HS Science Task

Describe the context of your task here. Separate the parts of the task into A, B, C, etc.

A. Students will make measurements using metric units in a lab setting by performing specific tasks.
B. Some measurements will be used to determine area and volume.
C. To complete the lab, students will be required to convert metric units to standard units.

Common Core State Standards

List the Common Core State Standards (and math practices if applicable) associated with your task.

Quantities: 1. Use units as a way to understand problems and to guide the solutions of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scales and the origin in graphs and data displays.

Essential Understandings

What key insights should students take from participating in this task?

How to properly use the measuring instruments as well as correctly determining the measurements.

An understanding of the comparison of metric units and standard units.

Possible Solutions/Solution Paths

What solutions or solution paths are acceptable in achieving a correct response for this task? Be sure to address all parts of the task.

Students will be shown the proper technique for using all lab instruments.
Students will demonstrate the correct technique for determining a measurement.
Students will perform the math tasks using dimensional analysis. This process will require using a conversion fraction created from the given equivalence

statements. Students will determine how to set up the dimensional analysis problems to determine the correct answers.

Additional Teacher Information

Add any additional notes that will help the teacher execute the task including necessary manipulatives, equipment, etc., and possible students' misconceptions that may need to be addressed.

Equipment:
Triple beam balance
Metric ruler
Meter stick
Celcius thermometer
Graduated cylinder

Items to measure:
Ice in a beaker
Colored water in a graduated cylinder
Object to determine mass
Small flat object like a notepad for area determination using a ruler
Classroom door for volume measurement using a meter stick
Length of a room or hallway for distance measurement
Measure the height of a partner for comparison

Misconceptions
Students do not usually know how to use the instruments. Care must be taken to show students how to use the instruments in the lab. Most do not understand the graduation on the instruments. Part of the lab to display and correct these misconceptions.

Purpose: The purpose of this lab is to learn to properly use laboratory equipment to make measurements, record measurements in the correct unit, and understand the issues that lead to possible errors when making measurements.

Materials: meter stick, metric ruler, triple beam balance, graduated cylinder, beaker, Celsius thermometer, lab report, black ink pen, formula sheet.

Safety: Safety glasses and aprons are not needed. Caution should be used when handling glass ware.

Procedure:
You are to make the following measurements, recording your answers in the requested unit.

Find the **volume** of the classroom door in **cm^3**

Length: _____

Width: _____

Height: _____

Calculation: _____

Find the **area** of the notepad in **mm^2** on 1st lab bench

Length: _____

Width: _____

Calculation: _____

Find the **width** of the hallway from the front door to the lockers in **meters**. _____

Find the **mass** of the object at the triple beam balance station in **grams**. _____

Find the **volume** of the green liquid in the graduated cylinder in **milliliters**. _____

Find the **height** of one partner in **meters**. _____

Find the **temperature** of the ice water in **Kelvin**.

°C : _____

Calculation: _____

Using the data for the measurements already taken, convert your answers to standard units for the following.

1. Convert the width of the hallway from meters to yards.
2. Convert the mass of the object to ounces.
3. Convert the volume of the liquid from milliliters to cups.
4. Convert the height of the partner to inches.
5. Convert the temperature to Fahrenheit.

One step further, convert the area of the notepad to inches and the volume of the door to feet.

Unit Conversions:

1 meter = 39.37 inches
1 meter = 1.1 yards
1 milliliter = .034 ounces
1 meter = 3.3 feet
1 milliliter = 0.004 cups
1 centimeter = 0.4 inches
1 milliliter = 0.067 tablespoons
1 cm2 = 0.16 inches
1 milliliter = 0.2 teaspoons
1 cm3 = 0.06 inches
1 millimeter = 0.04 inches
1 gram = 0.034 ounces