MODIFIED UBD LESSON PLAN

COURSE: Introduction to Engineering		
UNIT: Measurement 2.0	**EXERCISE:** Protractor Activity	**TIME FRAME:** 1 Hour

PREPARATION: *Summary of "to do's" that the teacher should understand and prepare before bringing this lesson to the classroom.*

Teachers will need to ensure that the proper supplies are available for students to build their solutions.

Materials:

- Protractor Printed Worksheet

Tools:

- Protractor

Additional Resources:

- Internet

Information

Before starting this exercise, students should have an understanding of

- ✓ Presentation: Measurement
- ✓ Presentation: Protractors

SAFETY: *Summary of safety strategies in the lesson.*

There are no safety exercises for this exercise.

S1 DESIRED RESULTS:

ESTABLISHED GOALS:

Problem Solving Techniques and Applications Standards:

Teachers should use the STEM Academy Standards Correlation System available in the STEM Connections area of a unit to extract specific standards and insert these standards here.

TRANSFER:

Students will be able to independently use their learning to…

- Demonstrate the correct use of micrometers, rulers, calipers, protractors and screw gauges in experiments;
- Use measurement tools accurately according to a rubric.

MEANING:

UNDERSTANDINGS

Students will understand that...

- Different tools are needed to take different types of measurements;
- Imperial and metric measurements are vastly different.

ESSENTIAL QUESTIONS

Students will keep considering...

- How accurate different types of measurements are;
- If there is a better tool for a certain task.

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ACQUISITION OF KNOWLEDGE AND SKILL:

Students will know...

- Specific uses and operations of various measurement tools;
- How specific measurement tools work.

Students will be skilled at...

- Choosing the correct tool for a task;
- Diagraming results of peer data compilation in an experiment.

S2 EVIDENCE:

EVALUATIVE CRITERIA:

- Completed
- Correct test answers

- Correct answers
- Accurate measurements

ASSESSMENT EVIDENCE:

Performance Task(s):

Protractor Activity
Students will learn and be tested on proper use of protractors.

Other Evidence:

- Corresponding test questions
- Collected measurement sheets

S3 LEARNING PLAN: *Summary of Key Learning Events and Instruction*

1. **Set Introduction**
   This activity will take one classroom day to complete.

2. **Familiarize**
   The teacher should be familiar with and present the materials or PowerPoint associated with measurement in this activity previous to the hands-on activity.

3. **Pass Out Paper**
   Students will need the printed protector worksheet to make measurements.

4. **Group Students**
   The teacher will determine the size of the groups that will work on the activity. If the activity is done individually, additional tape measures and rulers will be needed. If the activity is done in groups with less than four students to a group, additional tape measures and rulers will be needed.

5. **Pass Out Materials**
   The instructor will need to pass out the worksheet and protractors. Students will enter their answers into the Learning Management System through the protractor assignment.

6. **Review**
   Have your students review the information via the online web portal under *Content Knowledge*. While the students are reading, pass out the necessary tools and text books to complete this exercise as needed.

7. **Student Time**
   Give each student ample time to complete the activity. Circulate the room to verify each student is on task and progressing forward.

8. **Collect**
   At the completion of the activity collect each student's tools.

9. **Class Review**
   If time permits, review the activity as a class and discuss the correct measurements and answers.

10. **Remind Students**

Remind your students to review all of the materials form this unit in preparation for the test.

Progress Monitoring:

- The instructor will need to monitor the classroom, checking student's work and ensuring students are on task and following directions.
- Ensure students store their projects at the end of class and leave all materials in the room.
- At the end of the activity, post student projects in the room and provide appropriate feedback

DIFFERENTIATION: *Summary of Key Differentiation Techniques*

Please use this space to insert your differentiation techniques. Depending on the needs of students, various techniques might be needed in a classroom, therefore use the information below and experts in the area needed to design your plan for differentiation.

The ASCD Study Guide for Integrating Differentiated Instruction and Understating by Design: Connecting Content and Kids.
by Carol Ann Tomlinson, Jay McTighe

Integrating Differentiated Instruction and Understating by Design: Connecting Content and Kids.
by Carol Ann Tomlinson, Jay McTighe
ISBN-13: 978-1416602842
ISBN-10: 1416602844

Differentiating Reading Instruction
by Laura Robb.
ISBN13: 9780545022989

A Teacher's Guide to Differentiating Instruction
The Center for Comprehensive School Reform and Improvement

CAREER CONNECTIONS: *Summary of Career Opportunities Associated with this Lesson*

Civil Engineer
Civil engineers rely on accurate measurements to design and construct various structures.

Architect
Architects use accurate measurements to design various structures.

Health Science
Many of those in the health science field rely on accurate measurements when working with humans and animals.

KEYWORDS: *Please Insert Keywords from this Lesson with their Definitions*

ACCURATE—the quality or state of being correct or precise

MEASUREMENT—the action of measuring something

INSTRUMENT—a tool or implement, especially one for delicate or scientific work