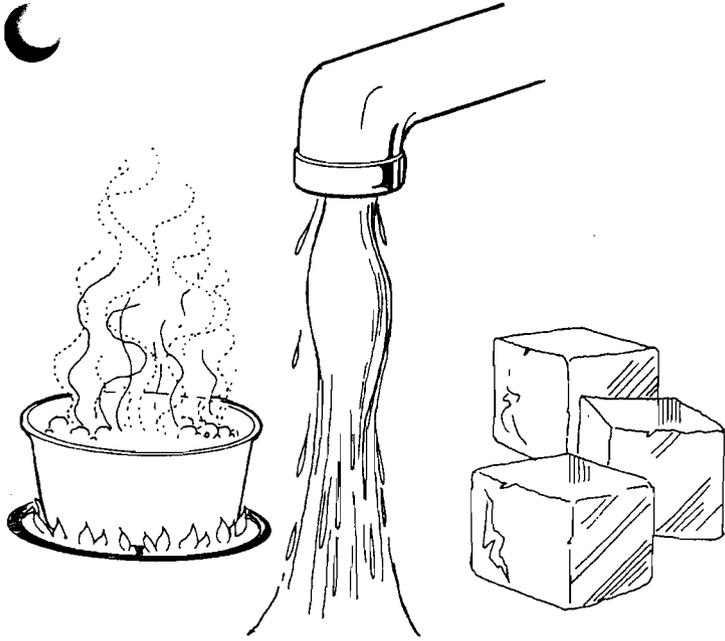


# PHYSICAL VS. CHEMICAL CHANGE

Name \_\_\_\_\_



In a physical change, the original substance still exists, it has only changed in form. Energy changes usually do not accompany physical changes, except in phase changes and when substances dissolve.

In a chemical change, a new substance is produced. Energy changes always accompany chemical changes. Chemical changes are always accompanied by physical changes.

Classify the following as examples of a physical change, a chemical change or both kinds of change.

1. Sodium hydroxide dissolves in water.

\_\_\_\_\_

2. Hydrochloric acid reacts with sodium hydroxide to produce a salt, water and heat.

\_\_\_\_\_

3. A pellet of sodium is sliced in two.

\_\_\_\_\_

4. Water is heated and changed to steam.

\_\_\_\_\_

5. Potassium chlorate decomposes to potassium chloride and oxygen gas.

\_\_\_\_\_

6. Iron rusts.

\_\_\_\_\_

7. Ice melts.

\_\_\_\_\_

8. Acid on limestone produces carbon dioxide gas.

\_\_\_\_\_

9. Milk sours.

\_\_\_\_\_

10. Wood rots.

\_\_\_\_\_

# SEPARATION OF MIXTURES

Name \_\_\_\_\_

Taking advantage of various physical and chemical properties, how would you separate the following mixtures into their components?

1. Sand and water \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

2. Sugar and water \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

3. Oil and water \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

4. Sand and gravel \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

5. A mixture of heptane (boiling point  $98^{\circ}\text{C}$ ) and heptanol (boiling point  $176^{\circ}\text{C}$ )

\_\_\_\_\_  
\_\_\_\_\_

6. A mixture of iodine solid and sodium chloride (Hint: Iodine is not soluble in water.)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7. A mixture of lead and aluminum pellets \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

8. A mixture of salt and iron filings \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

# Substances vs. Mixture

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

# Homogeneous vs. Heterogeneous

Name \_\_\_\_\_



## Mixture

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

### Homogeneous

### Heterogeneous

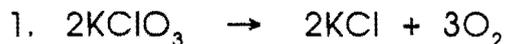
1. Flat soda pop
2. cherry vanilla ice cream
3. salad dressing
4. sugar
5. soil
6. aluminum foil
7. black coffee
8. sugar water
9. city air
10. paint
11. alcohol
12. iron
13. beach sand
14. pure air
15. spaghetti sauce

# CONSERVATION OF MASS

Name \_\_\_\_\_

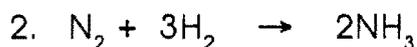
In chemical reactions, mass is neither gained nor lost. The total mass of all the reactants equals the total mass of all the products. Atoms are just rearranged into different compounds.

Using this idea, solve the following problems.



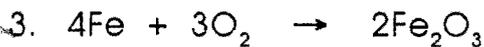
If 500 g of  $\text{KClO}_3$  decomposes and produces 303 g of  $\text{KCl}$ , how many grams of  $\text{O}_2$  are produced?

\_\_\_\_\_



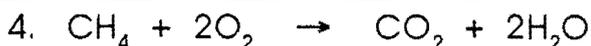
How many grams of  $\text{H}_2$  are needed to react with 100 g of  $\text{N}_2$  to produce 121 g of  $\text{NH}_3$ ?

\_\_\_\_\_



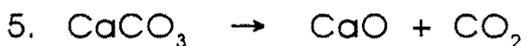
How many grams of oxygen are needed to react with 350 g of iron to produce 500 g of  $\text{Fe}_2\text{O}_3$ ?

\_\_\_\_\_



16 g of  $\text{CH}_4$  react with 64 g of  $\text{O}_2$ , producing 44 g of  $\text{CO}_2$ . How many grams of water are produced?

\_\_\_\_\_



How much  $\text{CO}_2$  is produced from the decomposition of 200 g of  $\text{CaCO}_3$  if 112 g of  $\text{CaO}$  are produced?

\_\_\_\_\_

# ELEMENT SYMBOLS

Name \_\_\_\_\_

Write the symbol for the following elements which are common in living things.

1. oxygen \_\_\_\_\_
2. hydrogen \_\_\_\_\_
3. chlorine \_\_\_\_\_
4. potassium \_\_\_\_\_
5. fluorine \_\_\_\_\_
6. manganese \_\_\_\_\_
7. carbon \_\_\_\_\_
8. zinc \_\_\_\_\_
9. sodium \_\_\_\_\_
10. sulfur \_\_\_\_\_
11. phosphorus \_\_\_\_\_
12. iodine \_\_\_\_\_
13. magnesium \_\_\_\_\_
14. nitrogen \_\_\_\_\_
15. copper \_\_\_\_\_
16. iron \_\_\_\_\_
17. calcium \_\_\_\_\_
18. cobalt \_\_\_\_\_

Write the name of the element indicated by each of the following symbols.

19. As \_\_\_\_\_
20. Pb \_\_\_\_\_
21. Kr \_\_\_\_\_
22. Ba \_\_\_\_\_
23. He \_\_\_\_\_
24. Ne \_\_\_\_\_
25. Si \_\_\_\_\_
26. U \_\_\_\_\_
27. Sn \_\_\_\_\_
28. Pt \_\_\_\_\_
29. Rn \_\_\_\_\_
30. Al \_\_\_\_\_
31. Cu \_\_\_\_\_
32. Ag \_\_\_\_\_
33. Pu \_\_\_\_\_
34. Sr \_\_\_\_\_
35. Am \_\_\_\_\_
36. Au \_\_\_\_\_
37. Ra \_\_\_\_\_
38. Ge \_\_\_\_\_
39. Br \_\_\_\_\_
40. Hg \_\_\_\_\_