Matter Unit Study Guide [1] Name _____ Date ____ Period __

The Periodic Table

	Group 1a	Group 2a											Group 3a	Group 4a	Group 5a	Group 6a	Group 7a	Group 0
Period 1	1 H Hydrogen 1.00794																	2 He Helium 4.0026
Period 2	3 Li Lithium 6.941	4 Be Beryllium 9.0122											5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.0067	8 O Oxygen 15.9994	9 F Fluorine 18.9984	10 Ne Neon 20.183
Period 3	11 Na Sodium 22.9898	12 Mg Magnesium 24.305	Group 3b	Group 4b	Group 5b	Group 6b	Group 7b	Group 8	Group 8	Group 8	Group 1b	Group 2b	13 Al Aluminum 26.9815	14 Si Silicon 28.086	15 P Phosphorus 30.9738	16 S Sulfur 32.065	17 Cl Chlorine 35.453	18 Ar Argon 39.948
Period 4	19 K Potassium 39.098	20 Ca Calcium 40.08	21 Sc Scandium 44.956	22 Ti Titanium 47.88	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.9380	26 Fe Iron 55.845	27 Co Cobalt 58.9332	28 Ni Nickel 58.69	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.72	32 Ge Germanium 72.61	33 As Arsenic 74.9216	34 Se Selenium 78.96	35 Br Bromine 79.904	36 Kr Krypton 83.80
Period 5	37 Rb Rubidium 85.47	38 Sr Strontium 87.62	39 Y Yttrium 88.905	40 Zr Zirconium 91.22	41 Nb Niobium 92.906	42 Mo Molybdenum 95.94	43 Tc Technetium (98)	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.905	46 Pd Palladium 106.4	47 Ag Silver 107.868	48 Cd Cadmium 112.41	49 In Indium 114.82	50 Sn Tin 118.71	51 Sb Antimony 121.75	52 Te Tellurium 127.60	53 I Iodine 126.9045	54 Xe Xenon 131.29
Period 6	55 Cs Cesium 132.905	56 Ba Barium 137.34	57-71 Lanthanides	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.84	75 Re Rhenium 186.2	76 Os Osmium 190.2	77 Ir Iridium 192.2	78 Pt Platinum 195.08	79 Au Gold 196.967	80 Hg Mercury 200.59	81 Tl Thallium 204.38	82 Pb Lead 207.2	83 Bi Bismuth 208.98	84 Po Polonium (210)	85 At Astatine (210)	86 Rn Radon (222)
Period 7	87 Fr Francium (223)	88 Ra Radium (226)	89-103 Actinides	104 Rf Rutherfordium (261)	105 Db Dubnium (262)	106 Sg Seaborgium (266)	107 Bh Bohrium (264)	108 Hs Hassium (265)	109 Mt Meitnerium (268)	110 Ds Darmstadtium (271)	111 Rg Roentgenium (280)	112 Uub Element 112 (285)	113 Uut Element 113 (284)	114 Uuq Element 114 (289)	115 Uup Element 115 (287)	116 Uuh Element 116 (293)		118 Uuo Element 118 (294)

10. What are the substances on the Periodic Table and why are they classified together in a table? S8P1b Elements, they are classified to help us understand the properties of elements and how one relates/compares/behaves to another

11. On the periodic table, sodium is represented by Na. Na is a symbol. S8P1f

12. Each element in the periodic table is assigned an atomic number. What does the atomic number tell us about the element? S8P1f

The number of protons present in the atom, and # of e's in a stable atom

13. On the Periodic Table, what does the number above each of the elements represent? S8P1f

atomic #, # protons, # electrons

14. In the chemical formula for Magnesium chloride, $MgCl_2$, what does the subscript 2 represent? S8P1f

the number of chlorine atoms present in the compound

15. What are metalloids? Identify all the metalloids from the Periodic Table. S8P1f.

have properties similar to both metals & non-metals; B, Si, Ge, As, Sb, Te, Po

16. Read the statements below about the Periodic Table. Identify which statements are true/false. If the statement is false, explain why it is false. S8P1f

False a. Each horizontal row of the table is called ~~group~~. Period. Tells the number of electron orbitals for the elements

True b. Each family represents the number of energy levels present in an atom of the element.

c. The properties of an element can be predicted from its location on the table.

True; physical & chemical properties & those elements are grouped together

d. The elements are arranged from left to right, up to down by ~~decreasing~~ increasing atomic number.

False Each ~~horizontal~~ vertical column is called a group and the members all share similar chemical properties.

Matter Unit Study Guide [1]

Name _____ Date ____ Period __

1. Oxygen and Hydrogen combine to form water. In the space to the right, draw an illustration of a water molecule. Additionally, identify water as any of the following that apply: an atom, an element, a molecule, and/or a compound. Explain your answer. S8P1a

$H_2 + O \longrightarrow H_2O$

compound b/c 2 or more elements chemically combined; it is the exception and can also be classified as a molecule

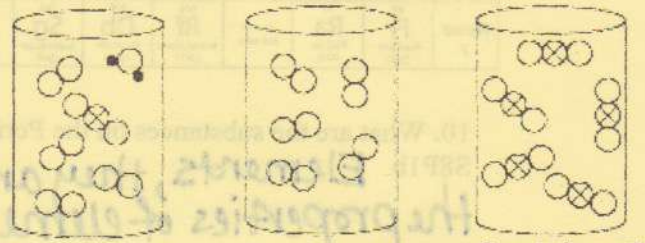
2. What is the smallest particle of the element iron (Fe) that can still be classified as iron? S8P1a

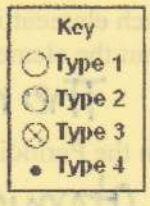
an atom

3. Paper, glass, and iron are all made up of elements. S8P1a.

4. A molecule is to a compound as an atom is to a(n) element. S8P1a.

5. The diagram shows three containers of gas. Use the diagram to answer the questions below. S8P1a-b





a. Which container(s) has atoms?

R, S, T

b. Which container(s) has an element?

R, S, T

c. Which container(s) has a pure substance?

S, T

d. Which container(s) has molecules?

S, R

e. Which container(s) has a mixture?

R

f. Which container(s) has compounds?

R, T

6. Which of the following do and do not represent a compound: O_2, N_2O, CO_2, H_2, NaCl Explain your answer. S8P1b

Do represent a compound: N_2O, NaCl, CO_2

Don't represent a compound: O_2, H_2

7. A solution of saltwater sits in the sun for 6 days. After 6 days, only salt remains in the cup. Explain why this is an example of a mixture. S8P1b

This is a mixture because it can be separated back into it's components (Salt + H_2O)

8. Mud Water is which of the following: element, compound, mixture. Explain your answer. S8P1b

mixture b/c it contains H_2O, salt, silt, clay, etc.

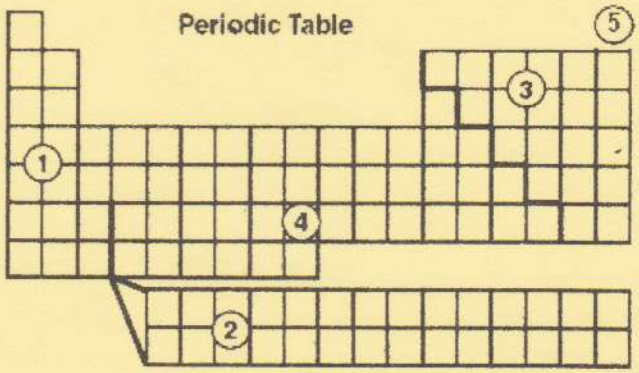
9. Which of the following does not belong: Air, Salt, Water, or Oxygen Explain. S8P1b

Air b/c it is a mixture of oxygen, carbon dioxide, Nitrogen; and is NOT chemically bonded.

Matter Unit Study Guide [1]

Name _____ Date ____ Period __

Use the Periodic Table to the right to answer the following questions.



17. In which region of the table would nonmetals be found? S8P1f 3

18. In which region would the most reactive elements be found? S8P1f 1

19. In which region would the least reactive elements be found? S8P1f 5

20. What is true about metals which is not true about nonmetals? S8P1f
good conductors of electricity, malleable, ductile, higher melting & boiling pts; more dense than non-metals

21. Define Mass. S8P1g
anything that has matter and takes up space

22. Define the Law of Conservation of Matter. S8P1g
it says that matter can't be created nor destroyed, but only Δ's forms; reactants = products (mass & #'s of atoms)

23. The diagram illustrates an experiment where baking soda was added to a container of vinegar. After five minutes, the balloon on the top of the bottle started expanding. Explain what happened and how this experiment demonstrates the Law of Conservation of Matter. S8P1g.


Deflated Balloon


Inflated Balloon

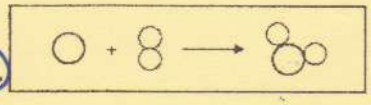
Some mass was converted to a gas. In a closed system the masses b4 & after the experiment would be equal; however, in an open system (like a balloon) some gas would be lost to the environ.

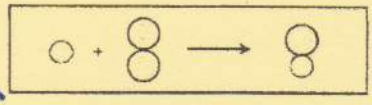
24. The diagram to the right illustrates law of cons. of mass & matter. Explain your answer. S8P1g

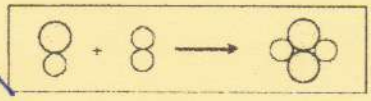
Mass of Reactants	Mass of Products
Methane + Oxygen	Carbon Dioxide + Water
50.0 g + 200.0 g →	137.5 g + 112.5 g
250g =	250g

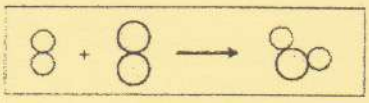
mass of reactants = mass of products

25. Which model demonstrates the Law of Conservation of Matter? Explain your answer. S8P1g

A. 

C. 

B. 

D. 

3 reactants = 3 products (same sizes)
just atoms are rearranged.

26. An iron bar had a beginning mass of 150 grams. As the bar rusted, its mass increased. Explain why the mass of the iron bar increased. S8P1g. The mass of the bar stayed the same, but when the iron reacted w/ the oxygen in the air the mass of the oxygen causes the mass overall to increase.

Name Answer Key

Matter Part 2 Unit Review

1. The image to the right is a(n) atom (bohr model) 

2. In the molecule of Carbon Dioxide (CO_2)  What do the symbols ● and ○ represent? ●=carbon ○=oxygen (molecule)

3. One Oxygen and Two Hydrogen combine to form water which is a molecule.

4. Inside the nucleus of an atom, protons & neutrons can be found.

5. A pure substance that can be separated into two or more simpler substances by chemical means is compounds.

6. A type of mixture that is usually a liquid and has something dissolved into it is called a/an solution?

7. Which phase of matter has definite volume, but no definite shape? liquid

8. Which physical property would be the same as a substance's freezing point? melting pt.

9. An endothermic reaction occurs when a chemical reaction causes heat to be absorbed.

10. When two elements combine to form a new substance, what type of change occurs? chemical

11. Silicon is an element used as semiconductor. How is silicon classified on the Periodic Table? Metalloids

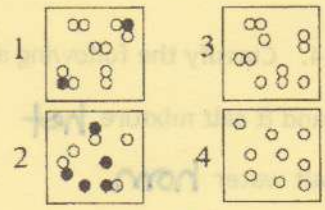
Short Answer

12. The chemical formula for glucose is $C_6H_{12}O_6$. How many different elements make up one molecule of glucose? 3 How many total atoms are in a molecule of glucose? 24

13. Circle which of the following is a compound? Ca Mg (CO₂) Al

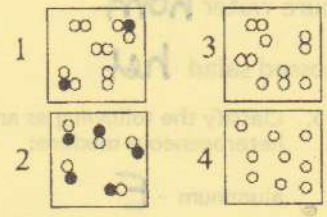
14. Which diagram is a pure substance? How do you know?

#4 can't be separated; all the same elements



15. Which sample is a mixture? Why?

#1, 2 more than one different element/ compound; could be separated



16. What two quantities must be known to calculate the density of a sample of matter? mass & volume

17. Which one does not belong? Why? H_2O CO_2 (H_2) $C_6H_{12}O_6$ H_2 is a molecule and bound to the same element, others bound to different elements

Elements, Mixtures, Compounds (Circle the correct choice, or fill in the blank with the correct term)

1. A mixture (is/is not) a chemical combining of substances.

2. In a compound the (atoms/molecules) are (chemically/physically) combined so that the elements that make up the compound (retain/lose) their identities and (do/do not) take on a new set of properties.

3. The smallest identifiable unit of a compound is a(n) ~~atom~~ element, which is made up of atoms which are chemically bonded.

4. True or False: A mixture is always made up of a combination of elements.

5. In a mixture, the substances (lose/retain) their identities.

6. In a mixture the substances involved (can/cannot) be separated by a simple physical process. In a compound the elements involved (can/cannot) be separated by a simple physical process because the elements are (physically combined/chemically bonded).

7. True or False: An element can be broken down into a simpler substance.

8. The smallest identifiable unit of an element is a(n) atom.

9. From the following list of substances, circle the ones that are elements:

silver	carbon dioxide		wood alcohol		chromium
water	hydrogen	carbon		nitrogen	oxygen
gold	sugar	salt	air	sulfur	magnesium nickel

10. Explain how to separate the sugar and water in a solution of sugar and water.
allow the water to evaporate; sugar will remain

11. How would you separate sand and water?

13. Classify the following as pure substances or as mixtures:

air M	gasoline M	grain alcohol M
water PS	sugar M	gold PS
mercury PS	oxygen PS	salt water PS

14. Classify the following as heterogeneous or as homogeneous:

sand & salt mixture het	hydrogen hom	iron het
salt water hom	unfiltered air hom	iron with rust het
pure water hom	an apple ~~hom~~ het	nitric acid hom
tossed salad het	granite ~~hom~~ het	wood het

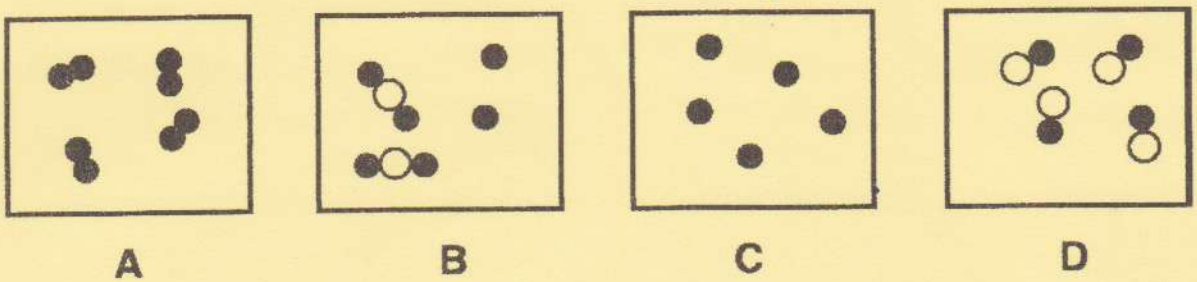
15. Classify the following as an element, a compound, a solution, or a heterogeneous mixture:

aluminum E	raisin bread H
carbon dioxide C	water C
sugar and water S	sulfur E
sulfuric acid C	mercury E
an orange H	water & instant coffee H

Matter Unit Study Guide [2]

Name _____ Date _____ Period ___

Use the diagram below to answer questions 23-25



A B C D

24. What does each circle and dot represent in the diagrams above? (S8P1a)
elements, molecules, compounds

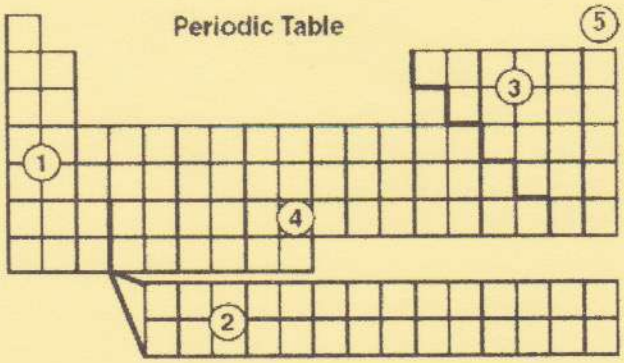
25. Which diagram(s) above represents a pure substance? (S8P1b)
A, C

26. Which diagram(s) above represents a mixture? (S8P1b)
B

27. In which region of the table would nonmetals be found? (S8P1f) 3

28. In which region would the most reactive elements be found? (S8P1f) 1

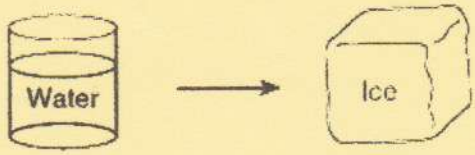
29. What does the zigzag line on the Periodic Table to the right indicate? (S8P1f)
metalloids



30. Which sample equation best illustrates the law of conservation of mass? (S8P1g)
atoms in reactants = #'s # atoms in product

A. 4 grams reactant U + 3 grams reactant V→7 grams product W
B. 12 grams reactant X +10 grams reactant Y→2 grams product Z
C. 5 grams reactant E + 5 grams reactant F→20 grams product G + 5 grams product H
D. 10 grams reactant Q + 9 grams reactant R→90 grams product S + 90 grams product T

31. What concept does the diagram to the right illustrate? (S8P1g)
freezing (phase change)



100 g 100 g

(Not drawn to scale)

32. What is the missing mass of the ice cube in the diagram to the right? (S8P1g) 100g
mass of ~~water~~ ice after water freezes