

Instructional Scenario

Measuring Up



Course/Duty Area: Introduction to Plant Systems/Incorporating Mechanical Skills Related to Plant Systems

Scenario:

Students will use several measuring devices to take measurements in the agricultural mechanics laboratory. As each student enters the room for the day, give them a piece of string that is 20 feet long. As the teacher, you will ask each student to cut the string into sections that they estimate to be 7 inches long. Students are not permitted to use any measuring devices. As the teacher, you might specify that each piece of string longer than 7 inches will cause students to lose five points from the point value of the assignment and each piece shorter than 7 inches will earn students two additional assignments due for the week.

As the teacher, you will compare the string activity to cutting lumber at the local lumber mill store. If the owner of the store cuts lumber for a customer that is too long and only charges the customer for the measurement they requested, the lumber store will lose money and inventory, resulting in decreased profit. If the owner cuts the pieces too short, the customer may be unhappy and not return, or the owner may have to re-cut the lumber, resulting in the first piece being waste, again resulting in decreased profit.

Big Question:

How do you accurately read a ruler with graduations in standard and metric units?

Focused Questions:

- What measurement techniques are frequently used in plant science?
- Why is it important to be able to use conversion factors?

Student Project or Outcome:

After the string activity and comparing operations to a lumber store owner, provide information for students on the different types of measuring devices. Provide students with *Assessment 1* and have them complete it. Distribute tape measures and/or rulers to every student. Each student will need to have a measuring device which measures using 1/16-inch intervals. Provide instruction on how to read the differences in the length of the black marks (1/16, 1/8, 1/4, 1/2) and explain how to count and reduce all the black marks to their simplest form. Distribute *Activity Sheet 1* and have them complete it. Collect *Activity Sheet 1* and grade using a ruler.

Materials

- Assessment 1 - Incorporating Mechanical Skills Measuring Devices Test (included)
- Activity Sheet 1 - Incorporating Mechanical Skills Measuring Devices Worksheet (included)
- Writing utensils (pencil or pen)
- Measuring devices (steel tapes, rulers, framing square, etc.)
- Scissors
- String

Project-Based Assessment:

- Assessment 1 - Incorporating Mechanical Skills Measuring Devices Test (*included*)
- Activity Sheet 1 - Incorporating Mechanical Skills Measuring Devices Worksheet (*included*)

Scenario submitted by Dr. Jessica M. Jones, Tunstall High School, Pittsylvania County Public Schools

Activity Sheet 1

Incorporating Mechanical Skills Related to Plant Systems Measuring Devices Worksheet

Name: _____

Date: _____

Directions: In the space next to the measurement, use a straight edge measuring device (e.g. a ruler) to draw a line the length of the measurement.

1. $4 \frac{1}{2}"$

2. $3 \frac{1}{4}"$

3. $5 \frac{3}{4}"$

4. $3 \frac{1}{8}"$

5. $2 \frac{3}{8}"$

6. $4 \frac{5}{8}"$

7. $1 \frac{7}{8}"$

8. $3 \frac{1}{16}"$

9. $4 \frac{3}{16}"$

10. $1 \frac{7}{16}"$

Assessment 1

Incorporating Mechanical Skills Related to Plant Systems Measuring Devices Test

Name: _____

Date: _____

Directions: Identify the tool in the picture by writing the correct name in the blank provided.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____