Honors Chemistry: Significant Figures Scientific Notation Date _____ Period _____

2·2

2. Distinguish between the accuracy and precision of a measurement.

2·3

3. Identify the number of significant figures in a measurement.
Examples: a. 0.42 L _____
b. 78.00 m _____
c. 320 g _____

2·4

4. Use the rules for significant figures in calculations to correctly round off numbers.
Examples: a. Round off 8630 km to two significant figures. _____
b. Round off 0.01025 m to three significant figures. _____
c. Round off 0.00543 L to two significant figures. _____
d. Round off 7.013 g to three significant figures. _____
e. Round off 0.003629 mm to three significant figures. _____

3. How many significant figures are in the measurement 40.04 cm^2? 3. _____

4. How many significant figures are in the measurement 400.000 cm^2? 4. _____

5. How many significant figures are in the measurement 3.15 cm^2? 5. _____

6. If the measurement in Question 5 were multiplied by another number, what is the maximum number of significant figures the product could have? 6. _____

7. If the measurement in Question 5 were added to another number, what is the maximum number of significant decimal places the sum could have? 7. _____

Match the numbers on the left with the correct scientific notation on the right.

a. 0.000 71 _____
b. 71 000 _____
c. 71.000 _____
d. 710.00 _____
e. 0.710 00 _____

(1) 7.1000×10^{2}
(2) 7.1×10^{4}
(3) 7.10000×10^{1}
(4) 7.1×10^{-4}
(5) 7.1000×10^{-1}

Match the numbers on the left with the correct number of significant figures on the right.

a. 0.000 370 _____
b. 1.000 37 _____
c. 100 _____
d. 0.10 _____
e. 1001 _____
f. 0.001 000 3 _____

(1) 1
(2) 2
(3) 3
(4) 4
(5) 5
(6) 6

USING CONCEPTS

How many significant digits are in each of the following numbers?

a. 1.005 g ____ b. 10 000 g ____ c. 74 200 g ____ d. 0.000 010 g ____

Fill in the blanks.

a. 1 m^3 = _____ cm^3 b. 1 m^3 = _____ liters c. 4.13 mL = _____ cm^3

Fill in the blanks

a. 2 m = _____ cm b. 4.62 L = _____ mL c. 0.4 kg = _____ g

Write the following numbers in scientific notation.

1. 512 — 1. _____
2. 35 615 — 2. _____
3. 885 326 251 — 3. _____
4. 0.000 40 — 4. _____
5. 0.010 01 — 5. _____

Write the following numbers in standard notation.

6. 3.0×10^{6} — 6. _____
7. 1.49×10^{-5} — 7. _____
8. $5.000\,102 \times 10^{3}$ — 8. _____
9. 4.4×10^{-7} — 9. _____
10. 9.993×10^{-2} — 10. _____

Express the following numbers either in scientific notation or in conventional form. Standard Scientific Notation: Expanded: (expanded notation)

a. 93 000 000 _____
b. 0.000 000 070 42 _____
c. 1.00 _____
d. 6.200×10^{-3} _____
e. 3.14×10^{6} _____
f. 1×10^{1} _____

Multiply the following. Be sure the correct number of significant digits appears in the answer.

a. $2.1_m \times 0.4700_m =$ _____ b. $6000_m \times 0.144_m =$ _____

Add the following numbers. Be sure the answer contains the correct number of decimal places.

```
  40.0     g
   0.7631  g
5000.112   g
+ 610.70   g
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```
0.0067      cm
0.1004      cm
3           cm
+ 7.00002   cm
```

Perform the following operations.

a. $(2.1 \times 10^{6}_{M})(4.0 \times 10^{-4}_{m}) =$

c. 4.0×10^{4} cm
$+ 6 \times 10^{3}$ cm

b. $\dfrac{1.6 \times 10^{-8}\ kg}{8.0 \times 10^{-3}\ m^3}$

d. 8.0×10^{-4}
$- 9 \times 10^{-5}$

MR. STONE

NAME_____
DATE_____
PERIOD_____

CHEMISTRY _____: SIGNIFICANT FIGURES/SCIENTIFIC NOTATION
CALCULATING WITH SF & SN

1. List the two main causes of error or uncertainty in measurements.

_____

_____

2. What general relationship does the number of significant figures found in a measurement have to the accuracy of that measurement?

_____

_____

3. In science, precise measurements are always accurate measurements. TRUE or FALSE. _____

(Q:4-8) Indicate the number of SF's in the following measurements:

4. 1200.0023 cm _____
5. 57.00 g _____
6. 1.0020 L _____
7. 0.0000456 s _____
8. 0.000340 Gg _____

(Q:9-13) Perform the following calculations and report your answer to the correct number of SF's:

9. 3.24 cm + 9.11 cm + 2 cm = _____
10. 10.89 kg - 4.123 kg = _____
11. 11.44 L + 6.043 L - 2.1257 L = _____
12. 2.20 s x 4.1 s = _____
13. 6.464 mm ÷ 2.1 mm = _____

(Q:14-15) Convert the following numbers into SN:

14. 243500000 _____
15. 0.00004315 _____

(Q:16-17) Convert the following numbers from SN into expanded form:

16. 4.065×10^{3} _____
17. 3.002×10^{-4} _____

(Q:18-20) Perform the following calculations using SN:

18. $(2.2 \times 10^{7}\ m) \times (1.0 \times 10^{-4}\ m)$ = _____
19. $4.44 \times 10^{6} \div 2.0 \times 10^{2}$ = _____
20. $7.33 \times 10^{5} + 3.11 \times 10^{4} - 2.3 \times 10^{3}$ = _____

Name _____ Date _____ Class _____

2 MEASURING AND CALCULATING

A. DISCOVERING CONCEPTS

Circle the letter in front of the best answer to complete each statement.

1. The International System (SI) of measurement is a modern version of the _____ system of measurement.
   a. English b. Metric

2. _____ depends on the distance between an object and the center of the earth.
   a. Mass b. Mass density c. Volume d. Weight

3. An object's mass _____ as the object is moved from sea level to the top of a mountain.
   a. increases b. decreases c. remains the same

4. The unit used to express our basic standard of time is the _____.
   a. second b. day c. month d. year

5. The unit of _____ is the kelvin (K).
   a. time b. temperature c. mass d. length

6. The temperature of a bucket of boiling water is _____ the temperature of a glass of boiling water.
   a. higher than b. lower than c. the same as

7. A bucket of boiling water has _____ heat energy than/as a glass of boiling water.
   a. less b. more c. the same

8. The Celsius temperature scale has _____ degrees between the boiling and freezing points of water.
   a. 32 b. 100 c. 180 d. 212

9. The units used to express measurements of speed, area, and volume are called _____ units.
   a. precise b. derived c. significant d. basic

10. The newton (N) is a unit of _____.
    a. mass b. length c. weight d. volume

11. The standard _____ is defined in terms of the wavelength of a particular color of light.
    a. kilogram b. second c. meter d. degree

12. _____ is expressed as a length per unit time.
    a. Density b. Area c. Volume d. Speed

13. The density of 1 kg of lead is _____ the density of 1 kg of feathers.
    a. more than b. less than c. the same as

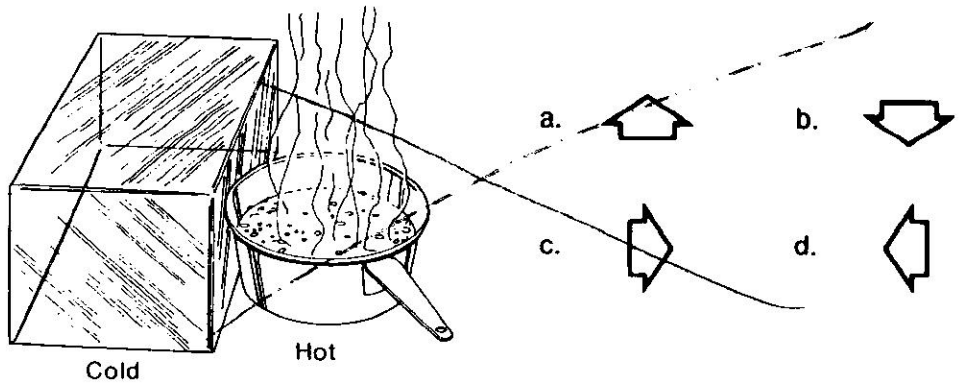
14. The density of 1 kg of lead is _____ the density of 1 g of lead.
    a. more than b. less than c. the same as

15. The mass of 1 kg of lead is _____ the mass of 1 kg of water.
    a. more than b. less than c. the same as

Name _____ Date _____ Class _____

B. INTERPRETING CONCEPTS

1. Circle the arrow indicating the direction heat will flow between the objects.



2. Match the prefixes with their equivalents.

a. micro (μ)	____	(1) 1/1 000 000 000 (billionth)
b. kilo (k)	____	(2) 1/1 000 000 (millionth)
c. deka (da)	____	(3) 1/1 000 (thousandth)
d. deci (d)	____	(4) 1/100 (hundredth)
e. centi (c)	____	(5) 1/10 (tenth)
f. hecto (h)	____	(6) 10 (ten)
g. giga (G)	____	(7) 100 (hundred)
h. milli (m)	____	(8) 1000 (thousand)
i. nano (n)	____	(9) 1 000 000 (million)
		(10) 1 000 000 000 (billion)

3. Fill in the blanks correctly.

a. g/cm^3 is a unit of _____. c. cm^2 is a unit of _____.

b. cm/s is a unit of _____. d. m^3 is a unit of _____.

4. Match the numbers on the left with the correct scientific notation on the right.

a. 0.000 71	____	(1) 7.1000×10^2
b. 71 000	____	(2) 7.1×10^4
c. 71.000	____	(3) 7.10000×10^1
d. 710.00	____	(4) 7.1×10^{-4}
e. 0.710 00	____	(5) 7.1000×10^{-1}

5. Match the numbers on the left with the correct number of significant figures on the right.

a. 0.000 370	____	(1) 1
b. 1.000 37	____	(2) 2
c. 100	____	(3) 3
d. 0.10	____	(4) 4
e. 1001	____	(5) 5
f. 0.001 000 3	____	(6) 6

6. The answer to the following problem should be expressed in units of _____.

$$\frac{60\ s}{min} \left| \frac{60\ min}{h} \right| \frac{24\ h}{day} \left| \frac{365\ days}{yr} \right| = $$