

Changes and Matter

Name: _____

Date: _____

Hour: _____

Information: Changes in Matter

Books are made of matter. You are made of matter. “Matter” is a fancy word for the “stuff” of which all objects are made. Every day, matter is changed in different ways. For example, paper can be changed in many ways—it can be torn, folded, or burned.

A chemical change is any alteration that changes the identity of matter. For example, by passing electricity through water it can be broken down into hydrogen and oxygen. Burning paper is a chemical change because after the change takes place, the paper has been changed into different substances (like ash, carbon dioxide, etc.).

A physical change is any alteration that does not change the identity of the matter. Shredding paper does not change the paper into a different substance. Dissolving salt in water is a physical change because after the change, the salt and water are both still there.

Critical Thinking Questions

1. Explain why each of the following is a physical change.
 - a) boiling water until no water remains

 - b) mixing sugar with coffee

2. Explain why each of the following is a chemical change.
 - a) a car rusting

 - b) food digesting

3. Identify each of the following changes as chemical or physical by placing a C or P in each blank.

_____ a) acid rain corroding the statue of liberty	_____ d) melting steel
_____ b) dissolving salt in water	_____ e) dissolving steel in acid
_____ c) boiling salt water until just salt remains	_____ f) cracking ice

Information: Elements, Compounds, Mixtures

Examine the following tables. Following the name of each element or compound is the “chemical formula” of the element or compound; please see the periodic table for the meaning of some of the symbols (i.e. Na = sodium). *Italics* tell you that substance is organic.

Elements	Compounds
Sodium (Na)	Water (H ₂ O)
Chlorine (Cl)	<i>Methane (CH₄)</i>
<i>Carbon (C)</i>	Sodium chloride, salt (NaCl)
Oxygen (O)	<i>Carbon dioxide (CO₂)</i>
Hydrogen (H)	Hydrogen Peroxide (H ₂ O ₂)

Pure Substances	Mixtures
Salt (NaCl)	Salt water (NaCl and H ₂ O)
Hydrogen (H)	Sand
<i>Carbon dioxide (CO₂)</i>	Hydrogen (H) and Oxygen (O)
Water (H ₂ O)	Sodium (Na) and Chlorine (Cl)
Aluminum (Al)	Kool-aid (sugar, water, etc.)

Critical Thinking Questions

4. How are elements different from compounds?
5. How are compounds different from mixtures?
6. How are pure substances different from mixtures?
7. Can something be both a mixture and a pure substance? Explain using examples from the tables.
8. Is it always possible to identify something as an element, compound, pure substance or mixture just by looking at it? Explain using examples from the tables.

9. Formulate a definition for each of the following terms.

a) element:

b) compound:

c) mixture:

d) pure substance:

10. Categorize each of the following as an element, compound, mixture, or pure substance. If more than one label applies, then include both labels. (You will need more than one label sometimes.)

a) _____ Popsicle

c) _____ Gold

b) _____ Sugar

d) _____ Dishwater

11. If you have a container with hydrogen gas and oxygen gas in it do you have water? Why or why not?

12. Give an example of something that is an element. Your example should not already be on this sheet.

13. Give an example of something that is a compound. Your example should not already be on this sheet.

14. Give an example of something that is a mixture. Your example should not already be on this sheet.

15. What do all organic substances have in common?

