

**Matter and the changes it undergoes.**

**What is matter?**

- A. Stuff
- B. Substance
- C. Things/ thingy
- D. gizmo
- E. Whatever

## **Matter**

- ❖ **The food we eat/drink**
- ❖ **The clothes we wear**
- ❖ **The stuff we use**
- ❖ **The air we breathe**

**Matter** is anything that has mass and takes up space.

**Can you think of anything that is NOT matter?**

## **What of following is matter?**

- A. fire
- B. light
- C. energy
- D. All of the above
- E. None of the above

# **Matter**

**Matter** is anything that has mass and takes up space.

## ❖ **Classification of matter**

- element
- compound
- mixture

## ❖ **Physical and chemical properties**

## ❖ **Physical and chemical changes**

## **Physical changes Vs. Chemical changes**

### ❖ **What changed in each type?**

### ❖ **What didn't change?**

❖ How would you determine if a change is a physical change or chemical change?

❖ How would you determine if a property is a physical property or chemical property?

❖ Define/differentiate

Physical property Vs. Chemical property

Physical change Vs. Chemical change

	Physical changes	Chemical changes
Scenarios	1, 6, 7, 8, 10	2, 3, 4, 5, 9, 11
What changed?	Shape, size, Physical state dye concentrate → watered down	<b>The substance turned into something else.</b> Bread → charcoal (charred bread) Shiny metal → stain/rust (color change) Baking soda → CO <sub>2</sub> (release of gas) Gun powder →vapor (release of light, heat and sound)
What didn't change	<b>The substance remains the same.</b> loaf → slices (Still bread) Wire → coils (still copper) Liquid water → water vapor (still water)	

### **Physical changes:**

- **No new substance is formed in physical changes.**
- A substance's physical properties is changed.
- **Examples:** slicing a loaf of bread  
coiling a piece of wire  
Adding food coloring to water

**Physical changes** are changes that *don't alter the identify of the substance* undergoing the change.

### **Chemical changes:**

- **New substance(s) are formed during chemical changes.**
  - different compositions and different properties
- **Examples:** bread over-toasted, fireworks going off, knife rusting.
- Chemical changes are often accompanied by one or more of the following
  - Release of energy in the form of light, heat, or sound
  - Formation of bubbles (indicating release of gas)
  - Release of odor
  - Color change

**Chemical changes** are changes that result in the *formation of new substances*.

❖ **Physical properties:** properties that can be observed without changing the identity of a substance.

❑ **Examples:** shape, size, density, boiling point, physical states.

❖ **Chemical properties:** properties that can only be observed when a substance is transformed into new substances.

❑ **Examples:** tendency to rust, combustibility, flammability

## **All Phase Changes are Physical changes**

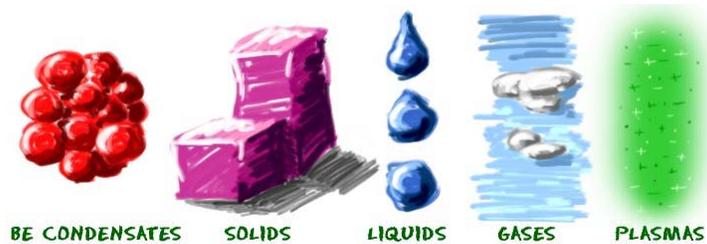
❖ Phases of matter and phase changes.

**How many phases are there?**

- A. 3
- B. 4
- C. 5
- D. 6

**How many phases are there?**

- A. 3
- B. 4
- C. 5**
- D. 6



## All matter can Exist in three Physical States (Phases)

**Gas**

**Liquid**

**Solid**

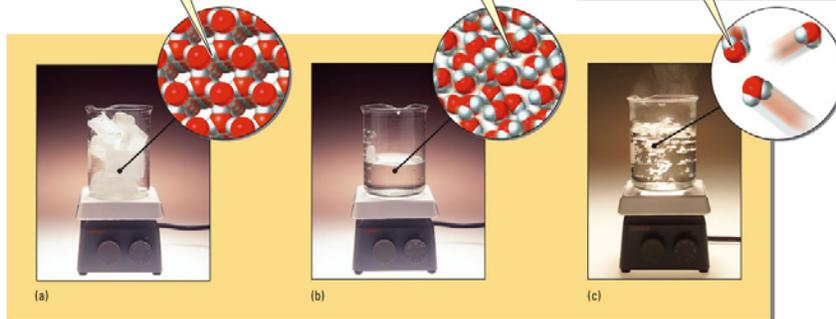


## Solid, Liquid and Gas at the Macroscopic Level

In solid water (ice) each water molecule is close to its neighbors and restricted to vibrating back and forth around a specific location.

In liquid water the molecules are close together, but they can move past each other; each molecule can move only a short distance before bumping into one of its neighbors.

In gaseous water (water vapor) the molecules are much farther apart than in liquid or solid, and they move relatively long distances before colliding with other molecules.



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**Solid:**

definite volume  
definite shape

**Liquid:**

definite volume  
Indefinite shape

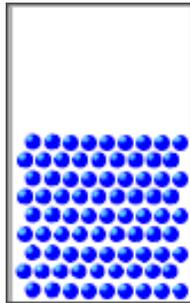
**Gas:**

Indefinite volume  
Indefinite shape

## Solid, Liquid and Gas at the Microscopic Level

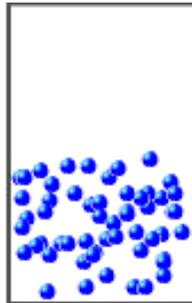
**Solid:**

definite volume  
definite shape



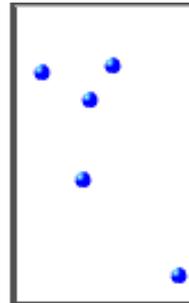
**Liquid:**

definite volume  
Indefinite shape



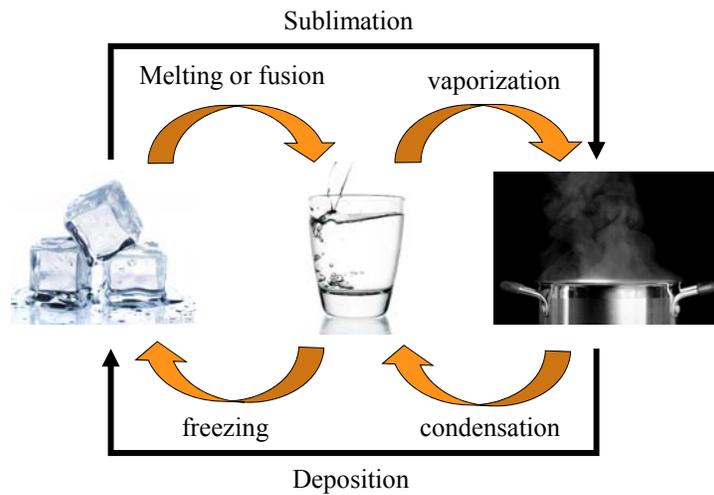
**Gas:**

Indefinite volume  
Indefinite shape



## Phase Changes

**Phase change** — conversion of matter from one physical state to another



freezing point: the temperature when a substance freezes.

melting point: the temperature when a substance melts.

boiling point: the temperature when a substance boils.

condensation point: the temperature when a substance condenses.

**Which temperature is higher,  
freezing point or melting point?**

- A. freezing point
- B. melting point
- C. They are the same
- D. It depends on the substance

