THOMPSON RIVERS UNIVERSITY | Education & Social Work

Bachelor of Education (Elementary) & Bachelor of Education (Secondary) STEM/BETT Unit Plan Template

Unit Title: Measurements | Number of Lessons: 3 | Time (in weeks): 3

Name: Reagan Tompkins | Subject(s): Metalworking | Grade(s): 8/9

Rationale

Measuring accurately is a fundamental skill in metalworking, ensuring precision in cutting, drilling, and fabricating materials. This unit will provide students with hands-on experience using metric and imperial measuring systems, rulers, and calipers to build confidence in their measurement skills.

Overview:

Students will learn how to read and use metric and imperial measuring tools effectively. Through guided practice, students will complete worksheets and participate in hands-on measurement activities using metalworking tools.

CORE COMPETENCIES

Communication	Thinking	Personal & Social
Following measurement instructions and explaining calculations.	• Critical thinking Problem-solving measurement tasks, such as identifying errors in measurements and adjusting for precision. • Creative thinking Applying measurement techniques to real-world metalworking challenges and developing strategies for improving accuracy.	• Positive personal and cultural identity Understanding the importance of precision and craftsmanship in metalworking and recognizing the value of these skills in different cultural and professional contexts. • Personal awareness and responsibility Developing accountability for accurate measuring and tool safety, ensuring precision in work. • Social responsibility Encouraging teamwork, respect for shared tools, and fostering a workshop environment that prioritizes safety and collaboration.

BIG IDEAS

(multiple subject areas for integrated unit)

Subject Name	Subject Name	Subject Name
Mathematics: Understanding measurement conversions and accuracy.	**Applied Design, Skills, and Technologies (ADST)**: Applying measurement skills in hands-on metal fabrication projects.	

LEARNING STANDARDS

Curricular Competencies	Content
Applied Design • Defining: Identify criteria for success and constraints for metalworking projects. • Prototyping: Develop a plan that includes key stages and resources; construct a first version of the product or prototype, making changes to tools, materials, and procedures as needed. • 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.	Metalworking techniques and processes using hand tools and power equipment.
Applied Skills • Use materials, tools, and technologies in a safe manner, and with an awareness of the safety of others, in both physical and digital environments.	Elements of plans and drawings.
Applied Technologies • Select, and as needed learn about, appropriate tools and technologies to extend their capability to complete a task	Characteristics and uses of ferrous and non-ferrous metals.

Prerequisite Concepts and Skills:

- Basic understanding of numbers and units
- Familiarity with rulers
- Introduction to safe tool handling

Teacher Preparation Required:

Lesson #	Teacher Preparation Required (See Unit Plan Sample)
Lesson 1	Print "Measure in Inches" worksheets, prepare rulers and tape measures, set up demonstration objects.
Lesson 2	Print "Measure Metric" worksheets, gather metric rulers and digital calipers, prepare sample objects for measuring.

Lesson 3	Print "Measure Metric" and “Measure in Inches” more advanced worksheets, set up metal pieces and precision calipers for hands-on measuring activity, prepare demonstration materials.

Cross-Curricular Connections:

Math: Measurement conversions and precision.

Aboriginal Connections/ First Peoples Principles of Learning:

- Focus on experiential, hands-on learning.
- Awareness of traditional tools and measuring techniques.

Universal Design for Learning (UDL)

- Visual demonstrations for varied learning styles.
- Hands-on activities to engage kinesthetic learners.
- Modified worksheet versions for different skill levels.

Differentiated Instructions (DI)

- Visual demonstrations for varied learning styles.
- Hands-on activities to engage kinesthetic learners.
- Modified worksheet versions for different skill levels.

Overview of Lessons:

Lesson 1

Name &Time (Minutes Allotted):	Introduction to Measurement (79 min)
Learning Standards: Curricular Competencies	• **Understanding Context**: Engage in research and observation to understand design opportunities in metalworking. • **Defining**: Identify criteria for success and constraints when measuring materials.
Learning Standards: Content	• Characteristics and uses of ferrous and non-ferrous metals. • Metalworking techniques and processes using hand tools and power equipment.
Instructional Objectives	Students will complete basic measuring exercises using provided worksheets.
Assessment:	• Completed "Measure in Inches" worksheets • Class participation in measuring activities.
Teaching Strategies:	• Direct instruction with demonstrations. • Guided practice using rulers.
Materials:	• "Measure in Inches" worksheets • Rulers, tape measures.
Lesson Activities:	
Introduction/Hook:	Quick discussion on the importance of accurate measuring in metalworking.
Body:	Teacher-led demonstration of measuring objects in inches. Students complete the worksheet.
Closure:	Group discussion on challenges faced while measuring.

Lesson 2

Name &Time (Minutes Allotted):	Metric Measurement (79 min)
Learning Standards: Curricular Competencies	• **Ideating**: Take creative risks in generating ideas and screen ideas against criteria and constraints.

	• Prototyping: Develop a plan that identifies key stages and resources, making changes as needed.
Learning Standards: Content	• Elements of plans and drawings. • Metalworking techniques and processes using hand tools and power equipment.
Instructional Objectives	Students will practice metric measurements using worksheets.
Assessment:	Completed "Measure Metric" worksheets
Teaching Strategies:	Direct instruction and guided practice.
Materials:	• "Measure Metric" worksheets • Metric rulers, digital calipers.
Lesson Activities:	
Introduction/Hook:	Discuss the differences between metric and imperial measurement.
Body:	Students measure classroom objects using metric rulers and complete worksheets.
Closure:	Share measurement strategies.

Lesson 3

Name &Time (Minutes Allotted):	Advanced Measurement & Application (79 min)
Learning Standards: Curricular Competencies	• Making: Identify and use appropriate tools, technologies, materials, and processes for production, adhering to safety procedures. • Sharing: Demonstrate and critique their product and processes, identifying new design goals.
Learning Standards: Content	• Metalworking techniques and processes using hand tools and power equipment. • Characteristics and uses of ferrous and non-ferrous metals.
Instructional Objectives	Students will measure metalworking components accurately.
Assessment:	• Completed "Measure Metric" and “Measure in Inches” worksheets • Hands-on measurement activity results.
Teaching Strategies:	• Hands-on learning with real-world applications.
Materials:	• "Measure Metric" worksheets and “Measure in Inches” worksheets • Metal pieces, calipers, rulers.
Lesson Activities:	
Introduction/Hook:	Demonstrate caliper usage.
Body:	Students measure real metal components and complete worksheets.
Closure:	Discussion on practical applications in metalworking.

Resources:

- Math-Aids.com (source for measurement worksheets)
- Measuring tools: rulers, tape measures, calipers

Extensions to Unit:

- Introduce blueprint reading and dimensioning in metal projects.
- Apply measuring skills in a simple metal fabrication project.

Reflections and Revisions

- Adjust difficulty based on student progress.
- Incorporate more real-world measuring tasks based on feedback.