

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



S8P1e. Distinguish between changes in matter as physical (i.e., physical change) or chemical (development of a gas, formation of a precipitate, and change in color)



Activating Strategy:

Watch the two video clips showing two ways to change a sheet of paper. Describe your observations and the differences on your Notes sheet.

<http://www.youtube.com/watch?v=1vNxjGMF6o8>

<http://www.youtube.com/watch?v=TUVScBf8Znw>



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 changes are more easily reversed



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



Physical Change in Matter Activity

- Select one activity below or use your own to demonstrate a physical change
 - Sugar Cube Activity [see resources]
 - Clay Transformation [see resources]
 - Paper Origami [see resources]



Distributed Summarizing:

On your notes sheet, identify and describe a physical change that you have made or observed in the past few days.

When instructed, share your physical change with a partner and explain why it is an example of a physical change.



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
- Some chemical changes can be reversed by more chemical changes



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
- Let's look at an old car as an example

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

Foaming

Change in color

Change in odor

Production of heat

Sound given off

Emission of light

Development of gas

Formation of a precipitate

The signs are not definite. More than one clue should be used to determine chemical change

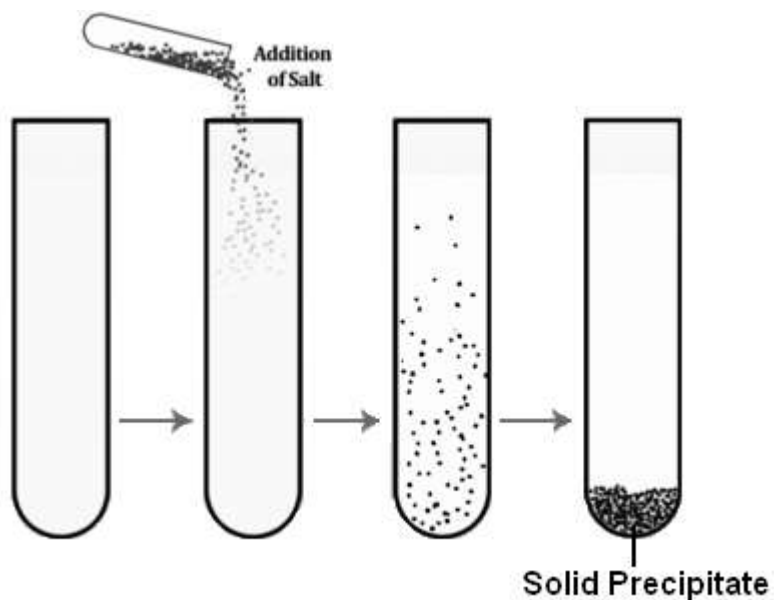
Emission of Light



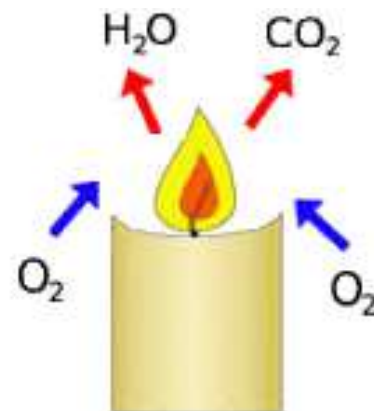
Fizzing and Foaming



Formation of a Precipitate



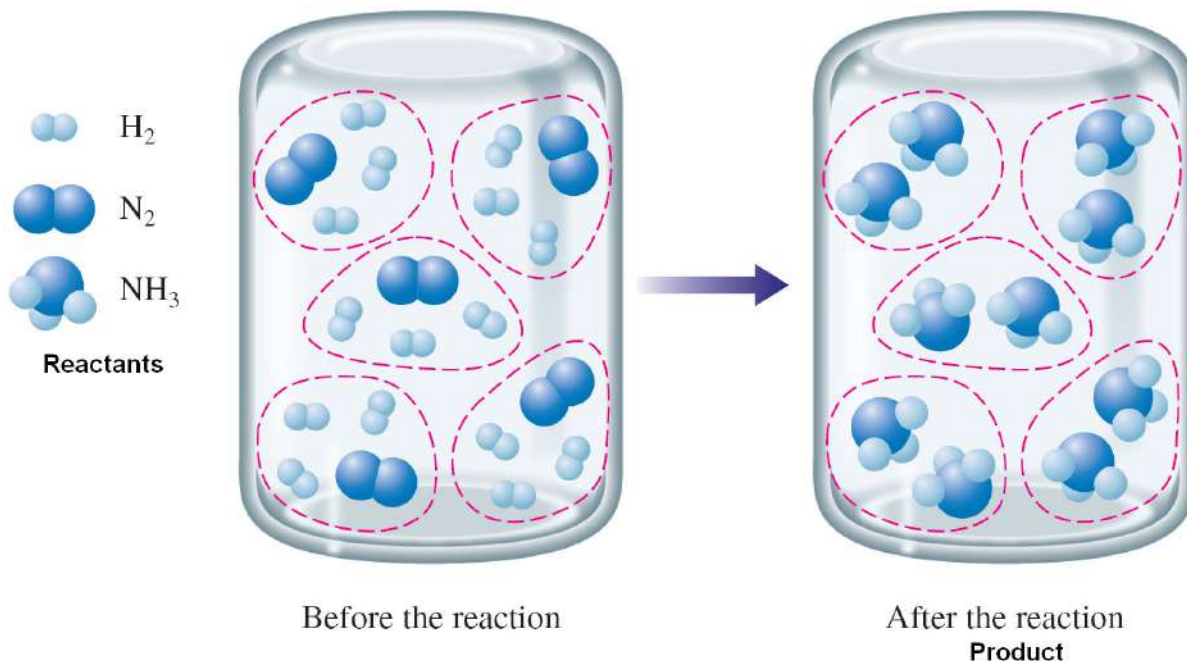
Development of Gas





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



Distributed Summarizing:

On your notes sheet, identify and describe a chemical change that you have made or observed in the past few days.

When instructed, share your chemical change with a partner and explain why it is an example of a physical change.



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 may appear much different after the change as compared to before



Physical and Chemical Changes Study Jams Video



Physical and Chemical Change Lab(s)

[see resources for suggestions or use your own]



Physical & Chemical Change Activities

- Select activities below from the resources based on time and student mastery:
 - Physical and Chemical Changes Sorting Cards
 - Physical and Chemical Changes 3 X 3 Review
 - Physical and Chemical Changes Worksheets
 - Physical and Chemical Change Illustrations
 - Physical and Chemical Change Flipbooks



Summarizing Strategy

Complete a Venn Diagram
comparing a Physical
Change to a Chemical
Change