



## Board/Authority Authorized Art Metal 10

<b>School District/Independent School Authority Name:</b> School District 73 (Kamloops/Thompson)	<b>School District/Independent School Authority Number (e.g. SD43, Authority #432):</b> SD73
<b>Developed by:</b> Dayton Fraser	<b>Date Developed:</b> February 16th/2018
<b>School Name:</b> Clearwater Secondary School	<b>Principal's Name:</b> Darren Coates
<b>Superintendent Approval Date (for School Districts only):</b>	<b>Superintendent Signature (for School Districts only):</b>
<b>Board/Authority Approval Date:</b>	<b>Board/Authority Chair Signature:</b>
<b>Course Name:</b> Art Metal 10	<b>Grade Level of Course:</b> 10
<b>Number of Course Credits:</b> 4	<b>Number of Hours of Instruction:</b> 120

**Board/Authority Prerequisite(s):**

None

**Special Training, Facilities or Equipment Required:**

Fully equipped metal shop including foundry with accessories and safety suits, centrifugal caster, wax burn-out oven, and welding equipment (oxy-acetylene, stick, and wire-feed). Lapidary and stained glass equipment as well as CNC plasma cutters or Laser Engravers are recommended to further enhance the course and opportunities for students. Teacher will need to possess qualifications from a training institute for technology education (BCIT).

**Goals and Rationale:**

This course has been developed to help students understand, appreciate and learn the use of metal to pursue various forms of artistic and aesthetic expressions through hands on applied learning. Students will learn to use and to apply sound problem solving practices, to design and to produce artistic and aesthetically pleasing artifacts, to appreciate the knowledge received from past generations, to research new techniques and design ideas. They will use the machines and hand tools found in a metal shop to express their individual originality while working with various metals.

**Aboriginal Worldviews and Perspectives:**

Students will be encouraged to take into consideration various perspectives of different cultures from around the world. Celebrating these cultures can be accomplished in various ways, including:

- Investigate local Aboriginal communities and identify, describe, and analyze traditional styles and methods of metal working
- Identify, describe, and analyze cultural and historical styles as represented by artists using metals in various artifacts and styles
- Critique a selected work of metal art, relating its content to the context in which it was created
- Describe how a specific work of art supports/ challenges specific beliefs, traditions, or responds to historical/ contemporary issues
- Representation of Aboriginal storytelling within the finished product

## BIG IDEAS

Products can be designed for life long use

Personal design interests require the evaluation and refinement of skills

Tools and technologies can be adapted for specific purposes

## Learning Standards

### *Students are expected to do the following:*

- *Understanding context*
- *Defining*
- *Ideating*
- *Testing*
- *Prototyping*
- *Making*
- *Sharing*

### *Students are expected to know the following:*

- *Machine and Metal Shop Safety*
- *Drafting and Design*
- *Basic Metallurgy*
- *Range of uses of metalwork*
- *Welding*
- *Forge (wrought iron)*
- *Fabrication techniques and processes using hand tools and stationary equipment*
- *Foundry processes, including creating patterns and moulds, and casting*

## **Big Ideas – Elaborations**

### **Products can be designed for life long use:**

Taking the Design Process into consideration as well as economic costs, social and environmental impacts of the product, from the extraction of raw materials to eventual reuse or recycling of component materials.

### **Personal design interests require the evaluation and refinement of skills:**

Students will receive instruction in measuring, sketching, different projection methods, and ideation. With these introductory skill sets, students can then present to the instructor with a proposal comprised of projects of their own design within the appropriate units, a finished drawing of the proposed project, a production plan, and a cost sheet for materials needed. Students will also need to highlight possible safety concerns when designing or planning their production method.

### **Tools and Technologies can be adapted for specific purposes:**

Students will continue to develop their Art Metal production skills, strategies, and ability to follow a design process as they work through the production sub-units. Sub-units will include but are not limited to: Casting (foundry, cuttlebone, lost-wax mold), Sheet Metal, wrought iron (forging) and Welding. Students and student teams will develop project designs, cost sheets, production plans and manufacture their projects. Concepts such as material characteristics and identification, choosing appropriate materials for projects, effective use of materials, tool and machine identification, proper tool and safe machine use, and finishing processes will be explored. There will be a continual emphasis on safety throughout each unit.

*Students are expected to do the following:*

**Understanding context**

- Engage in a period of research and empathetic observation in order to understand design opportunities
  - This can include the investigation of local Aboriginal communities and identities

### **Defining**

- Choose a design opportunity
- Identify potential users and relevant contextual factors
- Identify criteria for success, intended impact, and any constraints

### **Ideating**

- Take creative risks in generating ideas and add to others' ideas in ways that enhance them
- Screen ideas against criteria and constraints
- Critically analyze and prioritize competing factors, including social, ethical, and sustainability considerations, to meet community needs for preferred futures
- Choose an idea to pursue, keeping other potentially viable ideas open

### **Prototyping**

- Identify and use sources of inspiration and information
- Choose a form for prototyping and develop a plan that includes key stages and resources
- Evaluate a variety of materials for effective use and potential for reuse, recycling, and biodegradability
- Prototype, making changes to tools, materials, and procedures as needed
- Record iterations of prototyping

### **Testing** (where appropriate)

- Identify sources of feedback
- Develop an appropriate test of the prototype
- Conduct the test, collect and compile data, evaluate data, and decide on changes
- Iterate the prototype or abandon the design idea

### **Making**

- Identify and use appropriate tools, technologies, materials, and processes for production
- Make a step-by-step plan for production and carry it out, making changes as needed
- Use materials in ways that minimize waste
- Incorporating traditional Aboriginal techniques for jewellery making and other process like flint knapping

### **Sharing**

- Decide on how and with whom to share their product and processes
- Demonstrate their product to potential users, providing a rationale for the selected solution, modifications, and procedures, using appropriate terminology
- Critically evaluate the success of their product, and explain how their design ideas contribute to the individual, family, community, and/or environment

- Critically reflect on their design thinking and processes, and evaluate their ability to work effectively both as individuals and collaboratively in a group, including their ability to share and maintain an efficient cooperative work space
  - Identify new design issues
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- 🔗 Demonstrate an awareness of precautionary and emergency safety procedures in both physical and digital environments
  - 🔗 Identify the skills and skill levels needed, individually or as a group, in relation to specific projects, and develop and refine them as needed
  - 🔗 Choose, adapt, and if necessary learn about appropriate tools and technologies to use for tasks
  - 🔗 Evaluate the personal, social, and environmental impacts, including unintended negative consequences, of the choices they make about technology use
  - 🔗 Evaluate how the land, natural resources, and culture influence the development and use of tools and technologies

#### **Machine and Metal Shop Safety**

- includes demonstrations and safety tests on how to properly use tools and equipment in a safe manner

#### **Drafting and Design**

- includes measurement and layout tools as well as the exploration of the Design Process and how it can be used in Art Metal setting

### **Basic Metallurgy**

- identification, characteristics, and properties of different metals, and characteristics of metal in a variety of formats and gauges

### **Range of uses of metalwork**

- for example, art metal, jewellery, stained glass, tools, sheet metal boxes, medieval armour

### **Welding**

- for example, arc, oxygen-acetylene, MIG and TIG welding and how they can be used for Art Metal

### **Forge Work (blacksmithing)**

- for example, wrought iron sculptures, scroll bending, etc.

### **Fabrication techniques and processes using hand tools and stationary equipment**

- for example, welding, plasma and gas cutting, machining (turning, milling, forming, knurling, boring) as well as filing, grinding, and shaping with hand tools in an Art Metal application

### **Foundry processes, including creating patterns and moulds, and casting**

- for example, wax, foam, and 3D printed molds for Lost Wax, Cuttlebone and Sand Casting

### **Recommended Instructional Components:**

- Direct Instruction
- Indirect Instruction
- Interactive/Peer Instruction
- Independent Instruction
- Modeling
- Practical Creativity
- Brainstorming
- Group Work
- Analysis of own and classmates' project work

**Recommended Assessment Components:**

Assessment is based highly on the process, rather than the product. The product, therefore should demonstrate the correct steps taken to complete the project. It could also involves the creation of a digital profile which encourages ongoing communication between teacher, parent, and student. This portfolio will become a collection of student work to be gathered over time to provide a full profile of the learner and learning to see where they started at the beginning of the course and where they are by the time of completion. By being digital, it enables the ability to communicate clearly to the learner and parents where the student is, what they are working towards and the ways that learning can be supported. Students are given a wide variety of choice in their projects therefore providing multiple ways to demonstrate their learning. Assessment for this course follows the know, do and understand model.

Rubrics will be an essential method of assessment when assessing individual or group projects. These rubrics can be used in a traditional method where the instructor marks the project. They should also be used in a self-evaluation or peer-evaluation situations for different assessment perspectives.

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**Sample Self-Assessment Rubric:**

		Understanding/Demonstrated									
Content: Art Metal 10	Not yet Meeting	Beginning	Developing		Emerging		Accomplished		Exemplary		Projects/ Assignments
	0-49%	50-59%	60-66%	67-72%	73-77%	78-82%	83-85%	86-91%	92-97%	98-100%	
	1	2	3	4	5	6	7	8	9	10	

AM-1	• I have demonstrated traditional and modern techniques related to the creation of jewellery.											
AM-2	• I can use of visual art elements and image design to create an emotional response and convey my ideas.											
AM-3	• I know the concepts related to the creation of art from metal.											
AM-4	• I incorporated other materials to enhance the final product.											
AM-5	• I understand the use, purpose, and traditions of high-value material. ie: gold, silver, copper, etc.											
AM-6	• I demonstrate various forms of casting: 1) lost wax casting 2) sand casting 3) pewter casting											
AM-7	• I can do detail-oriented welding. ie: stained glass, silver soldering, etc.											
AM-8	• I can select the correct material selection for specific applications and											

	projects.											
AM-9	• I can perform the application and understand the purpose of finishes and polishes.											
AM-10	• I am able to carve mediums(wax, wood, plastic, ridge foam, etc.) for transfer to metal.											
AM-11	• I layout and use materials so to minimize waste and conserve the material.											
AM-12	• I can demonstrate and use power and non-power tools.											

**Learning Resources:**

- Heads Up for Safety Teacher Resource
- Teacher handouts
- Guest speakers from the community in related fields
- Visit/interview local trades people in related fields
- Books
  - Basic Metalwork Procedures - Metric ed., D. D. Caspersen, 1984.
  - Making Wire Jewelry, Helen Clegg and Mary Larom, Asheville, Lark, 1997.
  - Practical Casting. Revised ed. Tim McCreight, Brynmorgen, Cape Elizabeth, 1994.
  - The Complete Metalsmith. Revised ed. Tim McCreight, Davis Publishing, Worcester, 1991.
  - The Encyclopedia of Jewelry-Making Techniques. Jinks McGrath, Philadelphia, Running, 1995.

**Additional Information:**

The delivery of this course should reflect the resources and equipment the individual Metal Shop has and the course should evolve as more equipment is obtained.

