Dimensional Analysis Lab Stations

Out Of The Box STEM

Station Material List

Station A: Pencil

Station B: Marble, Balance

Station C: Dry Beans (or something similar)
Pyrex Glass Measuring Cup

Station D: None

Station E: Spare change greater than $1

Station F: None

Station G: Stopwatch

Station H: Rice, Measuring Spoons

Station I: Pennies, Scale

Station J: 3 Different Objects, Ruler

Station K: Daily Temperature

Station L: 3 Beakers, Water, Food Coloring

Station A: Length

1) Measure your pencil/pen in centimeters. Record your answer.
2) Convert the length in centimeters to inches (2.54 cm = 1 inch).
3) Convert the length in centimeters to the length in kilometers. (10,000 cm = 1 km)
4) What is the best unit to use? Why?

Station B: Money

1. How much money (in dollars) is on the table? Record.
2. Convert to Euros (1 US dollar = 0.90 Euros)
3. Convert to Indian Rupee (1.12 US dollar = 75.07 Indian Rupee)
4. Convert to Australian dollars (1.12 US dollar = 1 AUD)
5. Do you have “more money” in another country if the number is different? Why or why not?

Station C: Ancient Egypt

1) Measure your height in centimeters. Record.
2) In Ancient Egypt, 1 *djeba*  equals 1.875 cm. Convert your height to to *djeba*.
3) In Ancient Egypt, 1 *meh nedjes*  equals 45 cm. Convert your height to *meh nedjes*
4) Does this system remind you more of the metric system or standard system? Why?

Station D: Time

1. Record how many seconds it takes you to walk from this station to the door and back. Record.
2. Convert seconds into minutes (60 seconds = 1 min)
3. Convert the minutes into hours (60 minutes = 1 hour)
4. How many times could you walk across the room in 1 hour (1 hour / answer to #3)
5. What is the best unit to use in this situation?

Station E: Volume

1. Measure 3 tablespoons of beans into the beaker.
2. Convert the number of tablespoons of beans into teaspoons (3 teaspoons = 1 tablespoons)
3. There are 16 tablespoons in 1 cup. How many cups of beans do you have in your beaker?
4. Double the amount of beans in the beaker. How many cups do you have now?

Pour the beans back into the container

Station F: Mass/Weight

1) There is an unknown amount of pennies in front of you. Mass the pennies in grams.
2) Convert the mass of these pennies to kilograms (1000g = 1 kg)
3) Each penny is 2.5 grams (1 penny = 2.5 grams). How many pennies are in your stack?
4) Convert the mass of the pennies to pounds (1 kg = 2.2 pounds)

Station G: Temperature

1) Today's temperature is currently _____ in Fahrenheit (look it up!)
2)

Temperature Formulas:

$$°C = (°F - 32) \cdot \frac{5}{9} \qquad °F = \frac{9}{5}°C + 32 \qquad K = °C + 273$$

Use the temperature formulas above to convert your temperature in Fahrenheit to **Celsius and Kelvin**. We cannot use regular dimensional analysis for temperature!

Station H: Volume

1) Record the volume in mL for each of the three colored liquids.
2) Convert the red liquid to liters (1000 ml = 1 liter)
3) Convert the blue liquid to pints (473 ml = 1 pint)
4) Convert the green liquid to gallons (3785.41ml = 1 gallons)
5) How and where do we use these units in everyday life?