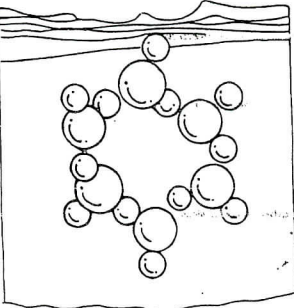
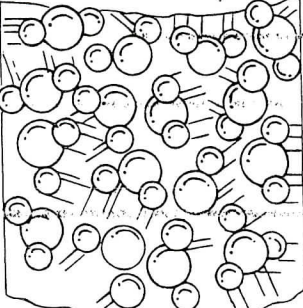
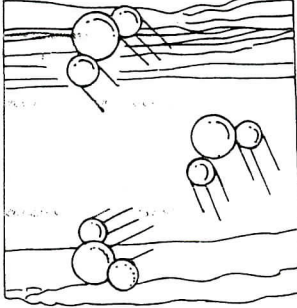


Three States of Matter

On Earth, matter comes in three common states: solid, liquid, and gas. The state of matter is determined by the strength of the bonds holding its molecules together. Matter can be changed from one state to another through the use of heat. Changes in the three states of matter are physical changes. Classify the phrases in the word box for each state of matter. Some phrases are used more than once.

molecule movement is greatest takes shape of container weak bonds between molecules spreads in all directions virtually no bonds between molecules molecule movement is smallest	has mass has definite volume does not expand expands spreads in direction of gravity strong bonds between molecules	has shape of its own has no definite volume hard to deform takes up space
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Solid	Liquid	Gas
		
<u>takes up space</u> <u>has mass</u> <u>has a shape of its own</u> <u>strong bonds between molecules</u> <u>hard to deform</u> <u>does not expand</u> <u>molecule movement is smallest</u> <u>has definite volume</u>	<u>takes up space</u> <u>has mass</u> <u>takes shape of container</u> <u>has definite volume</u> <u>Weak bonds between molecules</u> <u>spreads in direction of gravity</u> <u>does not expand</u>	<u>takes up space</u> <u>has mass</u> <u>takes shape of container</u> <u>has no definite volume</u> <u>Virtually no bonds between molecules</u> <u>spreads in all direction</u> <u>expands</u> <u>molecule movement is greatest</u>

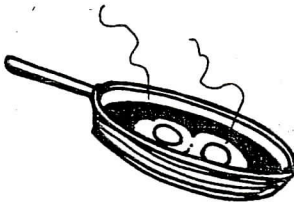
Identifying Physical and Chemical Changes

Read each description and classify it as a physical or chemical change.

- 1 chemical Iron rusts.
- 2 physical Sodium hydroxide dissolves in water.
- 3 chemical A safety match ignites and burns.
- 4 physical A cube of ice melts to form a puddle of water.
- 5 physical Icicles form at the edge of a roof.
- 6 physical Water is heated and changed into steam.
- 7 chemical Milk goes sour.
- 8 physical A chocolate bar melts in the sun.
- 9 chemical Acid on limestone produces carbon dioxide gas.
- 10 chemical Vinegar and baking soda react.
- 11 physical A tea kettle begins to whistle.
- 12 chemical Wood and leaves rot to form humus.

TWO WAYS TO CHANGE

A melting ice sculpture . . . a spectacular bonfire . . . a cake baking in the oven . . . a milkshake in the making . . . an explosion . . . all of these involve changes in matter. Some are physical changes (changes in shape, color, or state) and others are chemical changes (changes involving chemical reactions). Which are which? For each change described below, write **P** for physical change or **C** for chemical change. Be ready to explain your choices.



- P 1. glass breaking
- P 2. hammering wood together to build a playhouse
- C 3. a rusting bicycle
- P 4. melting butter for popcorn
- P 5. glassblower creating sculptures out of glass
- P 6. freezing chocolate-covered bananas
- P 7. separating sand from gravel
- C 8. spoiling food
- C 9. burning toast
- P 10. making salt water to gargle for a sore throat
- P 11. mixing lemonade powder into water
- P 12. cream being whipped
- P 13. water evaporating from a pond
- P 14. cutting grass
- C 15. burning leaves
- P 16. humidifier putting moisture into the air
- C 17. corroding metal
- C 18. bleaching your hair
- C 19. fireworks exploding
- P 20. squeezing oranges to get orange juice
- C 21. frying an egg
- P 22. pouring milk on your oatmeal



Name _____

ELEMENTS, COMPOUNDS & MIXTURES WORKSHEET

Part 1: 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:

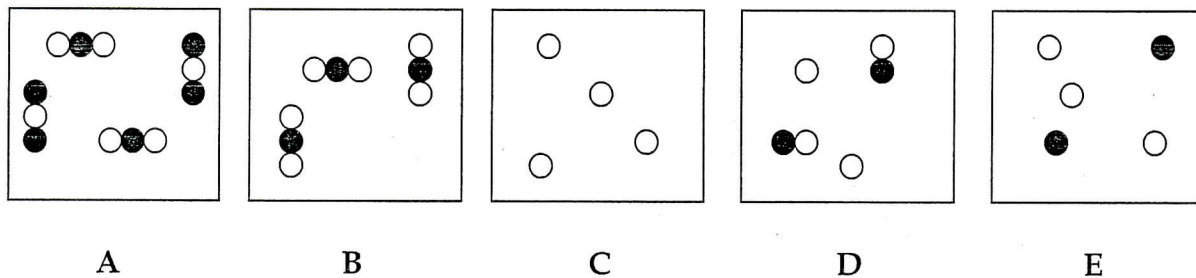
- Two or more elements or compounds NOT chemically combined.
- No reaction between substances.
- Mixtures can be uniform (called homogeneous) and are known as solutions.
- Mixtures can also be non-uniform (called heterogeneous).
- Mixtures can be separated into their components by chemical or physical 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

ELEMENTS, COMPOUNDS & MIXTURES WORKSHEET

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



- 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.

Part 4: Column A lists a substance. In Column B, list whether the substance is an element (E), a compound (C), a Heterogeneous Mixture (HM), or a Solution (S). (Remember a solution is a homogeneous mixture.)

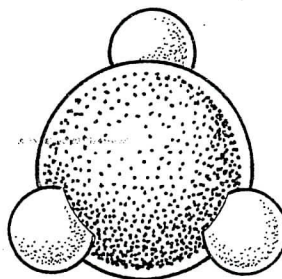
Column A	Column B
1. Summer Sausage	HM
2. Steam	C
3. Salt Water	S
4. Pencil lead (Pb)	E
5. Dirt	HM
6. Pepsi	HM
7. Silver (Ag)	E
8. Toothpaste (Na_2HPO_4)	C
9. A burrito	HM
10. Italian Dressing	HM
11. Chicken Soup	HM
12. Lemonade	S

SUBSTANCES VS. MIXTURES

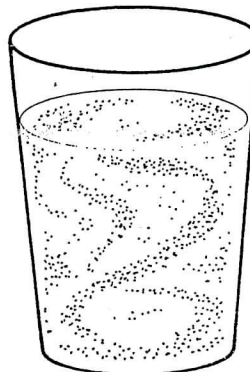
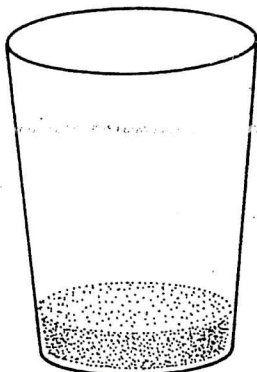
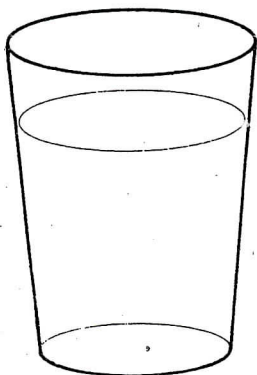
Name _____

A substance is matter for which a chemical formula can be written. Elements and compounds are substances. Mixtures can be in any proportion, and the parts are not chemically bonded.

Classify the following as to whether it is a substance or a mixture by writing S or M in the space provided.



- | | | | |
|-------------------|----------|-----------------|----------|
| 1. sodium | <u>S</u> | 11. iron | <u>S</u> |
| 2. water | <u>S</u> | 12. salt water | <u>M</u> |
| 3. soil | <u>M</u> | 13. ice cream | <u>M</u> |
| 4. coffee | <u>M</u> | 14. nitrogen | <u>S</u> |
| 5. oxygen | <u>S</u> | 15. eggs | <u>M</u> |
| 6. alcohol | <u>S</u> | 16. blood | <u>M</u> |
| 7. carbon dioxide | <u>S</u> | 17. table salt | <u>S</u> |
| 8. cake batter | <u>M</u> | 18. nail polish | <u>M</u> |
| 9. air | <u>M</u> | 19. milk | <u>M</u> |
| 10. soup | <u>M</u> | 20. cola | <u>M</u> |



HOMOGENEOUS VS. HETEROGENEOUS MATTER

Name _____

Classify the following substances and mixtures as either homogeneous or heterogeneous. Place a ✓ in the correct column.

	HOMOGENEOUS	HETEROGENEOUS
1. flat soda pop	✓	
2. cherry vanilla ice cream		✓
3. salad dressing		✓
4. sugar	✓	
5. soil		✓
6. aluminum foil	✓	
7. black coffee	✓	
8. sugar water	✓	
9. city air		✓
10. paint		✓
11. alcohol	✓	
12. iron	✓	
13. beach sand		✓
14. pure air	✓	
15. spaghetti sauce		✓