Dear Future AP Chemistry Students and Parents/Guardians:

Welcome to AP Chemistry! In order to ensure the best start for everyone, I have prepared a summer assignment that reviews basic chemistry concepts that you learned in your first year of Chemistry. You will quickly notice that things are different than they were in Honors Chemistry. Material that I didn't ask you to memorize, you now have to know without reference material.

You will also need to practice mental math skills, as the multiple-choice section of the AP exam does not allow calculators. This assignment will help you with memorization, math skills, and basic topics for your start in August.

This is college course and has different expectations than honors classes. Fifty percent of the grade is based on summative (test) assessments. This is intentional so you will be prepared for the AP test. Plan ahead. Find a study group, seek help when needed and look for resources (test prep guides, videos, web pages) to be successful.

You are a responsible, self-motivated learner, completing frequent homework assignments outside of class time. Some weeks will require more study time than most. If you have a sport or a job, please look ahead to test dates and homework assignments.

Your goal should be to complete the summer assignment and ask your teacher for help when needed.

Spread out the summer assignment. Do not try to complete it all in the final week of the summer. Chemistry takes time to process and grasp at a level necessary for success in AP Chemistry. All research on human memory shows us that frequent, short periods of study, spread over long periods of time will produce much greater retention than long periods of study completed in a short period of time.

The course will move on from the initial chemistry review into the six Big Ideas of AP Chemistry: Structure of Matter, Bonding and Intermolecular Forces, Chemical Reactions, Kinetics, Thermodynamics, and Chemical Equilibrium. The topics will build upon your knowledge from your first year chemistry class and cover more application and detail.

This summer assignment will not be collected. However, you will have a test on the fifth day of class on items that are to be memorized and the content from the summer review assignment (Tasks 1-5).

Task 1: Review material from sophomore/junior chemistry that was most challenging (stoichiometry, molecular geometry, solubility)

Online chemistry tutorial websites and videos to re-learn content that you may have forgotten.
- Khan Academy videos
- YouTube- Bozeman Science videos- AP Chemistry Video Essentials—Tyler DeWitt videos
- YouTube- Crash Course Chemistry- Chemistry Playlist
- https://chemfiesta.org
- www.chemteam.info
- Any others that you find helpful

Task 2: Memorize the names of the elements and their corresponding symbols, phases (solid, liquid, gas), and subscripts, if applicable.

● You should memorize the "Names and Symbols of Common Elements & Their Phases" list at end of this document. While the AP exam will never require that you name an element, knowing the elements' symbols will increase your fluency in the language of chemistry and make life easier.

● Many of these elements you will already know.

● Making flashcards or using Quizlet will be helpful. Many of these already exist on Quizlet.

● It's important that you know these elements because the periodic table you are provided in AP Chem has only the symbols and not the names of the elements.

● There are many memorization tools to help you remember the diatomic elements (Br_2 , I_2 , N_2 , Cl_2 , H_2 , O_2 , and F_2):
- Brinclhof (sounds like brinckle-hof)
- H NO, halogens
- They make a 7 on the periodic table
- Cleveland Browns IN Hall Of Fame.

Task 3: Memorize the ionic charges of the monatomic ions

1. Ionic Charge by Location on Periodic Table

Most elements form normal monatomic ions in a clear and easy-to-remember pattern on the periodic table. Their place on the periodic table suggests the charge on the ion, since the neutral atom gains or loses a predictable number of electrons in order to obtain a noble gas configuration. This was a focus in first year chemistry, so if you are unsure what this means, get help BEFORE the start of the year.

a. All Group 1 metals lose one electron to form an ion with a 1+ charge
b. All Group 2 metals lose two electrons to form an ion with a 2+ charge
c. Group 13 metals lose three electrons to form an ion with a 3+ charge
d. All Group 17 nonmetals gain one electron to form an ion with a 1- charge
e. All Group 16 nonmetals gain two electrons to form an ion with a 2- charge
f. All Group 15 nonmetals gain three electrons to form an ion with a 3- charge

Notice that cations keep their name (sodium ion, Na^+ or calcium ion, Ca^{2+}) while anions get an *-ide* ending (chloride ion,Cl^- or oxide ion, O^{2-}).

2. Ionic Charge of Transition Metals

Many transition metals (plus lead and tin) can often form more than one cation. The only major exceptions to this rule for transition metals are silver (Ag^+), zinc (Zn^{2+}), and cadmium (Cd^{2+}), which form no other ions.

This tendency of transition metals to form different ions under different circumstances is the reason we have to use Roman numerals in the names of compounds of transition elements to identify which ion is present. (For example, iron (II) oxide when the Fe^{2+} ion is present and iron (III) oxide when the Fe^{3+} ion is present.)

- All transition metals will have an ion with a charge of 2+ as one of their forms. This is due to the atoms losing their *s* orbital electrons before any others.

Transition Metals to Memorize

Ion	Name
Fe^{3+}	Iron (III)
Fe^{2+}	Iron (II)
Co^{3+}	Cobalt (III)
Co^{2+}	Cobalt (II)
Hg^{2+}	Mercury (II)
Hg_2^{2+}	Mercury (I)

Ion	Name
Cu^{2+}	Copper (II)
Cu^{+}	Copper (I)
Sn^{4+}	Tin (IV)
Sn^{2+}	Tin (II)
Pb^{4+}	Lead (IV)
Pb^{2+}	Lead (II)

Task 4: Memorize the names, symbols, and charges of polyatomic ions

Polyatomic ions are ions that include more than one element, but they remain together as a group and have one overall charge for the group of atoms involved. There are many of these; the ones you need to memorize are listed below. Be sure to learn the names, formulas, and charges.

As with memorizing the names and symbols of elements, the AP exam will never ask you to name a specific polyatomic ion. But it will greatly benefit you to have a working knowledge of the common polyatomic ions and their charges.

There are many patterns with polyatomic ions that will greatly reduce the amount of memorizing that you must do.

Oxyanions are polyatomic anions containing oxygen, whose names end in *-ate* or *-ite*.

1. *-ate* is used for the most common form of the polyatomic
    a. *-ate* anions have one more oxygen than the *-ite* ion, but the same charge.
    b. If you memorize the *-ate* ions, then you should be able to derive the formula for the *-ite* ion and vice-versa.
        i. sulfate is SO_4^{2-}, so sulfite has the same charge but one less oxygen, SO_3^{2-}
        ii. nitrate is NO_3^- , so nitrite has the same charge but one less oxygen, NO_2^-
2. Adding hydrogen to the front of the polyatomic changes the charge on the ion. Since a hydrogen atom has a 1+ charge, the net charge on the new ion is less negative by one.
    a. Example:

PO_4^{3-}	→	HPO_4^{2-}	→	$H_2PO_4^-$
phosphate		hydrogen phosphate		dihydrogen phosphate

3. Prefixes are also used
    a. *Hypo-* indicates one fewer oxygen than the *-ite* form because the prefix *hypo-* means “under” or “below”
    b. *Per-* indicates one more oxygen than the *-ate* form because the prefix *per-* come from the prefix *hyper-* which mean “above” or “over”
    c. Example: Notice how this sequence increases in oxygen while retaining the same charge

ClO^-	→	ClO_2^-	→	ClO_3^-	→	ClO_4^-
hypochlorite		chlorite		chlorate		perchlorate

d. If you learn the chlorate series, you automatically know the bromate, iodate, and fluorate series, as well because all of the halogens behave in the same way.

You should be able to use the above rules to name most polyatomic ions, even if they are not on the following list to memorize.

Watching a YouTube video about Nick the Camel may help with the most common polyatomics.

Polyatomic Ions to Memorize

+1 ions Ammonia, NH_4^+		
-1 ions Acetate, $C_2H_3O_2^-$ (also written as CH_3COO^-) Bromate, BrO_3^- Chlorate, ClO_3^- Chlorite, ClO_2^- Cyanide, CN^- Hydrogen carbonate, HCO_3^- (also called bicarbonate) Hydrogen sulfate, HSO_4^- (also called bisulfate) Hydroxide, OH^- Hypochlorite, ClO^- Iodate, IO_3^- Nitrate, NO_3^- Nitrite, NO_2^- Permanganate, MnO_4^- Perchlorate, ClO_4^- Thiocyanate, SCN^-	-2 ions Carbonate, CO_3^{2-} Chromate, CrO_4^{2-} Dichromate, $Cr_2O_7^{2-}$ Oxalate, $C_2O_4^{2-}$ Peroxide, O_2^{2-} Sulfate, SO_4^{2-} Sulfite, SO_3^{2-} Thiosulfate, $S_2O_3^{2-}$	-3 ions Phosphate, PO_4^{3-}

A. Be able to name other polyatomic ions using the rules above:

HPO_4^{2-} _____ FO_3^- _____

HSO_3^- _____ HCO_3^- _____

B. Be able to write formulas for other polyatomic ions using the rules above:

Bromite _____ Dihydrogen phosphite _____

Periodate _____ Hydrogen chromate _____

Task 5: Complete Worksheets 1-3 (attached)

Worksheet #1- Math Skills

Use dimensional analysis (factor labeling method) when appropriate. Use significant figures when solving problems.

Significant Figures (sig figs)

Five rules of significant figures:

1. All non-zero digits are significant. (1,245 = 4 sig figs)
2. Zeroes between non-zero digits are always significant. (1,051 = 4 sig figs)
3. Leading zeros are **never** significant. (0.00023 = 2 sig figs)
4. Zeros after a number (on the right) are **only** significant if there is a decimal in the number. (0.00230= 3 sig figs, 230.0 = 4 sig figs, 2,300 = 2 sig figs)

1. How many significant figures are in each of the following?

a. 1.9200	_____	e. 0.000036	_____
b. 0.0301001	_____	f. 10000	_____
c. 6.022×10^{23}	_____	g. 2.9×10^{-3}	_____
d. 460.000	_____	h. 0.001345	_____

2. Solve the following problems. Round your answer to the correct number of sig figs (and use the correct unit on your answer).

- **Addition and subtraction** with sig figs- the answer should contain the **smallest number of decimal places** that was in the problem (3.2145 - 0.25 = 2.96)
- **Multiplication and division** with sig figs- the answer should contain the **smallest number of sig figs** that was in the problem (8.210 x 2,700 = 22,000)

a. 1.270 g / 5.20 cm^3 _____
b. 12.0 g / 1.010 L _____
c. 12.1 g + 0.38 g _____
d. 170 g + 2.785 g _____
e. 2.100 cm x 3.2102 cm _____
f. 2.35 L - 0.4 L - 1.23 L _____

Scientific Notation

3. Record the following in correct **scientific notation**:

a. 4050,000,000 cal _____
b. 0.000123 mol _____
c. 0.00345 g _____
d. 700,000,000 atoms _____

Density

4. A cube of ruthenium metal is 1.5 cm on a side and has a mass of 42.0 g. What is the density in g/cm^3? Will ruthenium float on water?

5. The density of bismuth metal is 9.8 g/cm^3. What is the mass of a sample of bismuth that displaces 65.8 mL of water?

Units

6. Classify each of the following as units of mass, volume, length, density, or amount of substance.

a. kg	_____	e. kg/m^3	_____
b. Liter	_____	f. mm	_____
c. m^3	_____	g. g/mL	_____
d. Mm	_____	h. mol	_____

Temperature

7. Most laboratory experiments are performed at room temperature, which is 25˚C. Express this temperature in Kelvin _____

Conversions

The following metric prefixes will be used throughout the year and will be useful to memorize:

- kilo (k) = 10^3 or 1,000 (To convert base unit into kilo, move the decimal 3 places left)
- centi (c) = 10^{-2} or 0.01
- milli (m) = 10^{-3} or 0.001 (To convert base unit into milli, move the decimal 3 places to the right, to convert milli into base unit, move the decimal 3 places to the left)
- micro (μ) = 10^{-6}
- nano (n) = 10^{-9}

8. Use factor labeling method (dimensional analysis) to convert the following values. Round answers to the correct number of sig figs and show work with units.

a. 450. milliliters to liters

b. 650.0 inches to meters (1 inch= 2.54 cm)

c. 4 years to seconds

d. 16.2 m to km

e. 5.44 nL to mL

f. 45.7 mL/s to kL/hr

Atomic Structure

9. What is an isotope? In what ways are isotopes similar and different from each other?

10. Determine number of protons and neutrons in each of the following isotopes.

a. $_{19}^{39}K$	b. $^{23}_{11}Na$.	c. $^{208}_{82}Pb$	d. $^{33}_{15}P$
p-	p-	p-	p-
n-	n-	n-	n-

11. Determine the number of protons, neutrons and electrons in the following:

a. A neutral atom of Vanadium

b. A neutral atom of Germanium

c. A Bromide ion

d. A Rubidium ion

11. An ion has 20 protons, 21 neutrons, and 18 electrons. What is the isotopic symbol of the ion?

12. An ion has 15 protons, 32 neutrons, and 18 electrons. What is the isotopic symbol of the ion?

Chemical Reactions

13. Balance the following and equations and tell what type of reaction it is (synthesis, decomposition, single replacement, double replacement, or combustion).

a) ___ KNO_3 → ___ KNO_2 + ___ O_2 Type: _____

b) ___ $AgNO_3$ + ___ K_2SO_4 → ___ Ag_2SO_4 + ___ KNO_3 Type: _____

c) ___ CH_3NH_2 + ___ O_2 → ___ CO_2 + ___ H_2O + ___ N_2 Type: _____

d) ___ N_2O_5 + ___ H_2O → ___ HNO_3 Type: _____

e) ___ Na + ___ $Zn(NO_3)_2$ → ___ Zn + ___ $NaNO_3$ Type: _____

Writing Chemical Equations

14. Write balanced chemical equations from the following word equations. Include state symbols.

a. The reaction of boron trifluoride gas with water gives liquid hydrogen fluoride and solid boric acid, (H_3BO_3).

b. The reaction of solid magnesium oxide with iron metal forms solid iron (III) oxide and magnesium metal.

c. Dinitrogen monoxide gas decomposes to its elements.

d. The reaction of calcium carbide (CaC_2) solid with water forms a calcium hydroxide precipitate and acetylene (C_2H_2) gas.

e. Ethane gas (C_2H_6) burns in air (oxygen).

Molar Mass

15. Calculate the molar masses (g/mol) of:

a. Ammonia (NH_3)

b. Sodium bicarbonate ($NaHCO_{3)}$)

c. Acetic acid (CH_3COOH)

d. Aluminum carbonate [$Al_2(CO_3)_3$]

Percent Composition

16. Calculate the percent composition of the following compounds for all elements.

a. SO_3

b. CH_3COOCH_3

c. $Ca(HCO_3)_2$

d. $CaSO_4$. 2 H_2O

17. In an experiment, a student gently heated a hydrated copper compound to remove the water of hydration. The following data was recorded:

Mass of crucible, cover, and hydrated compound before heating	23.4 g.
Mass of empty crucible and cover	18.82 g.
Mass of crucible, cover, and contents after heating to constant mass	20.94 g.

Calculate the experimental percent of water in the compound.

18. The molecular formula of morphine, a pain-killing narcotic, is $C_{17}H_{19}NO_3$.

a. What is the molar mass?

b. What percent of atoms in morphine is accounted for by carbon?

c. Which element contributes least to the molar mass?

The Mole Concept

19. Calculate the number of moles of the following: (Show work)

a. 42.8 g of KNO_3

b. 155.7 L of CO_2 at STP

c. 9.25 x10^{26} molecules of $CaCl_2$

20. Determine the number of molecules present in 4.50 mol of nitrogen dioxide.

21. How many grams of methane (CH_4) are present in 10.0 moles of methane gas?

22. Calculate the mass in grams of 3.01 x 10^{23} formula units of BaI_2.

Empirical and Molecular Formulas

23. The compound adrenaline contains 56.7 % C, 6.56 % H, 28.37% O and 8.28 % N by mass. What is the empirical formula for adrenaline?

24. Arsenic reacts with chlorine to form a chloride. If 1.587 g of arsenic reacts with 3.755 g of chlorine, what is the simplest formula of the chloride?

25. Determine the empirical and molecular formula of Ibuprofen, a headache remedy that contains 75.6% C, 8.80% H , and 15.5% O by mass and has a molar mass of 206 g/mol.

26. A sample (3.585g) contains 1.388g of C, 0.345g of H, 1.850g O and its molar mass is 62g. What is molecular formula of this substance?

Stoichiometry

27. What mass of Iron is required to replace silver from 8.00g of silver nitrate dissolved in water?

$$Fe(s) + 2\ AgNO_3\ (aq) \rightarrow Fe(NO_3)_2\ (aq) + 2\ Ag\ (s)$$

28. Using the following equation: $2\ NaOH + H_2SO_4 \rightarrow 2\ H_2O + Na_2SO_4$
How many grams of sodium sulfate will be formed if you start with 200.0 grams of sodium hydroxide and you have an excess of sulfuric acid?

29. Using the following equation: $Pb(SO_4)_2 + 4\ LiNO_3 \rightarrow Pb(NO_3)_4 + 2\ Li_2SO_4$
How many grams of lithium nitrate will be needed to make 250.0 grams of lithium sulfate, assuming that you have an adequate amount of lead (IV) sulfate to do the reaction?

Limiting Reactants and Percent Yield

30. Sodium hydroxide reacts with carbon dioxide as follows:

$$2\ NaOH(s) + CO_2(g) \rightarrow Na_2CO_3(s) + H_2O(l)$$

a. Which reagent is the limiting reactant when 1.85 mol of sodium hydroxide and 1.00 mol carbon dioxide are allowed to react?

b. How many moles of sodium carbonate can be produced?

c. How many moles of the excess reactant remain after the completion of the reaction?

31. When benzene (C_6H_6) reacts with bromine (Br_2) bromobenzene(C_6H_5Br) is obtained:

$$C_6H_6 + Br_2 \rightarrow C_6H_5Br + HBr$$

a.What is the theoretical yield of bromobenzene in this reaction when 30.0g of benzene reacts with 65.0 g of bromine?

b. If the actual yield of bromobenzene was 56.7 g, what was the percentage yield?

Worksheet 2- Practice Naming Compounds

1. Provide names for the following ionic compounds:
   a. AlF_3 _____
   b. $Fe(OH)_2$ _____
   c. $Cu(NO_3)_2$ _____
   d. $Ba(ClO_4)_2$ _____
   e. Li_3PO_4 _____
   f. Hg_2S _____
   g. $Cr_2(CO_3)_3$ _____
   h. $(NH_4)_2SO_4$ _____

2. Write the chemical formulas for the following compounds:
   a. Copper(I) oxide _____
   b. Potassium peroxide _____
   c. Iron(III) carbonate _____
   d. Zinc nitrate _____
   e. Sodium hypobromite _____
   f. Aluminum hydroxide _____

3. Give the name or chemical formula for each of the following molecular substances:
   a. SF_6 _____
   b. XeO_3 _____
   c. Dinitrogen tetroxide _____
   d. Hydrogen cyanide _____
   e. IF_5 _____
   f. Dihydrogen monoxide _____
   g. Tetraphosphorous hexasulfide _____

4. Give the name or chemical formula for the following compounds:
   a. Ammonium oxalate _____
   b. Manganese(III) dichromate _____
   c. $Ti(OH)_4$ _____
   d. $Ni(ClO_2)_3$ _____
   e. Dinitrogen pentoxide _____
   f. Aluminum oxide _____
   g. Fe_2S_3 _____

5. Name the following acids
   a. $H_2C_2O_4$ _____
   b. $HBrO_3$ _____
   c. HBr _____
   d. HNO_2 _____
   e. H_2SO_4 _____
   f. HClO _____

6. Write formulas for the following acids.
   a. hydrochloric acid _____
   b. sulfuric acid _____
   c. nitric acid _____
   d. phosphoric acid _____
   e. carbonic acid _____
   f. acetic acid _____

Worksheet 3- Composition of Matter

Physical and Chemical Properties and Changes

1. What type change produces a new substance with its own properties?

2. Are changes of state physical or chemical changes? Explain.

3. Identify the names of the following changes of state:
   a. Solid → Liquid _____
   b. Liquid → Solid _____
   c. Liquid → Gas _____
   d. Gas → Liquid _____
   e. Solid → Gas _____
   f. Gas → Solid _____

Instructions: Classify each of the following mixtures as homogeneous [O] or heterogeneous [E].

4. Black coffee _____
5. Lucky Charms _____
6. Dirt _____
7. Sausage and mushroom pizza _____
8. Milk _____
9. Kool-aid _____
10. Chicken noodle soup _____

INSTRUCTIONS: Classify each of the following as an *element* [**E**], a *compound* [**C**], or a *mixture* [**M**].

11. Gold _____
12. Water _____
13. Seawater _____
14. Sugar _____
15. A chocolate sundae _____
16. Air _____
17. Carbon dioxide _____
18. Silver _____
19. Ice _____
20. A Big Mac® _____

INSTRUCTIONS: Classify each of the following properties of matter as *physical* [**P**] or *chemical* [**C**].

21. Color _____
22. Density _____
23. Burns easily (flammable) _____
24. Not affected by acids _____
25. Boils at 450 °C _____
26. Reacts violently with chlorine _____
27. Good conductor of heat _____
28. Dissolves readily in water _____
29. Melts at 145 °C _____
30. Malleable _____

INSTRUCTIONS: Classify each of the following changes in matter as *physical* [**P**] or *chemical* [**C**].

31. Grinding chalk into powder _____
32. Dissolving salt in water _____
33. Dissolving zinc in acid _____
34. Tearing a piece of paper _____
35. Stretching copper into wire _____
36. Burning gasoline _____
37. Hammering gold into foil _____
38. Melting ice _____
39. Digesting food _____
40. Making hydrogen from water _____

INSTRUCTIONS: Classify each of the following as an *intensive property* [**I**] or an *extensive property* [**E**].

41. Mass _____
42. Density _____
43. Melting point _____
46. Color _____
47. Volume _____
48. Length _____

Atomic Structure

49. Give a quick summary of the following scientists contributions to atomic theory. Name their model, any important experiments performed, their discovery and/or their contribution to the understanding of the atom.

a. John Dalton-

b. JJ.Thomson-

c. Ernest Rutherford-

d. Neils Bohr-

e. Erwin Shrodinger-

50. What are the correct representative particles of the following substances (atoms, ions, molecules, or formula units)?

a. Na^+ _____	f. NO_2 _____	k. F_2 _____
b. Br_2 _____	g. N_2 _____	l. F^- _____
c. P _____	h. Au _____	m.CO_2 _____
d. KCl _____	i. Fe^{2+} _____	n. CO_3^{2-}_____
e. NaF _____	j. $MgCl_2$_____	o. O^{2-} _____

51. Identify the following as a diatomic element, molecular compound, ionic compound, or atomic element.

a. F_2 _____	f. CO_2 _____	k. O_2 _____
b. Cl_2 _____	g. H_2 _____	l. I_2 _____
c. C _____	h. Ag _____	m.CO _____
d. NaCl_____	i. Fe_2O_3_____	n. K_2CO_3_____
e. KF _____	j. MgO _____	o. N_2O _____

52. Why do we call $Ba(NO_3)_2$ barium nitrate, but we call $Fe(NO_3)_2$ iron(II) nitrate?

53. What is the difference between:

a. Oxygen atom and oxide ion

b. Magnesium atom and magnesium ion

54. For the following 4 types of reactions, write the general formula in terms of A, B, C, and D.

a. Synthesis-

b. Decomposition-

c. Single Replacement-

d. Double Replacement-

55. What species is always present as a reactant in a combustion reaction?

56. What two species are always present as products in the combustion of a hydrocarbon?

57. Which of the following hydrocarbons will produce equimolar quantities (the same number of moles) of carbon dioxide and water when combusted in excess oxygen? (Hint- write balanced equations for the combustion of each hydrocarbon.)

C_4H_8 or C_6H_6

Accuracy/Precision

Accuracy: Refers to how close a measurement is to a true, accepted or target value.
Precision: Refers to the reproducibility of a series of measurements
Percent Error: A measurement of the discrepancy between an observed and a true, or accepted value.

58. The following measurements were made to determine the density of a material whose value was, according to the Handbook of Chemistry and Physics, 1.24 g/mL

Trial #1 1.20 g/mL
Trial #2 1.22 g/mL
Trial #3 1.22 g/mL

a. make a general comment on the accuracy of these results

b. make a general comment on the precision of these results

59. The following measurements were made to determine the density of a material whose value was, according to the handbook of Chemistry and Physics, 3.75 g/mL

Trial #1 4.75 g/mL
Trial #2 4.76 g/mL
Trial #3 4.74 g/mL

a. make a general comment on the accuracy of these results

b. make a general comment on the precision of these results

60. A student buys a rope at the store. The label on the packaging says that the rope is 2.15 meters in length. The student measures the rope as 1.85m. What is the student's percent error?

61. A 250.0 gram block is placed on a balance. The balance measures the mass of the block as 243.9 grams. What is the percent error of the mass of the block?

Chemical Compounds

62. What is meant by the term binary compound?

63. What types of elements are present in ionic compounds?

64. What types of elements are present in covalent/molecular compounds?

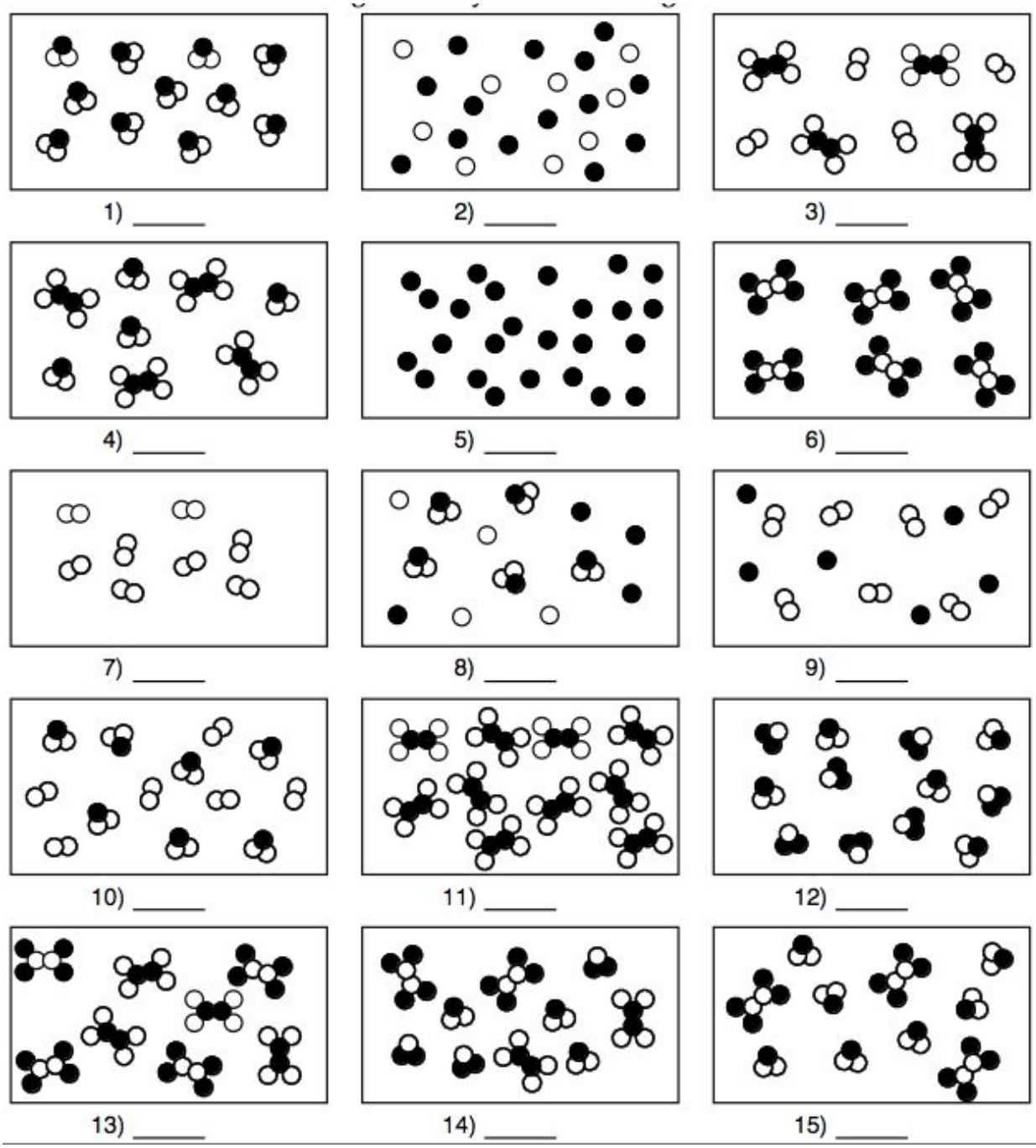
Matter

65. Identify the states of matter present in the particle diagrams below.

66. Classify each of the pictures below by placing the correct label in the blanks beneath each picture:

A= Element
B= Compound
C= Mixture of elements
D= Mixture of compounds
E= Mixture of elements and compounds

Each circle represents an atom and each different color represents a different kind of atom. If two atoms are touching then they are bonded together.



Names and Symbols of Common Elements & Their Phases

Al	aluminum
Sb	antimony
Ar	argon
As	arsenic
Ba	barium
Be	beryllium
B	boron
Br	bromine
Cd	cadmium
Ca	calcium
C	carbon
Cs	cesium
Cl	chlorine
Cr	chromium
Co	cobalt
Cu	copper
F	fluorine
Fr	francium
Ge	germanium
Au	gold
He	helium
H	hydrogen
I	iodine
Fe	iron
Kr	krypton
Pb	lead
Li	lithium
Mg	magnesium
Mn	manganese
Hg	mercury
Ne	neon
Ni	nickel
N	nitrogen
O	oxygen
Pd	palladium
P	phosphorous
Pt	platinum
Pu	plutonium
K	potassium
Ra	radium
Rn	radon
Rb	rubidium
Se	selenium
Si	silicon
Ag	silver
Na	sodium
Sr	strontium
S	sulfur
Te	tellurium
Th	thorium
Sn	tin
W	tungsten
U	uranium
Xe	xenon
Zn	zinc

Phases:

- All metals are solid at room temperature, except for mercury which is a liquid.
- All metalloids are solids.
- Nonmetals:
    - Carbon, phosphorus, sulfur, & selenium are solids
    - Bromine is a liquid
    - All other nonmetals are gases

Subscripts:

- Diatomic elements: Br_2, I_2, N_2, Cl_2, H_2, O_2, F_2
- Other subscripts: P_4, S_8