

## Lab Framework

**Text: CORD**

**Unit number and title: 13: Precision, Accuracy, and Tolerances**

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### Lab Title

## Precision of Measuring Devices

### LAB PLAN

**TEACHER:** Teacher Prep/ Lesson Plan

- **Lab Objective**

Students will learn the importance of using precision tools for measurement within acceptable tolerances.

- **Statement of pre-requisite skills needed** (i.e., vocabulary, measurement techniques, formulas, etc.)

Ability to perform accurate measurements.

Use mathematical operations to compare measurements.

Understanding the difference between accuracy and precision.

- **Materials List**

1 Yardstick

1 12" Ruler with 1/8" increments

1 12" Ruler with 1/16" increments

1 6" Ruler

Machinist's steel ruler

Paper, Pencils, Pens

- **State Standards addressed**

**Math:**

**A1.2.D:** Determine whether approximations or exact values of real numbers are appropriate depending on the context and justify the selection.

**G.6.E:** Use different degrees of precision in measurement, explain the reason for using a certain degree of precision, and apply estimation strategies to obtain measurements with appropriate precision for a given purpose.

- **SCAN Skills/Workplace Skills**

**Writing:** Records information completely and accurately.

Includes supporting documentation and attends to level of detail, checks, edits, and revises for correct information.

**Mathematics:** Uses quantitative data to construct explanations for real world situations.

Expresses mathematical ideas and concepts orally and in writing.

**Listening:** Receives, attends to, interprets, and responds to verbal messages and other cues such as body language in ways that are appropriate to the purpose.

**Reasoning:** Discovers a rule or principle underlying the relationship between two or more objects.

- **Lab organization**(-Grouping/leadership opportunities/cooperative learning expectations; -**Timeline required**)  
Groups of 3-5.
- **Teacher Assessment of student learning** (scoring guide, rubric)  
Students will turn in their drawings with comments about the precision of the assorted measuring and marking tools.  
**Practical Assessment:** Instruct the students to choose a measuring device to draw varying lengths of lines, such as 3 inches,  $2\frac{3}{4}$  inches, 1.01 inches,  $3\frac{5}{16}$  inches.
- **Summary of learning** (to be finished after student completes lab)
  - discuss real world application of learning from lab
  - opportunity for students to share/present learning
- **Optional activities**  
Have students research the tolerances in different industries, such as, machinists, framing carpenters, finish carpenters, steel workers, etc.  
Include Vernier Caliper and Vernier Micrometer in the lab.
- **Career Applications**  
Machinists, Carpenters, Architects, Contractors, Landscapers, etc.

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**LAB TITLE: Precision of Measuring Devices**

**STUDENT INSTRUCTIONS:**

- **Statement of problem addressed by lab**  
All measuring instruments have a limited precision. The problem is to select the measuring tool that gives appropriate precision for the task at hand
- **Grouping instructions and roles**  
Break into groups of three.
- **Procedures – steps to follow/instructions**  
Each group is to select one each of the five measuring devices. Note the precision of each instrument (1/2 the smallest marking).  
With each instrument draw three lines,  $1\frac{1}{32}$ ", 2.025",  $6\frac{3}{4}$ ", with each instrument. Draw some with pen and some with pencil  
After students have drawn the lines, each student is to measure the drawn lines of one of their partners. Comment on the partner's paper on the precision of the lines.
- **Outcome instructions**  
Compare notes with your partners. How accurate were the drawings with each instrument? Which instruments were best suited for which lines?  
Summarize your findings.
- **Assessment instructions (peer-teacher)**  
Students will turn in their drawings with comments about the precision of the assorted measuring and marking tools. Summaries will be assessed for accuracy

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## Lab Data Collection

Student: \_\_\_\_\_ Date: \_\_\_\_\_

Unit: \_\_\_\_\_

Lab Title:

Criteria: Write the problem/objective in statement form

Data Collection: Record the collected/given data

Calculations: Complete the given calculations to solve for an answer(s)

Summary Statement:

Other Assessment(s)

Washington  
Applied  
Math  
Council

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