

# Chapter 3.2

## Changes of States (Phase Changes)

## A. Phase Change

- Is when a substance changes state
- It depends on the heat energy.
- Heat energy is either gained or lost.
- A freezer loses heat energy
- A stove gains heat energy.

## B. HEAT ENERGY

- Also known as THERMAL ENERGY
  - Total *energy* of all the particles in an object

Now we will correct the  
back of the Matter  
Outline HW

# Melting

- Solid → Liquid
- The particles in a solid vibrate so fast, they break free
- **Gains heat energy**
- Melting point of water = 0° C.











# Freezing

- Liquid → Solid
- The particles in a liquid begin to slow down (begin to take on a fixed position)
- Particles lose heat energy.
- Freezing point of water = 0 ° C.

A cartoon illustration of two dogs in a snowy environment. A large, shaggy, light-brown dog stands on the left, looking towards a smaller, dark brown dog on the right. The background is a dark, greyish-blue sky with falling white snow. The ground is covered in a layer of white snow. The large dog has a speech bubble above it, and the small dog has a speech bubble above it.

My feet are  
just freezing!

**BLIMEY!!**  
You think you've  
got troubles!



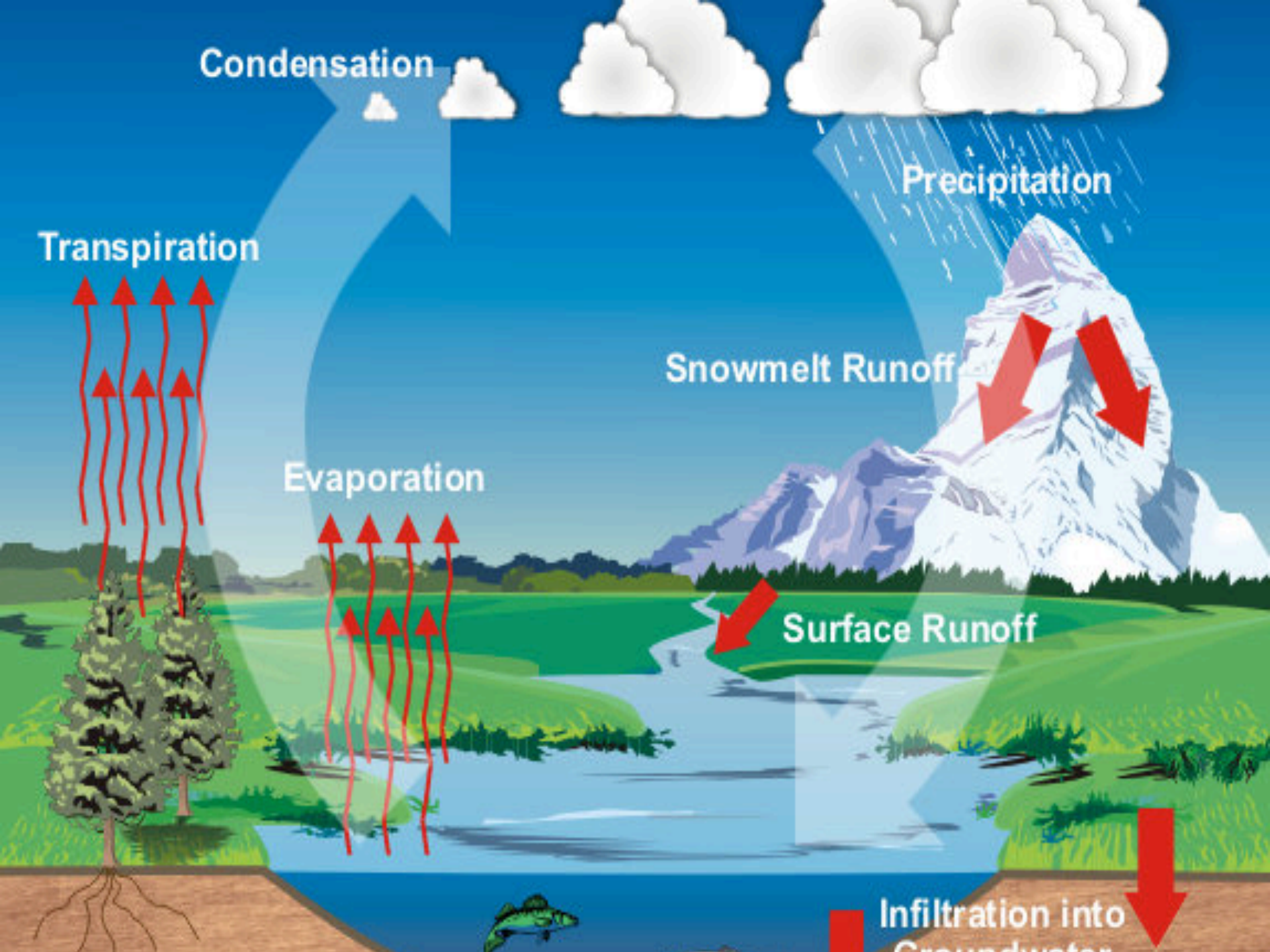
# Vaporization

- Liquid → Gas.
- The particles in a liquid gain enough heat energy to move independently, forming a gas
- Particles **gain** (absorb) **heat energy**.

- EVAPORATION

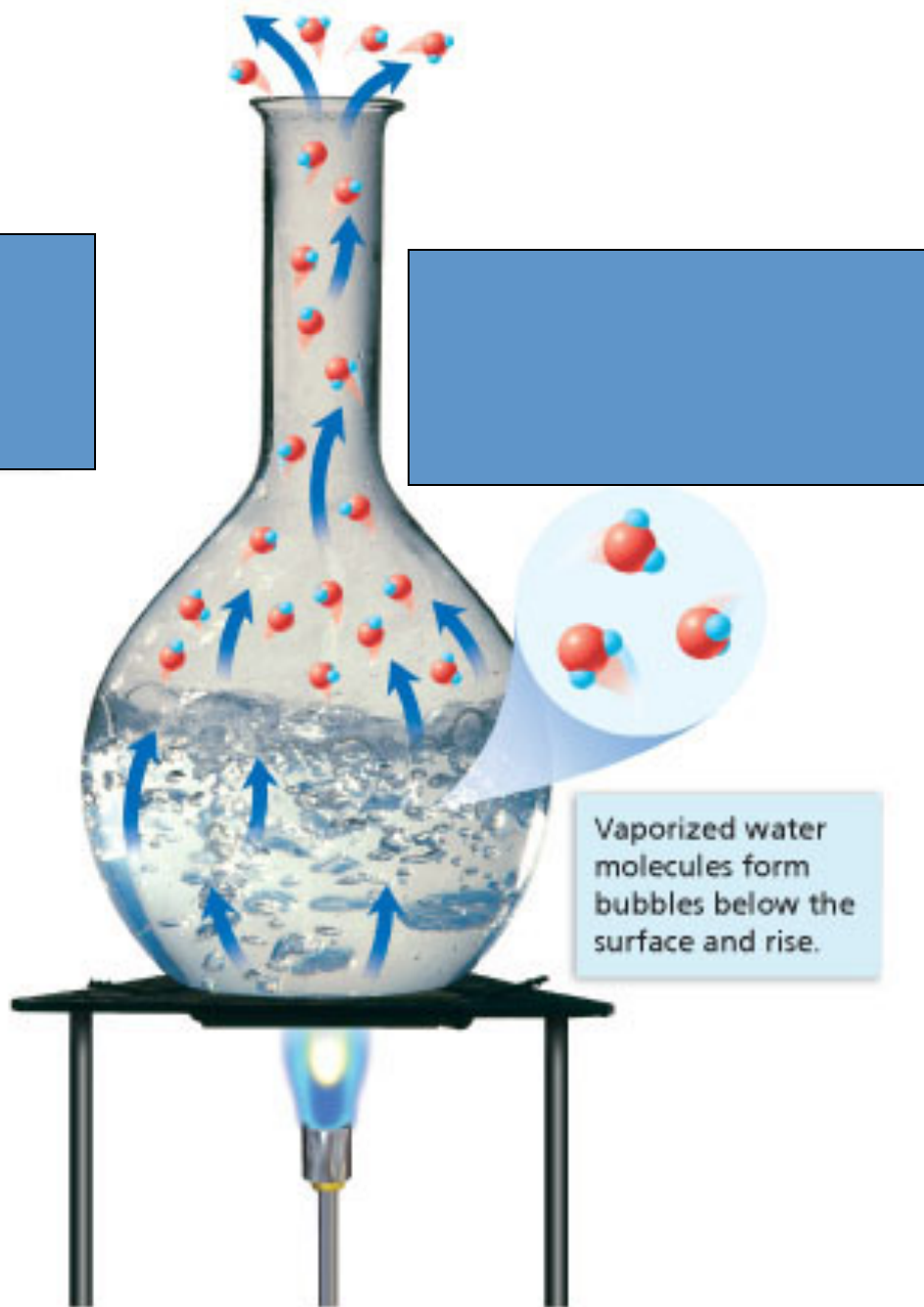
- Vaporization that takes place on the surface of a liquid





# Boiling point

- **BOILING: vaporization that occurs below its surface**
- **Boiling point – the temperature at which a liquid boils. 100 Celsius**





Heat of Vaporization

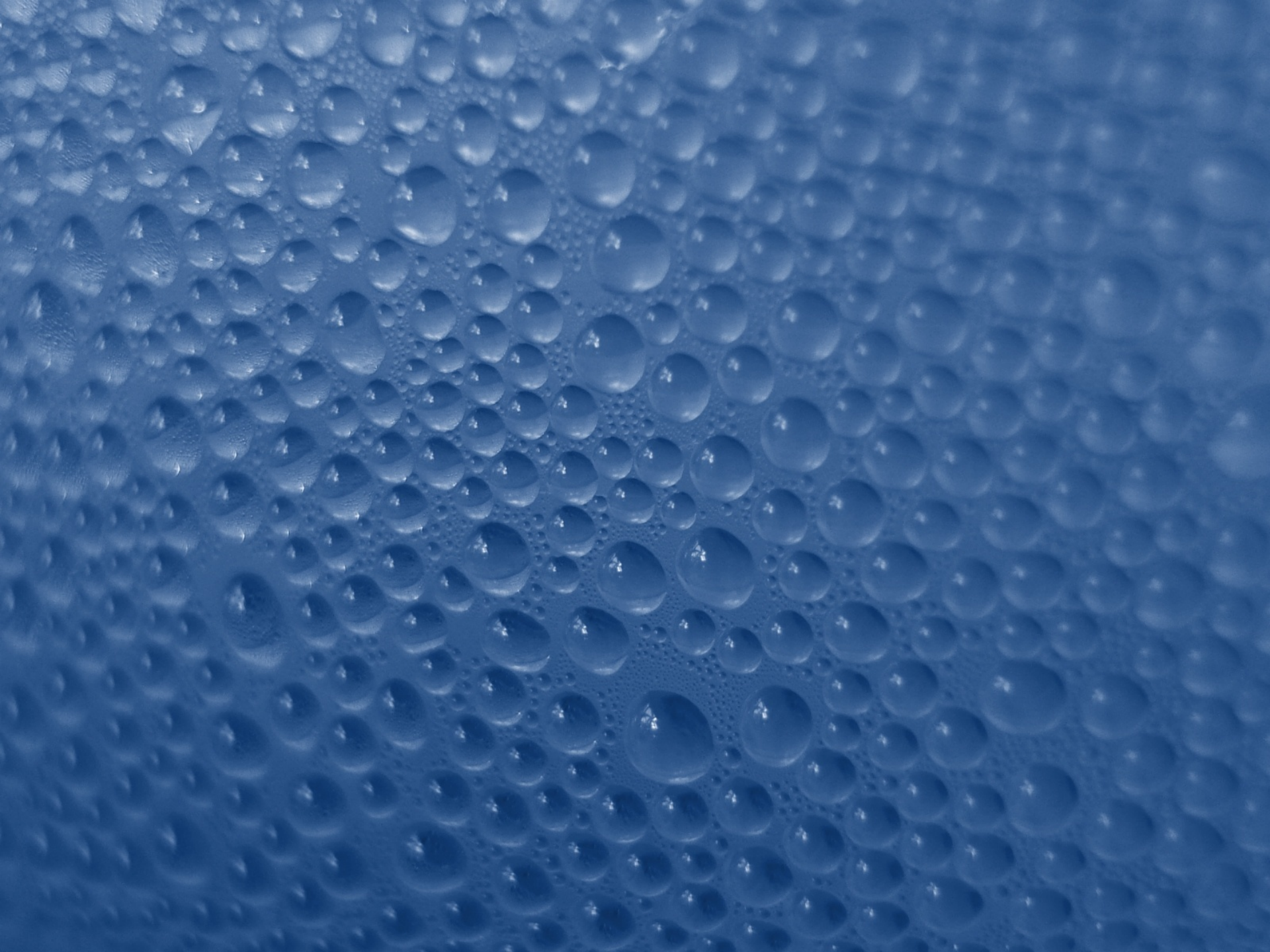




# Condensation

- Gas → Liquid
- Particles in a gas **lose** enough **heat energy** to form a liquid







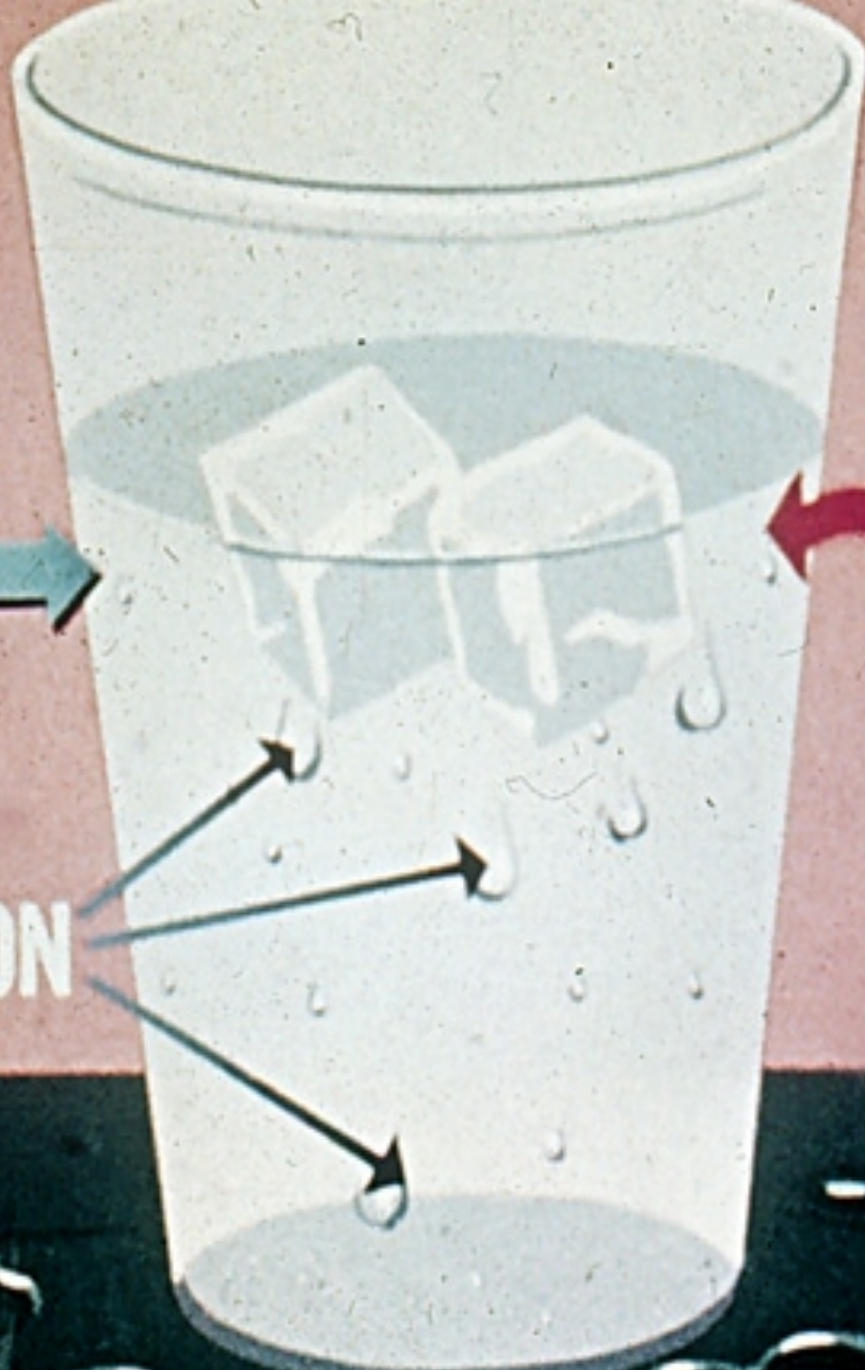




**WARM  
MOIST  
AIR**

**COLD  
GLASS**

**CONDENSATION**









# Sublimation

- Solid → Gas.
- Particles of a solid do not pass through the liquid state as they form a gas.
- rapidly **gain** (absorb) heat energy
- Example: Dry ice

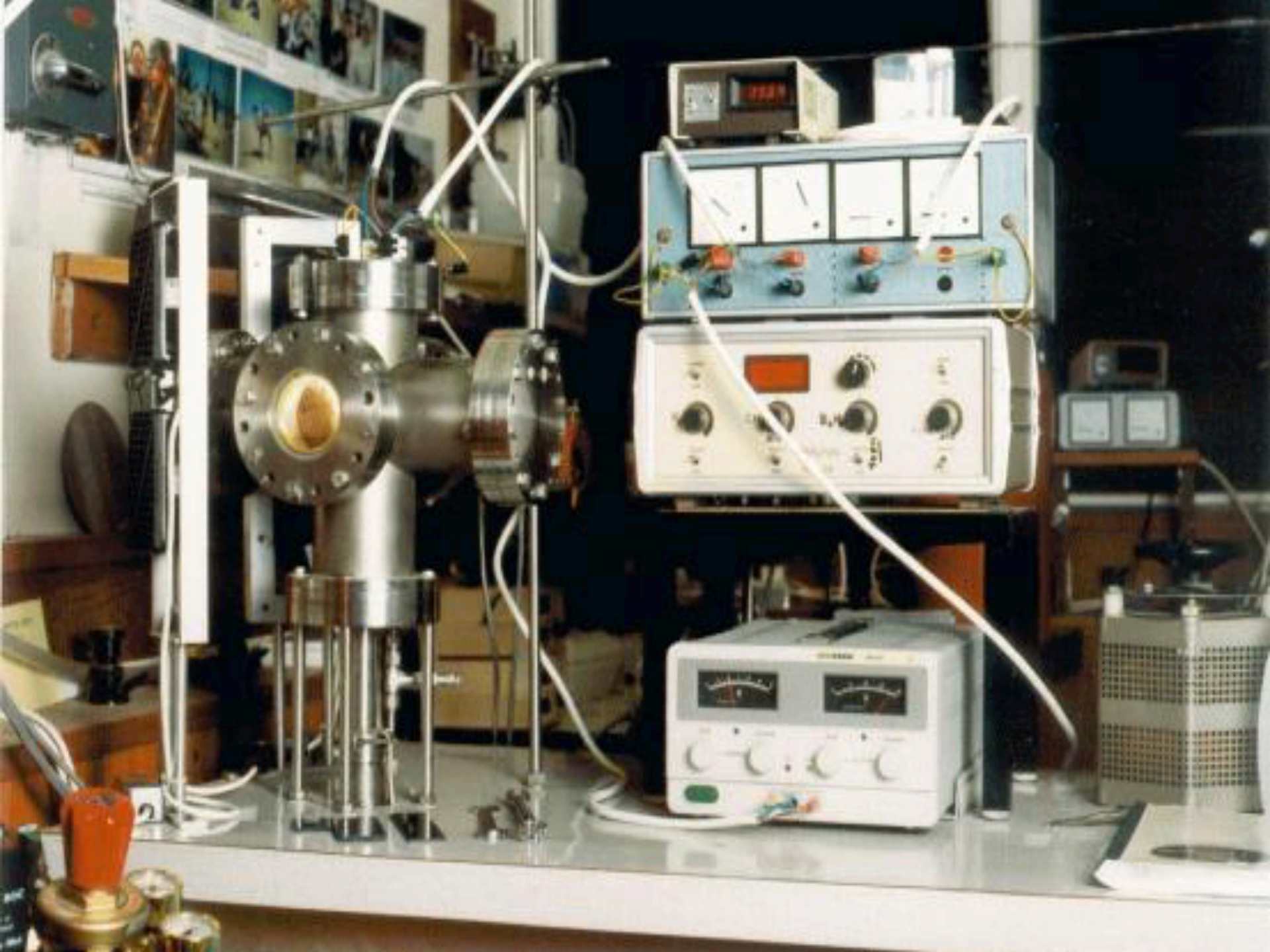




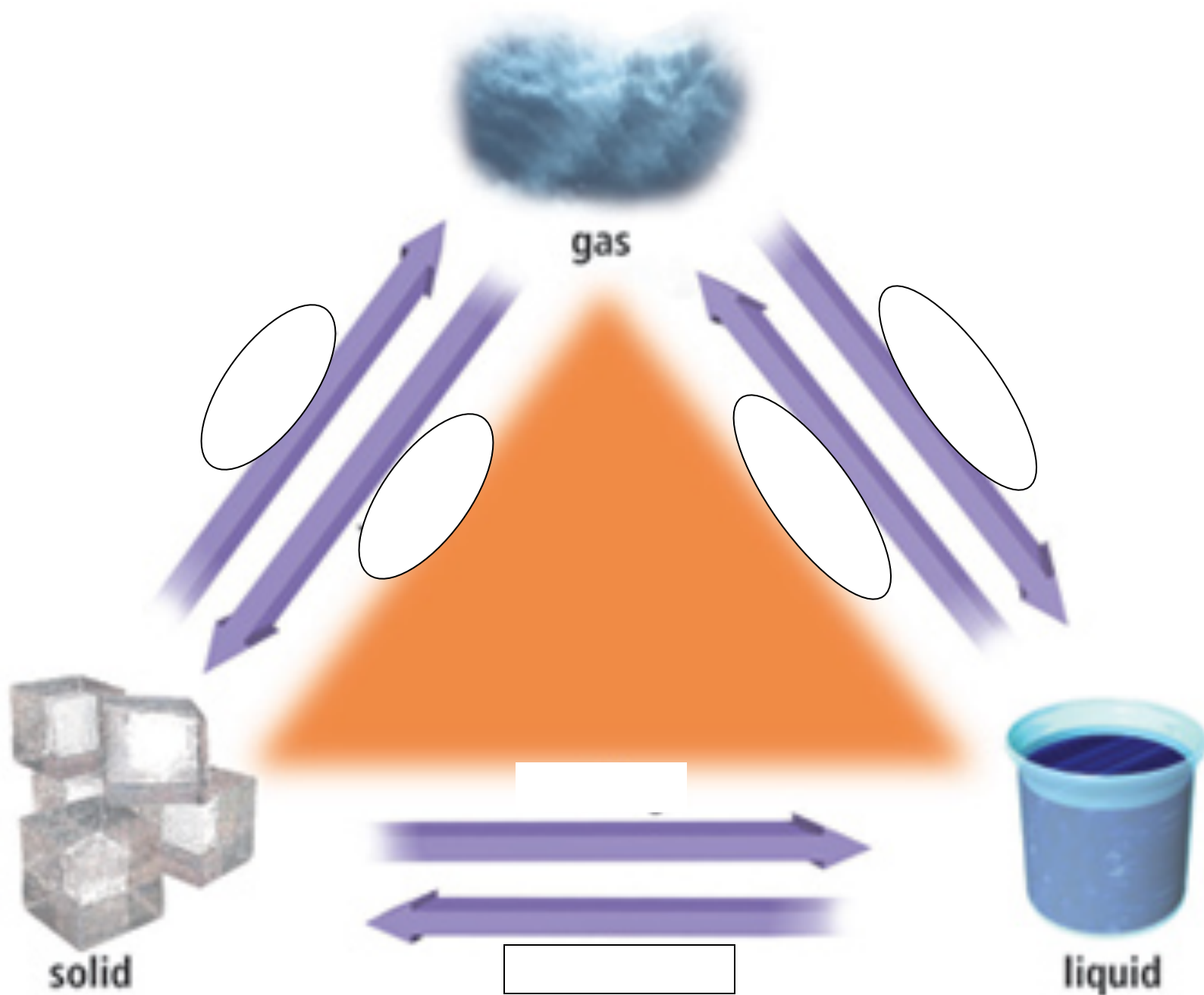


# Deposition

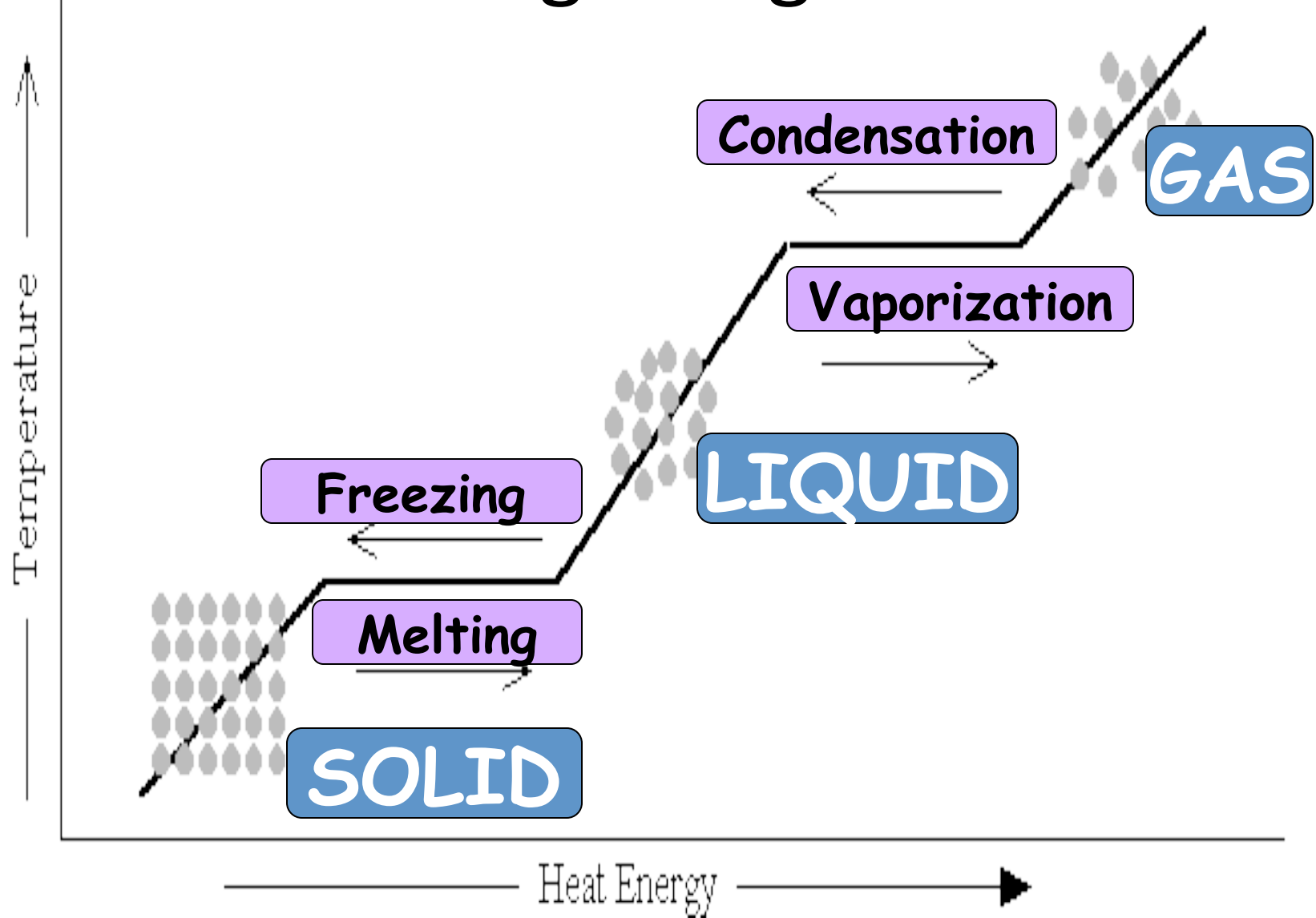
- Gas → Solid
- How dry ice is made (by freezing carbon dioxide gas)
- Does not happen often in nature
- This occurs naturally on Mars



C.



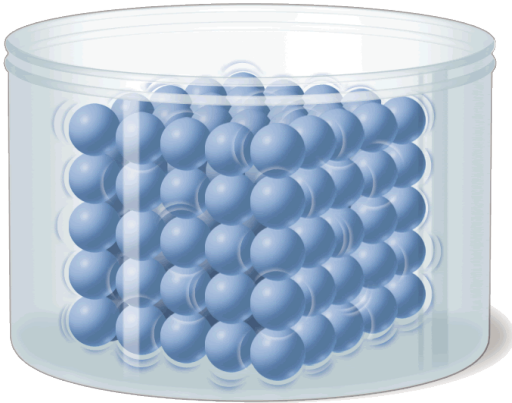
# D. Phase Change diagram



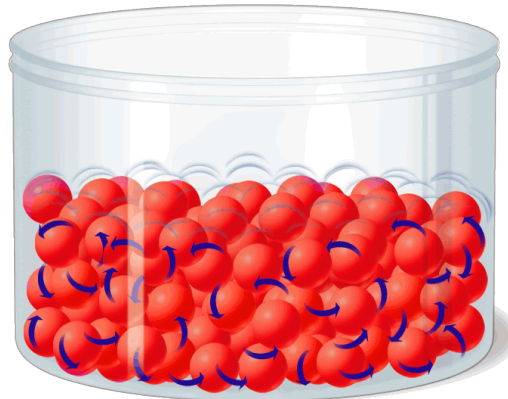


## E. Drawings

SOLID



LIQUID



GAS

