Exploring the Properties of Water Through Hands-On Experiments

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What Makes Water Special?

Water is special because it is one of the few substances we commonly see in all three states of matter here on Earth.

Water can change from one state to another when you **add or remove heat**:

- **Freezing:** Liquid ⟹ Solid (Remove heat, e.g., putting water in a freezer)
- **Melting:** Solid ⟹ Liquid (Add heat, e.g., an ice cube melting on a table)
- **Evaporation/Boiling:** Liquid ⟹ Gas (Add heat, e.g., water boiling on a stove)
- **Condensation:** Gas ⟹ Liquid (Remove heat, e.g., water droplets forming on a cold glass)

States of Matter

Solid

- **What it is:** The coldest state of water.
- **Examples:** Ice cubes, snow, hail, frost.
- **Shape & Volume:** It has a definite shape (like a cube) and a definite volume.
- **Molecules:** The water molecules are packed tightly in a fixed pattern and only vibrate in place.

Liquid

- **What it is:** The form we see most often (like in rivers and oceans).
- **Examples:** Drinking water, rain, dew.
- **Shape & Volume:** It has a definite volume (you can measure it), but it has no definite shape—it always takes the shape of its container.
- **Molecules:** The molecules are still close together, but they can slide past each other, which is why water flows and can be poured.

Gas

- **What it is:** The invisible, warmest state of water. When it is visible (like from a kettle), it is technically tiny liquid droplets floating in the air (Water Vapor or Steam)
- **Examples:** Steam from a hot shower, water vapor in the air, clouds.
- **Shape & Volume:** It has no definite shape and no definite volume—it will spread out to fill up any container or space.
- **Molecules:** The molecules are very far apart and move freely and quickly in all directions.

Properties of Water

We will explore four key properties:

- Floating
- Sinking
- Dissolving
- Evaporation + Condensation

Floating

- Some objects stay on top of water. For example - foil boat, plastic bottle cap.
- They float because they are light or have air inside. Think of a light, hollow rubber ducky floating on the water.

Can you name another object that floats?

Sinking

When an object moves **down to the bottom** of a liquid. Some objects sink because they are heavier or more dense than the liquid.

For example; Stone, keys. Think of a heavy pebble sinking right to the bottom of a pond.

Why do you think heavy things sink?

Dissolving

Some solids dissolve in water: This means they mix completely and disappear, but they are still in the water.

For example - Stirring sugar into hot tea until you can no longer see the white grains—it has dissolved to make a solution.

Which of these will dissolve — salt, sugar, chalk, soil?

Evaporation

vaporation is the process where a liquid like water in a puddle turns into an ıvisible gas called water vapor and goes up into the air. This Happens when it ains heat.

oth evaporation and boiling are processes where liquid water turns into aseous water (water vapor or steam), which is generally called vaporization. owever, they happen under different conditions.

/hen water is heated, it turns into vapour. Evaporation occurs only at the ırface of the liquid.

Where do you see evaporation in your everyday life?

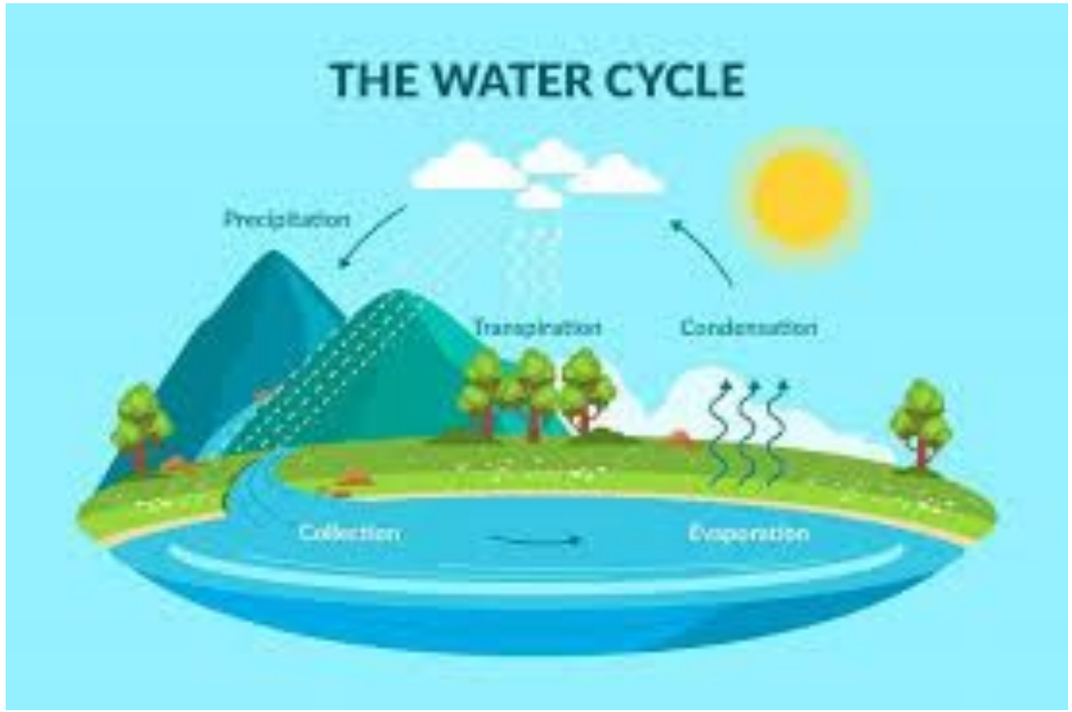
Condensation

Have you seen this on a bottle or window?

The process where that invisible gas (**water vapor**) cools down and changes back into tiny liquid drops. (This is what forms **clouds** and the droplets on a cold glass.) . When water vapour cools down, it becomes droplets again.

For example - droplets on cold glass

Water Cycle



The **Water Cycle**, also known as the **Hydrologic Cycle**, is a vital and continuous process that describes how water moves on, above, and below the surface of the Earth.

This process repeats again and again. That's how clouds and rain are formed.

Which step did you observe most clearly in class today?

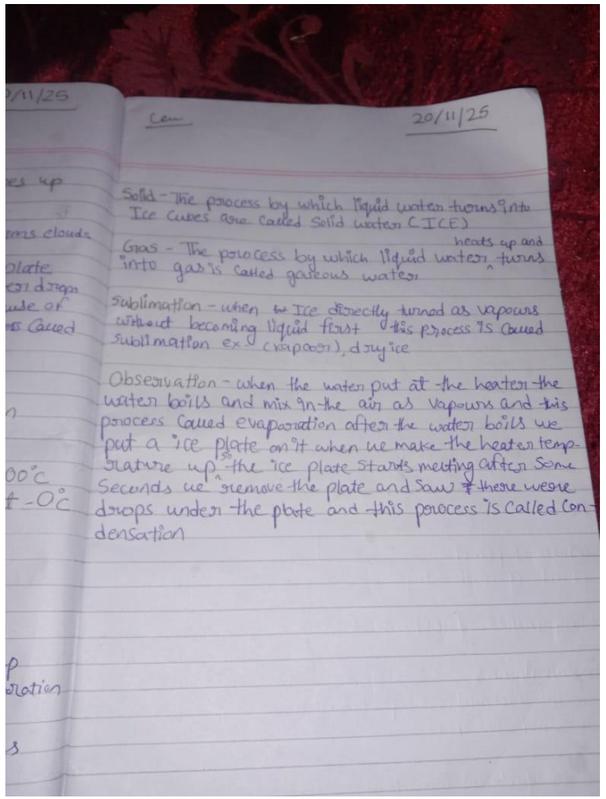
Our Experiment

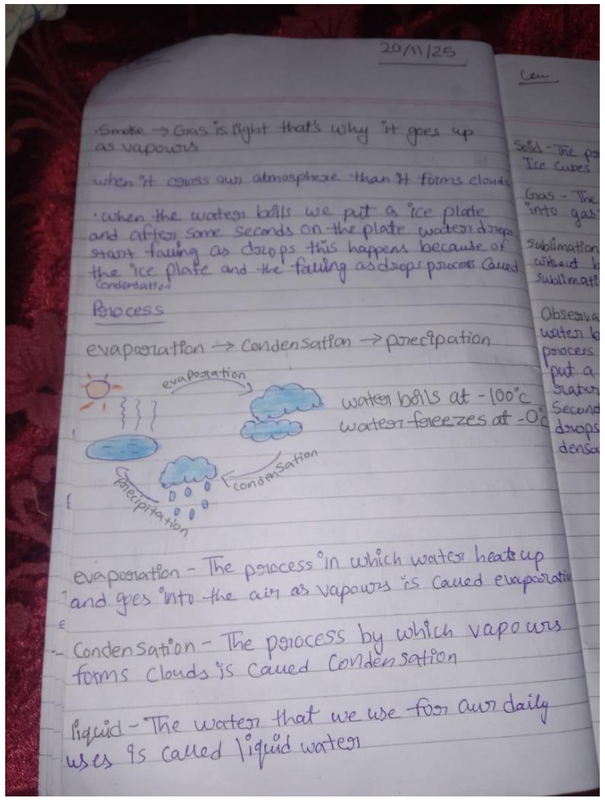
We explored :

- What floats and sinks
- What dissolves
- How evaporation works when water is heated

Action Point: Write everything you observed in the experiment.

Do Now: Plan your Experiment





Student artifacts

What experiment will your group create?

In your class:

- **Form groups of 3–4**
- **Choose one property of water**
- **Plan your own experiment for the next class**
- **Write your idea, materials and prediction**

Reflection and commitment

- If you leave a glass of water outside on a very hot, sunny day, you notice that the water level slowly goes down. Which state change is happening here, and what is providing the energy for the change?
- Look around your home or classroom. Can you find one place where water is currently in its **liquid** state, one place where it is in its **solid** state, and one place where it is in its **gas** state (even if you can't see it)? Describe your three examples.

Thank You!