

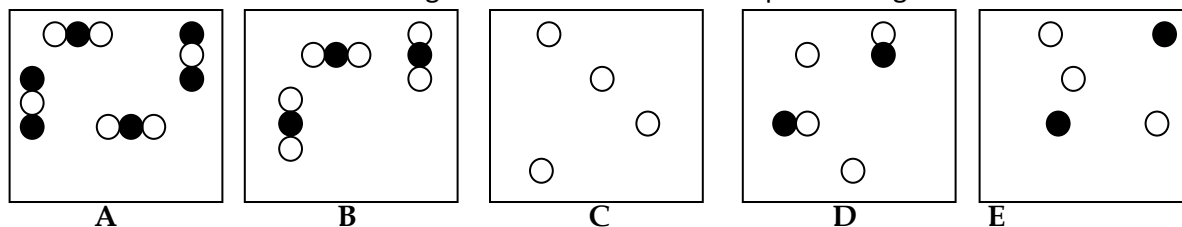
Name \_\_\_\_\_ Date \_\_\_\_\_

**Matter: Pure Substances and Mixtures**

**Part I: Directions:** Classify each of the materials below. In the center column, state whether the material is a **pure substance** or a **mixture**. If the material is a pure substance, further classify it as either an **element** or **compound** in the right column. Similarly, if the material is a mixture, further classify it as **homogeneous** or **heterogeneous** in the right column

<b>Material</b>	<b>Pure Substance Or Mixture</b>	<b>Element, Compound, Heterogeneous or Homogeneous</b>
Water		
Soil		
concrete		
sugar + pure water ( $C_{12}H_{22}O_{11} + H_2O$ )		
iron filings (Fe)		
limestone ( $CaCO_3$ )		
orange juice (w/pulp)		
chromium (Cr)		
Chex mix		
salt + pure water ( $NaCl + H_2O$ )		
benzene ( $C_6H_6$ )		
muddy water		
brass (Cu mixed with Zn)		
baking soda ( $NaHCO_3$ )		
Mint chocolate chip ice cream		

**Part II: Directions:** Match each diagram with its correct description. Diagrams will be used once.



- \_\_\_ 1. Pure Element – only one type of atom present.
- \_\_\_ 2. Mixture of two elements – two types of uncombined atoms present.
- \_\_\_ 3. Pure compound – only one type of compound present.
- \_\_\_ 4. Mixture of two compounds – two types of compounds present.
- \_\_\_ 5. Mixture of a compound and an element.

Name \_\_\_\_\_ Date \_\_\_\_\_

**Physical and Chemical Properties and Changes**

**Part I Directions:** Identify if the following are Physical Properties (P) or Chemical Properties (C).

- |                                 |                               |
|---------------------------------|-------------------------------|
| _____ 1. blue color             | _____ 6. melting point        |
| _____ 2. density                | _____ 7. reacts with water    |
| _____ 3. flammability (burns)   | _____ 8. hardness             |
| _____ 4. solubility (dissolves) | _____ 9. boiling point        |
| _____ 5. Luster (shine)         | _____ 10. reacts with an acid |

**Part II Directions:** Identify if the following are Physical Changes (P) or Chemical Changes (C).

- |  |                                    |
|--|------------------------------------|
| _____ 1. NaCl (Table Salt) dissolves in water.   | _____ 6. Milk sours.               |
| _____ 2. Ag (Silver) tarnishes.                  | _____ 7. Sugar dissolves in water. |
| _____ 3. An apple is cut.                        | _____ 8. Wood rots.                |
| _____ 4. Heat changes H <sub>2</sub> O to steam. | _____ 9. Pancakes cook.            |
| _____ 5. Baking soda reacts to vinegar.          | _____ 10. Snow melts               |

**Part III Directions:** Read each scenario. Decide whether a physical or chemical change has occurred and give **2 pieces** of evidence for your decision.

	Scenario	Physical or Chemical Change?	Evidence
1.	A student removes a loaf of bread hot from the oven. The student cuts a slice off the loaf and spreads butter on it.		
2.	Your friend decides to toast a piece of bread, but leaves it in the toaster too long. The bread is black and the kitchen is full of smoke.		
3.	A straight piece of wire is coiled to form a spring.		
4.	You blow dry your wet hair.		

Name \_\_\_\_\_ Date \_\_\_\_\_

**The Atom**

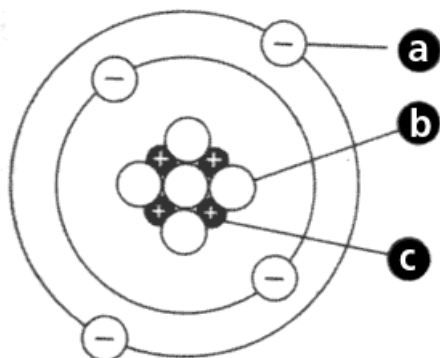
**Part I Directions:** Use the periodic table to identify each element described below.

1. Element with an atomic number of 65. \_\_\_\_\_
2. A neutral element with 44 protons and 44 electrons. \_\_\_\_\_
3. An element with 21 protons. \_\_\_\_\_
4. A neutral element with 78 electrons. \_\_\_\_\_
5. An element with 17 protons and 19 neutrons. \_\_\_\_\_

**Part II Directions:** Fill in the table below using the periodic table.

Name of Element	Element Symbol	Mass Number	Atomic Number	Protons	Neutrons	Electrons
Boron	B	11	5	5	6	5
Sodium		24	11			
Gallium				31	37	
	Y	89				39
Copper			29		35	
	Tc	98		43		

**Part III Directions:** Label the parts of the atom below.



\*The number of \_\_\_\_\_ determines the identity of an element

Name \_\_\_\_\_ Date \_\_\_\_\_

### Isotopes

**Directions:** Answer the following questions. For questions 4-6 show your work and include units.

1) Given the following information you can ALWAYS determine the identity of an element (YES OR NO)

- a. Number of protons \_\_\_\_\_
- b. Number of neutrons \_\_\_\_\_
- c. Number of electrons in a neutral atom \_\_\_\_\_
- d. Number of electrons \_\_\_\_\_

2) Here are three isotopes of an element:  $^{12}_6C$        $^{13}_6C$        $^{14}_6C$

- a. The element is: \_\_\_\_\_
- b. The number 6 refers to the \_\_\_\_\_
- c. The numbers 12, 13, and 14 refer to the \_\_\_\_\_
- d. How many protons and neutrons are in the first isotope? \_\_\_\_\_
- e. How many protons and neutrons are in the second isotope? \_\_\_\_\_
- f. How many protons and neutrons are in the third isotope? \_\_\_\_\_

3) Fill in the table below. Beside the table list 2 similarities for these isotopes and 2 differences.

	Chromium-58	Chromium-63
# of protons		
# of neutrons		
# of electrons		

Unit 2 Matter and the Atom HW Packet

Name \_\_\_\_\_ Date \_\_\_\_\_

4) Calculate the atomic mass of copper if copper-63 is 69.17% abundant and copper-65 is 30.83% abundant.

5) Lithium-6 is 4% abundant and lithium-7 is 96% abundant. What is the average mass of lithium?

6) Iodine is 80%  $^{127}\text{I}$ , 17%  $^{126}\text{I}$ , and 3%  $^{128}\text{I}$ . Calculate the average atomic mass of iodine.

7) Boron exists in two isotopes, boron-10 and boron-11. Based on the average atomic mass, which isotope should be more abundant? WHY?

8) Explain the difference between mass number and average atomic mass.

9) Fill in the table below:

Isotope Notation	Atomic Number	Mass Number	Number of Protons	Number of Electrons	Number of Neutrons
$^{23}\text{Na}$				10	
K		40		19	
			16	18	17
		109	47	46	

Name \_\_\_\_\_ Date \_\_\_\_\_

**Magic Square: The Atom**

**Directions:** Put the number of the definition from the list below into the square with the appropriate term. Check your answers by adding the numbers to see if all the sums of all rows, both across and down add up to the same number, the Magic #.

Democritus _____	Dalton _____	Thomson _____	Chadwick _____	Total _____
Rutherford _____	Proton _____	Atom _____	Bohr _____	_____
Wave Model _____	Neutron _____	Nucleus _____	Alpha particle _____	_____
Electron _____	Model _____	Energy levels _____	Electron cloud _____	_____
<b>Total</b> _____	_____	_____	_____	_____

**Magic Number** \_\_\_\_\_

1. Represented by a symbol; all are found on the Periodic Table
2. Made a mental model of the atom; Greek philosopher
3. Used by Rutherford in his experiment; made of two protons and two neutrons
4. The paths in which electrons circle the nucleus according to the Bohr model
5. The positive particle in the nucleus of an atom
6. The tiny positive core of an atom; contains protons and neutrons
7. Formed the atomic theory model of the atom; English schoolteacher
8. Discovered the nucleus using his gold foil experiment
9. Current explanation of where electrons might be found in the atom
10. Used by scientists to explain something we cannot see or understand
11. The smallest particle of an element that has the properties of that element
12. Discovered the neutron
13. Current model of the atom; proposed by Schrodinger
14. Mass of protons and neutrons
15. Developed the model of the atom in which electrons orbit the nucleus in energy levels
16. The negative particle that circles the nucleus
17. The neutral particle in the nucleus of an atom
18. Proposed the "plum-pudding" model of the atom; discovered the electron