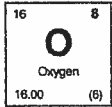



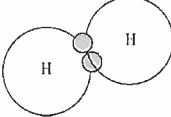

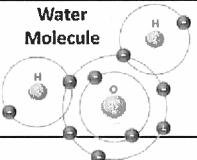



Key

What's the Difference? Atom, Element, Molecule, Compound

Type of Matter	Definition	Sample Drawing	Symbol or Formula
ELEMENT	A pure substance made up of only one kind of atom that cannot be broken down into simpler substances.		 Color/pattern represents element identity (He, Au, C, etc.)
ATOM	The smallest particle of an element that still keeps the properties of that element		Circle represents one atom 
MOLECULE	The smallest particle of a substance that has all the properties of that substance; made of 2 or more atoms that are chemically bonded		Grouped circles represent a Molecule (O2, H2, etc.) 
COMPOUND	A substance made up of 2 or more different elements whose atoms are chemically bonded.		Grouped circles of different colors (elements) represent a compound  H ₂ O

Atom? Element? Molecule? Compound?

Directions: Study each picture below. In the spaces provided, identify how many atoms, elements, molecules, and compounds there are.

1.



atoms 1
elements 1
molecules 0
compounds 0

2.



atoms 2
elements 1
molecules 1
compounds 0

3.



atoms 2
elements 2
molecules 0
compounds 0

4.



atoms 3
elements 2
molecules 1
compounds 1

5.



atoms 3 4
elements 1 2
molecules 1
compounds 1 0

6.



atoms 4
elements 2
molecules 2
compounds 1

7.



atoms 10
elements 5
molecules 2
compounds 2

8.



atoms 4
elements 2
molecules 0
compounds 0

9.



atoms 3
elements 3
molecules 0
compounds 0

Elements, Compounds & Mixtures Worksheet

Part 1: Read the following information on elements, compounds and mixtures. Fill in the blanks where necessary.

Elements:

- A pure substance containing only one kind of atom.
- An element is always uniform all the way through (homogeneous).
- An element cannot be separated into simpler materials (except during nuclear reactions).
- Over 100 existing elements are listed and classified on the Periodic Table.

Compounds:

- A pure substance containing two or more kinds of atoms.
- The atoms are chemically combined in some way. Often times (but not always) they come together to form groups of atoms called molecules.
- A compound is always homogeneous (uniform).
- Compounds cannot be separated by physical means. Separating a compound requires a chemical reaction.
- The properties of a compound are usually different than the properties of the elements it contains.

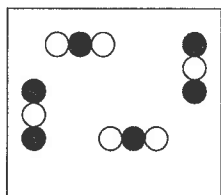
Mixtures:

- Two or more elements or compounds NOT chemically combined.
- No reaction between substances.
- *Mixtures* can be uniform (called homogeneous) and are known as solutions.
- Mixtures can also be non-uniform (called heterogeneous).
- Mixtures can be separated into their components by chemical or physical means.
- The properties of a mixture are similar to the properties of its components.

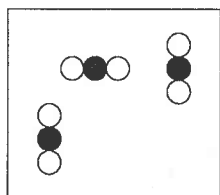
Part 2: Classify each of the following as elements (E), compounds (C) or Mixtures (M). Write the letter X if it is none of these.

<u>E</u> Diamond (C)	<u>C</u> Sugar (C ₆ H ₁₂ O ₆)	<u>M</u> Milk	<u>E</u> Iron (Fe)
<u>M</u> Air	<u>C</u> Sulfuric Acid (H ₂ SO ₄)	<u>M</u> Gasoline	<u>X</u> Electricity
<u>E</u> Krypton (K)	<u>E</u> Bismuth (Bi)	<u>E</u> Uranium (U)	<u>M</u> Popcorn
<u>C</u> Water (H ₂ O)	<u>C</u> Alcohol (CH ₃ OH)	<u>M</u> Pail of Garbage	<u>M</u> A dog
<u>C</u> Ammonia (NH ₃)	<u>C</u> Salt (NaCl)	<u>X</u> Energy	<u>E</u> Gold (Au)
<u>M</u> Wood	<u>M</u> Bronze	<u>M</u> Ink	<u>M</u> Pizza
<u>C</u> Dry Ice (CO ₂)	<u>C</u> Baking Soda (NaHCO ₃)	<u>E</u> Titanium (Ti)	<u>M</u> Concrete

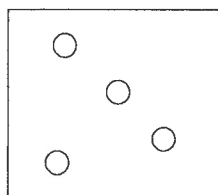
Part 3: Match each diagram with its correct description. Diagrams will be used once.



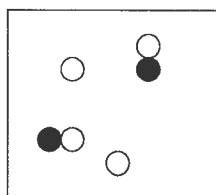
A



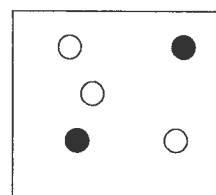
B



C



D



E

C 1. Pure Element - only one type of atom present.

E 2. Mixture of two elements - two types of uncombined atoms present.

B 3. Pure compound - only one type of compound present.

A 4. Mixture of two compounds - two types of compounds present.

D 5. Mixture of a compound and an element.

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

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

14. Classify the following as heterogeneous or as homogeneous:

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

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

aluminum	C E	raisin bread	HM
carbon dioxide	C	water	C
sugar and water	S	sulfur	C E
sulfuric acid	C	mercury	C E
an orange	HM	water & instant coffee	S
a pencil	HM	carbon particles & sugar	HM
nitrogen	C E	air	S
gasoline	S	grain alcohol	S

Elements, Compounds, and Mixtures

Classify each of the pictures below by placing the correct label in the blanks below:

A= Element

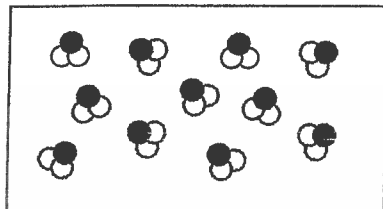
B= Compound

C= Mixture of elements

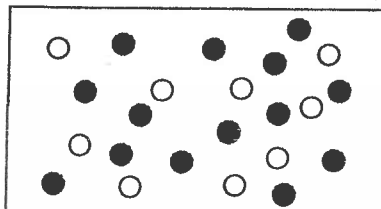
D= Mixture of compounds

E= Mixture of elements and compounds

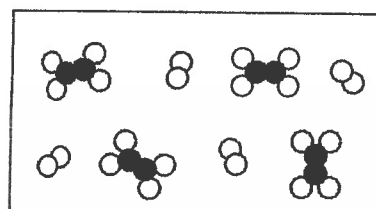
Each circle represents an atom and each different color represents a different kind of atom. If two atoms are touching then they are bonded together.



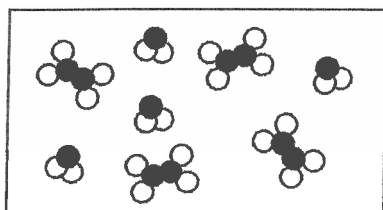
1) D



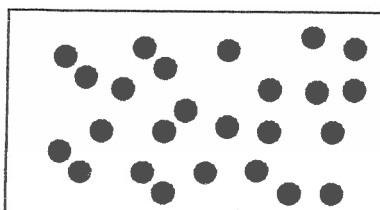
2) C



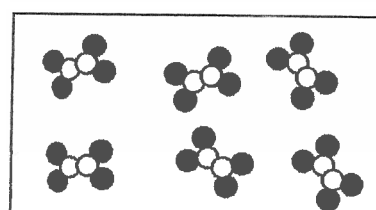
3) D



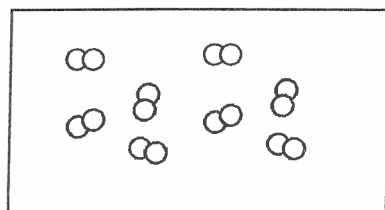
4) D



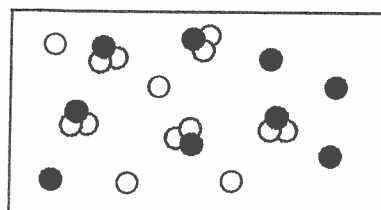
5) A



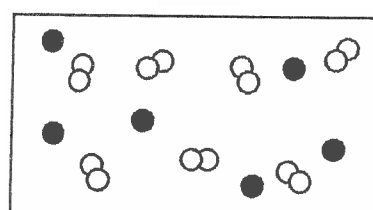
6) B



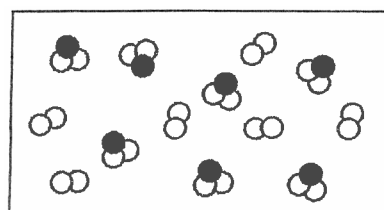
7) B



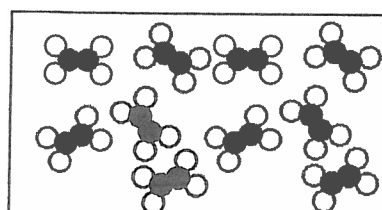
8) E



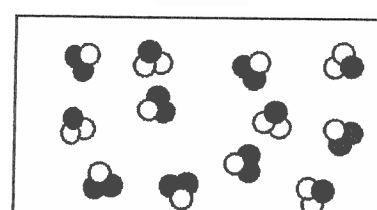
9) E



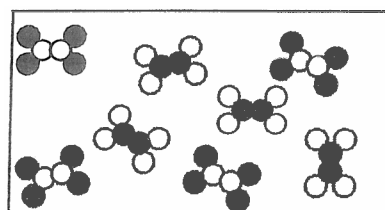
10) D



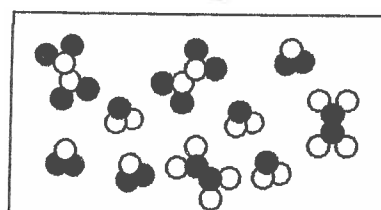
11) B



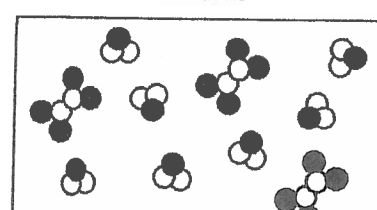
12) D



13) D



14) D



15) D

Name: _____

Hour: _____ Date: _____

Chemistry: Classifying Matter

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. Write the entire word in each space to earn full credit.

Material	Pure Substance or Mixture	Element, Compound, Homogeneous, Heterogeneous
concrete	Mixture	Heterogeneous
sugar + pure water ($C_{12}H_{22}O_{11} + H_2O$)	Mixture	Compound <i>Homogeneous</i>
iron filings (Fe)	Pure Substance	Element
limestone ($CaCO_3$)	Pure Substance	Element
orange juice (w/pulp)	Mixture	Heterogeneous
Pacific Ocean	Mixture	Heterogeneous
<i>He</i> air inside a balloon	Mixture	Homogeneous
aluminum (Al)	Pure Substance	Element
magnesium (Mg)	Pure Substance	Element
acetylene (C_2H_2)	Pure Substance	Compound
tap water in a glass	Mixture	Homogeneous
soil	Mixture	Heterogeneous
pure water (H_2O)	Pure Substance	Compound,
chromium (Cr)	Pure Substance	Element,
Chex mix	Mixture	Heterogeneous
salt + pure water ($NaCl + H_2O$)	Mixture	Homogeneous
benzene (C_6H_6)	Pure Substance	Compound
muddy water	Mixture	Heterogeneous
brass (Cu mixed with Zn)	Mixture	Homogeneous
baking soda ($NaHCO_3$)	Pure Substance	Compound