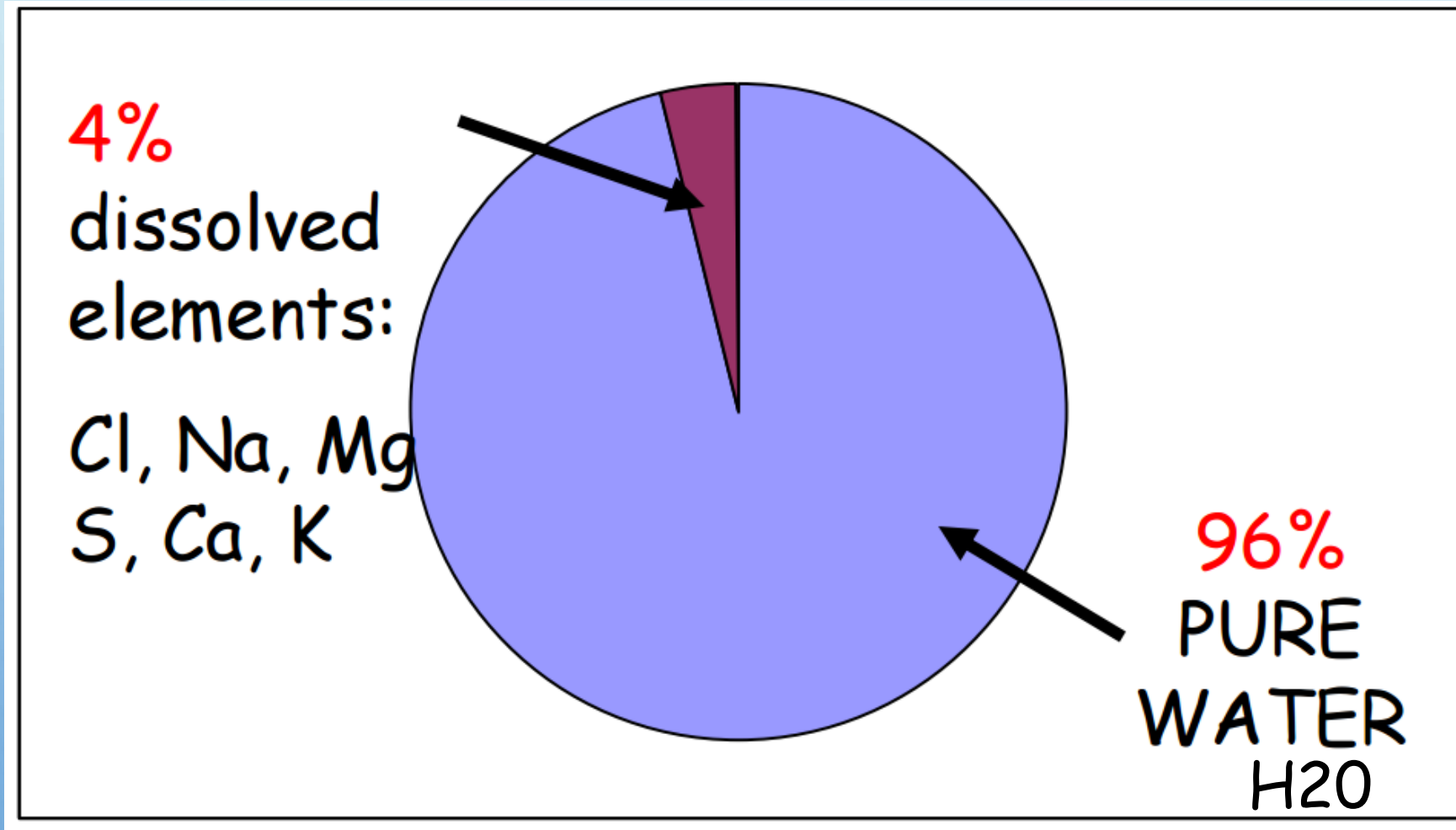




WHAT IS OCEAN WATER?

- Ocean water is a mixture of gases and solids dissolved in water



What are the elements?

Element Symbol	Element Name
Cl	Chlorine
Na	Sodium
Mg	Magnesium
S	Sulfur
Ca	Calcium
K	Potassium

Chlorine and **Sodium** are the most abundant dissolved solids.

Together, sodium and chlorine make the compound: **Sodium Chloride (NaCl)**.

What is the common name for NaCl?

Salinity

Salinity: A measure of dissolved solids in sea water

1 kilogram = 1000 grams, so salinity is the number of grams of dissolved salts in 1 kilogram of water

Average Salinity is 35 ‰

What is this symbol? → ‰ - this is the parts per mille symbol which means PPT- **PARTS PER THOUSAND**
(For every 1000 parts of water, 35 parts are dissolved solids)

Where did all of that salt come from?!

Salts and other materials in ocean water come from:

- Volcanic activity in oceans
- Erosion of land areas by rivers
- Wave action along the shoreline

Earth had 4.5 billion years to make the waters salty!

What controls salinity?

Evaporation: pure H₂O will evaporate from the surface of salt water. This will change the salt:water ratio and increase the salinity.

DENSITY $D = \frac{M}{V}$

Density is the mass of a substance per unit volume.

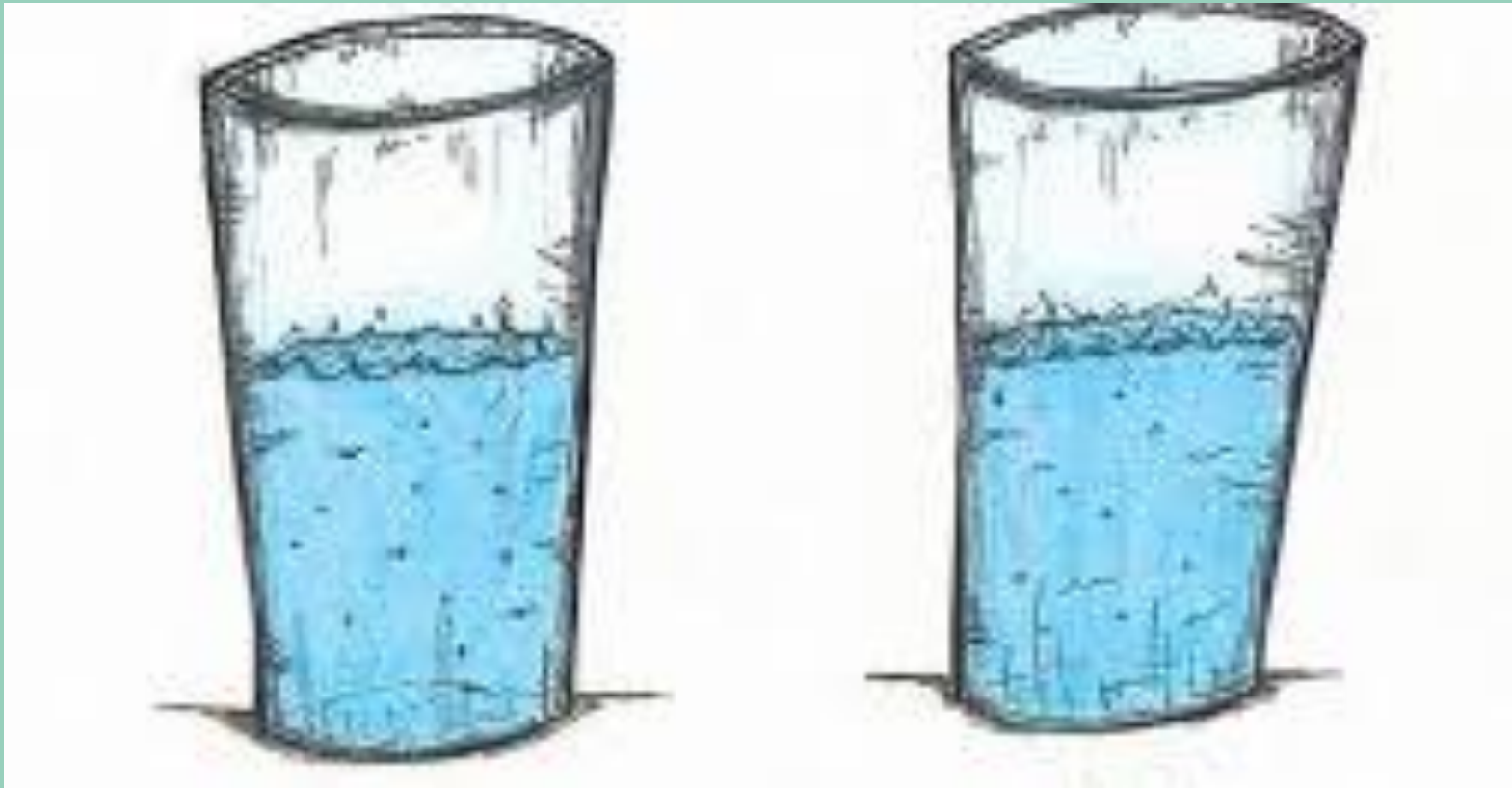
In this unit we need to understand the density of saltwater-
Ex: how many dissolved solids are in a certain volume of
saltwater

What controls saltwater density?

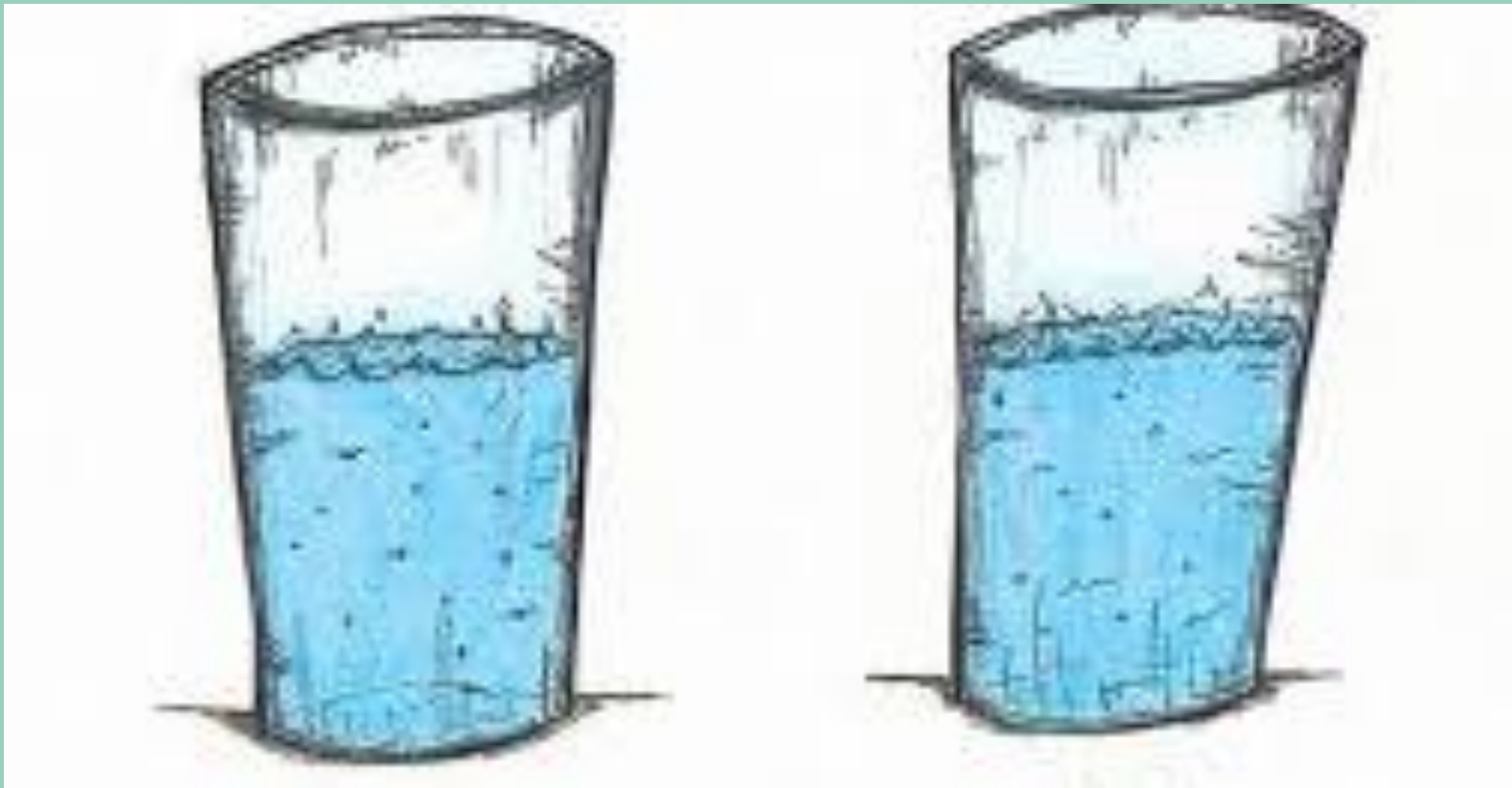
1. Salinity - Dissolved solids make ocean water more dense than fresh water

2. Temperature - Cold water is more dense than warm water
Most abundant gases

SALINITY: If you have 2 cups of freshwater...
Will the densities be equal or different?



If you add dissolved solids to cup A,
which cup will have the higher density?



A

B

Answer this question:

**How does salinity impact
the density
of ocean water?**

Temperature: Cold water is more dense than warm water.

WHY? Cold water holds more dissolved gases and warm water holds less dissolved gases.

WHY? Think of a pot of water on the stove – what is coming out as the temperature rises?

GASES! (oxygen) • The warmer the water, the less gas it holds!

Dissolved Gases

Most Abundant Gases in Ocean Water:

- Nitrogen (N_2)
- Carbon Dioxide (CO_2)
- Oxygen (O_2)

- CO_2 dissolves most easily