Name:_____ Date:_____ Chemistry

1-4 Explore

Solve each of the following problems as directed. Show all your work. Use the correct abbreviation for each unit.

1. Convert 83-cm into meters.

2. Convert 459-L into milliliters.

3. Express 1123-pg in nanograms.

4. Express 0.032-m^3 in liters.

5. Express 2.5-mm in micrometers.

6. Which is the longer amount of time, 1351-ps or 1.2-ns? Explain your answer.

7. Which is the larger pressure, 232.1-kPa or 125,487-Pa? Explain your answer.

8. Which is the smaller mass, 285.0 cg or 23.78 dg? Explain your answer.

9. Which is the shorter length, 175.6-mm or 38.4-cm? Explain your answer.

10. Convert the masses below into grams.
    a. 0.7824-mg
    b. 345,000-ng
    c. 0.003 78-kg
    d. 34,981-Mg
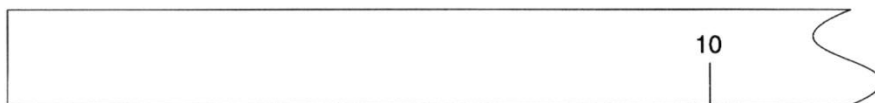
1-6 Explore

Paper Clip Patterns

In this activity you will explore why measurements involve a degree of uncertainty.
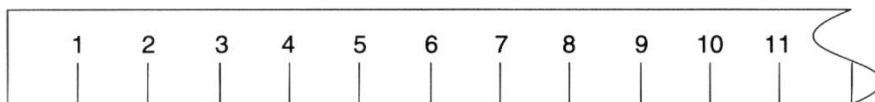
Materials (per student)

Paper Clip

Procedure

1. Measure the length of a paper clip on each ruler pictured below. The measurements will not be identical. Write your answers in the space provided.

length of paper clip
_____-cm

length of paper clip
-cm

length of paper clip
_____-cm

Questions

1. Were all of your measurements identical? Explain.

_____

_____

_____

2. Which measurement required the greatest amount of estimation? Explain.

_____

_____

_____

3. How do your measurements indicate this difference in the degree of estimation needed?

_____

_____

_____

1-6 Practice Problems

Identify the number of significant digits in each of the following measurements. Write the number in the space provided.

1. 520-mL _____   5. 10.002-ns _____

2. 0.0102-ms _____   6. 0.451-Pa _____

3. 0.230-kg _____   7. 0.001-cm _____

4. 25,600-L _____

Perform the following calculations and round off the answer to the correct number of significant digits.

8. 0.3287-g x 45.2-g =?   13. 0.258-mL + 0.36105-mL =?

9. 125.5-kg + 52.68-kg + 2.1-kg =?   14. (1250-cal - (234.207-cal ÷ 52.69-cal)) =?

10. $\dfrac{52.8 \text{ Pa} + 3.0025 \text{ Pa}}{253.4 \text{ Pa}}$ = ?   15. $\dfrac{78.26 \text{ L} - 89.50 \text{ L}}{678.2\text{-L}+9511\text{-L}}$ = ?

11. (0.12-g + 5.16-g) x (45.56-g - 93.0-g) = ?

12. 68.32-ns + (-1.001-ns) + (-0.00367-ns) + (-678.1-ns) = ?

1-6 Practice Problems (continued)

Express each of the following numbers in scientific notation.

16. 8960

19. 36,000,000 _____

17. 0.00023 _____

20. 0.0000000253 _____

18. 86,000 _____

Check the following equalities for errors. If an answer is correct, write "correct" in the space provided. If an answer is incorrect, rewrite it to make it correct.

21. 45,630,000 = 4.563×10^7 _____

22. 0.000253 = 2.53×10^{-3} _____

23. 680,500,000 = 68.05×10^8 _____

Solve each of the following problems as directed. Show all your work.

24. An unknown liquid has a mass of 30.6-g and a volume of 52.3 mL. What is the density of the liquid?

27. The density of ice is 0.917-g/cm^3. How much volume does 52.3-g of ice occupy?

25. Iron has a density of 7.86-g/cm^3. Could a block of metal with a mass of 18.2-g and a volume of 2.56-cm^3 be Iron? Explain.

28. If 1.35-g of aluminum occupies 0.500 cm^3, what is the density of Aluminum?

26. The density of Gold is 19.3-g/cm^3. What is the mass of 11.3-cm^3 of Gold?

Place a P next to physical changes, and a C next to chemical changes.

___	Rusting Iron	___	Etching glass with acid
___	Breaking a tree limb	___	Stalagmites forming in caves
___	Cutting paper	___	Fertilizing a lawn
___	Yeast making bread rise	___	Crushing ice in a blender
___	Souring of milk	___	Evaporation of lake water
___	Wadding up paper	___	Eating food
___	Erasing a pencil mark	___	Burning gas in a car
___	Freezing water	___	Burning logs in a fireplace
___	Boiling water	___	Toasting marshmallows
___	Salting ice on a sidewalk	___	Adding bleach to water
___	Baking powder in cake	___	Slicing a block of cheese
___	Bending a wire	___	Making blue cheese.

2-4 Review and Reinforcement

Elements and Compounds

Fill in the blank portions of the chart.

Element Name	Element Symbol	Derivative Name
1.		Natrium
2.	Cu	
3. Lead		
4.	W	
5.		Ferrum
6.	Sn	
7. Potassium		
8.		Aurum
9. Mercury		
10.	Ag	

Complete the following sentences by filling in the appropriate word from the list below.

elements	mixtures	compound
symbols	properties	pure
periodic table	letters	carbon dioxide

11.   _____cannot be separated by physical or chemical means.

12.   Elements are abbreviated with _____ , which consist of one or two

_____.

13.   Elements are organized on the _____.

14.   Two or more elements chemically combined make up a _____.

15.   Carbon is an example of an element and _____ is an example of a

compound.

16.   Elements and compounds are called _____ substances because they

have a unique set of chemical and physical _____.

2-4 Review and Reinforement (Continued)

Use what you learned in Section 2-4 to identify each of the following materials as either an element or a compound.

_____ 17. carbon

_____ 18. water

_____ 19. aluminum foil

_____ 20. plastic

_____ 21. tin

_____ 22. silicon dioxide   .

_____ 23. carbon dioxide

_____ 24. helium

_____ 25. arsenic

_____ 26. sodium chloride (salt)

Answer each of the following questions in the space provided.

27. When fossil fuels are burned, carbon dioxide and water are produced. What elements must be contained in fossil fuels? (Assume that the oxygen comes from the air.)

   _____

   _____

   _____

28. List three elements that were named for famous scientists.

   _____

   _____

   _____

29. Two substances were tested and were found to have the following chemical compositions.

Substance A	Substance B
73 percent oxygen	57 percent oxygen
27 percent carbon	43 percent carbon

   Are these substances the same compound? Explain.
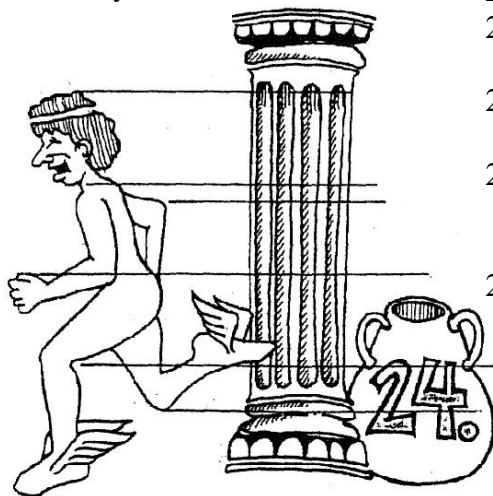
   _____

   _____

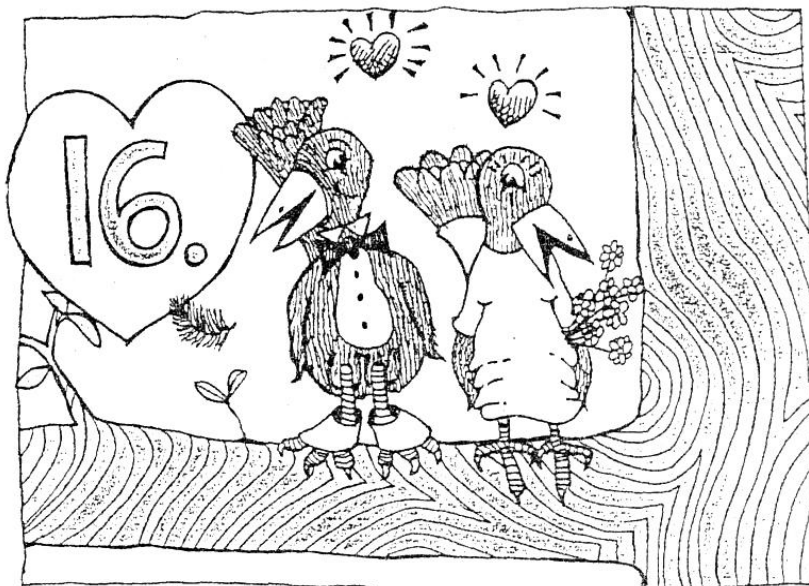   _____

3 Activity _____

Puzzle Page

The statements below are 'punny' riddles. Pick the correct answers from the list at the end of the page.

1. Person who gives admission tickets to traffic court.
2. Half a dime.
3. What they do with dead people.
4. What all that glitters is not.
5. Cheaper than day rates.
6. Man who raises cows in Texas.
7. Goofy Aunt Katherine.
8. Dead parrot.
9. What you do to cattle that get away.
10. What a horse has to be if he won't go for water.
11. Lone Ranger's horse.
12. When it's dark, you turn it on and it gets light.
13. A really "pressing" thing.
14. What most lectures are.
15. HIJLKMNO
16. Mr. & Mrs. Crow.
17. The outside of oxen.
18. The 007 of the chem. lab.
19. Twice a half-nium.
20. Eve's husband.
21. Prisoner who sniffed laughing gas.
22. Soldier from Troy who only fights after dark.
23. What a doctor should do for his patients (two answers).
24. Greek streaker who wore shoes with wings.
25. What I do is none of your _____!!!
26. What the police do to drug parties.
27. How we refer to the guy who had his stomach removed.
28. What the Lone Ranger did to his horse.

Answers: Ag, Au, B, Ba, Bi, Cm, Cu, Eu, Fe, He, Hg, Ho, N, Ni, No, Pb, Ra, Rh, Si, atom, catalyst, chemical bond, chromates, electrolyte, nitrates, oxides, polygon, silicate, water.
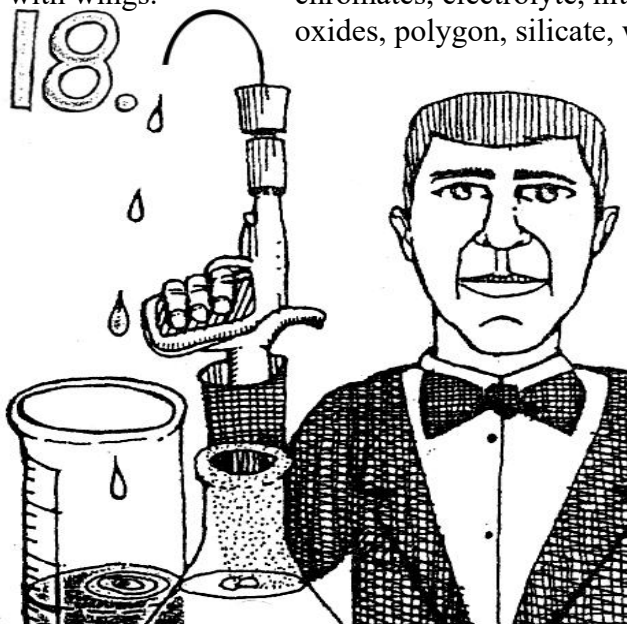
3.1 Assignment

1. How long does it take a 100.0-g sample of Au-l98 ($t_{1/2}$=2.7-days) to decay via β^- to 6.3-g?

2. How many half-lives will pass by the time a 60.0-g sample of Co-60 ($t_{1/2}$=5.3-years) decays to 7.59-g?

3. What is the half-life of a radioactive isotope if a 500.0-g sample decays to 162.5-g in 24.3 hours

4. How old is a bone if it presently contains 0.3125-g of C-14 ($t_{1/2}$=5730.0-years), but it was estimated to have originally contained 80.000-g of C-14?

5. Cs-137 ($t_{1/2}$=30.2-years) is produced as a waste product in nuclear fission reactors. What fraction (N/N_o) remains undecayed after 250.0-years?

6. U-233 ($t_{1/2}$=1.6 x 10^5-years) and U-235 ($t_{1/2}$=7.1 x 10^8-years) are the only two isotopes of Uranium used as fuels in nuclear fission reactors. If you had 500.0-kg of U-233 and 1000.0-kg of U-235, which one would contain the least amount of the original radioisotope after 1 billion years?

7. After 5.6 x 10^6-years 5.3-kg of Pu-239 ($t_{1/2}$=2.4 x 10^4-years) remains in a storage facility. How much of the isotope was created originally?

8. What is the half-live of a radioactive isotope if it takes 6.2 days for a 72.0-g sample to decay to 28.0-g?

9. H-3 (Tritium) ($t_{1/2}$=12.3-years) is an artificially produce radioisotope used in some nuclear reactions. How much of a 1.0-kg sample remains undecayed after 85.8-years?

10. If your cellar was measured to contain 2.4-g of Rn-222 ($t_{1/2}$=3.8-days) (a radioactive gas naturally produced by some granite deposits), how long would it take for that sample to decay to 0.2-g?