

# PHYSICAL AND CHEMICAL PROPERTIES AND CHANGES

Name SOLUTIONS

## PHYSICAL PROPERTY

- observed with senses
- determined without destroying matter

## CHEMICAL PROPERTY

- indicates how a substance reacts with something else
- matter will be changed into a new substance after the reaction

Identify the following as a chemical (C) or physical property (P):

- P 1. blue color
- P 2. density
- C 3. flammability (burns)
- P 4. solubility (dissolves)
- C 5. reacts with acid
- C 6. supports combustion
- P 7. sour taste

- P 8. melting point
- C 9. reacts with water
- P 10. hardness
- P 11. boiling point
- P 12. luster
- P 13. odor
- C 14. reacts with air

## PHYSICAL CHANGE

- a change in size, shape, or state
- no new substance is formed

## CHEMICAL CHANGE

- a change in the physical and chemical properties
- a new substance is formed

Identify the following as physical (P) or chemical (C) changes.

- P 1. NaCl (Table Salt) dissolves in water.
- C 2. Ag (Silver) tarnishes.
- P 3. An apple is cut.
- P 4. Heat changes H<sub>2</sub>O to steam.
- C 5. Baking soda reacts to vinegar.
- C 6. Fe (Iron) rusts.
- P 7. Alcohol evaporates .
- P 8. Ice melts.

- C 9. Milk sours.
- P 10. Sugar dissolves in water.
- C 11. Wood rots.
- C 12. Pancakes cook.
- C 13. Grass grows.
- P 14. A tire is inflated.
- C 15. Food is digested. (if chemical digestion)
- P 16. Paper towel absorbs water.

## Physical and Chemical Changes

### Part A

Can you recognize the chemical and physical changes that happen all around us? If you change the way something looks, but haven't made a new substance, a **physical change** (P) has occurred. If the substance has been changed into another substance, a **chemical change** (C) has occurred.

1.	<u>P</u>	An ice cube is placed in the sun. Later there is a puddle of water. Later still the puddle is gone.
2.	<u>C</u>	Two chemicals are mixed together and a gas is produced.
3.	<u>C</u>	A bicycle changes color as it rusts.
4.	<u>P</u>	A solid is crushed to a powder.
5.	<u>C</u>	Two substances are mixed and light is produced.
6.	<u>C</u>	A piece of ice melts and reacts with sodium.
7.	<u>P</u>	Mixing salt and pepper.
8.	<u>P</u>	Chocolate syrup is dissolved in milk.
9.	<u>C</u>	A marshmallow is toasted over a campfire.
10.	<u>P</u>	A marshmallow is cut in half.

**Part B**

Read each scenario. Decide whether a physical or chemical change has occurred and give evidence for your decision. The first one has been done for you to use as an example.

	Scenario	Physical or Chemical Change?	Evidence...
1.	Umm! A student removes a loaf of bread hot from the oven. The student cuts a slice off the loaf and spreads butter on it.	Physical	No change in substances. No unexpected color change, temperature change or gas given off.
2.	Your friend decides to toast a piece of bread, but leaves it in the toaster too long. The bread is black and the kitchen is full of smoke.	Chemical	New colour, new substance (smoke) and new smell
3.	You forgot to dry the bread knife when you washed it and reddish brown spots appeared on it.	Chemical	New colour Very difficult to reverse
4.	You blow dry your wet hair.	Physical	Nothing new was created Just evaporation of water (liquid to gas form, still water)
5.	In baking biscuits and other quick breads, the baking powder reacts to release carbon dioxide bubbles. The carbon dioxide bubbles cause the dough to rise.	Chemical	New gas (CO <sub>2</sub> ) is created
6.	You take out your best silver spoons and notice that they are very dull and have some black spots.	Chemical	Reaction of silver with air (tarnishing), new substance created New colour
7.	A straight piece of wire is coiled to form a spring.	Physical	Nothing new is created, just changed shape
8.	Food color is dropped into water to give it color.	Physical	No new colour, just mixing of existing colours, nothing new created
9.	Chewing food to break it down into smaller particles represents a _____ change, but the changing of starch into sugars by enzymes in the digestive system represents a _____ change.	Physical chemical	Nothing new created, just changed size Changing food into new substances by reacting with enzymes
10.	In a fireworks show, the fireworks explode giving off heat and light.	Chemical	New light (energy) and sounds

**Part C: True (T) or False (F)**

1.	<b>F</b>	Changing the size and shapes of pieces of wood would be a chemical change.
2.	<b>F</b>	In a physical change, the makeup of matter is changed.
3.	<b>T</b>	Evaporation occurs when liquid water changes into a gas.
4.	<b>T</b>	Evaporation is a physical change.
5.	<b>F</b>	Burning wood is a physical change.
6.	<b>F</b>	Combining hydrogen and oxygen to make water is a physical change.
7.	<b>T</b>	Breaking up concrete is a physical change.
8.	<b>F</b>	Sand being washed out to sea from the beach is a chemical change.
9.	<b>F</b>	When ice cream melts, a chemical change occurs.
10.	<b>F</b>	Acid rain damaging a marble statue is a physical change.