STATION 1 •

Can your hands work like a thermometer?

What to do

1 - One bowl has warm water, one with iced water and one with medium water.

2 - Put one hand into the warm water and one in the iced water for **about 30 seconds.**

3 - Take your hands out of the water and put them both into the medium water.

How does the water feel?

4- Write a paragraph in your notebook describing what happened in this activity and what it taught you about your hands and “feeling” temperature. Can your hands measure temperature or heat differences?

STATION 2 • Scientific Notation & SF's

1. How to write (# to notation and visa versa).

Numbers 10 or larger have a positive exponent for the power of 10.
(Decimal point moves to the left)

Ex: 323,000 → moved 5 left → 3.23×10^5

100.4 → moved 2 left → 1.004×10^2

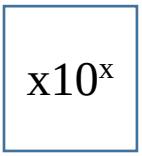
Numbers less than 1 have a negative exponent for the power of 10.
(Decimal point moves to the right)

Ex: .0323 → moved 2 right→ 3.23×10^{-2}

.001004 → moved 3 right → 1.004×10^{-3}

Change the following to Scientific Notation then indicate the number of sig. figs (SF's) in each measurement:

1. 50.28 = _____ SF's _____
2. 2,000 = _____ SF's _____
3. 6,589,000 = _____ SF's _____
4. .00007060 = _____ SF's _____



Do you know how to put a number in scientific notation in your calculator?

Which button do you have on your calculator? →

Put **2.508 x 10^{-3}** in your calculator. Write down what it looks like on the calculator.

_____ Now **NEVER** write it this way on any papers again. What you see on the calculator stays on the calculator. Know how to look at your display and write it in the correct form on worksheets and tests.

Try these and your answers need to have correct sigfigs:

		Calculator Answer	Answer Rounded to sf's
5.	$(5.1 \times 10^4)(2.07 \times 10^{-18}) =$	_____	_____
6.	$\frac{3.52 \times 10^6}{4.1 \times 10^{-2}} =$	_____	_____

• S T A T I O N 3 • Thermal expansion of liquids

1. Look at the test tubes that are in the ice water and make a sketch of it in your lab book. Record the temperature of the ice water.

2. Measure how high the liquids is in the test tube with the cm ruler and label your diagram. If you can't see any in the tube write 0.00cm. **Be sure to measure to 2 decimal places.**

3. Now place the tube in the room temperature water and describe what you see. It's a race. Put the tube back in the ice water once it reaches the top of the tube. Which one gets to the top of the top first? Record the temperature of the room temperature water

4. Place the test tube back in the ice water for the next group. Be sure to write some observations in your lab book.

• STATION 4 • METRIC CONVERSIONS
using Dimensional Analysis

Write this example in your notebook!!!!

How many meters are in 4.1 cm.

$$\frac{what\ you\ want}{what\ you\ have}$$

Start with the quantity in the problem **4.1 cm**

1. Examine the units of the desired answer. **m**
2. Multiply your quantity by the "relationship".
3. The starting units cancel out and you end up with the desired units.

$$4.1cm \times \frac{1m}{10^2 cm} = 4.1 \times 10^{-2} \text{ or } 0.041m$$

Some conversions require more than one factor;

We do not convert directly from **km to μm.**
So, the best approach is to convert from kg to g (the base unit) then from g to μg.

$$0.38km \times \frac{10^3 m}{1km} \times \frac{10^6 \mu m}{1m} = 3.8 \times 10^8 \mu m$$

Remember, even though we write factors with x signs, we multiply by the numerators and divide by the denominators.

1 m = _____ cm 1 m = _____ mm 1 km = _____ m

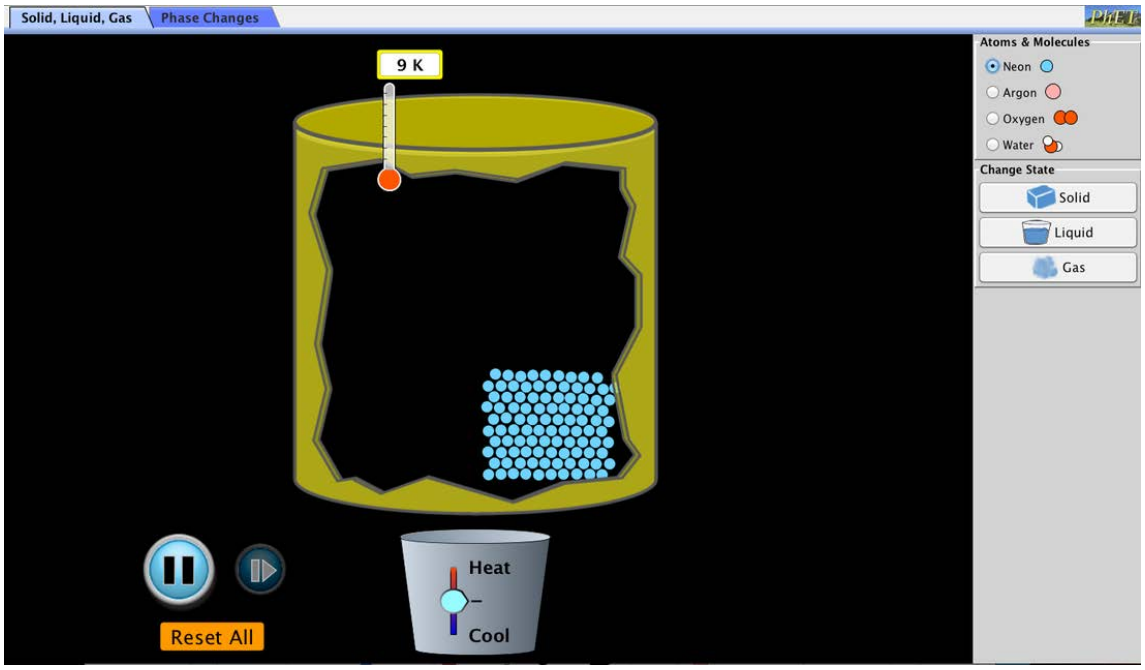
Now you try it using "Dimensional Analysis". Use your metric sheet for conversion factors!!

Convert 2570 mg into Mg:

Convert 0.000335 km into yards:

Convert 45.9 gal/hour to mL/sec (Hint do 2 problems!!)

S T A T I O N 5 • Observations of phases of matter



1. Using the computer go my website **www.quarkygal.com** and go to unit Two.
2. Click on the States of Matter pHet
3. When the pHet opens click on neon and solid. Does it look like our model of a solid?
4. Now play with the simulation and change the temperature on the solid.
5. What do you see is happening the as the solid is heated? Is it what you expect?
6. Try changing the states of matter and the type of particles present. Also try increasing the temperature and decreasing it.
7. Write a paragraph in your lab book reflecting what you observed and how it applies to our model of matter and energy.

STATION 6• Measuring mass & grams

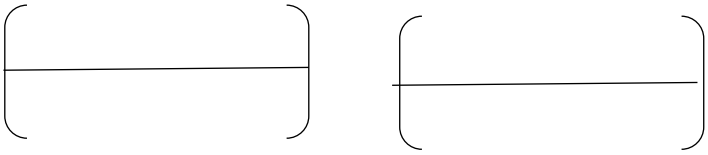
1. Look at the big mass at this station it is **one** Kilogram (Kg)
   Describe it in your notebook.

2. Now look at the little mass sitting next to it, it is **ten** grams. (g)

3. Draw a picture comparing the two sizes. Which is **BIGGER**? Can 1000kg fit into one gram?

4. What is the relationship between grams and Kilograms?

Show that relationship as a **"FFOO"** _____g___ = _____Kg___

Now write it a "relationship" two ways 

Now you try it using "Dimensional Analysis".

1. Put one of the objects in the basket on the scale.
2. Write the mass in grams to 3 decimal places in your lab book.
3. Now convert that mass to Kg using dimensional analysis.
4. Next convert the mass from Kg back to pounds (lbs).

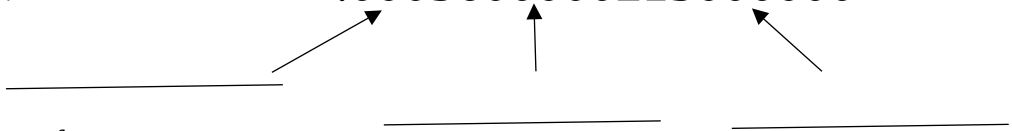
While you wait at this station do a little SF practice.

STATION 7 • Significant Figures (SF's)

Remember the pesky ZEROS!!!

Working with a partner answer the following questions in your notebook:

Write down the following number: .000560000213000000



Now mark whether the zeros are significant or not.
Hint: If a decimal zero's at the end **COUNT!!!**

1) How many significant figures are in each of the following?

a) .0012 _____

b) 904,000 _____

c) 0.001060 _____

d) 900.0 _____

Now do the following calculations:	Calculator Answer	Answer Rounded to sf's
2) (42.16)(.00301) =	_____	_____
3) 1.31 + 47.3315 =	_____	_____
4) (.00881)(57.07) =	_____	_____
5) $\frac{.7016}{.520}$ =	_____	_____

DON'T WRITE ON THIS PAPER!!!!!!

S T A T I O N 8 • M e a s u r i n g d i s t a n c e & m e t e r s

Look at the meter stick at this station and answer the following questions:

How many meters are in a meter (m) stick? _____

How many centimeters (cm) are in the same meter stick? _____

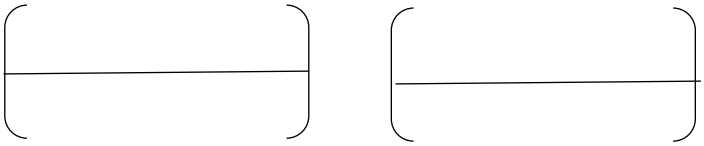
How many inches (in) are in the same meter stick? _____
Which is bigger a yard or a meter? _____

Now look at the little lines between the cm's on the ruler. How many lines do you see? _____

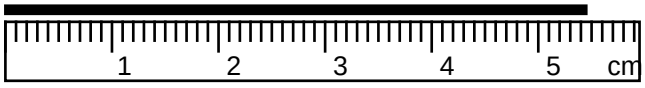
What is the relationship between cm's and meters?

Show that relationship as a **"FFOO"** _____= _____

Now write it a "relationship" two ways



1. Look at the ruler below:



What is the correct measurement for the length of the black line? _____

2. Use the plastic ruler. The length of this line is:

Does your answer have 2 decimal places and units?

3. Now choose a block and measure the mass _____g
   Measure the length, _____cm
   width, _____cm
   height to the **correct sig. figs.** _____cm

Record all your measurements in your notebook and use them to calculate the **density of the wood block** and use the correct number of SF's.

Density of wood Block _____g/cm^3

DON'T WRITE ON THIS PAPER!!!!!!