Chapter 1 Sample Test **NAME** _____

EITHER print this sheet and answer the following questions on the sheet OR answer the following on notebook paper. If you use notebook paper, number each question with the same numbers below. Skip lines between each question. You do not have to write the questions. There's a Periodic Table on the back for you to use.

1. For each of the following types of chemical investigations, determine whether the investigation is *basic research, applied research, or technological development.*

_____ a. A laboratory in a major university surveys all the reactions involving bromine.

_____ b. A pharmaceutical company explores a disease in order to produce a medicine with less harmful side effects.

_____ c. A scientist investigates the cause of the ozone hole to find a way to stop the loss of the ozone layer.

_____ d. A pharmaceutical company discovers a more efficient method of producing a drug.

_____ e. A chemical company develops a new biodegradable plastic that will not contaminate ground water.

_____ f. A laboratory explores the use of ozone to develop a less expensive water purification system.

_____ g. A university plans to map all the genes on human chromosomes.

2. For each type of investigation, select a branch of chemistry from the following choices: *organic chemistry, analytical chemistry, biochemistry, theoretical chemistry.* More than one branch may be appropriate.

_____ a. A forensic scientist finds information at the scene of a crime.

_____ b. A scientist uses a computer model to see how an enzyme will function.

_____ c. A professor explores the reactions that take place in a human liver.

_____ d. An oil company scientist tries to design a better gasoline.

_____ e. An anthropologist identifies the nature of a substance in a mummy's wrap.

_____ f. A pharmaceutical company examines the protein on the coating+ of a virus.

3. Use checks in the chart below to classify each of the following properties as a *qualitative, quantitative, intensive, and extensive.* <u>More than one check will apply for each property</u>.

	Qualitative	**Quantitative**	**Intensive**	**Extensive**
The truck is rusted				
The dog is 25 kg				
The room is 27° C				
The metal rod was hot when touched				
The kitchen smells like garlic				
The density of water is 1 g/mL				

4. Classify each of the following as a *physical* or *chemical* change and briefly explain the reason.

	Physical	**Chemical**	**Reason**
Ice melting			
Wood burning			
Battery cable corroding			
Gas pressure in a cylinder increasing			
Salt water evaporating			
Food digesting			
Potato rotting in a compost			
Distillation of water			
Leaves turning red in the fall			

5. Use checks in the chart below to classify each of the following as a *mixture, element, or compound,* and then as either a *homogeneous* or *heterogeneous* substance. Careful – you may need to think a second about this last one.

	Mixture	**Element**	**Compound**		**Homogeneous**	**Heterogeneous**
Copper ore						
Cake batter						
Granite						
Table salt						
Rainwater						
Nitrogen						
Granola bar						
Iron shavings from filing down a nail						
Carbon dioxide						
Cement sidewalk						

6. Here are some sample questions from the periodic table. Answer below and count how many you got right without looking.

   a. A horizontal row of elements in the periodic table is called what?

   b. What property allows aluminum to be hammered or rolled into thin sheets?

   c. Element Z is a good conductor of electricity at extreme temperatures and is easily crushed with a hammer. It is what type of element?

   d. Element X is a poor conductor of electricity and breaks when hit. It is what type of element?

   e. Element Y is good conductor of heat and is used to make pots and pans. It is what type of element?

   f. The elements in Group 18, which are generally unreactive, have what family name?

   g. At room temperature, most nonmetals are what state of matter?

   h. Circle the element(s) that is most similar in properties to lithium - carbon, chlorine, sodium, or aluminum.

   i. Circle the element(s) that is most similar in properties to bromine - carbon, chlorine, sodium, or aluminum.

7. Complete the table below by filling in the spaces with correct names or symbols. Then use a Periodic Table on the next page to fill in the type of element, state of matter, group number, period, atomic number, and atomic mass.

Name of element	Element Symbol	Type of Element	State of Matter	Group	Period	Atomic Number	Atomic Mass
	Ar						
Mercury							
Manganese							
	Pu						
	As						
Chlorine							

Answer the questions below on notebook paper.

8. Using circles to represent particles, draw a diagram for each state of matter that will define the states of matter without using any words except the label to show which state of matter you are diagramming. *Hint: your diagram for each state must represent the properties of that state of matter.*

9. A chemistry student removed a container of water from a freezer and found the temperature of the water to be -90°C. The student placed the container of water on a hot plate and, over a period of time, monitored the temperature change of the water.
   a. Draw and label a phase diagram that we used in class to show the change in temperature with time through three changes in state. Keep in mind that your sample is water, and your temperatures should reflect this.
   b. In each section of the phase diagram, label the state(s) of matter present.

10. Remembering and using the information you learned about the three things required for something to burn, explain the following. *Careful – there may be more than one part to your answers.*
    a. How does a CO_2 fire extinguisher put out a fire?
    b. How does water put out a fire?

Periodic Table of the Elements

1 H 1.00794																	2 He 4.002602
3 Li 6.941	4 Be 9.012182											5 B 10.811	6 C 12.0107	7 N 14.00674	8 O 15.9994	9 F 18.9984032	10 Ne 20.1797
11 Na 22.989770	12 Mg 24.3050											13 Al 26.981538	14 Si 28.0855	15 P 30.973761	16 S 32.066	17 Cl 35.4527	18 Ar 39.948
19 K 39.0983	20 Ca 40.078	21 Sc 44.955910	22 Ti 47.867	23 V 50.9415	24 Cr 51.9961	25 Mn 54.938049	26 Fe 55.845	27 Co 58.933200	28 Ni 58.6934	29 Cu 63.546	30 Zn 65.39	31 Ga 69.723	32 Ge 72.61	33 As 74.92160	34 Se 78.96	35 Br 79.904	36 Kr 83.80
37 Rb 85.4678	38 Sr 87.62	39 Y 88.90585	40 Zr 91.224	41 Nb 92.90638	42 Mo 95.94	43 Tc (98)	44 Ru 101.07	45 Rh 102.90550	46 Pd 106.42	47 Ag 107.8682	48 Cd 112.411	49 In 114.818	50 Sn 118.710	51 Sb 121.760	52 Te 127.60	53 I 126.90447	54 Xe 131.29
55 Cs 132.90545	56 Ba 137.327	57 La 138.9055	72 Hf 178.49	73 Ta 180.9479	74 W 183.84	75 Re 186.207	76 Os 190.23	77 Ir 192.217	78 Pt 195.078	79 Au 196.96655	80 Hg 200.59	81 Tl 204.3833	82 Pb 207.2	83 Bi 208.98038	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra (226)	89 Ac (227)	104 Rf (261)	105 Db (262)	106 Sg (263)	107 Bh (262)	108 Hs (265)	109 Mt (266)	110 Ds	111 Rg	112 Cn	113 Nh	114 Fl	115 Mc	116 Lv	117 Ts	118 Og

58 Ce 140.116	59 Pr 140.90765	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.964	64 Gd 157.25	65 Tb 158.92534	66 Dy 162.50	67 Ho 164.93032	68 Er 167.26	69 Tm 168.93421	70 Yb 173.04	71 Lu 174.967
90 Th 232.0381	91 Pa 231.03588	92 U 238.0289	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)