_____THE BUS PROJECT_____

TODAY'S EXPLORATION: Measurement

Grade Level : 9 - 12

Overview: This unit introduces students to systems of measurement and the importance of understanding, interpreting, and accurately using measurements in trade and technical careers. Students will investigate the measurements and measurement tools commonly used in a specific trade and technical fields. Students will have the opportunity to weigh their interest in particular trade and technical careers against their skills, abilities, and aptitudes for taking and using measurements required for successful work in those careers.

Students will measure and map out the dimensions of the school bus using tape measures, calipers, speed squares, combination squares, construction pencils, folding rulers, and laser distance finders.

CTE Alignment

Architecture and Construction Cluster:
AC01 Use vocabulary, symbols, and formulas commonly used in design and construction.

Engineering and Technology Cluster:
EN04 Understand and use applied mathematics and science for engineering cluster careers.
EN04-06 Demonstrate the ability to select, apply, and convert systems of measurement to solve problems

Materials:

- Tape Measures
- Carpenter Pencils
- Calipers
- Speed Squares
- Combination Squares

- Folding Rulers
- Laser Distance Finders.
- Graph Paper

Investigation:

Measurement in Trade and Technical Fields

1. **Global Systems of Measurement** - Students will:
    a. Understand the two measuring systems used in the United States: US Customary and metric
    b. Explain how measuring systems are used to measure distance, weight, volume, time, temperature, and physical shapes
    c. Describe how measuring systems relate to each other
    d. Identify types of measurements typically used to accomplish work in specific trade areas

2. **Measurement Tools** - Students will:
    a. Select the appropriate tool for measurement tasks, such as a tape measure for length and a scale for weight
    b. Describe benefits and challenges of using particular measurement tools for specific measuring applications
    c. Explain the purpose and importance of calibration
    d. Show how measurements made with common tools relate to one another
    e. Identify types of measuring tools typically used to accomplish work in specific trade areas

3. **Measuring Distance** - Students will:
    a. Identify tools used for measuring distance
    b. Communicate distance measurements in appropriate units for the measurement task
    c. Demonstrate use and care of distance measuring tools
    d. Utilize appropriate distance measuring tools and procedures to accomplish tasks in specific trade areas

4. **Measuring Physical Shapes** - Students will:
    a. Describe the relationship between 3-dimensional shapes and 2-dimensional shapes
    b. Identify measurements that apply to 3-dimensional shapes
    c. Apply knowledge of the relationship between 3-dimensional and 2-dimensional shapes, and measurement skills to the construction of physical shape

5. **Measurement in Trade and Technical Career Pathways -** Students will:

a. Explain the roles, functions, and importance of measuring skills to work in trade career areas successfully
b. Assess personal skills for performing measuring tasks required for success in specific trade areas
c. Evaluate personal suitability for work in specific trade careers

Guiding Questions:

What knowledge and skills are necessary to demonstrate introductory understanding of systems of measurement and the ways accurate measurements assist trade and technical workers in the successful completion of their work?

What Are We Discovering?

The interior dimensions of a school bus for design and modeling.

Additional Activities:

Career and Community Connections

Measurement Relay!

1. Divide students into teams.
2. Place a variety of measuring tools throughout the classroom.
3. Develop two sets of cards for each team with enough cards for each team member to have at least one turn.
4. On each card in the first set, write a measuring task; on each card in the second set, write the name of a trade or technical career.
5. The relay begins with one member from each team selecting a measuring task card.
6. Next, they must find the appropriate measuring tool and find an appropriate career card to complete their turn and tag the next team member.
7. The first team to complete the relay is the class winner.
8. Discuss how different measurements and measuring tools are typically used in a specific trade and technical careers.

Problem Solving and Innovation

Measure, Mark, and Cut (Kerf)

Students work in pairs to measure, mark, and cut a 2"x 4" board to a designated length,

checking their partner's accuracy at each step. Next, partners measure the completed cuts. Partners discover that the board cuts are consistently too short. Next, students research the concept of Kerf to answer the question of why the board cuts are consistently off. Finally, partners decide how to modify their measure, mark, and cut approach to create accurate cuts and test their plans.

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Image sources: