

## Chemical Changes and Reactions- Guided Notes

Matter can be described in terms of two kinds of properties:

1. \_\_\_\_\_

2. \_\_\_\_\_

A \_\_\_\_\_ is a characteristic of a substance that can be observed without changing the substance into another substance.

Examples: ice \_\_\_\_\_

\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and

\_\_\_\_\_.

A \_\_\_\_\_ is a characteristic of a substance that describes its ability to change into other substances.

Examples: when \_\_\_\_\_ burns, it **combines with oxygen** in the air to form a new substance, **magnesium oxide**. \_\_\_\_\_ and \_\_\_\_\_ are other examples.

### Changes in Matter

A \_\_\_\_\_ is any change that alters the form or appearance of a substance, but does not make the substance into another substance. Other examples : \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.

A change in matter that produces one or more new substances, is a **chemical change**, or \_\_\_\_\_.

Chemical reactions involve two main kinds of changes that you can observe.

1. \_\_\_\_\_

2. \_\_\_\_\_

## Changes in Properties

One way to detect chemical reactions, are to observe \_\_\_\_\_ in the \_\_\_\_\_ of the materials involved, such as:

\_\_\_\_\_ change, formation of a \_\_\_\_\_, and production of a \_\_\_\_\_.

## Changes in Energy

As matter changes, it can either \_\_\_\_\_ or \_\_\_\_\_ energy. This change occurs during a \_\_\_\_\_.

\_\_\_\_\_ are reactions in which energy is \_\_\_\_\_.

\_\_\_\_\_ are reactions that release energy in the form of \_\_\_\_\_.

## Rate of Reactions

■ Chemical reactions \_\_\_\_\_ all occur at the same rate. Some occur very \_\_\_\_\_, like explosions. Others, like rusting of metal, occur \_\_\_\_\_ over time.

■ Chemists can control rate of reactions by changing factors such as \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.

■ They can also use substances called **catalysts** and **inhibitors**.

A \_\_\_\_\_ is a material that increases the rate of a reaction by lowering the activation energy, or energy needed to start the reaction.

– Example: **enzymes** in our bodies.

A material used to decrease the rate of a reaction is an \_\_\_\_\_. They usually work by preventing the reactants from combining together.

– Example: **preservatives** added to food to prevent it from becoming stale or spoiling.

Name: \_\_\_\_\_

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## Describing Chemical Reactions

Scientists also use \_\_\_\_\_ and \_\_\_\_\_ to describe chemical reactions rather than a long sentence.

- Chemical equations use \_\_\_\_\_ and other \_\_\_\_\_ instead of words to summarize a reaction.
- All chemical equations use formulas to represent the substances involved in a reaction.
- A \_\_\_\_\_ is a combination of symbols that represents the elements in a compound.



CO<sub>2</sub> is the formula for carbon dioxide.

This formula tells you that this compound is made up of the elements \_\_\_\_\_ and \_\_\_\_\_ and each molecule has 1 carbon atom and 2 oxygen atoms.

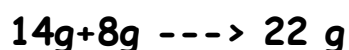
## Structure of an Equation

- All chemical equations have a common structure.

A chemical equation tells you the substances you \_\_\_\_\_ and the substances you get \_\_\_\_\_.

- The substances at the beginning are called the \_\_\_\_\_.
- When the reaction is complete, you have new substances called \_\_\_\_\_.

## Conservation of Mass



The sum is equal to its parts. This is an example of the Conservation of Mass.

- This principle, the conservation of mass, states that during a chemical reaction, matter is \_\_\_\_\_.
- This means that all the atoms present at the start of the reaction are still present at the end.

### Classifying Chemical Equations

Many chemical reactions are classified into one of three categories.

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

### Synthesis

When two or more elements or compounds combine to make a more complex substance, the process is called \_\_\_\_\_.

- Example: Hydrogen and oxygen join together to form water.

### Decomposition

\_\_\_\_\_ breaks down compounds into simpler products.



Hydrogen peroxide eventually decomposes into water and oxygen.

### Replacement

When one element replaces another in a compound, or when two elements in different compounds trade places, this process is called \_\_\_\_\_.



Copper metal can be obtained by heating copper oxide with carbon. The carbon replaces the copper.

