

Scientific English for chemistry

Lesson 3: States of Matter and Phase Changes

1. The Three Main States of Matter

Matter exists in different states, which change based on temperature and pressure. The three main states are:

Solid – Has a fixed shape and volume (Example: Ice, wood, metal).

Liquid – Has a fixed volume but takes the shape of its container (Example: Water, milk, oil).

Gas – Has no fixed shape or volume and spreads to fill a container (Example: Oxygen, steam, helium).

2. Changes in State (Phase Changes)

Matter can change from one state to another when heated or cooled.

Melting – Solid → Liquid (Example: Ice melts into water).

Freezing – Liquid → Solid (Example: Water freezes into ice).

Evaporation – Liquid → Gas (Example: Water turns into steam).

Condensation – Gas → Liquid (Example: Steam turns into water on a cold surface).

Sublimation – Solid → Gas (Example: Dry ice turns into gas).

Deposition – Gas → Solid (Example: Frost forming on a cold window).

3. Properties of Each State of Matter

Each state of matter has different properties:

Solids have a definite shape and do not flow.

Liquids can flow and take the shape of their container.

Gases expand to fill the container and can be compressed easily.

4. Grammar Focus: Using Comparatives to Describe States of Matter

We use comparative adjectives to compare the three states of matter.

--Solids are harder than liquids.

--Liquids are denser than gases.

--Gases are lighter than solids.

Some adjectives add -er (hard → harder, light → lighter), while longer adjectives use "more" (dense → more dense).

5. The Water Cycle: A Real-Life Example of Phase Changes

The water cycle is an example of how matter changes between states in nature.

Evaporation – The sun heats water, turning it into water vapor.

Condensation – Water vapor cools and forms clouds.

Precipitation – Water falls as rain, snow, or hail.

6. Writing Practice: Describe a Phase Change

Choose one phase change and write 3-5 sentences about it.

Use the following structure:

Name the phase change.

What causes it?

What happens in the process?

Example Answer:

"Evaporation is when a liquid changes into a gas. It happens when heat is added. When water is heated, it turns into steam and rises into the air. This is an important part of the water cycle."

7. Speaking Practice: Guess the State of Matter

Instructions:

One student describes an object, and the other guesses if it is a solid, liquid, or gas.

Example Dialogue:

Student A: "This matter flows, takes the shape of its container, but has a fixed volume."

Student B: "Is it a liquid?"

Student A: "Yes, correct!"

8. Homework

Find one real-life example of a phase change.

Write five new words you learned and their meanings.

Describe the phase change using comparative adjectives.

End of Lesson 3

"The early bird catches the worm"

Activity 1: Match the Phase Change with Its Description

Match the phase change to its correct description.

1. ___ Melting
2. ___ Freezing
3. ___ Evaporation
4. ___ Condensation
5. ___ Sublimation
6. ___ Deposition

- A. Gas changes directly to a solid.
- B. A liquid changes to a gas.
- C. A solid changes into a gas.
- D. A liquid turns into a solid.
- E. A gas cools down and becomes a liquid.
- F. A solid turns into a liquid.

Activity 2: True or False

Write T for true and F for false.

1. ___ A solid has a fixed shape and volume.
2. ___ A gas has a definite shape.
3. ___ Liquids can flow and take the shape of their container.
4. ___ Freezing means a liquid turns into a gas.
5. ___ Evaporation happens when a gas turns into a liquid.

Activity 3: Fill in the Blanks with Comparatives

Complete the sentences using harder, softer, more flexible, lighter, heavier.

1. Ice is _____ than water.
2. Gases are _____ than solids.
3. A liquid is _____ than a solid because it can flow.
4. Metals are _____ than plastic.
5. Water is _____ than oil.

Activity 4: Complete the Water Cycle

Fill in the missing words: evaporation, condensation, precipitation

1. When the sun heats the ocean, _____ happens.
2. Water vapor turns into clouds through _____.
3. Rain falls back to Earth as _____.

Activity 5: Correct the Mistakes

1. Ice is more hot than water.

→ _____

2. Gas have a fixed shape.

→ _____

3. Evaporation is when a gas changes into a liquid.

→ _____

4. Water cycle does not include condensation.

→ _____

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