Title: Accuracy and Precision

Objectives	Time frame to Complete
Students will be able to define accuracy, precision, and error.	15 minutes

	NRS EFL
	4

Stackable Cert. Documentation	Technology	Study / Life skills	EL-Civics	Career Pathways	Police	Paramedic	Fire Rescue	Medical Asst.	EKG / Cardio	Phlebotomy	Practical Nursing	Healthcare Admin	Pharmacy Tech	IMT	AMT	HVAC	Welding	Other:
X		X																

Standard(s) Addressed in Lesson

Use Math to Solve Problems and Communicate

Benchmark(s) Addressed in Lesson

M.4.11 Show that geometric measures such as length, perimeter, area and volume depend on the choice of unit and that measurements are only as precise as the units used.
M.4.12 Apply measurement scales and units to describe geometric figures to solve one-step and two-step problems.
M.4.33 Explain the differences among accuracy, precision and error.

Materials

- Various rulers – inches, centimeters, millimeters. If you do not have more than one type in the classroom, scale versions can be printed from this websitehttp://www.vendian.org/mncharity/dir3/paper_rulers/
- Other common items that can be used to measure (pennies, string, paperclips, straws, fingers, pencils).
- *Accuracy and Precision* handout

Learner Prior Knowledge

Basic understanding of measurement, including calculating area of a rectangle

Activities

Step 1   Define accuracy, precision, and error. Precision describes the how closely an instrument measures; accuracy describes the correctness of a measurement; error is a lack of accuracy. Students will be examining units of measure to determine the levels of accuracy, precision, and error.

Step 2   Distribute the *Accuracy and Precision* worksheet. Students measure objects using a variety of units in order to evaluate accuracy and precision.

Step 3   Check work, and re-teach as needed. As a class, discuss situations in which accuracy is important (such as the saying "measure twice, cut once", medicine dosages, or perhaps following a new recipe) and how errors can have a negative impact.

Step 4   Save worksheet in student portfolios as documentation for Basic Skills Stackable Certificate.

Assessment/Evidence

Completed worksheet

Adaptations for Beginning Students
Provide formulas to calculate area of a rectangle (LxW)
Adaptations for Advanced Students
Teacher Reflection/Lesson Evaluation
This lesson was created by Middletown ABLE.

Precision and Accuracy

The **precision** of a measuring device is determined by its unit of measure. If you are measuring on a ruler with marks every inch, your precision is within one inch. If you are measuring with a ruler with centimeters, your precision is within one centimeter. Centimeters are more precise measurements than inches because they are a smaller unit of measure. The smaller the unit of measure, the more precise it is. **Accuracy** describes how correct a measurement is. **Error** describes how inaccurate a measurement is.
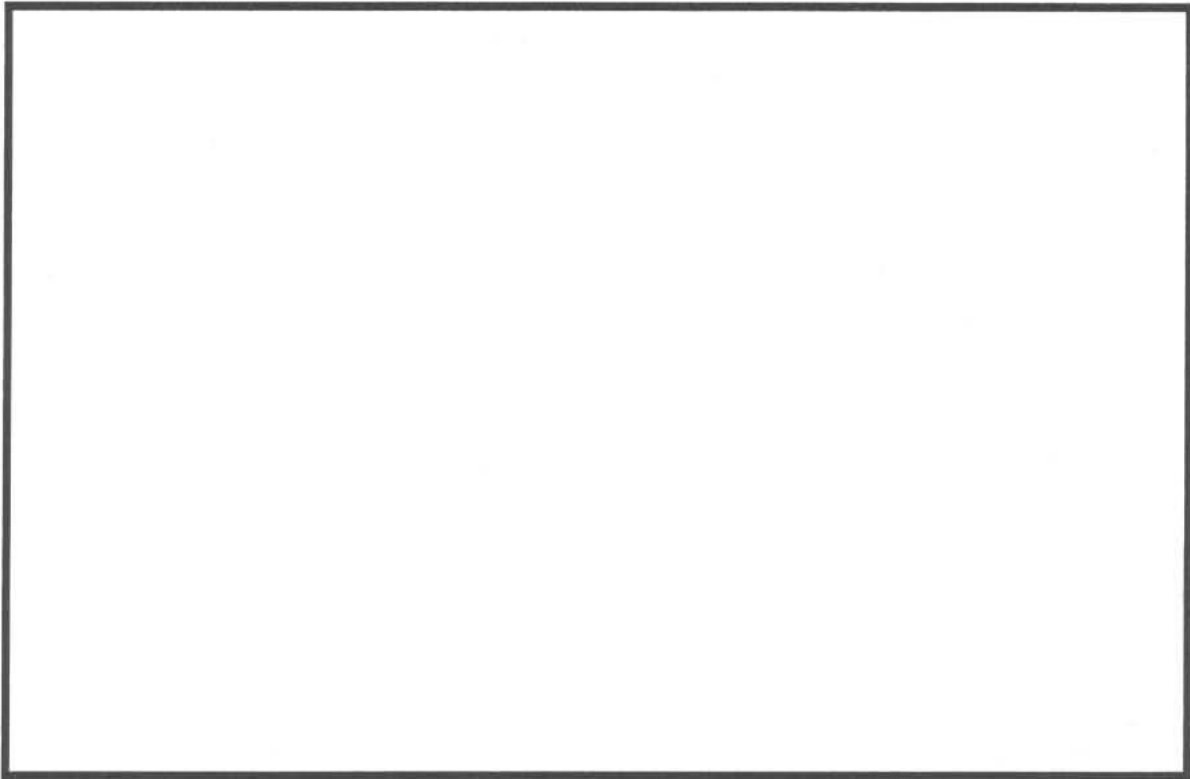
1. Measure this rectangle with four different units of measure (i.e. inches, finger-widths, pennies, etc.) Record the length and width in the table below.

Unit of Measure	Length	Width	Area

2. Calculate the area of the rectangle based upon the measurements.

3. Which unit is most precise?

4. Measure the rectangle again with the same units of measure. Record your findings and notice if there were any changes.

Unit of Measure	Length	Width

5. Which measurements were accurate? Explain.

6. If you were measuring the distance between your home and your office, which unit of measurement is most precise? Circle the accurate unit/s and explain your answer.

        ½ mile   2640 feet   3 blocks

7. Which is more precise - a household bathroom scale or a hospital scale used to weigh babies? Explain your answer. (Which unit of measure is used on each type of scale?)

8. In your own words explain the difference between accuracy and precision.