

Science Skills Review

You are responsible for the concepts and ideas reviewed in this packet. We will not go over these topics in class. If you have any questions, please see me outside of class. All of these topics should have been covered in your previous math and science classes. Answers are (or will soon be) made available. This material will be included in your first quiz. You may answer all of the questions right on these sheets. Your textbook covers much of this material in Chapter 1 and Appendix A.

A. Scientific Notation and Exponents

1. Express the following numbers in scientific notation:

- | | | | |
|------------|-------|--------------|-------|
| a. 560 | _____ | d. 4,320,000 | _____ |
| b. .0048 | _____ | e. .00065 | _____ |
| c. 43, 200 | _____ | f. 101.35 | _____ |

2. Express the following in proper scientific notation:

- | | | | |
|----------------------------|-------|----------------------------|-------|
| a. 125×10^3 | _____ | c. $.895 \times 10^8$ | _____ |
| b. 109589×10^{-4} | _____ | d. $.00678 \times 10^{-9}$ | _____ |

3. Write out the following numbers long hand. (These are not given in proper sci. notation):

- | | | | |
|-----------------------|-------|-----------------------------|-------|
| a. 1×10^6 | _____ | d. 7657×10^{-3} | _____ |
| b. 45.6×10^2 | _____ | e. $.006 \times 10^3$ | _____ |
| c. 5×10^3 | _____ | f. 985678×10^{-10} | _____ |

4. Solve the following addition and subtraction problems. Write your answer in scientific notation.

- a. $4.5 \times 10^7 + 6.45 \times 10^7 =$ _____
- b. $5.4 \times 10^7 + 7.8 \times 10^6 =$ _____
- c. $7.8 \times 10^{-6} - 8.4 \times 10^{-7} =$ _____
- d. $2.3 \times 10^4 - 4.2 \times 10^3 =$ _____
- e. $6.7 \times 10^{-8} + 8.2 \times 10^{-7} =$ _____

5. Solve the following multiplication and division problems. Write your answer in scientific notation.

- a. $(4.5 \times 10^2)(2.3 \times 10^{-4}) =$ _____

- b. $(2 \times 10^6)(3.5 \times 10^{-9}) =$ _____
- c. $(1.2 \times 10^7)(1.2 \times 10^4) =$ _____
- d. $(6.0 \times 10^7)/(1.5 \times 10^2) =$ _____
- e. $(7.2 \times 10^{-4})/(1.2 \times 10^8) =$ _____
- f. $(5.5 \times 10^{-5})(6 \times 10^4)/(2.1 \times 10^4) =$ _____
- g. $(5.5 \times 10^{-5})(6.0 \times 10^4)/(3.0 \times 10^{-6}) =$ _____

B. Units and Prefixes

1. What are the standard units in the SI or metric system for each of the following:

- a. length _____
- b. mass _____
- c. time _____
- d. volume _____

2. These are the prefixes that you are responsible for knowing in this course:

Prefix	Power	Abbreviation
giga	$\times 10^9$	G
mega-	$\times 10^6$	M
kilo-	$\times 10^3$	k
centi-	$\times 10^{-2}$	c
milli-	$\times 10^{-3}$	m
micro-	$\times 10^{-6}$	μ
nano-	$\times 10^{-9}$	n
pico-	$\times 10^{-12}$	p

For each of the following, rewrite the measurement using powers instead of prefixes. For example,

$$10\text{mm} = \underline{10 \times 10^{-3}\text{m}}$$

- a. 25picograms = _____
- b. 85 gigawatts = _____
- c. 1.56 nanoseconds = _____
- d. 10.05 milliliters = _____
- e. 970cl = _____
- f. 65kg = _____
- g. .57 μm = _____
- g. 1200Mg = _____

3. For each of the following, rewrite the measurement using prefixes. There is more than one correct answer for some. Just use the most convenient.

a. 36582474 g = _____

e. 1256×10^{-6} m = _____

b. 53236 Volts = _____

f. 4.62×10^{-3} s = _____

c. 0.000000452 m = _____

g. 1.895×10^9 m = _____

d. 1567.9845 Watts = _____

h. 2.35×10^{12} L = _____

C. Unit conversions. Knowing the prefixes that you know, you should be able to convert between and among units. You should have done many similar problems in chemistry....

1. Complete the conversions. For example:

1178m -> mm

$$\left(\frac{1178m}{1}\right)\left(\frac{1000mm}{1m}\right) = 1178000mm$$

97987 grams/hour -> kilograms/year

$$\left(\frac{97987\text{grams}}{\text{hour}}\right)\left(\frac{1\text{kilogram}}{1000\text{grams}}\right)\left(\frac{24\text{hours}}{1\text{day}}\right)\left(\frac{365\text{days}}{1\text{year}}\right) = 858366.12\text{kilograms/year}$$

a. 1Ms -> ps

b. 1kg -> μg

c. 1cm -> nm

d. 35mm -> m

e. 450cm -> mm

f. 250km -> cm

g. $1500\mu\text{g} \rightarrow \text{g}$

h. $543\text{mg} \rightarrow \text{kg}$

i. $1 \text{ year} \rightarrow \text{seconds}$

j. $450\text{m/s} \rightarrow \text{m/h}$

k. $85\text{cm/min} \rightarrow \text{m/s}$

l. $3 \times 10^8 \text{ m/s} \rightarrow \text{km/day}$

m. If one case = \$225, one case = 50 packages, and 1 package = 24 cookies, what is the cost of one cookie?

n. $756 \text{ grams}/(\text{centimeter})^3 \rightarrow \text{grams}/(\text{meter})^3$

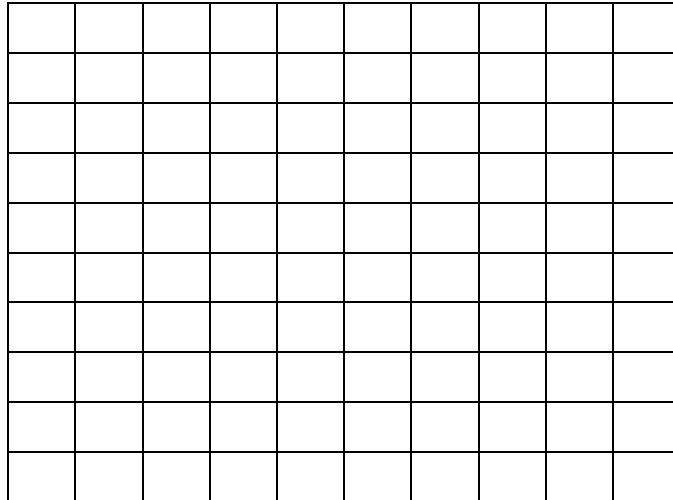
o. A person works 7 hours per day, 5 days per week, and gets paid \$25 per hour. He works 36 weeks per year. How much does he make in 4 years?

p. A shag rug costs \$11.00 for 5 square yards. How much will it cost to carpet your bedroom, which is 88 square yards in area?

D. Graphing

A car was designed so that each time one liter of gasoline was used, a light would flash on and the driver would then read the number of kilometers traveled. The data are given below.

Liters	Kilometers
1	6
2	13
3	18
4	23
5	30



1. Which variable is the independent variable? _____ Which is the dependent?

2. Graph the data on the graph paper above. Place the correct variable on the correct axis. Be sure to label all axis completely and correctly. Give your graph an appropriate title.
3. Draw a best-fit line for the data.
4. Find the slope of the best-fit line:

5. What distance would be expected for 1.5 liters? _____
6. What distance would you expect for 6 liters? _____
7. Write an equation representing the relationship between gasoline consumption and kilometers traveled: _____