How does a physical change differ from a chemical change in matter?

Physical Change in Matter

- A physical change is a change that affects one or more physical properties of a substance.
- The identify of the substance stays the same
- No new substance is formed

Physical Change in Matter

Imagine that a piece of silver is pounded and molded into a heart-shaped pendant.

This is an example of a physical change. Why?

Only the shape of the silver has changed. The piece of silver is still silver.

Physical Change in Matter

Some Examples of Physical Change:

- Melting
- Breaking
- Bending
- Cutting
- Freezing
- Crushing
- Boiling
- Dissolving
- Condensing
- Evaporating
- Changing State

Chemical Change in Matter

- A chemical change happens when one or more substances are changed into new substances that have new and different properties
- Most chemical changes are difficult to reverse

What is the difference between a chemical property and a chemical change?

- A chemical property of a substance determines whether a chemical change can occur
- A chemical change is the actual process of changing

What is the difference between a Chemical Property and a Chemical Change?

- The iron used to make the old car above has the Chemical Property of Reactivity with Oxygen. The Chemical Change occurs only when the car is left out and is exposed to oxygen and it rusts.
- Why then does the bumper on the car still look shiny and new?
- The bumper is coated with chromium. Chromium has the Chemical Property of Non-reactivity with Oxygen.

Chemical Change in Matter

Some Clues that a Chemical Change occurred:

Fizzing

Change in color

Production of heat

Emission of light

Development of gas

Formation of a precipitate

Foaming

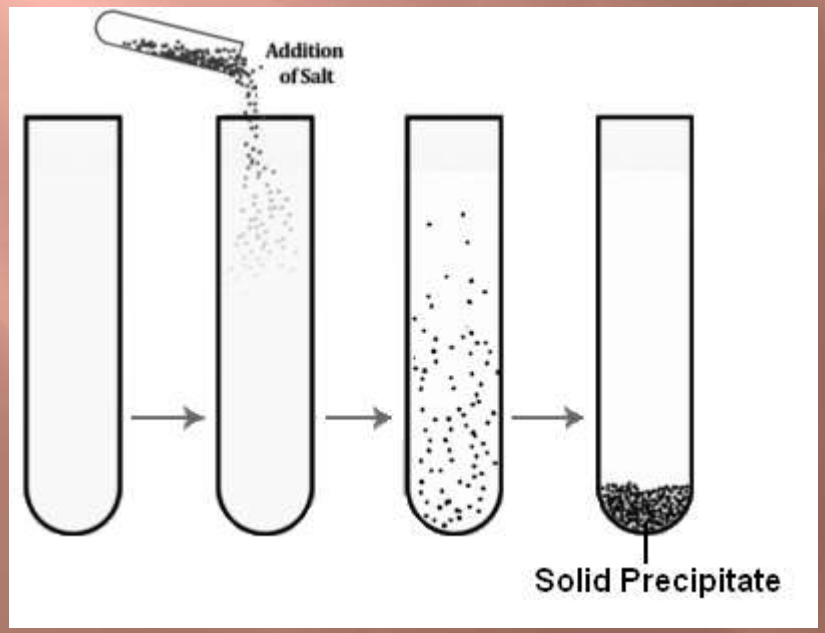
Change in odor

Sound given off

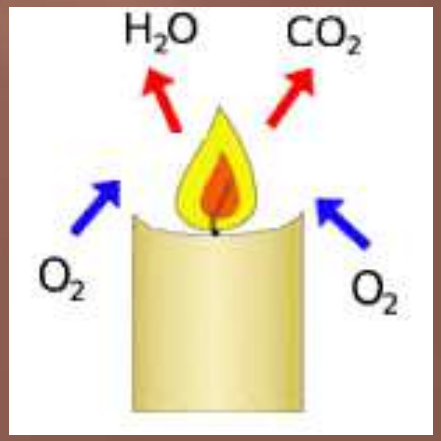
Emission of Light

Fizzing and Foaming

Formation of a Precipitate

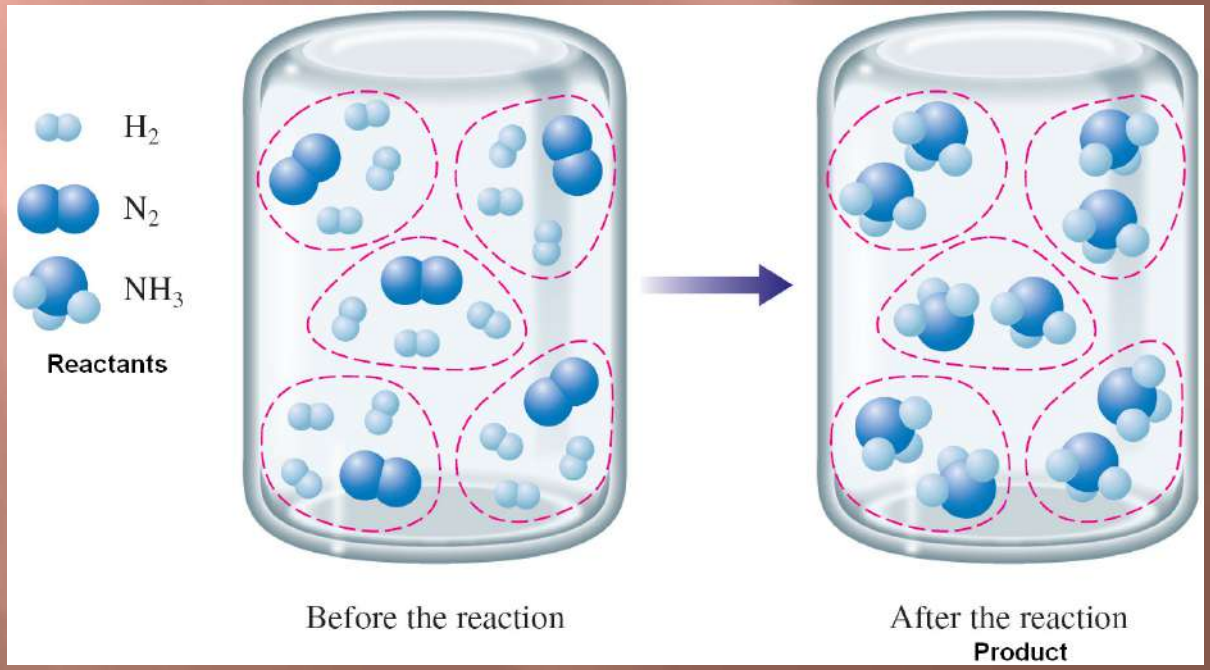


Development of Gas



Chemical Change in Matter

- Substances before a chemical change are “reactants”. After a chemical change, the new substances formed are called “products.”
- The product cannot go back to its original reactants.



Chemical Change: Baking a Cake Example

- To bake a cake, you combine eggs, flour, sugar, and other ingredients.
- However, when you bake the batter, you end up with something completely different.
- The result is a cake that has properties that differ from the properties of the ingredients.

Chemical Change: Baking a Cake Example

What clues could you use to determine there was a chemical change?

- You smell the cake baking
- You see the batter rise
- You see the cake brown
- You can see air pockets made by gas bubbles that formed in the batter when it is finished baking
- A new substance is formed that cannot be reversed

Examples of Chemical Change in Matter

Burning
Cooking/Frying
Using a battery
Fermenting
Decomposition
Photosynthesis
Rusting
Fireworks
Digestion
Respiration

Physical & Chemical Change in Matter

- When matter undergoes change, it always involves energy going into or out of the system
- Whether the change is physical or chemical, the total amount of matter always stays the same, even though the materials my appear much different after the change as compared to before