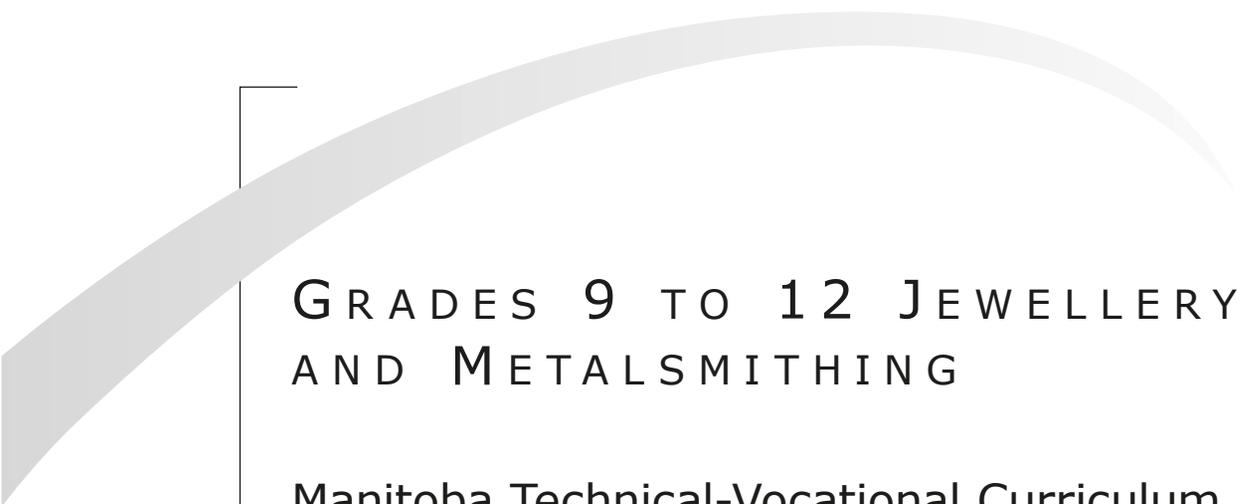




# **Grades 9 to 12 Jewellery and Metalsmithing**

Manitoba Technical-Vocational  
Curriculum Framework  
of Outcomes





GRADES 9 TO 12 JEWELLERY  
AND METALSMITHING

Manitoba Technical-Vocational Curriculum  
Framework of Outcomes

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Any websites referenced in this document are subject to change. Educators are advised to preview and evaluate websites and online resources before recommending them for student use.

This resource is available on the Manitoba Education and Advanced Learning website at <[www.edu.gov.mb.ca/k12/cur/teched/sy\\_tech\\_program.html](http://www.edu.gov.mb.ca/k12/cur/teched/sy_tech_program.html)>.

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 Grades 9 to 12 courses in a variety of areas, including jewellery and metalsmithing.

# JEWELLERY AND METALSMITHING OVERVIEW

## Introduction

*Grades 9 to 12 Jewellery and Metalsmithing: Manitoba Technical-Vocational Curriculum Framework of Outcomes* identifies the goals, general learning outcomes (GLOs), and specific learning outcomes (SLOs) for nine jewellery and metalsmithing courses. This framework is intended for use in all Manitoba schools teaching jewellery and metalsmithing courses as part of the Senior Years Technology Education Program.

## Program 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 in which the courses are offered are a local school-based decision, but it is highly recommended that the sequencing of credits align with the following schedule.

Cross-curricular learning outcomes including, but not limited to, information and communication technologies, science, English language arts, and mathematics are to be integrated into the authentic activities of the course.

Outcomes dealing with the following topics are integrated into most courses:

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

In the TVE curriculum, the emphasis is on applied activities. For instructional purposes, the sequence of learning outcomes can vary based on the activities within the course. Teachers are advised to select the activities best suited to teach the outcomes, based on a variety of factors, including access to resources, or regional needs.

1. The curriculum is not sequential. In other words, outcomes might be taught in an order different from how they appear in the document.
2. In light of rapid changes in technology, teachers are encouraged to update their activities in order to meet the needs of students.

All courses are intended for students pursuing a career in the jewellery and metalsmithing industry. They focus on theoretical principles and their practical applications, and provide students with the knowledge and skills required for employment in the field of jewellery and metalsmithing. The emphasis is on the design, construction, and repair of

jewellery. Students will have the opportunity to develop the skills required to work in the jewellery trade.

## Career and Employment Opportunities

Students who complete the program can find entry-level employment in jewellery repair and production facilities. Many graduates become self-employed by starting up their own jewellery studio as entrepreneurs.

Students can also pursue post-secondary opportunities in jewellery and metalsmithing programs outside of Manitoba.

## Goals and General Learning Outcomes (GLOs)

The Jewellery and Metalsmithing curriculum includes 13 goals, which are broken down into General Learning Outcomes, which are further broken down into Specific Learning Outcomes.

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**Goal 1:** Describe and apply appropriate **safety and health** practices as they apply to the jewellery/metalsmithing trade.

**GLO 1.1:** Create and maintain a **safe workplace**.

**GLO 1.2:** Create and maintain **safe and healthy workplace practices**.

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

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

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

**GLO 2.3:** Demonstrate the appropriate **handling, storage, and management of materials.**

---

**Goal 3:** Demonstrate an understanding of **metallurgy, gemmology, and the characteristics of jewellery materials.**

**GLO 3.1:** Demonstrate an understanding of **metallurgy.**

**GLO 3.2:** Demonstrate an understanding of **gemmology.**

**GLO 3.3:** Demonstrate an understanding of the **characteristics of jewellery materials.**

---

**Goal 4:** Demonstrate knowledge of the creative **design** of jewellery.

**GLO 4.1:** Demonstrate knowledge of the creative **design** of jewellery.

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**Goal 5:** Demonstrate an understanding of the **construction, casting, incorporation of components and gemstones, and production techniques** of jewellery creations.

**GLO 5.1:** Demonstrate the **construction techniques** used in creating jewellery from **sheet and wire.**

**GLO 5.2:** Demonstrate the **lost wax casting techniques** used in creating jewellery.

**GLO 5.3:** Demonstrate the **construction** of jewellery incorporating components such as **handmade and commercial findings.**

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**GLO 5.4:** Demonstrate **stone-setting techniques.**

**GLO 5.5:** Demonstrate **production techniques** in the construction of jewellery.

---

**Goal 6:** Demonstrate an understanding of the **finishing, polishing, and textural techniques** of jewellery creation.

**GLO 6.1:** Demonstrate the **finishing techniques** of jewellery creation.

**GLO 6.2:** Demonstrate the **polishing techniques** of jewellery creation.

**GLO 6.3:** Demonstrate the **textural finishing techniques** of jewellery creation.

---

**Goal 7:** Demonstrate knowledge of the **adjustment, modification, and repair** of jewellery.

**GLO 7.1:** Demonstrate an awareness of situations which require jewellery to be **adjusted, modified, or repaired.**

**GLO 7.2:** **Adjust** jewellery.

**GLO 7.3:** **Modify** jewellery.

**GLO 7.4:** **Repair** jewellery.

---

**Goal 8:** Demonstrate an understanding of the transferable, **cross-curricular** knowledge and skills as they pertain to the jewellery trade.

**GLO 8.1:** **Read, interpret, and communicate** information relevant to jewellery/metalsmithing.

**GLO 8.2:** Apply **mathematics** knowledge and skills relevant to jewellery/metalsmithing.

**GLO 8.3:** Apply **science** knowledge and skills relevant to jewellery/metalsmithing.

**GLO 8.4:** Apply **arts** knowledge and skills relevant to jewellery/metalsmithing.

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**GLO 8.5:** Apply **other subject areas** knowledge and skills relevant to jewellery/metalsmithing (art, physical education/health education, information communication and technology, social studies).

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**Goal 9:** Demonstrate an understanding of **career opportunities** in the jewellery trade and associated professions.

**GLO 9.1:** Describe education and **career opportunities, and professional organizations** in the jewellery trade and associated professions.

---

**Goal 10:** Demonstrate awareness of **sustainability** as it pertains to the jewellery trade.

**GLO 10.1:** Describe the impact of **human sustainability** on the health and well-being of metalsmiths and their clients.

**GLO 10.2:** Describe the trade's **sustainability practices** and impact on the environment.

**GLO 10.3:** Describe **sustainable business practices** within the jewellery trade.

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**Goal 11:** Demonstrate **awareness of the ethical and legal standards** as they pertain to the jewellery trade.

**GLO 11.1:** Practise the **ethical and legal standards** as they pertain to the jewellery trade.

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**Goal 12:** Demonstrate knowledge of the **employability skills** related to the jewellery trade.

**GLO 12.1:** Demonstrate **fundamental employability skills**.

**GLO 12.2:** Demonstrate an understanding of the **business operation** of a jewellery/metalsmithing studio.

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**Goal 13:** Demonstrate an understanding of the **evolution and technological progression of, and the emerging trends in** the jewellery/metalsmithing trade.

**GLO 13.1:** Demonstrate an understanding of the **evolution and technological progression of, and the emerging trends in** the jewellery trade.

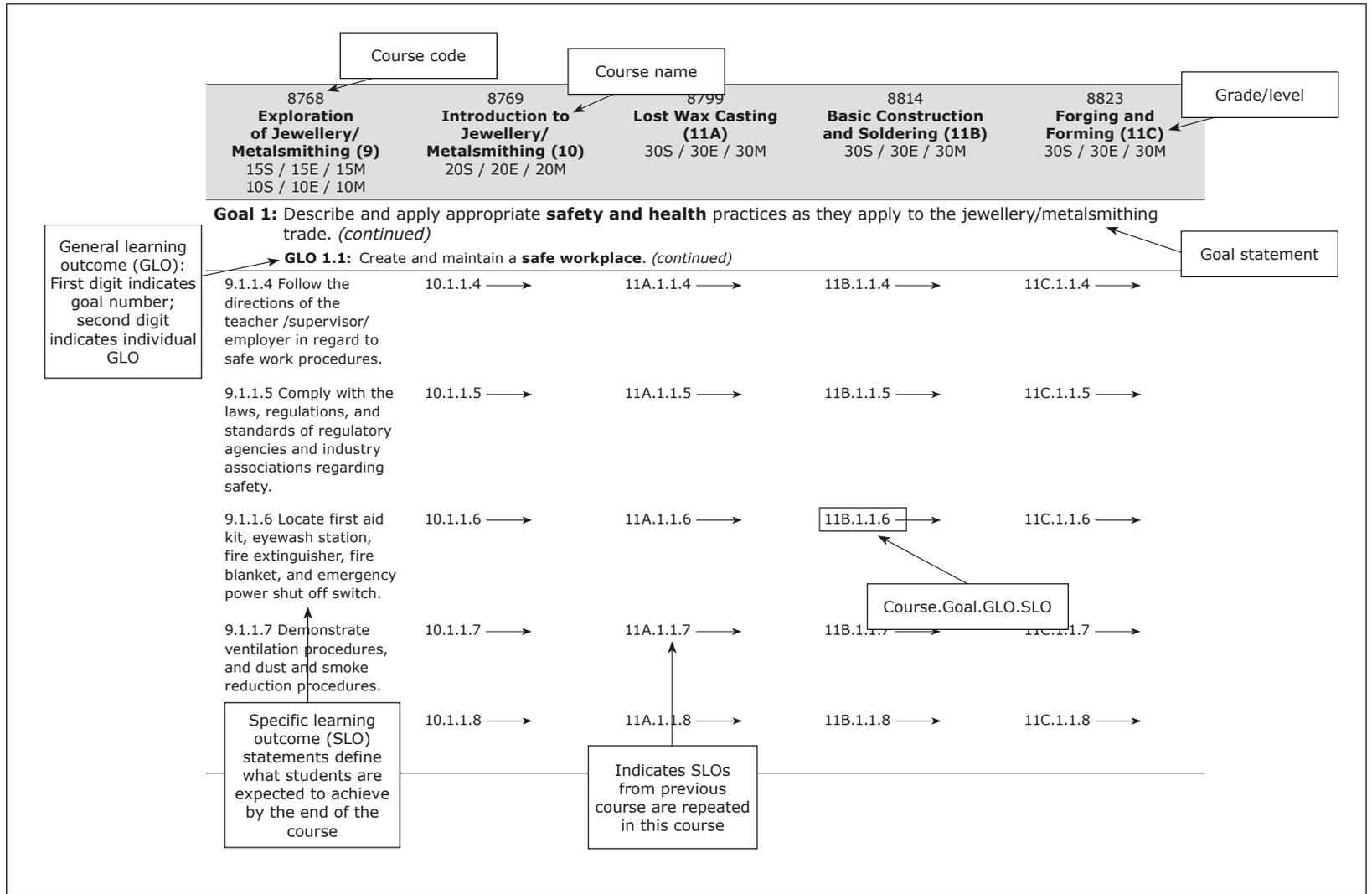
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## Specific Learning Outcomes (SLOs)

*Grades 9 to 12 Jewellery and Metalsmithing: Manitoba Technical-Vocational Curriculum Framework of Outcomes* identifies specific learning outcomes (SLOs) for use in all Manitoba schools teaching the Grades 9 to 12 jewellery and metalsmithing courses as part of the Senior Years Technology Education Program. Specific learning outcome statements define what students are expected to achieve by the end of the 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 all the courses.

# Guide to Reading the Jewellery and Metalsmithing Goals and Learning Outcomes



## Course Descriptions

Course titles, descriptions, and codes for the nine jewellery and metalsmithing courses follow. For an explanation of the course codes, refer to the [Subject Table Handbook: Technology Education: Student Records System and Professional School Personnel System](#) (Manitoba Education and Advanced Learning).

8768 Exploration of Jewellery and Metalsmithing 15S/15E/15M  
10S/10E/10M

This is an **optional** half-credit or full-credit course. It is intended for students wishing to sample jewellery and metalsmithing. The curriculum content focuses on an exploration of basic skills including sawing, drilling, polishing, construction with sheet and wire, and lost wax casting with an emphasis on hands-on, project-based activities.

8769 Introduction to Jewellery and Metalsmithing 20S/20E/20M

This course is intended for students wishing to investigate jewellery and metalsmithing. The curriculum content focuses on a more advanced exploration of basic skills, as well as riveting and simple stone setting with an emphasis on hands-on, project-based activities.

8799 Lost Wax Casting 30S/30E/30M

This course is intended for students considering specialization in jewellery and metalsmithing. The curriculum content focuses on an understanding of wax carving, casting, and finishing. Students use this process to create rings, pendants, and other jewellery.

8814 Basic Construction and Soldering 30S/30E/30M

This course is intended for students continuing in the specialization phase of the jewellery and metalsmithing program. The curriculum content focuses on an understanding of cold connections such as rivets, tabs, and links, as well as basic hard soldering. Students use these materials and processes to create jewellery.

8823 Forging and Forming 30S/30E/30M

This course is intended for students completing the specialization phase of the jewellery and metalsmithing program. The curriculum content focuses on an understanding of forging and forming non-ferrous metals, including the use of hammers, anvils, and other forging and forming equipment. Students use these tools and processes to create jewellery.

8824 Jewellery Repair 40S/40E/40M

This course is intended for students entering the transition phase of the jewellery and metalsmithing program. The curriculum content focuses on an extension of knowledge and skills learned in previous courses to repair jewellery, including ring sizing, chain soldering, clasp repair, retipping, and electroplating. Students use these materials and processes for live jewellery repairs.

8838 Advanced Construction and Soldering 40S/40E/40M

This course is intended for students entering the transition phase of the jewellery and metalsmithing program. The curriculum content focuses on an extension of the knowledge and skills learned in 8814 (Basic Construction and Soldering), including hinges, tubing, and box clasps. Students use these materials and processes to create jewellery.

8839 Gem Setting 40S/40E/40M

This course is intended for students entering the transition phase of the jewellery and metalsmithing program. The curriculum content focuses on an understanding of basic gemmology and stone-setting techniques, including bezel, basket, and claw settings. Students use these materials and processes to create jewellery that includes set stones.

8840 Advanced Gem Setting 40S/40E/40M

This course is intended for students entering the transition phase of the jewellery and metalsmithing program. The curriculum content focuses on an extension of the knowledge and skills learned in course 8839 (Gem Setting), including pearls, rubbed settings, and channel settings. Students use these materials and processes to create jewellery that includes set stones.

## 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 jewellery and metalsmithing courses began in the fall of 2013 and will continue until their respective system-wide implementation dates.

Date	System-Wide Implementation
Fall 2014	Grade 9 (optional)
Fall 2015	Grade 10
Fall 2016	Grade 11
Fall 2017	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](#).



GRADES 9 TO 11  
JEWELLERY AND  
METALSMITHING

General and Specific Learning  
Outcomes by Goal



# GRADES 9 TO 11 JEWELLERY AND METALSMITHING: GENERAL AND SPECIFIC LEARNING OUTCOMES BY GOAL

8768 <b>Exploration of Jewellery/ Metalsmithing (9)</b> 15S / 15E / 15M 10S / 10E / 10M	8769 <b>Introduction to Jewellery/ Metalsmithing (10)</b> 20S / 20E / 20M	8799 <b>Lost Wax Casting (11A)</b> 30S / 30E / 30M	8814 <b>Basic Construction and Soldering (11B)</b> 30S / 30E / 30M	8823 <b>Forging and Forming (11C)</b> 30S / 30E / 30M
----------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------	--------------------------------------------------------------	------------------------------------------------------------------------------	-----------------------------------------------------------------

**Goal 1:** Describe and apply appropriate **safety and health** practices as they apply to the jewellery/metalsmithing trade.

**GLO 1.1:** Create and maintain a **safe workplace**.

9.1.1.1 Follow safe practices and procedures related to facilities, processes, materials, tools, and equipment used in the jewellery studio.	10.1.1.1 →	11A.1.1.1 →	11B.1.1.1 →	11C.1.1.1 →
9.1.1.2 Apply the principles of Workplace Hazardous Materials Information Systems (WHMIS) as they apply to the jewellery studio.	10.1.1.2 →	11A.1.1.2 →	11B.1.1.2 →	11C.1.1.2 →
9.1.1.3 Describe hazards related to processes, materials, tools, and equipment used in the jewellery studio.	10.1.1.3 →	11A.1.1.3 →	11B.1.1.3 →	11C.1.1.3 →

8768 <b>Exploration of Jewellery/ Metalsmithing (9)</b> 15S / 15E / 15M 10S / 10E / 10M	8769 <b>Introduction to Jewellery/ Metalsmithing (10)</b> 20S / 20E / 20M	8799 <b>Lost Wax Casting (11A)</b> 30S / 30E / 30M	8814 <b>Basic Construction and Soldering (11B)</b> 30S / 30E / 30M	8823 <b>Forging and Forming (11C)</b> 30S / 30E / 30M
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**Goal 1:** Describe and apply appropriate **safety and health** practices as they apply to the jewellery/metalsmithing trade. *(continued)*

**GLO 1.1:** Create and maintain a **safe workplace.** *(continued)*

9.1.1.4 Follow the directions of the teacher /supervisor/ employer in regard to safe work procedures.	10.1.1.4 →	11A.1.1.4 →	11B.1.1.4 →	11C.1.1.4 →
9.1.1.5 Comply with the laws, regulations, and standards of regulatory agencies and industry associations regarding safety.	10.1.1.5 →	11A.1.1.5 →	11B.1.1.5 →	11C.1.1.5 →
9.1.1.6 Locate first aid kit, eyewash station, fire extinguisher, fire blanket, and emergency power shut off switch.	10.1.1.6 →	11A.1.1.6 →	11B.1.1.6 →	11C.1.1.6 →
9.1.1.7 Demonstrate ventilation procedures, and dust and smoke reduction procedures.	10.1.1.7 →	11A.1.1.7 →	11B.1.1.7 →	11C.1.1.7 →
9.1.1.8 Demonstrate fire prevention and control strategies.	10.1.1.8 →	11A.1.1.8 →	11B.1.1.8 →	11C.1.1.8 →

8768 <b>Exploration of Jewellery/ Metalsmithing (9)</b> 15S / 15E / 15M 10S / 10E / 10M	8769 <b>Introduction to Jewellery/ Metalsmithing (10)</b> 20S / 20E / 20M	8799 <b>Lost Wax Casting (11A)</b> 30S / 30E / 30M	8814 <b>Basic Construction and Soldering (11B)</b> 30S / 30E / 30M	8823 <b>Forging and Forming (11C)</b> 30S / 30E / 30M
----------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------	--------------------------------------------------------------	------------------------------------------------------------------------------	-----------------------------------------------------------------

**Goal 1:** Describe and apply appropriate **safety and health** practices as they apply to the jewellery/metalsmithing trade. *(continued)*

**GLO 1.1:** Create and maintain a **safe workplace.** *(continued)*

9.1.1.9 Describe emergency evacuation and response procedures.	10.1.1.9 →	11A.1.1.9 →	11B.1.1.9 →	11C.1.1.9 →
9.1.1.10 Demonstrate safety zone markings and procedures.	10.1.1.10 →	11A.1.1.10 →	11B.1.1.10 →	11C.1.1.10 →
9.1.1.11 Discuss hazards related to compressed gas.	10.1.1.11 →	11A.1.1.11 →	11B.1.1.11 →	11C.1.1.11 →
9.1.1.12 Identify and report hazards (e.g., chemicals, electrical, ergonomics, material handling, spills, and equipment damage) related to tools, equipment, processes, and materials in studio.	10.1.1.12 →	11A.1.1.12 →	11B.1.1.12 →	11C.1.1.12 →

8768 <b>Exploration of Jewellery/ Metalsmithing (9)</b> 15S / 15E / 15M 10S / 10E / 10M	8769 <b>Introduction to Jewellery/ Metalsmithing (10)</b> 20S / 20E / 20M	8799 <b>Lost Wax Casting (11A)</b> 30S / 30E / 30M	8814 <b>Basic Construction and Soldering (11B)</b> 30S / 30E / 30M	8823 <b>Forging and Forming (11C)</b> 30S / 30E / 30M
----------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------	--------------------------------------------------------------	------------------------------------------------------------------------------	-----------------------------------------------------------------

**Goal 1:** Describe and apply appropriate **safety and health** practices as they apply to the jewellery/metalsmithing trade. *(continued)*

**GLO 1.2:** Create and maintain **safe and healthy workplace practices.**

9.1.2.1 Explain the chemical points of entry into the body.	10.1.2.1 →	11A.1.2.1 →	11B.1.2.1 →	11C.1.2.1 →
9.1.2.2 Describe and demonstrate appropriate personal protection (e.g., safety goggles/facemask, gloves, respirator mask, hair ties, apron, hearing protection).	10.1.2.2 →	11A.1.2.2 →	11B.1.2.2 →	11C.1.2.2 →
9.1.2.3 Describe the injury reporting process.	10.1.2.3 →	11A.1.2.3 →	11B.1.2.3 →	11C.1.2.3 →
9.1.2.4 Describe the use of fire blankets and fire extinguishers.	10.1.2.4 →	11A.1.2.4 →	11B.1.2.4 →	11C.1.2.4 →
9.1.2.5 Describe the use of an eyewash station.	10.1.2.5 →	11A.1.2.5 →	11B.1.2.5 →	11C.1.2.5 →
9.1.2.6 Demonstrate the ergonomic use of equipment and tools as it relates to bench tools and equipment operation.	10.1.2.6 →	11A.1.2.6 →	11B.1.2.6 →	11C.1.2.6 →

8768 <b>Exploration of Jewellery/ Metalsmithing (9)</b> 15S / 15E / 15M 10S / 10E / 10M	8769 <b>Introduction to Jewellery/ Metalsmithing (10)</b> 20S / 20E / 20M	8799 <b>Lost Wax Casting (11A)</b> 30S / 30E / 30M	8814 <b>Basic Construction and Soldering (11B)</b> 30S / 30E / 30M	8823 <b>Forging and Forming (11C)</b> 30S / 30E / 30M
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**Goal 2:** Demonstrate knowledge of the identification, and the safe and appropriate **operation, cleaning, maintenance, and management of equipment, tools, and materials.**

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

9.2.1.1 Identify hand tools, power tools, equipment, and materials used in jewellery/ metalsmithing.	10.2.1.1 →	11A.2.1.1 Describe hand tools, power tools, equipment, and materials used in lost wax casting.	11B.2.1.1 Describe hand tools, power tools, equipment, and materials used in basic construction and soldering.	11C.2.1.1 Describe hand tools, power tools, equipment, and materials used in forging and forming.
9.2.1.2 Demonstrate the safe and appropriate operation of hand tools and equipment used in basic jewellery construction.	10.2.1.2 Demonstrate the safe and appropriate operation of hand tools and equipment used in the introduction to jewellery construction.	11A.2.1.2 Demonstrate the safe and appropriate operation of hand tools and equipment used in lost wax casting.	11B.2.1.2 Demonstrate the safe and appropriate operation of hand tools and equipment used in the basic construction and soldering of jewellery.	11C.2.1.2 Demonstrate the safe and appropriate operation of hand tools and equipment used in forging and forming for jewellery construction.
9.2.1.3 Demonstrate the safe and appropriate use of the polishing/buffing machines.	10.2.1.3 →	11A.2.1.3 Demonstrate the safe and appropriate use of the flex-shaft.	11B.2.1.3 Demonstrate the safe and appropriate use of the polishing/buffing machines as it pertains to basic construction and soldering.	11C.2.1.3 Demonstrate the safe and appropriate use of the polishing/buffing machines as it pertains to forging and forming.

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**Goal 2:** Demonstrate knowledge of the identification, and the safe and appropriate **operation, cleaning, maintenance, and management of equipment, tools, and materials.** *(continued)*

**GLO 2.1:** Demonstrate the **identification**, and the safe and appropriate **operation of equipment and tools.** *(continued)*

9.2.1.4 Demonstrate the safe and appropriate use of the flex-shaft.	10.2.1.4 →	11A.2.1.4 Demonstrate the safe and appropriate use of the polishing/buffing machines as it pertains to lost wax casting.	11B.2.1.4 Demonstrate the safe and appropriate use of the flex-shaft.  11B.2.1.5 Demonstrate the safe and appropriate operation of torch as it pertains to basic construction and soldering of jewellery.	11C.2.1.4 →  11C.2.1.5 Demonstrate the safe and appropriate operation of torch as it pertains to forging and forming.
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**Goal 2:** Demonstrate knowledge of the identification, and the safe and appropriate **operation, cleaning, maintenance, and management of equipment, tools, and materials.** *(continued)*

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

9.2.2.1 Demonstrate the daily cleaning, maintenance, and management of equipment and tools as they pertain to the exploration of jewellery/metalsmithing.	10.2.2.1 Demonstrate the daily cleaning, maintenance, and management of equipment and tools as they pertain to the introduction to jewellery/metalsmithing.	11A.2.2.1 Demonstrate the daily cleaning, maintenance, and management of equipment and tools used in lost wax casting.	11B.2.2.1 Demonstrate the daily cleaning, maintenance, and management of equipment and tools used in basic construction and soldering.	11C.2.2.1 Demonstrate the daily cleaning, maintenance, and management of equipment and tools used in forging and forming.
9.2.2.2 Discuss the scheduled cleaning, maintenance, and management of equipment and tools as they pertain to the exploration of jewellery/metalsmithing.	10.2.2.2 Discuss the scheduled cleaning, maintenance, and management of equipment and tools as they pertain to the introduction to jewellery/metalsmithing.	11A.2.2.2 Discuss the scheduled cleaning, maintenance, and management of equipment and tools as they pertain to lost wax casting.	11B.2.2.2 Discuss the scheduled cleaning, maintenance, and management of equipment and tools as they pertain to basic construction and soldering.	11C.2.2.2 Discuss the scheduled cleaning, maintenance, and management of equipment and tools as they pertain to forging and forming.

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**Goal 2:** Demonstrate knowledge of the identification, and the safe and appropriate **operation, cleaning, maintenance, and management of equipment, tools, and materials.** *(continued)*

**GLO 2.3:** Demonstrate the appropriate **handling, storage, and management of materials.**

9.2.3.1 Demonstrate the appropriate disposal and/or recycling of materials and supplies.	10.2.3.1 →	11A.2.3.1 Demonstrate the appropriate disposal and/or recycling of materials and supplies as it pertains to lost wax casting.	11B.2.3.1 Demonstrate the appropriate disposal and/or recycling of materials and supplies as it pertains to basic construction and soldering.	11B.2.3.1 Demonstrate the appropriate disposal and/or recycling of materials and supplies as it pertains to forging and forming.
9.2.3.2 Demonstrate the appropriate storage of materials and supplies.	10.2.3.2 →	11A.2.3.2 Demonstrate the appropriate storage of materials and supplies as it pertains to lost wax casting.	11B.2.3.2 Demonstrate the appropriate storage of materials and supplies as it pertains to basic construction and soldering.	11C.2.3.2 Demonstrate the appropriate storage of materials and supplies as it pertains to forging and forming.

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**Goal 3:** Demonstrate an understanding of **metallurgy, gemmology, and the characteristics of jewellery materials.**

**GLO 3.1:** Demonstrate an understanding of **metallurgy.**

9.3.1.1 Identify the ferrous and non-ferrous metals and their subgroups used in jewellery/ metalsmithing.	10.3.1.1 Discuss the ferrous and non-ferrous metals and their subgroups used in jewellery/ metalsmithing.	11A.3.1.1 Demonstrate an understanding of metallurgy as it pertains to lost wax casting.	11B.3.1.1 Define the ferrous and non-ferrous metals and their subgroups used in jewellery/ metalsmithing.	11C.3.1.1 Demonstrate an understanding of metallurgy as it pertains to forging and forming.
9.3.1.2 Identify the terminology for descriptive characteristics and properties of metals as it pertains to the exploration of jewellery/ metalsmithing.	10.3.1.2 Discuss the terminology for descriptive characteristics and properties of metals as it pertains to the introduction to jewellery/ metalsmithing.	11A.3.1.2 Define the terminology for descriptive characteristics and properties of metals as it pertains to lost wax casting.	11B.3.1.2 Define the terminology for descriptive characteristics and properties of metals as it pertains to basic construction and soldering.	11C.3.1.2 Define the terminology for descriptive characteristics and properties of metals as it pertains to forging and forming.
9.3.1.3 Identify the characteristics of metals as introduced.	10.3.1.3 Discuss the characteristics of metals as introduced.	11A.3.1.3 Define the characteristics of metals as they pertain to lost wax casting.	11B.3.1.3 Define the characteristics of metals as they pertain to basic construction and soldering.	11C.3.1.3 Define the characteristics of metals as they pertain to forging and forming.

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**Goal 3: Demonstrate an understanding of metallurgy, gemmology, and the characteristics of jewellery materials. (continued)**

**GLO 3.2: Demonstrate an understanding of gemmology.**

9.3.2.1 Discuss the categories of gem material used in jewellery creation.	10.3.2.1 →			11C.3.2.1 Discuss the styles of stone cuts as well as cabochon stone style.
9.3.2.2 Discuss precautions and the appropriate care of gem materials.	10.3.2.2 Demonstrate precautions and the appropriate care of gem materials.			11C.3.2.2 Demonstrate precautions and the appropriate care of gem materials.

**GLO 3.3: Demonstrate an understanding of the characteristics of jewellery materials.**

9.3.3.1 Demonstrate the principles of material characteristics in construction processes.	10.3.3.1 →	11A.3.3.1 Demonstrate the principles of material characteristics in construction processes as they pertain to lost wax castings.	11B.3.3.1 Demonstrate the principles of material characteristics in construction processes as they pertain to basic construction and soldering.	11C.3.3.1 Demonstrate the principles of material characteristics in construction processes as they pertain to forging and forming.
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**Goal 4:** Demonstrate knowledge of the creative **design** of jewellery.

**GLO 4.1:** Demonstrate knowledge of the creative **design** of jewellery.

9.4.1.1 Identify the design problem.	10.4.1.1 →	11A.4.1.1 Identify the design problems related to lost wax casting.	11B.4.1.1 Identify the design problems related to basic construction and soldering.	11C.4.1.1 Identify the design problems related to forging and forming.
9.4.1.2 Research the factors that influence design.	10.4.1.2 →	11A.4.1.2 Research the factors that influence design as they pertain to lost wax casting.	11B.4.1.2 Research the factors that influence design as they pertain to basic construction and soldering.	11C.4.1.2 Research the factors that influence design as they pertain to forging and forming.
9.4.1.3 Recognize and apply the elements of design.	10.4.1.3 →	11A.4.1.3 Recognize and apply the elements of design as they pertain to lost wax casting.	11B.4.1.3 Recognize and apply the elements of design as they pertain to basic construction and soldering.	11C.4.1.3 Recognize and apply the elements of design as they pertain to forging and forming.
9.4.1.4 Identify the function of the design.	10.4.1.4 →	11A.4.1.4 Identify the function of the design as it pertains to lost wax casting.	11B.4.1.4 Identify the function of the design as it pertains to basic construction and soldering.	11C.4.1.4 Identify the function of the design as it pertains to forging and forming.

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**Goal 4:** Demonstrate knowledge of the creative **design** of jewellery. *(continued)*

**GLO 4.1:** Demonstrate knowledge of the creative **design** of jewellery. *(continued)*

9.4.1.5 Identify the limitations of the materials.	10.4.1.5 →	11A.4.1.5 Identify the limitations of the materials used in lost wax casting.	11B.4.1.5 Identify the limitations of the materials used in basic construction and soldering.	11C.4.1.5 Identify the limitations of the materials used in forging and forming.
9.4.1.6 Develop concept drawings for construction based on design criteria.	10.4.1.6 →	11A.4.1.6 Develop concept drawings for construction based on design criteria related to lost wax casting.	11B.4.1.6 Develop concept drawings for construction based on design criteria related to basic construction and soldering.	11C.4.1.6 Develop concept drawings for construction based on design criteria related to forging and forming.

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**Goal 5:** Demonstrate an understanding of the **construction, casting, incorporation of components and gemstones, and production techniques** of jewellery creations.

**GLO 5.1:** Demonstrate the **construction techniques** used in creating jewellery from **sheet and wire**.

9.5.1.1 Demonstrate the basic operation of tools and equipment used in jewellery construction using sheet and wire.	10.5.1.1 →	11A.5.1.1 Demonstrate the safe and appropriate operation of the flex-shaft.	11B.5.1.1 Demonstrate the basic operation of tools and equipment used in jewellery construction using sheet and wire as it pertains to basic construction and soldering.	11C.5.1.1 Demonstrate the basic operation of tools and equipment used in jewellery construction using sheet and wire as it pertains to forging and forming.
9.5.1.2 Demonstrate the safe and appropriate operation of the flex-shaft.	10.5.1.2 →	11A.5.1.2 Demonstrate the application of integral rivets.	11B.5.1.2 Demonstrate the application of standard, nail head, and flush rivets.	11C.5.1.2 Demonstrate the forming of hollow ring constructions using patterns.
9.5.1.3 Demonstrate the safe and appropriate use of the pickle pot.	10.5.1.3 Demonstrate the application of standard rivets.	11A.5.1.3 Demonstrate the safe and appropriate use of the pickle pot.	11B.5.1.3 Demonstrate tab and slot construction.	11C.5.1.3 Demonstrate the production of sheet from ingots using a rolling mill.
9.5.1.4 Demonstrate etching copper and brass with ferric chloride.	10.5.1.4 Demonstrate tab construction and cold connections.		11B.5.1.4 Demonstrate the ability to pour sterling silver ingots.	11C.5.1.4 Demonstrate the production of wire from ingots using a rolling mill and drawplates.

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**Goal 5:** Demonstrate an understanding of the **construction, casting, incorporation of components and gemstones, and production techniques** of jewellery creations. *(continued)*

**GLO 5.1:** Demonstrate the **construction techniques** used in creating jewellery from **sheet and wire**. *(continued)*

9.5.1.5 Demonstrate the forming of cuff bracelets on a bracelet mandrel and anvil.	10.5.1.5 Discuss the safe and appropriate use of the pickle pot.		11B.5.1.5 Demonstrate the production of sheet from ingots using a rolling mill.	11C.5.1.5 Demonstrate the safe and appropriate use of the pickle pot.
9.5.1.6 Demonstrate the forming and production of jump-rings into simple chains.	10.5.1.6 Demonstrate the ability to etch copper and brass with ferric chloride.		11B.5.1.6 Demonstrate the production of wire from ingots using a rolling mill and drawplates.	11C.5.1.6 Demonstrate the forming of metal on stakes, anvils, metal blocks, mandrels, and swage blocks.
9.5.1.7 Demonstrate wire forming with pliers.	10.5.1.7 Demonstrate the forming and production of jump-rings into complex chain constructions.		11B.5.1.7 Demonstrate the safe and appropriate use of the pickle pot.	11C.5.1.7 Demonstrate the forming of domes with dapping tools and a block.
9.5.1.8 Demonstrate the use of a bending brake.	10.5.1.8 Demonstrate wire forming with pliers and incorporating other objects into designs.		11B.5.1.8 Demonstrate the forming of cuff bracelets on a bracelet mandrel and anvil.	11C.5.1.8 Demonstrate wire work forming with pliers as it pertains to forging and forming.

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**Goal 5:** Demonstrate an understanding of the **construction, casting, incorporation of components and gemstones, and production techniques** of jewellery creations. *(continued)*

**GLO 5.1:** Demonstrate the **construction techniques** used in creating jewellery from **sheet and wire**. *(continued)*

	10.5.1.9 Demonstrate the forging of wire with hammers.	11B.5.1.9 Demonstrate a variety of hard soldered joints using a variety of solders with sheet and wire.	11C.5.1.9 Demonstrate the forging of wire with hammers as it pertains to forging and forming.
		11B.5.1.10 Demonstrate the forming and production of jump-rings into complex soldered chains.	11C.5.1.10 Demonstrate die forming with a hydraulic press.
		11B.5.1.11 Demonstrate wire work forming with pliers as it pertains to basic construction and soldering.	11C.5.1.11 Demonstrate the chase and repousse technique.

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**Goal 5:** Demonstrate an understanding of the **construction, casting, incorporation of components and gemstones, and production techniques** of jewellery creations. *(continued)*

**GLO 5.2:** Demonstrate the **lost wax casting techniques** used in creating jewellery.

9.5.2.1 Describe the lost wax casting process.	10.5.2.1 →	11A.5.2.1 Demonstrate the lost wax casting process.
9.5.2.2 Discuss terminology related to tools, equipment, and techniques.	10.5.2.2 →	11A.5.2.2 Demonstrate an understanding of the terminology related to tools, equipment, and techniques.
9.5.2.3 Demonstrate wax carving techniques and produce wax rings for casting.	10.5.2.3 Demonstrate wax carving techniques to produce wax models of rings and pendants for casting.	11A.5.2.3 →
9.5.2.4 Demonstrate attaching sprue for an individual wax model.	10.5.2.4 →	11A.5.2.4 Demonstrate an understanding of sprue arrangement for flasks.
9.5.2.5 Discuss investing and using a vacuum machine.	10.5.2.5 →	11A.5.2.5 Demonstrate the ability to use vacuum investing flasks for casting.

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**Goal 5:** Demonstrate an understanding of the **construction, casting, incorporation of components and gemstones, and production techniques** of jewellery creations. *(continued)*

**GLO 5.2:** Demonstrate the **lost wax casting techniques** used in creating jewellery. *(continued)*

9.5.2.6 Discuss the burnout schedule of flasks in a burnout oven.	10.5.2.6 →	11A.5.2.6 Demonstrate an understanding of the burnout schedule for flasks in a burnout oven.
9.5.2.7 Discuss the centrifugal casting technique.	10.5.2.7 →	11A.5.2.7 Demonstrate the guided practice of the safe and appropriate use of the centrifugal casting machine.
9.5.2.8 Discuss the use of a torch and melting metal.	10.5.2.8 →	11A.5.2.8 Demonstrate torch set-up and the melting of metal.
9.5.2.9 Discuss the post casting procedure with flasks and castings.	10.5.2.9 →	11A.5.2.9 Demonstrate the post-casting procedure with flasks and castings.

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**Goal 5:** Demonstrate an understanding of the **construction, casting, incorporation of components and gemstones, and production techniques** of jewellery creations. *(continued)*

**GLO 5.3:** Demonstrate the **construction** of jewellery incorporating components such **handmade and commercial findings**.

9.5.3.1 Define terminology for findings and jewellery items.	10.5.3.1 →	11A.5.3.1 Define terminology for findings and jewellery items as it pertains to lost wax casting.	11B.5.3.1 Define terminology for findings and jewellery items as it relates to basic construction and soldering.	11C.5.3.1 Define terminology for findings and jewellery items as it relates to forging and forming.
9.5.3.2 Demonstrate incorporation of findings into construction.	10.5.3.2 →	11A.5.3.2 Incorporate findings into construction as they pertain to lost wax casting.	11B.5.3.2 Incorporate findings into construction as they pertain to basic construction and soldering.	11C.5.3.2 Incorporate findings into construction as they pertain to forging and forming.

**GLO 5.4:** Demonstrate **stone-setting techniques**.

10.5.4.1 Demonstrate the setting of cabochon stones using tabs.	11C.5.4.1 Demonstrate the setting of cabochon stones in constructed and soldered bezel.
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**Goal 5:** Demonstrate an understanding of the **construction, casting, incorporation of components and gemstones, and production techniques** of jewellery creations. *(continued)*

**GLO 5.5:** Demonstrate **production techniques** in the construction of jewellery.

9.5.5.1 Define production and the benefits to trade.	10.5.5.1 →	11A.5.5.1 Define the production and benefits to trade as they pertain to lost wax casting.	11B.5.5.1 Define production and benefits to trade as they pertain to basic construction and soldering.	11C.5.5.1 Define production and benefits to trade as they pertain to forging and forming.
9.5.5.2 Demonstrate the production process when cutting multiples of pattern pieces.	10.5.5.2 →	11A.5.5.2 Demonstrate the production process when cutting multiples of pattern pieces as it pertains to lost wax casting.	11B.5.5.2 Demonstrate the production process when cutting multiples of pattern pieces as it pertains to basic construction and soldering.	11C.5.5.2 Demonstrate the production process when cutting multiples of pattern pieces as it pertains to forging and forming.
9.5.5.3 Demonstrate the organization of work for the finishing process.	10.5.5.3 →	11A.5.5.3 Demonstrate the organization of work for the finishing process as it pertains to lost wax casting.	11B.5.5.3 Demonstrate the organization of work for the finishing process as it pertains to construction and basic soldering.	11C.5.5.3 Demonstrate the organization of work for the finishing process as it pertains to forging and forming.
		11A.5.5.4 Demonstrate the use of wax injection for rubber molds.	11B.5.5.4 Demonstrate the grouping of chain links or other components for soldering.	11C.5.5.4 Demonstrate the use of a wire jig to form ear-wires.
				11C.5.5.5 Demonstrate the production of die-formed pieces.

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**Goal 6:** Demonstrate an understanding of the **finishing, polishing, and textural techniques** of jewellery creation.

**GLO 6.1:** Demonstrate the **finishing techniques** of jewellery creation.

9.6.1.1 Identify the sequence of the finishing steps leading up to polishing.	10.6.1.1 →	11A.6.1.1 Identify the sequence of the finishing steps leading up to polishing as they pertain to lost wax casting.	11B.6.1.1 Identify the sequence of the finishing steps leading up to polishing as they pertain to basic construction and soldering.	11C.6.1.1 Identify the sequence of the finishing steps leading up to polishing as they pertain to forging and forming.
9.6.1.2 Identify the tools and equipment used in finishing jewellery.	10.6.1.2 →	11A.6.1.2 Identify the tools and equipment used in finishing jewellery as they pertain to lost wax casting.	11B.6.1.2 Identify the tools and equipment used in finishing jewellery as they pertain to basic construction and soldering.	11C.6.1.2 Identify the tools and equipment used in finishing jewellery as they pertain to forging and forming.
9.6.1.3 Demonstrate the sequence of finishing steps as they pertain to metal type, technique, and jewellery design.	10.6.1.3 →	11A.6.1.3 Demonstrate the sequence of finishing steps as they pertain to metal type, technique, and jewellery design as it relates to lost wax casting.	11B.6.1.3 Demonstrate the sequence of finishing steps as they pertain to metal type, technique, and jewellery design as it relates to basic construction and soldering.	11C.6.1.3 Demonstrate the sequence of finishing steps as they pertain to metal type, technique, and jewellery design as it relates to forging and forming.

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**Goal 6:** Demonstrate an understanding of the **finishing, polishing, and textural techniques** of jewellery creation.  
(continued)

**GLO 6.2:** Demonstrate the **polishing techniques** of jewellery creation.

9.6.2.1 Identify the sequence of polishing techniques.	10.6.2.1 →	11A.6.2.1 Identify the sequence of polishing techniques as it pertains to lost wax casting.	11B.6.2.1 Identify the sequence of polishing techniques as it pertains to basic construction and soldering.	11C.6.2.1 Identify the sequence of polishing techniques as it pertains to forging and forming.
9.6.2.2 Demonstrate the sequence of polishing techniques as they pertain to metal type, technique, and jewellery design.	10.6.2.2 →	11A.6.2.2 Select the sequence of polishing techniques as they pertain to metal type, technique, and jewellery design as it relates to lost wax casting.	11B.6.2.2 Select the sequence of polishing techniques as they pertain to metal type, technique, and jewellery design as it relates to basic construction and soldering.	11C.6.2.2 Select the sequence of polishing techniques as they pertain to metal type, technique, and jewellery design as it relates to forging and forming.
9.6.2.3 Demonstrate the safe and appropriate operation of the cleaning equipment (e.g., ultra-sonic cleaner, steam cleaner).	10.6.2.3 →	11A.6.2.3 →		

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**Goal 6:** Demonstrate an understanding of the **finishing, polishing, and textural techniques** of jewellery creation.  
(continued)

**GLO 6.3:** Demonstrate the **textural finishing techniques** of jewellery creation.

9.6.3.1 Identify hand tools and techniques for texturing.	10.6.3.1 →	11A.6.3.1 Identify hand tools and techniques for texturing used in lost wax casting.	11B.6.3.1 Identify hand tools and techniques for texturing used in basic construction and soldering.	11C.6.3.1 Identify hand tools and techniques for texturing used in forging and forming.
9.6.3.2 Demonstrate textural finishing techniques with hammers and chasing tools.	10.6.3.2 →	11A.6.3.2 Demonstrate the use of burs/flex-shafts to engrave and texture metal as it pertains to lost wax casting.	11B.6.3.2 Demonstrate textural finishing techniques with hammers and chasing tools as they pertain to basic construction and soldering.	11C.6.3.2 Demonstrate textural finishing techniques with hammers and chasing tools as they pertain to forging and forming.
9.6.3.3 Discuss the use of a rolling mill for roller printing.	10.6.3.3 →	11A.6.3.3 Demonstrate the use of burs/flex-shafts to carve and texture wax.	11B.6.3.3 Demonstrate the use of a rolling mill for roller printing.	11C.6.3.3 Demonstrate the use of burs/flex-shafts to engrave and texture metal as it pertains to forging and forming.

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**Goal 6:** Demonstrate an understanding of the **finishing, polishing, and textural techniques** of jewellery creation. *(continued)*

**GLO 6.3:** Demonstrate the **textural finishing techniques** of jewellery creation. *(continued)*

9.6.3.4 Demonstrate the use of burs/flex-shafts to engrave and texture metal.	10.6.3.4 →	11A.6.3.4 Demonstrate the use of patinas as it pertains to lost wax casting.	11B.6.3.4 Demonstrate the use of burs/flex-shafts to engrave and texture metal as it pertains to basic construction and soldering.	11C.6.3.4 Demonstrate the use of patinas as it pertains to forging and forming.
9.6.3.5 Demonstrate the use of burs/flex-shafts to carve and texture wax.	10.6.3.5 →			
9.6.3.6 Discuss the use of patinas.	10.6.3.6 →			

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**Goal 7:** Demonstrate knowledge of the **adjustment, modification, and repair** of jewellery.

**GLO 7.1:** Demonstrate an awareness of situations which require jewellery to be **adjusted, modified, or repaired**.

9.7.1.1 Identify situations in which jewellery would require adjustments, modifications, or repairs.	10.7.1.1 →	11A.7.1.1 Identify situations in which jewellery would require adjustments, modifications, or repairs as they pertain to lost wax casting.	11B.7.1.1 Identify situations in which jewellery would require adjustments, modifications, or repairs as they pertain to basic construction and soldering.	11C.7.1.1 Identify situations in which jewellery would require adjustments, modifications, or repairs as they pertain to forging and forming.
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**GLO 7.2: Adjust** jewellery.

9.7.2.1 Recognize and apply simple adjustments to the design and function of jewellery creations.	10.7.2.1 →	11A.7.2.1 Recognize and apply simple adjustments to the design and function of jewellery creations as they pertain to lost wax casting.	11B.7.2.1 Recognize and apply simple adjustments to the design and function of jewellery creations as they pertain to basic construction and soldering.	11C.7.2.1 Recognize and apply simple adjustments to the design and function of jewellery creations as they pertain to forging and forming.
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**Goal 7:** Demonstrate knowledge of the **adjustment, modification, and repair** of jewellery. *(continued)*

**GLO 7.3: Modify** jewellery.

9.7.3.1 Identify and apply simple modifications to the design and function of jewellery creations.	10.7.3.1 →	11A.7.3.1 Demonstrate an understanding of lost wax casting when performing modifications to jewellery creations.	11B.7.3.1 Demonstrate an understanding of basic construction and soldering when performing modifications to jewellery creations.	11C.7.3.1 Demonstrate an understanding of forging and forming when performing modifications to jewellery creations.
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**GLO 7.4: Repair** jewellery.

9.7.4.1 Identify repair techniques related to jewellery creations.	10.7.4.1 →	11A.7.4.1 Demonstrate an understanding of lost wax casting when applying repair techniques to jewellery creations.	11B.7.4.1 Demonstrate an understanding of basic construction and soldering when performing repair techniques to jewellery creations.	11C.7.4.1 Demonstrate and understanding of forging and forming when performing repair techniques to jewellery creations.
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**Goal 8:** Demonstrate an understanding of the transferable, **cross-curricular** knowledge and skills as they pertain to the jewellery trade.

**GLO 8.1: Read, interpret, and communicate** information relevant to jewellery/metalsmithing.

9.8.1.1 Read and identify project specifications.	10.8.1.1 →	11A.8.1.1 Read and identify project specifications as they pertain to lost wax casting.	11B.8.1.1 Read and identify project specifications as they pertain to basic construction and soldering.	11C.8.1.1 Read and identify project specifications as they pertain to forging and forming.
9.8.1.2 Read and identify technical information.	10.8.1.2 →	11A.8.1.2 Read and identify technical information as it pertains to lost wax casting.	11B.8.1.2 Read and identify technical information as it pertains to basic construction and soldering.	11C.8.1.2 Read and identify technical information as it pertains to forging and forming.
9.8.1.3 Discuss the interpretation of investment/water ratio charts.	10.8.1.3 →	11A.8.1.3 Demonstrate the ability to read charts for mixing investment.		
9.8.1.4 Discuss the alloy chart as pertaining to jewellery metals.	10.8.1.4 Demonstrate the ability to read an alloy chart.	11A.8.1.4 Demonstrate the ability to read an alloy chart as it pertains to lost wax casting.		

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**Goal 8:** Demonstrate an understanding of the transferable, **cross-curricular** knowledge and skills as they pertain to the jewellery trade. *(continued)*

**GLO 8.2:** Apply **mathematics** knowledge and skills relevant to jewellery/metalsmithing.

9.8.2.1 Define units of measurement and tools relevant to the jewellery trade (e.g., metric and imperial measurements, weights and volumes, gauges).	10.8.2.1 →	11A.8.2.1 Define units of measurement and tools relevant to the jewellery trade (e.g., metric and imperial measurements, weights and volumes, gauges) as they pertain to lost wax casting.	11B.8.2.1 Define units of measurement and tools relevant to the jewellery trade (e.g., metric and imperial measurements, weights and volumes, gauges) as they pertain to basic construction and soldering.	11C.8.2.1 Define units of measurement and tools relevant to the jewellery trade (e.g., metric and imperial measurements, weights and volumes, gauges) as they pertain to forging and forming.
9.8.2.2 Discuss formulas for determining weights of casting materials.	10.8.2.2 →	11A.8.2.2 Demonstrate an understanding of formulas for determining weights of casting materials.	11B.8.2.2 Demonstrate the use of basic geometry as it pertains to basic construction and soldering.	11C.8.2.2 Demonstrate the use of basic geometry as it pertains to forging and forming.
9.8.2.3 Discuss material costs.	10.8.2.3 →	11A.8.2.3 Demonstrate an understanding of formulas for material costs.		
	10.8.2.4 Demonstrate the use of basic geometry.	11A.8.2.4 Demonstrate the use of basic geometry as it pertains to lost wax casting.		

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**Goal 8:** Demonstrate an understanding of the transferable, **cross-curricular** knowledge and skills as they pertain to the jewellery trade. *(continued)*

**GLO 8.3:** Apply **science** knowledge and skills relevant to jewellery/metalsmithing.

9.8.3.1 Discuss specific gravities of metal.	10.8.3.1 →	11A.8.3.1 Demonstrate an understanding of specific gravities of metal.	11B.8.3.1 Demonstrate an understanding of metal expansion and contraction as related to work hardening, annealing, melting, and porosity of cast metal.	11C.8.3.1 Demonstrate an understanding of metal expansion and contraction as related to work hardening, annealing, melting, and porosity of forged and formed metal.
9.8.3.2 Reference the alloy chart for metals.	10.8.3.2 →	11A.8.3.2 Demonstrate an understanding of the alloy chart for metals.	11B.8.3.2 Demonstrate an understanding of oxides as they relate to basic construction and soldering.	
9.8.3.3 Discuss metal expansion and contraction as related to melting and working properties of metal.	10.8.3.3 →	11A.8.3.3 Demonstrate an understanding of metal expansion and contraction as related to annealing, melting, and porosity of cast metal.	11B.8.3.2 Demonstrate the prevention and removal of oxides as they pertain to basic construction and soldering.	

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**Goal 8:** Demonstrate an understanding of the transferable, **cross-curricular** knowledge and skills as they pertain to the jewellery trade. *(continued)*

**GLO 8.3:** Apply **science** knowledge and skills relevant to jewellery/metalsmithing. *(continued)*

9.8.3.4 Discuss the formation of oxides.	10.8.3.4 →	11A.8.3.4 Demonstrate an understanding of oxides as it pertains to lost wax casting.  11A.8.3.5 Demonstrate the prevention and removal of oxides related to lost wax casting.		
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**GLO 8.4:** Apply **arts** knowledge and skills relevant to jewellery/metalsmithing.

9.8.4.1 Demonstrate the creation of a design for project use.	10.8.4.1 →	11A.8.4.1 Demonstrate the creation of a design for project use in lost wax casting.	11B.8.4.1 Demonstrate the creation of a design for project use in basic construction and soldering.	11C.8.4.1 Demonstrate the creation of a design for project use in forging and forming.
9.8.4.2 Discuss and apply design elements.	10.8.4.2 →	11A.8.4.2 Discuss and apply design elements as they pertain to lost wax casting.	11B.8.4.2 Discuss and apply design elements as they pertain to basic construction and soldering.	11C.8.4.2 Discuss and apply design elements as they pertain to forging and forming.

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**Goal 8:** Demonstrate an understanding of the transferable, **cross-curricular** knowledge and skills as they pertain to the jewellery trade. (*continued*)

**GLO 8.5:** Apply **other subject areas** knowledge and skills relevant to jewellery/metalsmithing (art, physical education/ health education, information communication and technology, social studies).

9.8.5.1 Demonstrate the use of Internet for design development and technical information.	10.8.5.1 →	11A.8.5.1 Demonstrate the use of Internet for design development and technical information as it pertains to lost wax casting.	11B.8.5.1 Demonstrate the use of Internet for design development and technical information as it pertains to basic construction and soldering.	11C.8.5.1 Demonstrate the use of Internet for design development and technical information as it pertains to forging and forming.
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**Goal 9:** Demonstrate an understanding of **career opportunities in the jewellery trade** and associated professions.

**GLO 9.1:** Describe **education and career opportunities, and professional organizations** in the jewellery trade and associated professions.

9.9.1.1 Discuss education and career opportunities in the jewellery trade and associated professions.	10.9.1.1 →	11A.9.1.1 →	11A.9.1.2 Discuss professional organizations and benefits, locally and globally.	
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**Goal 10:** Demonstrate awareness of **sustainability** as it pertains to the jewellery trade.

**GLO 10.1:** Describe the impact of **sustainability** on the health and well-being of metalsmiths and their clients.

9.10.1.1 Identify ergonomics and repetitive movement strains.	10.10.1.1 →	11A.10.1.1 Identify ergonomics and repetitive movement strains as they pertain to lost wax casting.	11B.10.1.1 Identify ergonomics and repetitive movement strains as they pertain to basic construction and soldering.	11C.10.1.1 Identify ergonomics and repetitive movement strains as they pertain to forging and forming.
9.10.1.2 Discuss sustainability as it relates to the human health and well-being of jewellers/metalsmiths and their clients.	10.10.1.2 →	11A.10.1.2 Discuss sustainability as it relates to the human health and well-being of jewellers/metalsmiths and their clients as it pertains to lost wax casting.	11B.10.1.2 Discuss sustainability as it relates to the human health and well-being of jewellers/metalsmiths and their clients as it pertains to basic construction and soldering.	11C.10.1.2 Discuss sustainability as it relates to the human health and well-being of jewellers/metalsmiths and their clients as it pertains to forging and forming.
9.10.1.3 Discuss the impact on health of metal and material allergies, dust, and toxicities.	10.10.1.3 →	11A.10.1.3 Discuss the impact on health of metal and material allergies, dust, and toxicities as it pertains to lost wax casting.	11B.10.1.3 Discuss the impact on health of metal and material allergies, dust, and toxicities as it pertains to basic construction and soldering.	11C.10.1.3 Discuss the impact on health of metal and material allergies, dust, and toxicities as it pertains to forging and forming.

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**Goal 10:** Demonstrate awareness of **sustainability** as it pertains to the jewellery trade. *(continued)*

**GLO 10.1:** Describe the impact of **sustainability** on the health and well-being of metalsmiths and their clients. *(continued)*

9.10.1.4 Demonstrate the proper use of equipment and tools to prevent repetitive strain injuries—ergonomics.	10.10.1.4 →	11A.10.1.4 Demonstrate the proper use of equipment and tools to prevent repetitive strain injuries—ergonomics, as it pertains to lost wax casting.	11B.10.1.4 Demonstrate the proper use of equipment and tools to prevent repetitive strain injuries—ergonomics, as it pertains to basic construction and soldering.	11C.10.1.4 Demonstrate the proper use of equipment and tools to prevent repetitive strain injuries—ergonomics, as it pertains to forging and forming.
9.10.1.5 Discuss the purposes of jewellery in regard to history, trade, personal wealth, culture, and personal statements and celebrations.	10.10.1.5 →			

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**Goal 10:** Demonstrate awareness of **sustainability** as it pertains to the jewellery trade. *(continued)*

**GLO 10.2:** Describe the trade’s **sustainability practices** and impact on the environment.

9.10.2.1 Discuss the trade’s sustainability practices and impact on the environment.	10.10.2.1 →	11A.10.2.1 →	11B.10.2.1 Discuss chemical hazards on the environment as they pertain to basic construction and soldering.	11C.10.2.1 Discuss chemical hazards on the environment as they pertain to forging and forming.
9.10.2.2 Describe and apply the efficient use and disposal of materials.	10.10.2.2 →	11A.10.2.2 Describe and apply the efficient use and disposal of materials as it pertains to lost wax casting.	11B.10.2.2 Describe and apply the efficient use and disposal of materials as it pertains to basic construction and soldering.	11C.10.2.2 Describe and apply the efficient use and disposal of materials as it pertains to forging and forming.
9.10.2.3 Discuss chemical hazards on the environment.	10.10.2.3 →	11A.10.2.3 Discuss chemical hazards on the environment as they pertain to lost wax casting.	11B.10.2.3 Demonstrate a basic knowledge of efficient material usage to reduce waste and its impact on the environment.	11C.10.2.3 →

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**Goal 10:** Demonstrate awareness of **sustainability** as it pertains to the jewellery trade. *(continued)*

**GLO 10.2:** Describe the trade’s **sustainability practices** and impact on the environment. *(continued)*

9.10.2.4 Demonstrate a basic knowledge of efficient material usage to reduce waste and its impact on the environment.	10.10.2.4 →	11A.10.2.4 →
9.10.2.5 Discuss the recycling process for materials related to the jewellery trade.	10.10.2.5 →	11A.10.2.5 Identify the recycling processes for materials related to the jewellery trade.

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**Goal 10:** Demonstrate awareness of **sustainability** as it pertains to the jewellery trade. *(continued)*

**GLO 10.3:** Describe **sustainable business practices** within the jewellery trade.

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9.10.3.1 Discuss sustainable business practices within the jewellery trade.	10.10.3.1 →
9.10.3.2 Discuss the changing world market value of metals and materials.	10.10.3.2 →
9.10.3.3 Discuss lifelong learning of trends, fashion, and technology.	10.10.3.3 →
9.10.3.4 Discuss the changing demographics regarding supply area, use of Internet shopping, and sales.	10.10.3.4 →

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8768 <b>Exploration of Jewellery/ Metalsmithing (9)</b> 15S / 15E / 15M 10S / 10E / 10M	8769 <b>Introduction to Jewellery/ Metalsmithing (10)</b> 20S / 20E / 20M	8799 <b>Lost Wax Casting (11A)</b> 30S / 30E / 30M	8814 <b>Basic Construction and Soldering (11B)</b> 30S / 30E / 30M	8823 <b>Forging and Forming (11C)</b> 30S / 30E / 30M
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**Goal 11:** Demonstrate **awareness of the ethical and legal standards** as they pertain to the jewellery trade.

**GLO 11.1:** Practise the **ethical and legal standards** as they pertain to the jewellery trade.

9.11.1.1 Discuss the ethical and legal standards as they pertain to the jewellery trade.	10.11.1.1 →	11A.11.1.1 Practise the ethical and legal standards as they pertain to the jewellery trade.
9.11.1.2 Discuss ethical mining practices for metals and gemstones.	10.11.1.2 →	11A.11.1.2 Discuss legal standards of hallmarking for metal content.
9.11.1.3 Discuss the history and ethics of gemmology and gem use in the jewellery trade.	10.11.1.3 →	

8768 <b>Exploration of Jewellery/ Metalsmithing (9)</b> 15S / 15E / 15M 10S / 10E / 10M	8769 <b>Introduction to Jewellery/ Metalsmithing (10)</b> 20S / 20E / 20M	8799 <b>Lost Wax Casting (11A)</b> 30S / 30E / 30M	8814 <b>Basic Construction and Soldering (11B)</b> 30S / 30E / 30M	8823 <b>Forging and Forming (11C)</b> 30S / 30E / 30M
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**Goal 12:** Demonstrate knowledge of the **employability skills** related to the jewellery trade.

**GLO 12.1:** Demonstrate **fundamental employability skills**.

9.12.1.1 Demonstrate problem-solving skills.	10.12.1.1 →	11A.12.1.1 →	11B.12.1.1 →	11C.12.1.1 →
9.12.1.2 Demonstrate critical-thinking skills.	10.12.1.2 →	11A.12.1.2 →	11B.12.1.2 →	11C.12.1.2 →
9.12.1.3 Demonstrate regular attendance and punctuality.	10.12.1.3 →	11A.12.1.3 →	11B.12.1.3 →	11C.12.1.3 →
9.12.1.4 Demonstrate accountability by taking responsibility for one’s actions.	10.12.1.4 →	11A.12.1.4 →	11B.12.1.4 →	11C.12.1.4 →
9.12.1.5 Demonstrate adaptability, initiative, and effort.	10.12.1.5 →	11A.12.1.5 →	11B.12.1.5 →	11C.12.1.5 →
9.12.1.6 Demonstrate the ability to accept and follow direction and feedback.	10.12.1.6 →	11A.12.1.6 →	11B.12.1.6 →	11C.12.1.6 →
9.12.1.7 Demonstrate teamwork skills.	10.12.1.7 →	11A.12.1.7 →	11B.12.1.7 →	11C.12.1.7 →

8768 <b>Exploration of Jewellery/ Metalsmithing (9)</b> 15S / 15E / 15M 10S / 10E / 10M	8769 <b>Introduction to Jewellery/ Metalsmithing (10)</b> 20S / 20E / 20M	8799 <b>Lost Wax Casting (11A)</b> 30S / 30E / 30M	8814 <b>Basic Construction and Soldering (11B)</b> 30S / 30E / 30M	8823 <b>Forging and Forming (11C)</b> 30S / 30E / 30M
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**Goal 12:** Demonstrate knowledge of the **employability skills** related to the jewellery trade. *(continued)*

**GLO 12.1:** Demonstrate **fundamental employability skills**. *(continued)*

9.12.1.8 Demonstrate the ability to stay on task and use class and studio time effectively.	10.12.1.8 →	11A.12.1.8 →	11B.12.1.8 →	11C.12.1.8 →
9.12.1.9 Demonstrate the ability to communicate respectfully and effectively with co-workers and customers.	10.12.1.9 →	11A.12.1.9 →	11B.12.1.9 →	11C.12.1.9 →
9.12.1.10 Demonstrate the ability to maintain an organized work area and use equipment, tools, and materials respectfully.	10.12.1.10 →	11A.12.1.10 →	11B.12.1.10 →	11C.12.1.10 →
9.12.1.11 Demonstrate appropriate dress for safe work with equipment and tools.	10.12.1.11 →	11A.12.1.11 →	11B.12.1.11 →	11C.12.1.11 →

8768 <b>Exploration of Jewellery/ Metalsmithing (9)</b> 15S / 15E / 15M 10S / 10E / 10M	8769 <b>Introduction to Jewellery/ Metalsmithing (10)</b> 20S / 20E / 20M	8799 <b>Lost Wax Casting (11A)</b> 30S / 30E / 30M	8814 <b>Basic Construction and Soldering (11B)</b> 30S / 30E / 30M	8823 <b>Forging and Forming (11C)</b> 30S / 30E / 30M
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**Goal 12:** Demonstrate knowledge of the **employability skills** related to the jewellery trade. *(continued)*

**GLO 12.2:** Demonstrate an understanding of the **business operation** of a jewellery/metalsmithing studio.

9.12.2.1 Discuss the overhead costs of producing jewellery.	10.12.2.1 →	11A.12.2.1 Demonstrate the calculations of metal costs for projects.
9.12.2.2 Discuss the market cost of metals and influences.	10.12.2.2 →	11A.12.2.2 →

8768 <b>Exploration of Jewellery/ Metalsmithing (9)</b> 15S / 15E / 15M 10S / 10E / 10M	8769 <b>Introduction to Jewellery/ Metalsmithing (10)</b> 20S / 20E / 20M	8799 <b>Lost Wax Casting (11A)</b> 30S / 30E / 30M	8814 <b>Basic Construction and Soldering (11B)</b> 30S / 30E / 30M	8823 <b>Forging and Forming (11C)</b> 30S / 30E / 30M
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**Goal 13:** Demonstrate an understanding of the **evolution and technological progression of, and the emerging trends in** the jewellery/metalsmithing trade.

**GLO 13.1:** Demonstrate an understanding of the **evolution and technological progression of, and the emerging trends in** the jewellery trade.

9.13.1.1 Discuss the evolution and technological progression of, and the emerging trends in the jewellery trade.	10.13.1.1 →	11A.13.1.1 Discuss the evolution and technological progression of, and the emerging trends in the jewellery trade as they pertain to lost wax casting.	11B.13.1.1 Discuss the evolution and technological progression of, and the emerging trends in the jewellery trade as they pertain to basic construction and soldering.	11C.13.1.1 Discuss the evolution and technological progression of, and the emerging trends in the jewellery trade as they pertain to forging and forming.
9.13.1.2 Demonstrate the use of new technology as introduced in the studio.	10.13.1.2 →	11A.13.1.2 Demonstrate the use of new technology as it pertains to lost wax casting.	11B.13.1.2 Demonstrate the use of new technology as it pertains to basic construction and soldering.	11C.13.1.2 Demonstrate the use of new technology as it pertains to forging and forming.



GRADE 12 JEWELLERY AND  
METALSMITHING

General and Specific Learning  
Outcomes by Goal



## GRADE 12 JEWELLERY AND METALSMITHING: GENERAL AND SPECIFIC LEARNING OUTCOMES BY GOAL

8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 1:** Describe and apply appropriate **safety and health** practices as they apply to the jewellery/metalsmithing trade.

**GLO 1.1:** Create and maintain a **safe workplace**.

12A.1.1.1 Follow safe practices and procedures related to facilities, processes, materials, tools, and equipment used in the jewellery studio.	12B.1.1.1 →	12C.1.1.1 →	12D.1.1.1 →
12A.1.1.2 Apply the principles of Workplace Hazardous Materials Information Systems (WHMIS) as they apply to the jewellery studio.	12B.1.1.2 →	12C.1.1.2 →	12D.1.1.2 →
12A.1.1.3 Describe hazards related to processes, materials, tools, and equipment used in the jewellery studio.	12B.1.1.3 →	12C.1.1.3 →	12D.1.1.3 →
12A.1.1.4 Follow the directions of the teacher/supervisor/ employer in regard to safe work procedures.	12B.1.1.4 →	12C.1.1.4 →	12D.1.1.4 →

8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 1:** Describe and apply appropriate **safety and health** practices as they apply to the jewellery/metalsmithing trade. *(continued)*

**GLO 1.1:** Create and maintain a **safe workplace**. *(continued)*

12A.1.1.5 Comply with the laws, regulations, and standards of regulatory agencies and industry associations regarding safety.	12B.1.1.5 →	12C.1.1.5 →	12D.1.1.5 →
12A.1.1.6 Locate first aid kit, eyewash station, fire extinguisher, fire blanket, and emergency power shut off switch.	12B.1.1.6 →	12C.1.1.6 →	12D.1.1.6 →
12A.1.1.7 Demonstrate ventilation procedures, and dust and smoke reduction procedures.	12B.1.1.7 →	12C.1.1.7 →	12D.1.1.7 →
12A.1.1.8 Demonstrate fire prevention and control strategies.	12B.1.1.8 →	12C.1.1.8 →	12D.1.1.8 →
12A.1.1.9 Describe emergency evacuation and response procedures.	12B.1.1.9 →	12C.1.1.9 →	12D.1.1.9 →

8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 1:** Describe and apply appropriate **safety and health** practices as they apply to the jewellery/metalsmithing trade. *(continued)*

**GLO 1.1:** Create and maintain a **safe workplace.** *(continued)*

12A.1.1.10 Demonstrate safety zone markings and procedures.	12B.1.1.10 →	12C.1.1.10 →	12D.1.1.10 →
12A.1.1.11 Discuss hazards related to compressed gas.	12B.1.1.11 →	12C.1.1.11 →	12D.1.1.11 →
12A.1.1.12 Identify and report hazards (e.g., handling, chemicals, electrical, ergonomics, material handling, spills, and equipment damage) related to tools, equipment, processes, and materials in studio.	12B.1.1.12 →	12C.1.1.12 →	12D.1.1.12 →

8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 1:** Describe and apply appropriate **safety and health** practices as they apply to the jewellery/metalsmithing trade. *(continued)*

**GLO 1.2:** Create and maintain **safe and healthy workplace practices.**

12A.1.2.1 Explain the chemical points of entry into the body.	12B.1.2.1 →	12C.1.2.1 →	12D.1.2.1 →
12A.1.2.2 Describe and demonstrate appropriate personal protection (e.g., safety goggles/facemask, gloves, respirator mask, hair ties, apron, hearing protection).	12B.1.2.2 →	12C.1.2.2 →	12D.1.2.2 →
12A.1.2.3 Describe the injury reporting process.	12B.1.2.3 →	12C.1.2.3 →	12D.1.2.3 →
12A.1.2.4 Describe the use of fire blankets and fire extinguishers.	12B.1.2.4 →	12C.1.2.4 →	12D.1.2.4 →
12A.1.2.5 Describe the use of an eyewash station.	12B.1.2.5 →	12C.1.2.5 →	12D.1.2.5 →
12A.1.2.6 Demonstrate the ergonomic use of equipment and tools as it relates to bench tools and equipment operation.	12B.1.2.6 →	12C.1.2.6 →	12D.1.2.6 →

8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 2:** Demonstrate knowledge of the **identification**, and the safe and appropriate **operation, cleaning, maintenance, and management of equipment, tools, and materials.**

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

12A.2.1.1 Identify hand tools, power tools, equipment, and materials as they pertain to jewellery repair.	12B.2.1.1 Describe hand tools, power tools, equipment, and materials as they pertain to advanced construction and soldering.	12C.2.1.1 Describe hand tools, power tools, equipment, and materials as they pertain to gem setting.	12D.2.1.1 Describe hand tools, power tools, equipment, and materials as they pertain to advanced gem setting.
12A.2.1.2 Demonstrate the safe and appropriate operation of hand tools as it pertains to jewellery repair.	12B.2.1.2 Demonstrate the safe and appropriate operation of hand tools as it pertains to advanced construction and soldering.	12C.2.1.2 Demonstrate the safe and appropriate operation of hand tools as it pertains to gem setting.	12D.2.1.2 Demonstrate the safe and appropriate operation of hand tools as it pertains to advanced gem setting.
12A.2.1.3 Demonstrate the safe and appropriate operation of torch as it pertains to jewellery repair.	12B.2.1.3 Demonstrate the safe and appropriate operation of torch as it pertains to advanced construction and soldering.	12C.2.1.3 Demonstrate the safe and appropriate operation of torch as it pertains to gem setting.	12D.2.1.3 Demonstrate the safe and appropriate operation of torch as it pertains to advanced gem setting.
12A.2.1.4 Demonstrate the safe and appropriate use of the polishing/buffing machines as it pertains to jewellery repair.	12B.2.1.4 Demonstrate the safe and appropriate use of the polishing/buffing machines as it pertains to advanced construction and soldering.	12C.2.1.4 Demonstrate the safe and appropriate use of the polishing/buffing machines as it pertains to gem setting.	12D.2.1.4 Demonstrate the safe and appropriate use of the polishing/buffing machines as it pertains to advanced gem setting.
12A.2.1.5 Demonstrate the safe and appropriate use of the flex-shaft.	12B.2.1.5 →	12C.2.1.5 →	12D.2.1.5 →

8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 2:** Demonstrate knowledge of the **identification**, and the safe and appropriate **operation, cleaning, maintenance, and management of equipment, tools, and materials.** *(continued)*

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

12A.2.2.1 Demonstrate the daily cleaning, maintenance, and management of equipment and tools as they pertain to jewellery repair.	12B.2.2.1 Demonstrate the daily cleaning, maintenance, and management of equipment and tools as they pertain to advanced construction and soldering.	12C.2.2.1 Demonstrate the daily cleaning, maintenance, and management of equipment and tools as they pertain to gem setting.	12D.2.2.1 Demonstrate the daily cleaning, maintenance, and management of equipment and tools as they pertain to advanced gem setting.
12A.2.2.2 Discuss the scheduled cleaning, maintenance, and management of equipment and tools as they pertain to jewellery repair.	12B.2.2.2 Discuss the scheduled cleaning, maintenance, and management of equipment and tools as they pertain to advanced construction and soldering.	12C.2.2.2 Discuss the scheduled cleaning, maintenance, and management of equipment and tools as they pertain to gem setting.	12D.2.2.2 Discuss the scheduled cleaning, maintenance, and management of equipment and tools as they pertain to advanced gem setting.

**GLO 2.3:** Demonstrate the appropriate **handling, storage, and management of materials.**

12A.2.3.1 Demonstrate the appropriate handling, storage, and management of materials and supplies as they pertain to jewellery repair.	12B.2.3.1 Demonstrate the appropriate handling, storage, and management of materials and supplies as they pertain to advanced construction and soldering.	12C.2.3.1 Demonstrate the appropriate handling, storage, and management of materials and supplies as they pertain to gem setting.	12D.2.3.1 Demonstrate the appropriate handling, storage, and management of materials and supplies as they pertain to advanced gem setting.
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8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 3: Demonstrate an understanding of metallurgy, gemmology, and the characteristics of jewellery materials.**

**GLO 3.1: Demonstrate an understanding of metallurgy.**

12A.3.1.1 Demonstrate an understanding of the characteristics of metals as they pertain to jewellery repair.	12B.3.1.1 Demonstrate an understanding of the characteristics of metals as they pertain to advanced construction and soldering.	12C.3.1.1 Demonstrate an understanding of the characteristics of metals as they pertain to gem setting.	12D.3.1.1 Demonstrate an understanding of the characteristics of metals as they pertain to advanced gem setting.
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**GLO 3.2: Demonstrate an understanding of gemmology.**

12A.3.2.1 Demonstrate precautions and appropriate care of gem materials as they pertain to jewellery repair.	12B.3.2.1 Demonstrate precautions and appropriate care of gem materials as they pertain to advanced construction and soldering.	12C.3.2.1 Demonstrate precautions and appropriate care of gem materials as they pertain to gem setting.  12C.3.2.2 Discuss the categories of gem materials used in jewellery creation.  12C.3.2.3 Describe the history and ethics of gemmology and gem use in the jewellery trade.	12D.3.2.1 Demonstrate precautions and appropriate care of gem materials as they pertain to advanced gem setting.
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**GLO 3.3: Demonstrate an understanding of the characteristics of jewellery materials.**

12A.3.3.1 Apply the principles of material characteristics to jewellery repair.	12B.3.3.1 Apply the principles of material characteristics to advanced construction and soldering.	12C.3.3.1 Apply the principles of material characteristics to gem setting.	12D.3.3.1 Apply the principles of material characteristics to advanced gem setting.
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8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 4:** Demonstrate knowledge of the creative **design** of jewellery.

**GLO 4.1:** Demonstrate knowledge of the creative **design** of jewellery.

12A.4.1.1 Identify the design problem as it pertains to jewellery repair.	12B.4.1.1 Identify the design problem as it pertains to advanced construction and soldering.	12C.4.1.1 Identify the design problem as it pertains to gem setting.	12D.4.1.1 Identify the design problem as it pertains to advanced gem setting.
12A.4.1.2 Research the factors that influence design as they pertain to jewellery repair.	12B.4.1.2 Research the factors that influence design as they pertain to advanced construction and soldering.	12C.4.1.2 Research the factors that influence design as they pertain to gem setting.	12D.4.1.2 Research the factors that influence design as they pertain to advanced gem setting.
12A.4.1.3 Recognize and apply the elements of design as they pertain to jewellery repair.	12B.4.1.3 Recognize and apply the elements of design as they pertain to advanced construction and soldering.	12C.4.1.3 Recognize and apply the elements of design as they pertain to gem setting.	12D.4.1.3 Recognize and apply the elements of design as they pertain to advanced gem setting.
12A.4.1.4 Identify the function of design as it pertains to jewellery repair.	12B.4.1.4 Identify the function of the design as it pertains to advanced construction and soldering.	12C.4.1.4 Identify the function of the design as it pertains to gem setting.	12E.4.1.4 Identify the function of the design as it pertains to advanced gem setting.
12A.4.1.5 Identify the limitations of the materials as they pertain to jewellery repair.	12B.4.1.5 Identify the limitations of the materials as they pertain to advanced construction and soldering.	12C.4.1.5 Identify the limitations of the materials as they pertain to gem setting.	12D.4.1.5 Identify the limitations of the materials as they pertain to advanced gem setting.
12A.4.1.6 Develop concept drawings for construction based on design criteria as they pertain to jewellery repair.	12B.4.1.6 Develop concept drawings for construction based on design criteria as they pertain to advanced construction and soldering.	12C.4.1.6 Develop concept drawings for construction based on design criteria as they pertain to gem setting.	12D.4.1.6 Develop concept drawings for construction based on design criteria as they pertain to advanced gem setting.

8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 5:** Demonstrate an understanding of the **construction, casting, incorporation of components and gemstones, and production techniques** of jewellery creations.

**GLO 5.1:** Demonstrate the **construction techniques** used in creating jewellery from **sheet and wire**.

12A.5.1.1 Demonstrate the basic operation of tools and equipment used in jewellery construction using sheet and wire as it pertains to jewellery repair.	12B.5.1.1 Demonstrate the basic operation of tools and equipment used in jewellery construction using sheet and wire as it pertains to advanced construction and soldering.	12C.5.1.1 Demonstrate the basic operation of tools and equipment used in jewellery construction using sheet and wire as it pertains to gem setting.	12D.5.1.1 Demonstrate the basic operation of tools and equipment used in jewellery construction using sheet and wire as it pertains to advanced gem setting.
12A.5.1.2 Demonstrate an understanding of soldering techniques as they pertain to jewellery repair.	12B.5.1.2 Demonstrate the production of sheet from ingots using a rolling mill.	12C.5.1.2 →	12D.5.1.2 →
12A.5.1.3 Demonstrate the safe and appropriate use of the pickle pot.	12B.5.1.3 Demonstrate the safe and appropriate use of the pickle pot.	12C.5.1.3 →	12D.5.1.3 →
12A.5.1.4 Demonstrate the safe and appropriate use of torch for annealing and soldering.	12B.5.1.4 Demonstrate an understanding of soldering techniques as they pertain to advanced construction and soldering.	12C.5.1.4 Demonstrate an understanding of soldering techniques as they pertain to gem setting.	12D.5.1.4 Demonstrate an understanding of soldering techniques as they pertain to advanced gem setting.
	12B.5.1.5 Demonstrate the production of wire from ingots using a rolling mill and drawplates.	12C.5.1.5 →	12D.5.1.5 →

8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 5:** Demonstrate an understanding of the **construction, casting, incorporation of components and gemstones, and production techniques** of jewellery creations. *(continued)*

**GLO 5.1:** Demonstrate the **construction techniques** used in creating jewellery from **sheet and wire**. *(continued)*

12B.5.1.6 Demonstrate the safe and appropriate use of a torch for annealing and soldering.

12C.5.1.6 —→

12D.5.1.6 —→

12B.5.1.7 Demonstrate the safe and appropriate use of burs for stone setting.

12C.5.1.7 Demonstrate the safe and appropriate use of burs for gem setting.

12D.5.1.7 Demonstrate the safe and appropriate use of burs for advanced gem setting.

12B.5.1.8 Demonstrate the safe and appropriate use of the bending brake.

12C.5.1.8 Demonstrate forming domes with dapping tools and a block.

12D.5.1.8 Demonstrate forming domes with dapping tools and block.

12B.5.1.9 Demonstrate the safe and appropriate use of forming equipment (e.g., mandrels, anvils, metal blocks) as it pertains to advanced construction and soldering.

12D.5.1.9 Demonstrate the safe and appropriate use of forming equipment (e.g., mandrels, anvils, metal blocks) as it pertains to advanced gem setting.

12B.5.1.10 Demonstrate the production of tubing from sheet.

12B.5.1.11 Demonstrate the construction of a box clasp from sheet.

12B.5.1.12 Demonstrate the construction of a hinged bracelet.

8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 5:** Demonstrate an understanding of the **construction, casting, incorporation of components and gemstones, and production techniques** of jewellery creations. *(continued)*

**GLO 5.2:** Demonstrate the **lost wax casting techniques** used in creating jewellery.

12D.5.2.1 Demonstrate an understanding of the lost wax casting process as it pertains to advanced gem setting.

**GLO 5.3:** Demonstrate the **construction** of jewellery incorporating components such as **handmade and commercial findings**.

12A.5.3.1 Define terminology for findings and jewellery items as it relates to jewellery repair.

12B.5.3.1 Define terminology for findings and jewellery items as it relates to advanced construction and soldering.

12C.5.3.1 Define terminology for findings and jewellery items as it relates to gem setting.

12D.5.3.1 Define terminology for findings and jewellery items as it relates to advanced gem setting.

12A.5.3.2 Incorporate findings into construction as they pertain to jewellery repair.

12B.5.3.2 Incorporate findings into construction as they pertain to advanced construction and soldering.

12C.5.3.2 Incorporate findings into construction as they pertain to gem setting.

12D.5.3.2 Incorporate findings into construction as they pertain to advanced gem setting.

12B.5.3.3 Demonstrate the construction of a box clasp from sheet.

12C.5.3.3 Demonstrate the incorporation of commercial pin back with hinge and roll catch.

12D.5.3.3 Demonstrate the construction of a basket setting from wire.

12B.5.3.4 Demonstrate the construction of a hinged bracelet clasp.

8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 5:** Demonstrate an understanding of the **construction, casting, incorporation of components and gemstones, and production techniques** of jewellery creations. *(continued)*

**GLO 5.4:** Demonstrate **stone-setting techniques**.

	12B.5.4.1 Demonstrate tube-setting stones.	12C.5.4.1 Demonstrate constructing and setting bezel-set, irregular-shaped gems.	12D.5.4.1 Demonstrate constructing settings for pearls and pearl setting.
		12C.5.4.2 Demonstrate setting oval-faceted stone into constructed basket setting.	12D.5.4.2 Demonstrate bead setting.
		12C.5.4.3 Demonstrate setting faceted stones into commercial claw settings.	12D.5.4.3 Demonstrate rub setting.
			12D.5.4.4 Demonstrate channel setting.

**GLO 5.5:** Demonstrate **production techniques** in the construction of jewellery.

12A.5.5.1 Demonstrate the organization of work for the finishing process.	12B.5.5.1 →	12C.5.5.1 →	12D.5.5.1 →
	12B.5.5.2 Define the production and benefits to the jewellery trade.	12C.5.5.2 →	12D.5.5.2 →
	12B.5.5.3 Demonstrate the grouping of chain links for soldering.		

8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 6:** Demonstrate an understanding of the **finishing, polishing, and textural techniques** of jewellery creation.

**GLO 6.1:** Demonstrate the **finishing techniques** of jewellery creation.

12A.6.1.1 Identify the sequence of the finishing steps leading up to polishing as it pertains to jewellery repair.	12B.6.1.1 Identify the sequence of the finishing steps leading up to polishing as it pertains to advanced construction and soldering.	12C.6.1.1 Identify the sequence of the finishing steps leading up to polishing as it pertains to gem setting.	12D.6.1.1 Identify the sequence of the finishing steps leading up to polishing as it pertains to advanced gem setting.
12A.6.1.2 Identify the tools and equipment used in finishing jewellery as they pertain to jewellery repair.	12B.6.1.2 Identify the tools and equipment used in finishing jewellery as they pertain to advanced construction and soldering.	12C.6.1.2 Identify the tools and equipment used in finishing jewellery as they pertain to gem setting.	12D.6.1.2 Identify the tools and equipment used in finishing jewellery as they pertain to advanced gem setting.
12A.6.1.3 Demonstrate the sequence of finishing steps as they pertain to metal type, technique, and jewellery design as it relates to jewellery repair.	12B.6.1.3 Demonstrate the sequence of finishing steps as they pertain to metal type, technique, and jewellery design as it relates to advanced construction and soldering.	12C.6.1.3 Demonstrate the sequence of finishing steps as they pertain to metal type, technique, and jewellery design as it relates to gem setting.	12D.6.1.3 Demonstrate the sequence of finishing steps as they pertain to metal type, technique, and jewellery design as it relates to advanced gem setting.

8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 6:** Demonstrate an understanding of the **finishing, polishing, and textural techniques** of jewellery creation.  
(continued)

**GLO 6.2:** Demonstrate the **polishing techniques** of jewellery creation.

12A.6.2.1 Identify the sequence of polishing techniques as it pertains to jewellery repair.	12B.6.2.1 Identify the sequence of polishing techniques as it pertains to advanced construction and soldering.	12C.6.2.1 Identify the sequence of polishing techniques as it pertains to gem setting.	12D.6.2.1 Identify the sequence of polishing techniques as it pertains to advanced gem setting.
12A.6.2.2 Select the sequence of polishing techniques during jewellery construction based on metal type, technique, and jewellery design as it relates to jewellery repair.	12B.6.2.2 Select the sequence of polishing techniques during jewellery construction based on metal type, technique, and jewellery design as it relates to advanced construction and soldering.	12C.6.2.2 Select the sequence of polishing techniques during jewellery construction based on metal type, technique, and jewellery design as it relates to gem setting.	12D.6.2.2 Select the sequence of polishing techniques during jewellery construction based on metal type, technique, and jewellery design as it relates to advanced gem setting.

**GLO 6.3:** Demonstrate the **textural finishing techniques** of jewellery creation.

12A.6.3.1 Demonstrate techniques for texturing as they relate to jewellery repair.	12B.6.3.1 Demonstrate techniques for texturing as they relate to advanced construction and soldering.	12C.6.3.1 Demonstrate techniques for texturing as they relate to gem setting.	12D.6.3.1 Demonstrate techniques for texturing as they relate to advanced gem setting.
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8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 7:** Demonstrate knowledge of the **adjustment, modification, and repair** of jewellery.

**GLO 7.1:** Demonstrate an awareness of situations which require jewellery to be **adjusted, modified, or repaired**.

12A.7.1.1 Identify situations in which jewellery would require adjustments, modifications, or repairs as they relate to jewellery repair.	12B.7.1.1 Identify situations in which jewellery would require adjustments, modifications, or repairs using advanced construction and soldering.	12C.7.1.1 Identify situations in which jewellery would require adjustments, modifications, or repairs using gem-setting techniques.	12D.7.1.1 Identify situations in which jewellery would require adjustments, modifications, or repairs using advanced gem-setting techniques.
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**GLO 7.2: Adjust** jewellery.

12A.7.2.1 Recognize and apply adjustments to the design and function of jewellery creations as they pertain to jewellery repair.	12B.7.2.1 Adjust jewellery using advanced construction and soldering.	12C.7.2.1 Adjust jewellery using gem-setting techniques.	12D.7.2.1 Adjust jewellery using advanced gem-setting techniques.
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**GLO 7.3: Modify** jewellery.

12A.7.3.1 Recognize and apply modifications to the design and function of jewellery creations as they pertain to jewellery repair.	12B.7.3.1 Modify jewellery using advanced construction and soldering.	12C.7.3.1 Modify jewellery using gem-setting techniques.	12D.7.3.1 Modify jewellery using advanced gem-setting techniques.
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8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 7:** Demonstrate knowledge of the **adjustment, modification, and repair** of jewellery. *(continued)*

**GLO 7.4:** Repair jewellery.

<p>12A.7.4.1 Repair jewellery using production techniques.</p> <p>12A.7.4.2 Apply repair techniques to commercial and one-of-a-kind jewellery items.</p> <p>12A.7.4.3 Demonstrate basic chain repair.</p> <p>12A.7.4.4 Demonstrate ring sizing, including sizing up by addition of metal and hammering or stretching, and downsizing by removal of metal.</p> <p>12A.7.4.5 Demonstrate claw retipping.</p> <p>12A.7.4.6 Demonstrate claw replacement.</p> <p>12A.7.4.7 Demonstrate silver and gold electroplating and the ability to create a piece of jewellery and electroplate it.</p> <p>12A.7.4.8 Demonstrate metal testing.</p>	<p>12B.7.4.1 Repair jewellery using advanced construction and soldering methods.</p>	<p>12C.7.4.1 Repair jewellery using gem-setting techniques.</p>	<p>12D.7.4.1 Repair jewellery using advanced gem-setting techniques.</p>
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8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 8:** Demonstrate an understanding of the transferable, **cross-curricular** knowledge and skills as they pertain to the jewellery trade.

**GLO 8.1: Read, interpret, and communicate** information relevant to jewellery/metalsmithing.

12A.8.1.1 Read and identify project specifications as they pertain to jewellery repair.	12B.8.1.1 Read and identify project specifications as they pertain to advanced construction and soldering.	12C.8.1.1 Read and identify project specifications as they pertain to gem setting.	12D.8.1.1 Read and identify project specifications as they pertain to advanced gem setting.
12A.8.1.2 Read and identify technical information as it pertains to jewellery repair.	12B.8.1.2 Read and identify technical information as it pertains to advanced construction and soldering.	12C.8.1.2 Read and identify technical information as it pertains to gem setting.	12D.8.1.2 Read and identify technical information as it pertains to advanced gem setting.
12A.8.1.3 Demonstrate the ability to read ring-sizing charts.			
12A.8.1.4 Demonstrate documentation of jewellery for repair.			

8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 8:** Demonstrate an understanding of the transferable, **cross-curricular** knowledge and skills as they pertain to the jewellery trade. *(continued)*

**GLO 8.2:** Apply **mathematics** knowledge and skills relevant to jewellery/metalsmithing.

12A.8.2.1 Define units of measurement and tools relating to the jewellery trade (e.g., metric and imperial measurements, weights and volumes, gauges) as they pertain to jewellery repair.	12B.8.2.1 Define units of measurement and tools relating to the jewellery trade (e.g., metric and imperial measurements, weights and volumes, gauges) as they pertain to advanced construction and soldering.	12C.8.2.1 Define units of measurement and tools relating to the jewellery trade (e.g., metric and imperial measurements, weights and volumes, gauges) as they pertain to gem setting.	12D.8.2.1 Define units of measurement and tools relating to the jewellery trade (e.g., metric and imperial measurements, weights and volumes, gauges) as they pertain to advanced gem setting.
12A.8.2.2 Demonstrate the use of basic geometry as it pertains to jewellery repair.	12B.8.2.2 Demonstrate the use of basic geometry as it pertains to advanced construction and soldering.	12C.8.2.2 Demonstrate the use of basic geometry as it pertains to gem setting.	12D.8.2.2 Demonstrate the use of basic geometry as it pertains to advanced gem setting.

**GLO 8.3:** Apply **science** knowledge and skills relevant to jewellery/metalsmithing.

12A.8.3.1 Demonstrate an understanding of the alloy chart for metal testing.	12C.8.3.1 Define Moh's Scale for hardness of gem material.
12A.8.3.2 Discuss the scientific principles behind electroplating.	

8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 8:** Demonstrate an understanding of the transferable, **cross-curricular** knowledge and skills as they pertain to the jewellery trade. *(continued)*

**GLO 8.4:** Apply **arts** knowledge and skills relevant to jewellery/metalsmithing.

12A.8.4.1 Demonstrate the creation of a design for project use related to jewellery repair.	12B.8.4.1 Demonstrate the creation of a design for project use related to advanced construction and soldering.	12C.8.4.1 Demonstrate the creation of a design for project use related to gem setting.	12D.8.4.1 Demonstrate the creation of a design for project use related to advanced gem setting.
12B.8.4.2 Discuss and apply design elements as related to jewellery repair.	12B.8.4.2 Discuss and apply design elements as related to advanced construction and soldering.	12C.8.4.2 Discuss and apply design elements as related to gem setting.	12D.8.4.2 Discuss and apply design elements as related to advanced gem setting.

**GLO 8.5:** Apply **other subject areas** knowledge and skills relevant to jewellery/metalsmithing (art, physical education/health education, information communication and technology, social studies).

12A.8.5.1 Demonstrate the use of Internet for design development and technical information as it pertains to jewellery repair.	12B.8.5.1 Demonstrate the use of Internet for design development and technical information as it pertains to advanced construction and soldering.	12C.8.5.1 Demonstrate the use of Internet for design development and technical information as it pertains to gem setting.	12D.8.5.1 Demonstrate the use of Internet for design development and technical information as it pertains to advanced gem setting.
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8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 9:** Demonstrate an understanding of **career opportunities in the jewellery trade** and associated professions.

**GLO 9.1:** Describe **education and career opportunities, and professional organizations in the jewellery trade** and associated professions.

12A.9.1.1 Discuss education and career opportunities in the jewellery trade and associated professions.

12B.9.1.1 Discuss education and career opportunities in advanced construction and soldering.

12C.9.1.1 Discuss education and career opportunities in gem setting.

12A.9.1.2 Discuss professional organizations and benefits, locally and globally.

**Goal 10:** Demonstrate awareness of **sustainability** as it pertains to the jewellery trade.

**GLO 10.1:** Describe the impact of **sustainability** on the health and well-being of metalsmiths and their clients.

12A.10.1.1 Identify ergonomics and repetitive movement strains as they pertain to jewellery repair.

12B.10.1.1 Identify ergonomics and repetitive movement strains as they pertain to advanced construction and soldering.

12C.10.1.1 Identify ergonomics and repetitive movement strains as they pertain to gem setting.

12D.10.1.1 Identify ergonomics and repetitive movement strains as they pertain to advanced gem setting.

8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 10:** Demonstrate awareness of **sustainability** as it pertains to the jewellery trade. *(continued)*

**GLO 10.1:** Describe the impact of **sustainability** on the health and well-being of metalsmiths and their clients. *(continued)*

12A.10.1.2 Discuss sustainability as it relates to the human health and well-being of jewellers/metalsmiths and their clients as it pertains to jewellery repair.	12B.10.1.2 Discuss sustainability as it relates to the human health and well-being of jewellers/metalsmiths and their clients as it pertains to advanced construction and soldering.	12C.10.1.2 Discuss sustainability as it relates to the human health and well-being of jewellers/metalsmiths and their clients as it pertains to gem setting.	12D.10.1.2 Discuss sustainability as it relates to the human health and well-being of jewellers/metalsmiths and their clients as it pertains to advanced gem setting.
12A.10.1.3 Discuss the impact on health of metal and material allergies, dust, and toxicities as they pertain to jewellery repair.	12B.10.1.3 Discuss the impact on health of metal and material allergies, dust, and toxicities as it pertains to advanced construction and soldering.	12C.10.1.3 Discuss the impact on health of metal and material allergies, dust, and toxicities as they pertain to gem setting.	12D.10.1.3 Discuss the impact on health of metal and material allergies, dust, and toxicities as they pertain to advanced gem setting.
12A.10.1.4 Demonstrate the proper use of equipment and tools to prevent repetitive strain injuries—ergonomics as it pertains to jewellery repair.	12B.10.1.4 Demonstrate proper use of equipment and tools to prevent repetitive strain injuries—ergonomics as it pertains to advanced construction and soldering.	12C.10.1.4 Demonstrate the proper use of equipment and tools to prevent repetitive strain injuries—ergonomics as it pertains to gem setting.	12D.10.1.4 Demonstrate the proper use of equipment and tools to prevent repetitive strain injuries—ergonomics as it pertains to advanced gem setting.
12A.10.1.5 Discuss the purposes of jewellery in regards to history, trade, personal wealth, culture, and personal statements and celebrations as it pertains to jewellery repair.			

8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 10:** Demonstrate awareness of **sustainability** as it pertains to the jewellery trade. *(continued)*

**GLO 10.2:** Describe the trade's **sustainability practices** and impact on the environment.

12A.10.2.1 Demonstrate the appropriate disposal and/or recycling of materials and supplies as it pertains to jewellery repair.	12B.10.2.1 Demonstrate the appropriate disposal and/or recycling of materials and supplies as it pertains to advanced construction and soldering.	12C.10.2.1 Demonstrate the appropriate disposal and/or recycling of materials and supplies as it pertains to gem setting.	12D.10.2.1 Demonstrate the appropriate disposal and/or recycling of materials and supplies as it pertains to advanced gem setting.
12A.10.2.2 Describe and apply the efficient use and disposal of materials as it pertains to jewellery repair.	12B.10.2.2 Describe and apply the efficient use and disposal of materials as it pertains to advanced construction and soldering.	12C.10.2.2 Describe and apply the efficient use and disposal of materials as it pertains to gem setting.	12D.10.2.2 Describe and apply the efficient use and disposal of materials as it pertains to advanced gem setting.
12A.10.2.3 Discuss chemical hazards on the environment as introduced as they pertain to jewellery repair.	12B.10.2.3 Discuss chemical hazards on the environment as introduced as they pertain to advanced construction and soldering.	12C.10.2.3 Discuss chemical hazards on the environment as introduced as they pertain to gem setting.	12D.10.2.3 Discuss chemical hazards on the environment as introduced as they pertain to advanced gem setting.
12A.10.2.4 Demonstrate a basic knowledge of efficient material usage to reduce waste and its impact on the environment.	12B.10.2.4 Demonstrate a basic knowledge of efficient material usage to reduce waste and its impact on the environment.	12C.10.2.4 Demonstrate a basic knowledge of efficient material usage to reduce waste and its impact on the environment.	12D.10.2.4 Demonstrate a basic knowledge of efficient material usage to reduce waste and its impact on the environment.

8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 10:** Demonstrate awareness of **sustainability** as it pertains to the jewellery trade. *(continued)*

**GLO 10.3:** Describe **sustainable business practices** within the jewellery trade.

12A.10.3.1 Demonstrate sustainable business practices within the jewellery trade as they relate to jewellery repair.

12A.10.3.2 Describe the impact of the changing world market values of metals and materials on jewellery repair.

12A.10.3.3 Discuss lifelong learning of trends, fashion, and technology as they relate to jewellery repair.

8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 11:** Demonstrate awareness of the **ethical and legal standards** as they pertain to the jewellery trade.

**GLO 11.1:** Practise the **ethical and legal standards** as they pertain to the jewellery trade.

12A.11.1.1 Practise the ethical and legal standards as they pertain to jewellery repair.

12A.11.1.2 Demonstrate an understanding of the legal standards of hallmarking for metal content as they pertain to jewellery repair.

12C.11.1.1 Demonstrate an understanding of the synthetic and natural characteristics of stones, and the treatments of natural stones.

12C.11.1.2 Demonstrate an understanding of ethical mining practices for metals and gem stones.

12C.11.1.3 Demonstrate an understanding of the history and ethics of gemmology and gem use in the jewellery trade.

8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 12:** Demonstrate knowledge of the **employability skills** related to the jewellery trade.

**GLO 12.1:** Demonstrate **fundamental employability skills**.

12A.12.1.1 Demonstrate problem-solving skills.	12B.12.1.1 →	12C.12.1.1 →	12D.12.1.1 →
12A.12.1.2 Demonstrate critical-thinking skills.	12B.12.1.2 →	12C.12.1.2 →	12D.12.1.2 →
12A.12.1.3 Demonstrate regular attendance and punctuality.	12B.12.1.3 →	12C.12.1.3 →	12D.12.1.3 →
12A.12.1.4 Demonstrate accountability by taking responsibility for one's actions.	12B.12.1.4 →	12C.12.1.4 →	12D.12.1.4 →
12A.12.1.5 Demonstrate adaptability, initiative, and effort.	12B.12.1.5 →	12C.12.1.5 →	12D.12.1.5 →
12A.12.1.6 Demonstrate the ability to accept and follow direction and feedback.	12B.12.1.6 →	12C.12.1.6 →	12D.12.1.6 →
12A.12.1.7 Demonstrate teamwork skills.	12B.12.1.7 →	12C.12.1.7 →	12D.12.1.7 →

8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 12:** Demonstrate knowledge of the **employability skills** related to the jewellery trade. (continued)

**GLO 12.1:** Demonstrate **fundamental employability skills**. (continued)

12A.12.1.8 Demonstrate the ability to stay on task and use class and studio time effectively.	12B.12.1.8 →	12C.12.1.8 →	12D.12.1.8 →
12A.12.1.9 Demonstrate the ability to communicate respectfully and effectively with co-workers and customers.	12B.12.1.9 →	12C.12.1.9 →	12D.12.1.9 →
12A.12.1.10 Demonstrate the ability to maintain an organized work area and use equipment, tools, and materials respectfully.	12B.12.1.10 →	12C.12.1.10 →	12D.12.1.10 →
12A.12.1.11 Demonstrate appropriate dress for safe work with equipment and tools.	12B.12.1.11 →	12C.12.1.11 →	12D.12.1.11 →

8824 <b>Jewellery Repair (12A)</b> 40S / 40E / 40M	8838 <b>Advanced Construction and Soldering (12B)</b> 40S / 40E / 40M	8839 <b>Gem Setting (12C)</b> 40S / 40E / 40M	8840 <b>Advanced Gem Setting (12D)</b> 40S / 40E / 40M
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**Goal 12:** Demonstrate knowledge of the **employability skills** related to the jewellery trade. (continued)

**GLO 12.2:** Demonstrate an understanding of the **business operation** of a jewellery/metalsmithing studio.

12A.12.2.1 Demonstrate the calculations of metal costs for projects.	12B.12.2.1 →	12C.12.2.1 →	12D.12.2.1 →
12A.12.2.2 Demonstrate record keeping as it pertains to jewellery repair.			

**Goal 13:** Demonstrate an understanding of the **evolution and technological progression of, and the emerging trends in** the jewellery/metalsmithing trade.

**GLO 13.1:** Demonstrate an understanding of the **evolution and technological progression of, and the emerging trends in** the jewellery trade.

12A.13.1.1 Discuss the evolution and technological progression of, and the emerging trends in the jewellery trade as they pertain to jewellery repair.	12B.13.1.1 Discuss the evolution and technological progression of, and the emerging trends in the jewellery trade as they pertain to advanced construction and soldering.	12C.13.1.1 Discuss the evolution and technological progression of, and the emerging trends in the jewellery trade as they pertain to gem setting.	12D.13.1.1 Discuss the evolution and technological progression of, and the emerging trends in the jewellery trade as they pertain to advanced gem setting.
12A.13.1.2 Demonstrate the use of new technology as it pertains to jewellery repair.	12B.13.1.2 Demonstrate the use of new technology as it pertains to advanced construction and soldering.	12C.13.1.2 Demonstrate the use of new technology as it pertains to gem setting.	12D.13.1.2 Demonstrate the use of new technology as it pertains to advanced gem setting.





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