Station 1 – Scientific Method

1. What are the six steps to the scientific method?

2. Read the situation below then answer the questions about it:

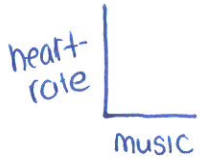
A group of college students were given a short course in speed-reading. The instructor was curious if a monetary incentive would influence performance on a reading test taken at the end of the course. Half the students were offered $5 for obtaining a certain level of performance on the test, the other half were not offered money.

a. What is the purpose of this experiment? if money makes a difference
b. Form a hypothesis about this experiment (Make sure it is in the proper notation). If the students do better, than money makes a difference
c. What is the independent variable? Money
d. What is the control group? ½ that doesn't get money
e. What is the dependent variable? score on test
f. Draw a graph and label the x and y axis with the proper headings.

3. Read the situation below the answer the questions about it:

A researcher is curious to find out what effect classical music has on people's level of relaxation (as measured by heart rate). He suspects that listening to classical music will make people feel more calm and relaxed. He lets one group listen to classical music for one hour. He lets another group sit in a quiet room for one hour (i.e they hear no music). After one hour, he monitors the heart rate of each participant to measure their level of relaxation.

a. What is the purpose of this experiment? to find out if music helps calm people
b. Form a hypothesis about this experiment (Make sure it is in the proper notation). if heartrate slows down when listening, then it has a positive effect.
c. What is the independent variable? music
d. What is the control group? group that doesn't listen to music
e. What is the dependent variable? heart-rate
f. Draw a graph and label the x and y axis with the proper headings.



Station 2 – Significant Figures

1. What are the 4 (or 5) rules for determining how many numbers are important in a problem?
   1. leading zeros never count
   2. Trailing zeros count if there is a decimal
   3. Interior zeros count
   4. non-zeros always count
2. What is the rule for determining how many significant figures there are when adding or subtracting?

   lowest number of sig. figs. after decimal point

3. What is the rule for determining how many significant figures there are when multiplying or dividing?

   lowest number of sig. figs. total

4. Determine how many significant figures there are in each of the following:

   a. 780. 3
   b. 0.00390 3
   c. 8120 3
   d. 72 2
   e. 91010 4
   f. 0.023 2
   g. 1020010 6
   h. 1000.0 5
   i. 0.0001 1
   j. 500 1

5. Solve each of the problems to the proper number of significant figures:
   a. 6.4888 + 7.287 + 97.669 = 111.445
   b. 8.6 – 3.66 = 4.9
   c. 9.984 – 9.1173 = 0.867
   d. 96.2 + 9.2758 = 105.5
   e. 1006 ÷ 19.178 = 52.46
   f. 0.77 x 536 x 501 = 210,000
   g. 9.5 x 0.07 = 0.7
   h. 94.45 ÷ 10 = 9

Station 3 – Scientific Notation

1. What are the 3 parts to writing any number into scientific notation?
   1. decimal part
   2. exponential part
   3. exponent
2. What are the 4 steps to writing a number in scientific notation?

   a. When n is positive which way does the decimal move?

   left

   b. When n is negative which way does the decimal move?

   right

3. Put the following numbers into scientific notation:

   a. 123.4 1.234×10^2
   b. 145000 1.45×10^5
   c. 25.25 2.525×10^1
   d. 1.45 1.45×10^0
   e. 8.0012 8.0012×10^0
   f. 0.00234 2.34×10^{-3}
   g. 0.0123 1.23×10^{-2}
   h. 0.000008706 8.706×10^{-6}

4. Put the following numbers into standard form:

   a. 2.1×10^3 2,100
   b. 9.66×10^{-4} 0.000966
   c. 6.04×10^{-2} 0.0604
   d. 1.71×10^7 17,100,000
   e. 4.02×10^0 4.02
   f. 3.3×10^1 33
   g. 1.5×10^{-2} 0.015
   h. 7.9×10^{-5} 0.000079

5. Solve the following problems using the rules of scientific notation:

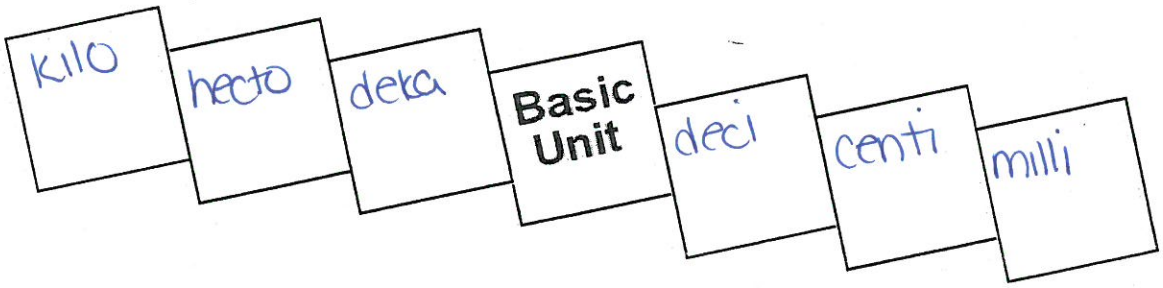
   a. $(1.2 \times 10^5) + (5.35 \times 10^6)$ 5.47×10^6
   b. $(3.67 \times 10^2) - (1.6 \times 10^1)$ 3.51×10^2
   c. $(6.0 \times 10^3) \times (1.5 \times 10^{-2})$ 9.0×10^1
   d. $\frac{8.1 \times 10^{-2}}{9.0 \times 10^2}$ 9.0×10^{-5}

Station 4 – Metric Conversions

1. What are the 5 main units and their quantity measured and their abbreviations used in the metric system?

Quantity Measured	Unit	Abbreviation
Length	meter	m
Mass	kilogram	kg
Volume	liter	L
Temperature	Kelvin	K
Time	second	S

2. Fill in the ladder with the correct prefixes and number of units:



3. What are the 3 steps to solve any metric conversion using the ladder method:
   a. Find starting spot
   b. count "jumps"
   c. move decimal

4. Solve:
   a. 160 cm = 1600 mm
   b. 14 km = 14000 m
   c. 198 g = 0.198 kg
   d. 6.3 cm = 63 mm
   e. 120 mg = 0.12 g
   f. 5.6 m = 560 cm
   g. 5 L = 5000 mL
   h. 576 L = 0.576 kL
   i. 3.42 m = 342 cm
   j. 16 kg = 16000 g

Station 5 – English to Metric Conversion

1. What are the 6 steps used to solve problems using dimensional analysis?
   a.
   b.
   c.
   d.
   e.
   f.

2. Solve the following problems:

a. 74 cm = 29 in. $74\text{cm} \times \frac{0.3937\text{in}}{1\text{cm}} =$

b. 25 mL = 5.1 tsp. $25\text{mL} \times \frac{0.2029\text{sp.}}{1\text{ mL}}$

c. 50 kg = 100 lbs. $50\text{kg} \times \frac{2.205\text{ lbs.}}{1\text{ kg}}$

d. 160 km = 99 mi. $160\text{ km} \times \frac{0.6214\text{ mi}}{1\text{ km}}$

e. 3.6 L = 0.95 gal. $3.6\text{L} \times \frac{0.2642\text{ gal}}{1\text{ L}}$

f. 500 g = 20 oz. $500\text{g} \times \frac{0.03527\text{ oz}}{1\text{g}}$

g. 300 mL = 1 cups $300\text{mL} \times \frac{1\text{ L}}{1000\text{mL}} \times \frac{4.227\text{ cups}}{1\text{ L}}$

h. 523 mm = 21.0 in. $523\text{mm} \times \frac{1\text{cm}}{10\text{ mm}} \times \frac{0.3937\text{in}}{1\text{cm}}$