

Activity 5: Element or Compound?

Name _____

Date _____

Class _____

Key Questions

1. _____

2. _____

Explore Your Ideas

Elements and Compounds

| Table 1: What Happens Near the Negative (-) and Positive (+) Battery Terminals | |
|--|--|
| Draw a picture and describe what happens near the pencil attached to the negative (-) end of the battery. | Draw a picture and describe what happens near the pencil attached to the positive (+) end of the battery. |
| | |

1. What is the evidence that an interaction occurred in your experiment?

Electrolysis of Water

2. Do you think that the gases collected near the two battery terminals are the same or different gases? Why?

3. What gas or gases do you think are made near each terminal? Explain your reasons.

The Flame Test

| Table 2: Flame Test of Two Gases | |
|--|--|
| Flame test of gas collected from the negative (-) battery terminal. | Flame test of gas collected from the positive (+) battery terminal. |
| | |

4. What gas do you think is made near the rod attached to the *positive* terminal of the battery? What is your evidence?

5. Is the gas made near the rod attached to the *negative* battery terminal the same gas or a different gas? Is this gas the same as any of the gases you tested in Chapter 1 Activity 2? What is your evidence?

6. Chemists have done further tests of the gas made at the rod attached to the negative terminal. This gas has a boiling point of -252°C . The mass of one liter (density) of this gas is 0.08 g. Look at the *Table of Densities* and *Table of Melting and Boiling Points* in the Appendix. What is this gas?

7. The gas collected at the rod attached to the positive terminal has a boiling point of -183°C . The mass of one liter of the gas is 1.33 g. What is the gas?

8. Is the electrolysis of water a physical interaction or a chemical interaction? What is your evidence? (Electrolysis is the change or changes that occur in a solution or a melted compound due to the passage of an electric current.)

9. If the interaction is chemical, then write a word chemical equation for the reaction.

Make Sense of Scientists' Ideas

1. What are the three elements that make up the compound calcium carbonate?

| Table 3: Compounds and Elements | | |
|---------------------------------|---|---------|
| Single Substance | What happens during chemical reactions | C or E? |
| pure water | Water breaks down into the two elements hydrogen and oxygen during electrolysis. | C |
| magnesium | Magnesium does not break down into simpler substances. | |
| acetic acid | Acetic acid breaks down into three elements, carbon, hydrogen, and oxygen (series of reactions). | |
| iodine | Iodine does not break down into simpler substances. | |
| sodium hydroxide (base) | Sodium hydroxide breaks down into three elements, sodium, hydrogen, and oxygen (series of reactions). | |
| sugar | Sugar breaks down into three elements (carbon, hydrogen, and oxygen (series of reactions). | |

2. Justify your answer for the materials that you decided were elements.

3. Justify your answer for the materials that you decided were compounds.

Explore and Make Sense of Your Ideas

| Table 4: Physical Properties of Metal and Nonmetal Elements | | | |
|---|--|--------|-----------|
| Physical property | Description of property | Metals | Nonmetals |
| phase | gas, liquid or solid at room temperature | | |
| color | interaction with eyes | | |
| shiny or dull | how well it reflects light | | |
| melting point | temperature at which it melts | | |
| malleable or brittle | how well it can be hammered into thin sheets | | |
| heat conductivity | how well it conducts heat | | |
| electrical conductivity | how well it conducts electric current | | |

Our Consensus Ideas

The key questions for this activity are:



1. How can you determine whether a single substance is an element or a compound?
2. What are some common properties of metal and nonmetal elements?

1. Answer the key questions.

Key Question 1

Key Question 2

2. Write the class consensus ideas.

Key Question 1

Key Question 2
