

WAMC Lab Template

Math Concept(s): Measurement and Precision

Source / Text:

Developed by: Ryan Watson E-Mail: Watson.ryan@yakimaschools.org

Date: Summer Conference 2016

Attach the following documents:

Lab Instructions: Students will accurately find the length and width of 10 various objects around the classroom using a ruler or measuring tape and measuring in US Standard and Metric Units.

Student Handout(s): Students will receive a document that contains 10 spaces that ask for length and width in both US Standard and Metric Units.

Rubric and/or Assessment Tool: I will randomly choose one of their 10 objects around the classroom and measure it myself to ensure that it is accurate and precise. Once this is complete, the student will receive a check on their handout. This document will be due the next day of class and needs to be completed on own if not finished in class.

Indicate "SPECIFIC" relationship to Science, Technology, or Engineering

Taking accurate measurements in US Standard and Metric Units is highly applicable and extremely important for a variety of professions such as carpentry, engineering, plumbing, and construction.

Short Description (Be sure to include where in your instruction this lab takes place):

In my classroom, students will be asked to take the prior knowledge of common measurement units for length and width in US standard and Metric units and apply that knowledge to precisely measure various objects. For material purposes, my students will be placed in groups of 3-4. Once their 10 measurements have been recorded, students will then label which objects was the largest/smallest.

Lab Plan

Lab Title: Measurement and Precision

Prerequisite skills:

- Fractions
- Full understanding of line segments.
- US Standard and Metric Units

<https://wa-appliedmath.org/>

Lab objective: Students will gain an understanding of how to measure objects for length and width in the US Standard and Metric Units.

Standards:

Mathematics K–12 Learning Standards:

- N-Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret unit consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
- N-Q.2 Define appropriate quantities for the purpose of descriptive modeling.
- N-Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standards for Mathematical Practice:

- MP.1 Makes sense of problems and persevere in solving them
- MP.2 Reason abstractly and quantitatively
- MP.3 Construct viable arguments and critique reasoning of others
- MP.5 Use appropriate tools strategically
- MP.6 Attend to Precision

K-12 Learning Standards-ELA (Reading, Writing, Speaking & Listening):

- RST.9-10.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
- W.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- L.9-10.6 Acquire and accurately use general academic words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level.

Leadership/21st Century Skills:

21st Century Interdisciplinary themes (Check those that apply to the above activity.)

- Global Awareness Financial/Economic/Business/Entrepreneurial Literacy Civic Literacy
 Health/Safety Literacy Environmental Literacy

21st Century Skills (Check those that students will demonstrate in the above activity.)

LEARNING AND INNOVATION

Creativity and Innovation

- Think Creatively
 Work Creatively with Others
 Implement Innovations

Critical Thinking and Problem Solving

- Reason Effectively
 Use Systems Thinking
 Make Judgments and Decisions
 Solve Problems

Communication and Collaboration

- Communicate Clearly
 Collaborate with Others

INFORMATION, MEDIA & TECHNOLOGY SKILLS

Information Literacy

- Access and Evaluate Information
 Use and manage Information

Media Literacy

- Analyze Media
 Create Media Products
 Information, Communications and Technology (ICT Literacy)
 Apply Technology Effectively

LIFE & CAREER SKILLS

Flexibility and Adaptability

- Adapt to Change
 Be Flexible

Initiative and Self-Direction

- Manage Goals and Time
 Work Independently
 Be Self-Directed Learners

Social and Cross-Cultural

- Interact Effectively with Others
 Work Effectively in Diverse Teams

Productivity and Accountability

- Manage Projects
 Produce Results

Leadership and Responsibility

- Guide and Lead Others
 Be Responsible to Others

<https://wa-appliedmath.org/>

Teacher Preparation: (What materials and set-up are required for this lab?)

Materials

- Paper
- Customary Ruler
- Metric Ruler
- Measuring Tape

Set-Up Required:

- Ensure that every student has a measuring tool (Ruler or measuring tape) at their desk.

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- 1.A Think Creatively
- 2.A Reason Effectively
- 2.B Use Systems Thinking
- 2.C Make Judgments and Decisions
- 2.D Solve Problems
- 3.B Collaborate with Others
- 4.A Access and Evaluate Information
- 4.B Use and Manage Information
- 7.B Be Flexible
- 8.A Manage Goals and Time
- 8.B Work Independently
- 8.C Be Self-Directed Learners
- 9.A Interact Effectively with Others
- 10.B Produce Results

Cooperative Learning:

- Students will need to work cohesively with everyone as the entire class will be walking around and measuring different entities. If a student is having difficulties, it is expected that their peers are helpful, informational, and supportive.

Expectations:

- Students are expected to take accurate measurements of 10 different objects in both US Standard and Metric Units and be able to calculate the area of the object.

Timeline:

- Approximately 57 minutes.

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab:

- Students will learn how to accurately and precisely measure various objects around the room. This skill can be applicable in a variety of real world situations such as designing the layout of a room in a home, ensuring that something is going to fit inside of another entity (a couch on a wall), or building/constructing something from scratch. Additionally, I have several students that have parents whom work in trades that require taking

accurate measurements. Therefore, this information and skill is highly relevant to their lives as it is how their parents make a living.

Career Applications:

- Construction
- Architecture
- Carpentry
- Engineering
- Surveyor

Optional or Extension Activities

- Students will be asked as homework to measure 10 items in their homes (walls, television, counter top, etc.) and record the length and width of those items in both US Standard and Metric. This assignment will be due the following day.

Washington Applied Math Council

<https://wa-appliedmath.org/>

Peer Evaluation Form for Group Work

Write the name of each of your group members in a separate column, including yourself. For each person, indicate the extent to which you agree with the statement on the left, using a scale of 1-4 (1=strongly disagree; 2=disagree; 3=agree; 4=strongly agree). Total the numbers in each column.

Evaluation Criteria	You:	Group member:	Group member:	Group member:
Contributes <u>meaningfully</u> & equally to group discussions and work.				
Prepares work in a <u>quality</u> manner.				
Demonstrates a cooperative and supportive attitude.				
Contributes significantly to the success of the group.				
TOTALS				

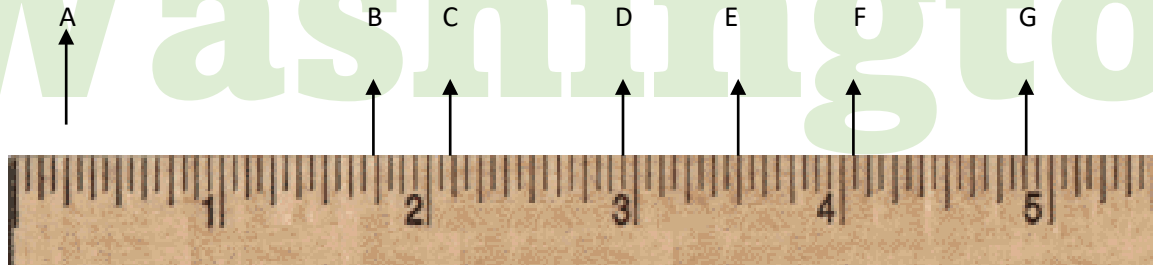
<https://wa-appliedmath.org/>

Name:
Date:
Period:

Measurement Quiz

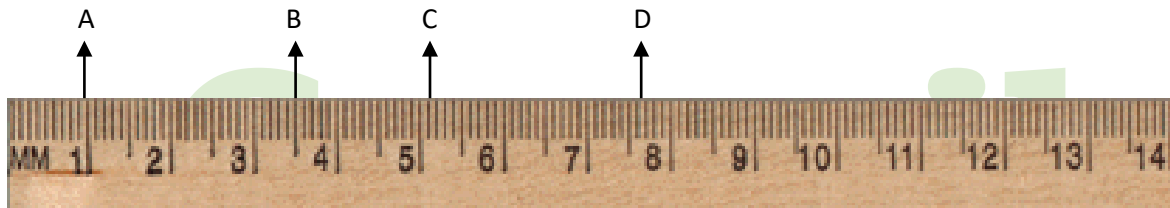
Problems:

1)



- A) _____
- B) _____
- C) _____
- D) _____
- E) _____
- F) _____
- G) _____

2)



- A) _____
- B) _____
- C) _____
- D) _____

6) If a carpenter has cut two pieces of lumber one is $3\frac{1}{2}$ inches long, the other is $4\frac{3}{8}$ inches long. If he puts the two pieces together how much total lumber does he have?

7) If a carpenter has a piece of lumber $10\frac{3}{4}$ inches long and he need a piece $8\frac{1}{2}$ inches long, how much does he need to cut off?