescription, and patient's anatomy.

### 3.3 Fabricate and repair functional dental prostheses and appliances.

- 3.3.a Follow federal and provincial dental and health standards for materials and components used in the fabrication and repair of dental prostheses and appliances.
- 3.3.b Select the appropriate dental laboratory equipment and tools, considering relevant factors including, appliance components, materials, and procedures.
- 3.3.c Apply skill and judgment in the manipulation of the materials and when integrating the appliance components.
- 3.3.d Consider all relevant factors related to the fabrication to ensure full function of the prosthesis or appliance (e.g.: the materials, components, the prescription, design parameters, and spatial constraints).

### 3.4 Perform quality control prior to releasing a dental prosthesis or an appliance.

- 3.4.a Confirm the final dental prosthesis and/or appliance adheres to the prescription, both throughout the fabrication and prior to release.
- 3.4.b Identify any imperfections or deficiencies and make appropriate adjustments.

### 3.5 Modify and repair dental prostheses and appliances, considering relevant factors.

- 3.5.a Identify and assess the existing prosthesis or appliance and determine the reason for the defect or breakage.
- 3.5.b Consider the compatibility of new materials with the existing materials, patient assessment data, and prosthesis or appliance history.
- 3.5.c Explain any limitations of the repair to the healthcare practitioner or patient.

## Unit 4: Accountability and Professionalism

5%

### 4.1 Provide safe, ethical, and effective services.

- 4.1.a Demonstrate ethical behaviours in accordance with the professional Code of Ethics.
- 4.1.e Accept responsibilities and accountability for own actions and for the integrity of completed work.

<b>4.2 Practice in accordance with applicable legislation, regulations, standards, and guidelines.</b>	
4.2.a Keep current with the regulatory professional standards, regulations, and legislation.	
4.2.b Collect, store, disclose, and destroy personal information in compliance with privacy and confidentiality legislation and organizational policies.	
4.2.c Obtain healthcare practitioner or patient consent for collection, use, or disclosure of personal information.	
4.2.d Maintain records according to provincial standards and organizational policies.	
4.2.e Complete documentation according to provincial standards and organizational policies.	
<b>4.3 Demonstrate sustainable business practices that are socially responsible and environmentally friendly.</b>	
4.3.a Demonstrate an awareness of the impact of sustainability on the health and well-being of self and others (public, patients, staff), and on the environment (e.g. reduce toxin emissions and waste).	
4.3.b Describe and implement sustainable business practices within dental technology (e.g. recycling, energy conservation).	
<b>4.4 Use effective communication skills.</b>	
4.4.a Use appropriate dental terminology in communications with the healthcare team.	
4.4.b Employ effective, respectful, and ethical communications.	
4.4.d Enter timely, clear, accurate, and valid documentation in records.	
<b>4.6 Apply critical-thinking skills and use professional judgment in all aspects of practice.</b>	
4.6.a Consult with and/or refer to others when issue(s) and client or patient needs are beyond personal competence and/or professional scope of practice.	
4.6.b Demonstrate awareness of potential problems and consider options for different course(s) of action.	
4.6.c Critically evaluate every situation and make decisions based on sound reasoning and evidence-based practice.	
4.6.d Integrate pertinent theoretical knowledge, experience, and collected data to justify and/or modify services.	
<b>Unit 5: Patient Care</b>	<b>5%</b>
<b>5.2 Apply cultural competence to practice when providing services to patients.</b>	
5.2.a Demonstrate a commitment to provide services to and understand demographics and cultural differences within the entire patient population.	
5.2.b Recognize and respect cultural perspectives and differences.	
<b>5.3 Collect and document relevant information to inform the design and to assist with treatment planning.</b>	
5.3.a Collect information from the patient and other appropriate sources related to current and prior medical and dental-health history, including current medication use.	
5.3.b Take intraoral and extraoral photographs of the patient and any existing dental prosthesis and appliances to support the design and fabrication or repair of the dental prosthesis or appliance.	
<b>5.4 Perform clinical laboratory procedures in a competent manner.</b>	
5.4.b Perform shade matching and record the selected shade to ensure aesthetically pleasing results.	
<b>Unit 6: Leadership, Business Management, and Administration</b>	<b>5%</b>
<b>6.1 Demonstrate leadership skills to support the safe, efficient, and ethical delivery of dental technology services.</b>	
6.1.e Recognize own limitations and seek support and assistance when needed.	

6.1.f Recognize limitations of others and provide support when needed.	
<b>6.2 Demonstrate accountability for all work performed within the dental technology practice when supervising others.</b>	
6.2.a Ensure the dental prostheses or appliances meet the prescription requirements and professional standards.	
6.2.b Review material documentation to confirm compatibility and to ensure materials used meet required regulations.	
6.2.c Maintain records to track material use and case parameters.	
	<b>100%</b>