

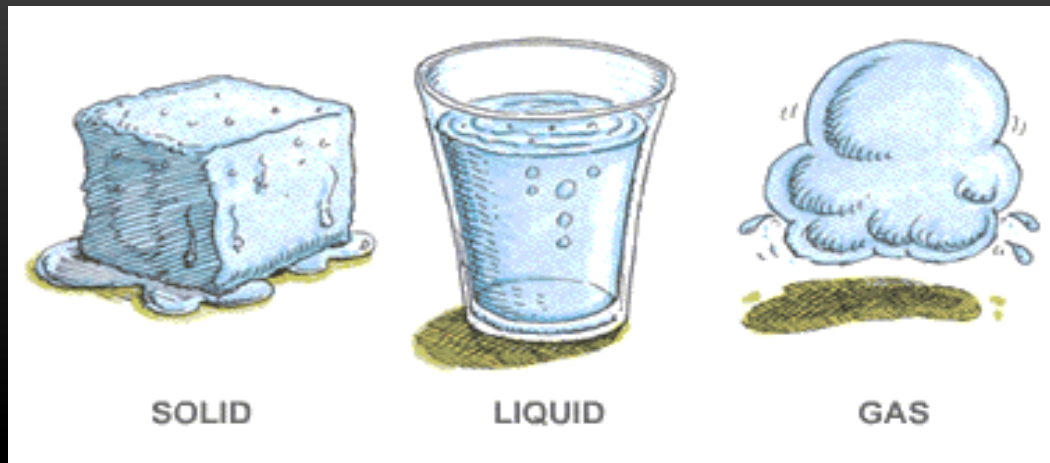
WARM-UP

1. What are the four states of matter?
 2. What is melting point?
 3. How does water change from a liquid to a gas?
 4. Define viscosity.
-

STATES OF MATTER: WEB QUEST

With your lab partner, you will complete the web quest using MiddleSchoolChemistry.com. Follow the procedure to answer the following questions.

1. Google Search: Middle School Chemistry
 2. Click on the Multimedia link.
 3. Start in Chapter 1: Matter – Solids, Liquids and Gases
 4. Click on the first link under Chapter 1 – Molecules Matter
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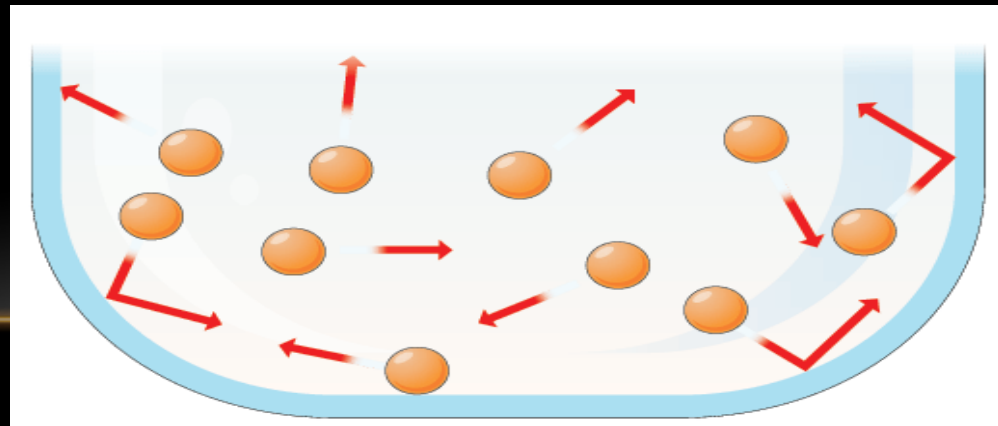
STATES OF MATTER NOTES

Solids, Liquids, Gases and Plasmas



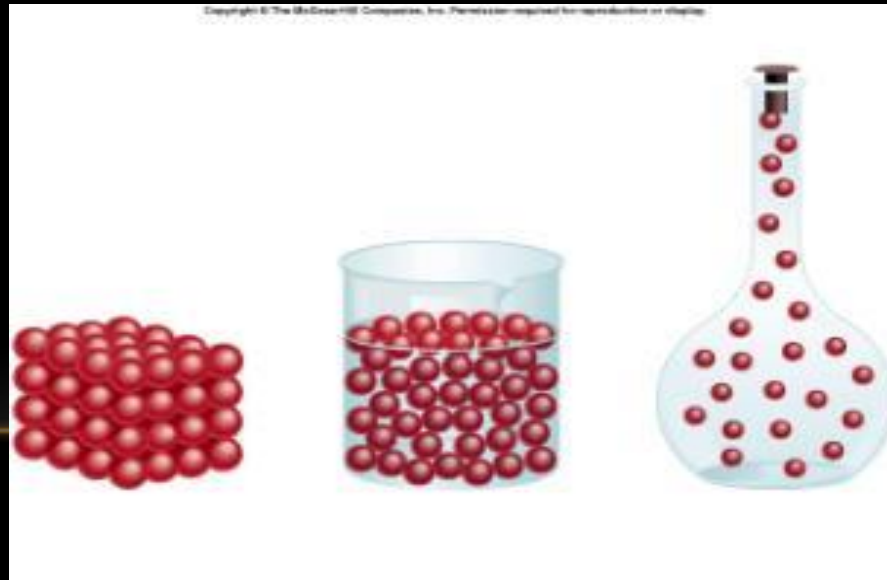
STATES OF MATTER

- Matter is made of **tiny particles** (atoms, molecules, or ions) that **attract** other particles.
- These particles are **constantly moving**.



STATES OF MATTER

- **The motion of the particles and strength of attraction between particles determine a material's state of matter.**

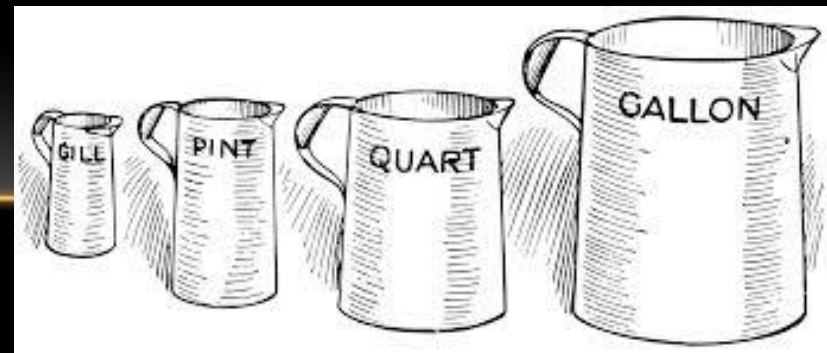


STATES OF MATTER

- **Mass** – the amount of matter in an object



- **Volume** – how much space an object occupies



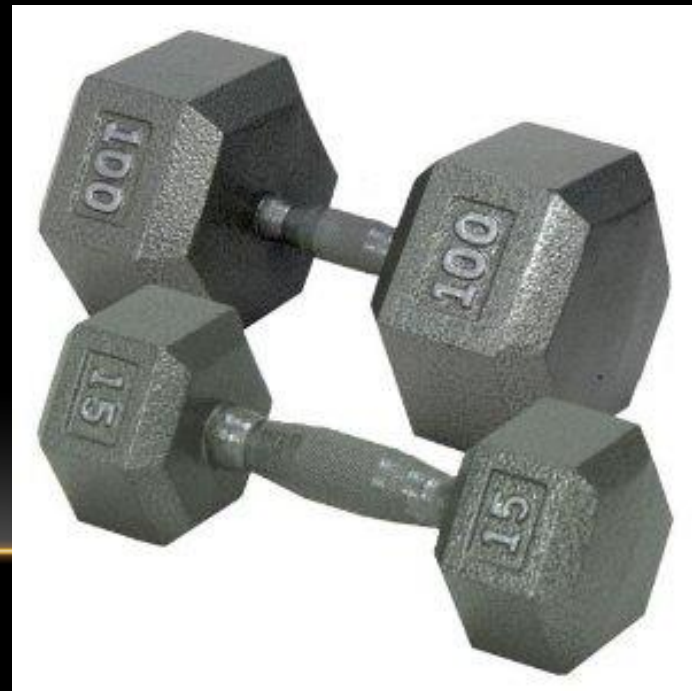
STATES OF MATTER

- The three familiar states of matter are solid, liquid, and gas.
- Plasma is common in the universe, but not on Earth.



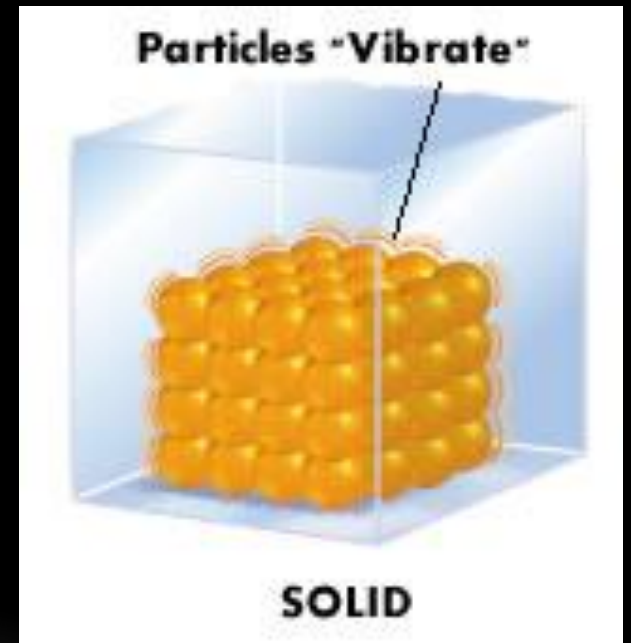
SOLIDS

- **A solid is matter with a definite shape and volume.**
- **Ex: tree, car**



SOLIDS

- **Particles in a solid are packed closely together.**
- **Particles vibrate in place, but do not have enough energy to move out of their fixed position.**



LIQUIDS

- **A liquid is matter that has a definite volume, but no definite shape.**



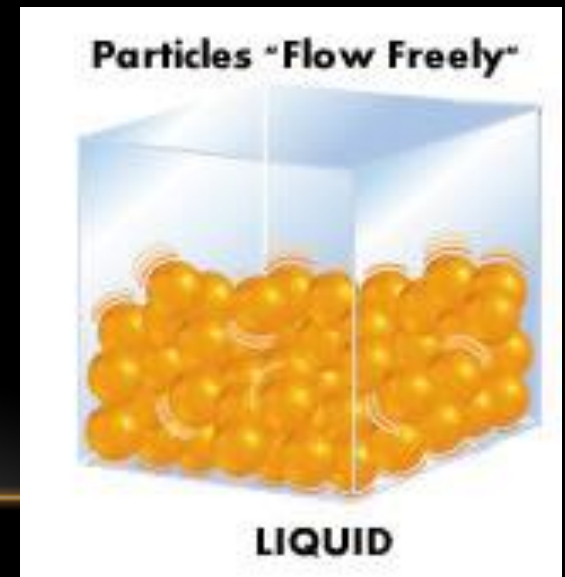
LIQUIDS

- If you **pour** a liquid from one container to another, the liquid will form to the container, but **the amount (volume) stays the same.**



LIQUIDS

- **Particles in a liquid move more **freely** than particles in a solid.**
- **The particles have enough energy to move out of their fixed position, enough energy to move **far**.**



VISCOSITY

- **Viscosity is a liquid's resistance to flow.**
- **The slower a liquid flows, the higher the viscosity.**
- **Ex: Honey has high viscosity, water has low viscosity.**

VISCOSITY



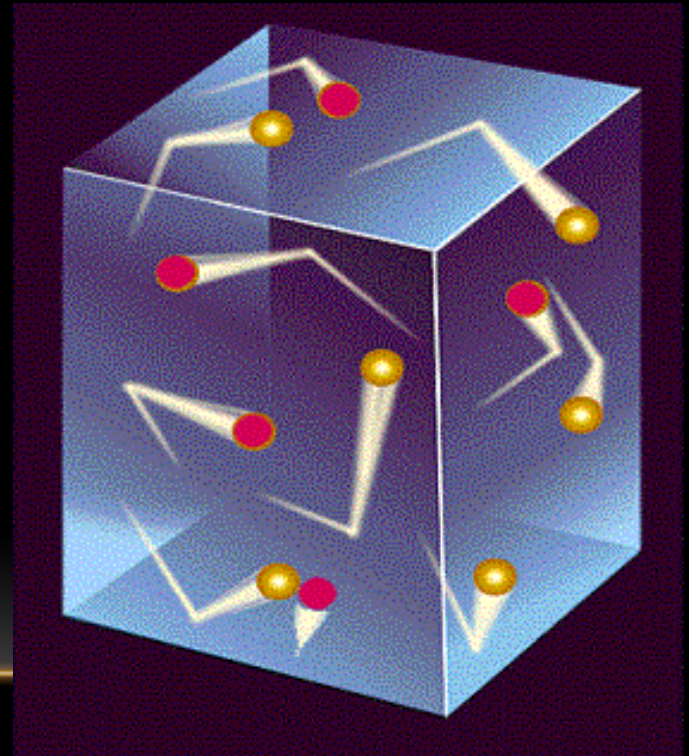
GASES

- **Most are invisible.**
- **Gas is matter that has NO definite shape or volume.**



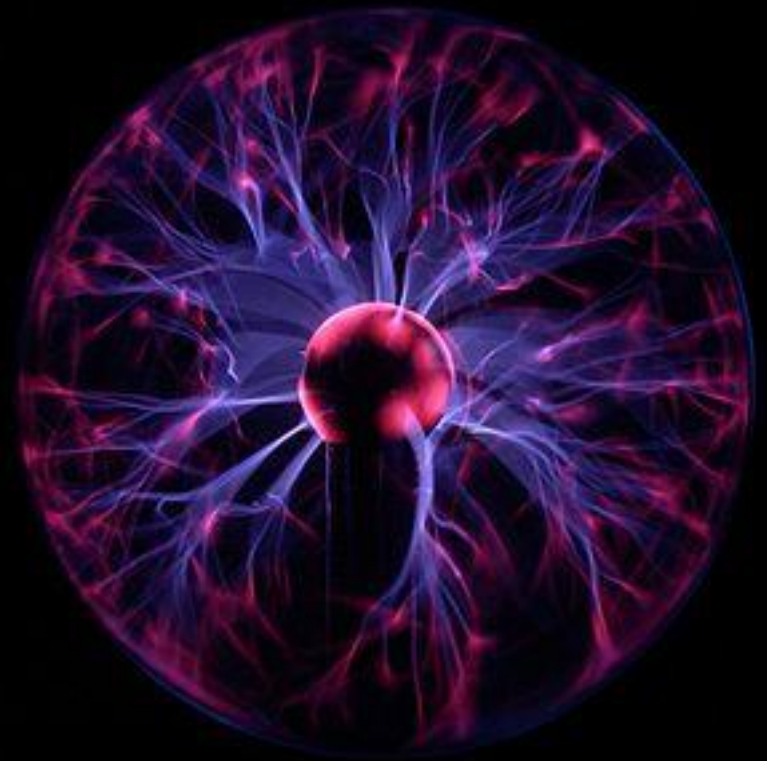
GASES

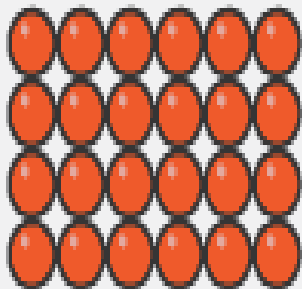

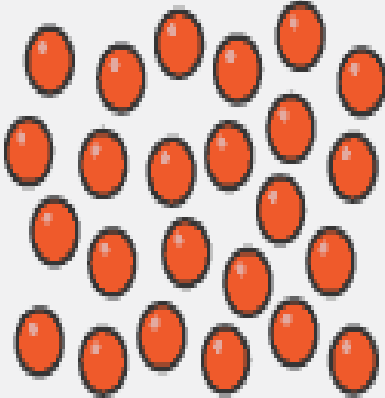
- **Particles in a gas are far apart and move at high speeds in all directions.**
- **Gases can be compressed and expanded (ex: basketball in winter)**



PLASMAS

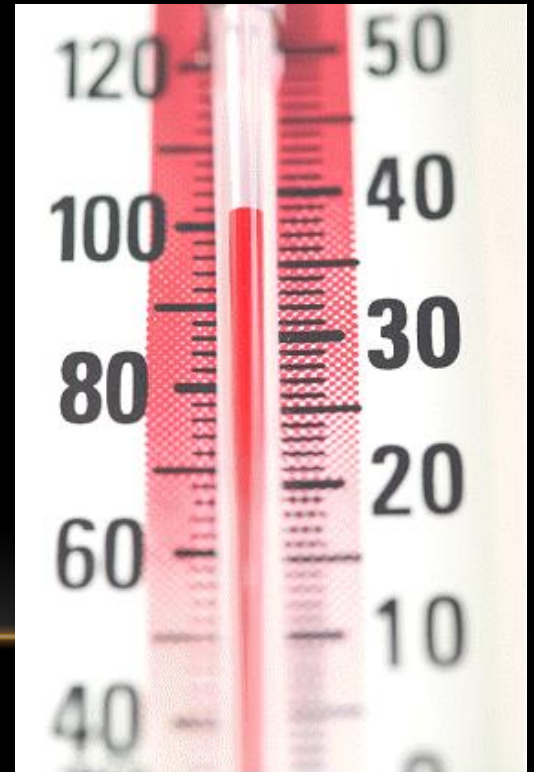
- Plasma occurs at extremely high temperatures.
- Found in stars, lightning, and neon lights.



| | Solid | Liquid | Gas |
|--------------------------|--|---|--|
| Arrangement of particles | Close together Regular pattern | Close together Random arrangement | Far apart Random arrangement |
| Movement of particles | Vibrate on the spot | Move around each other | Move quickly in all directions |
| Diagram |  |  |  |

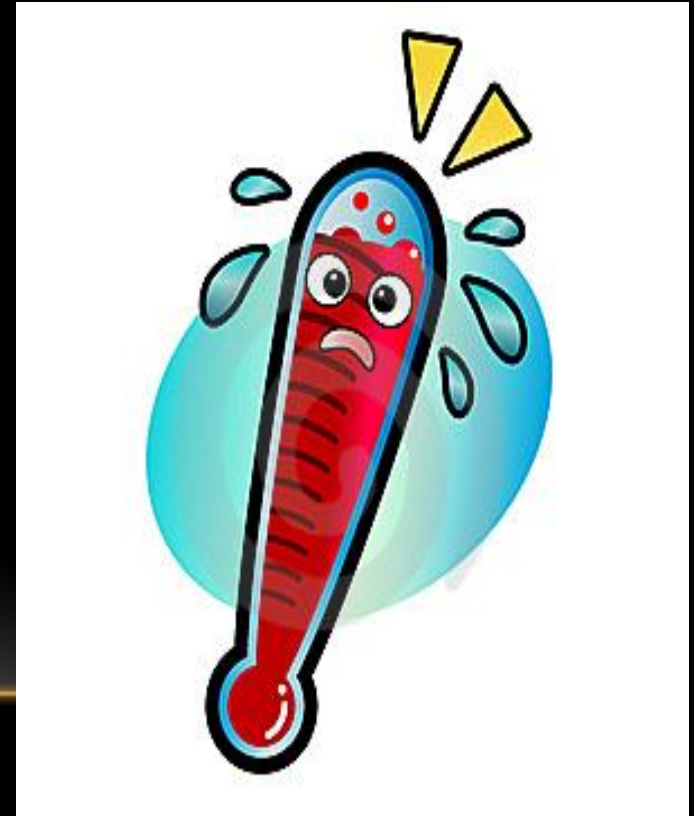
TEMPERATURE

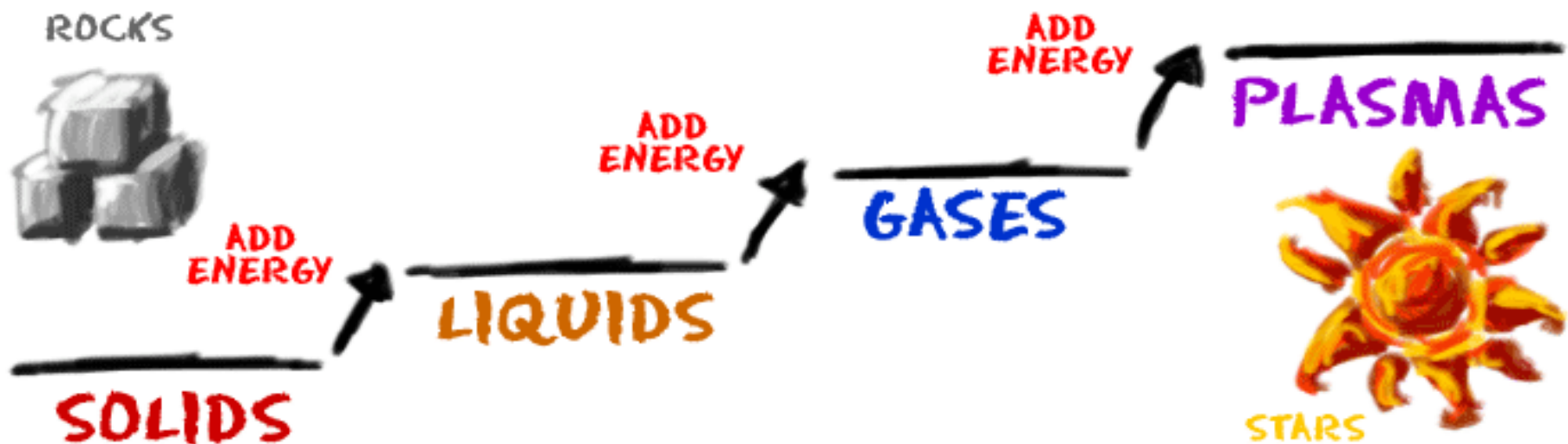
- **Temperature is a measure of how fast the particles in an object are moving.**
- **Higher temperatures have faster moving particles.**



HEAT

- Heat is the movement of thermal energy from a substance at a higher temperature to one at a lower temperature.





THE STATE OF MATTER CHANGES AS YOU ADD MORE ENERGY

CHANGES BETWEEN SOLID AND LIQUID STATES

- **Melting** – changing from a solid to a liquid.
- Melting occurs when a solid absorbs thermal energy and its temperature rises.



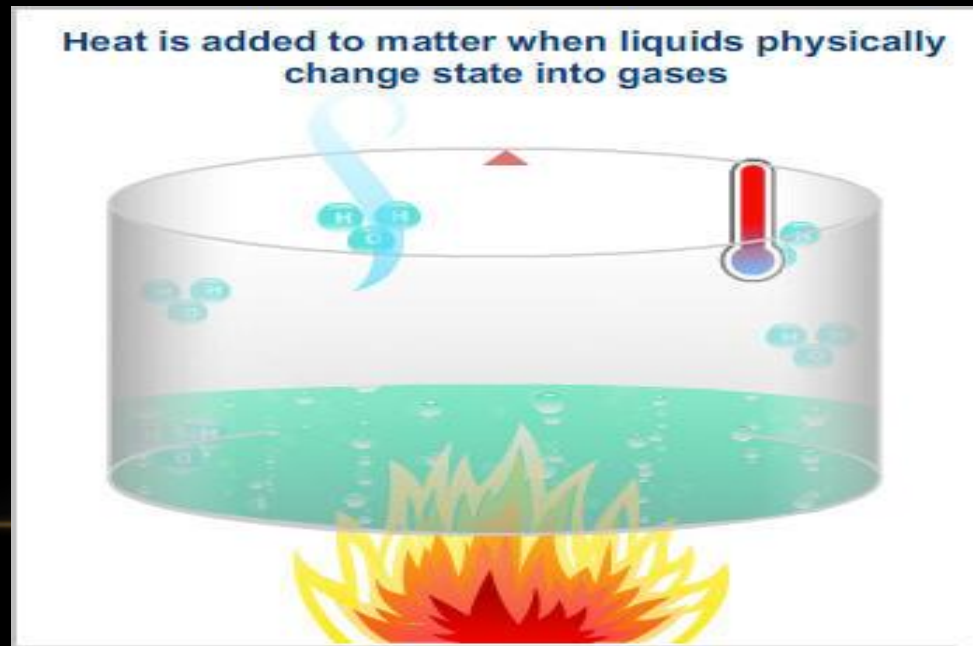
CHANGES BETWEEN SOLID AND LIQUID STATES

- **Freezing** – changing from a liquid to a solid.
- As the liquid cools, it loses thermal energy and the particles slow down and come closer together.



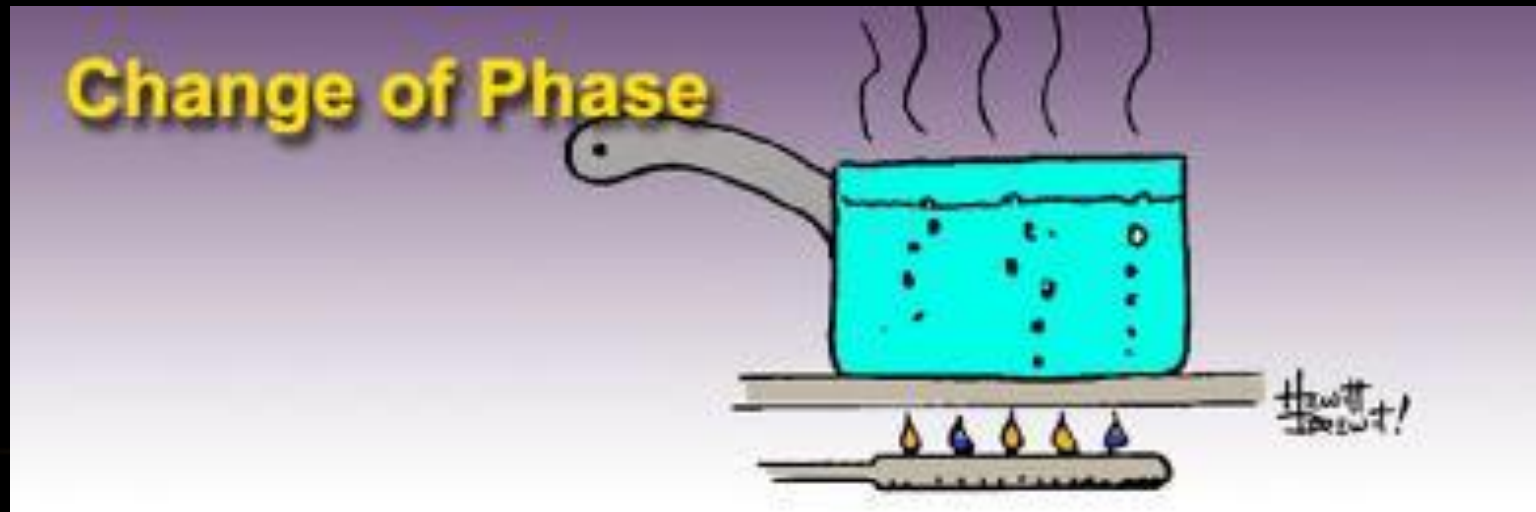
CHANGES BETWEEN LIQUID AND GAS STATES

- Matter changes between a liquid and a gas states by **vaporization** and **condensation**.



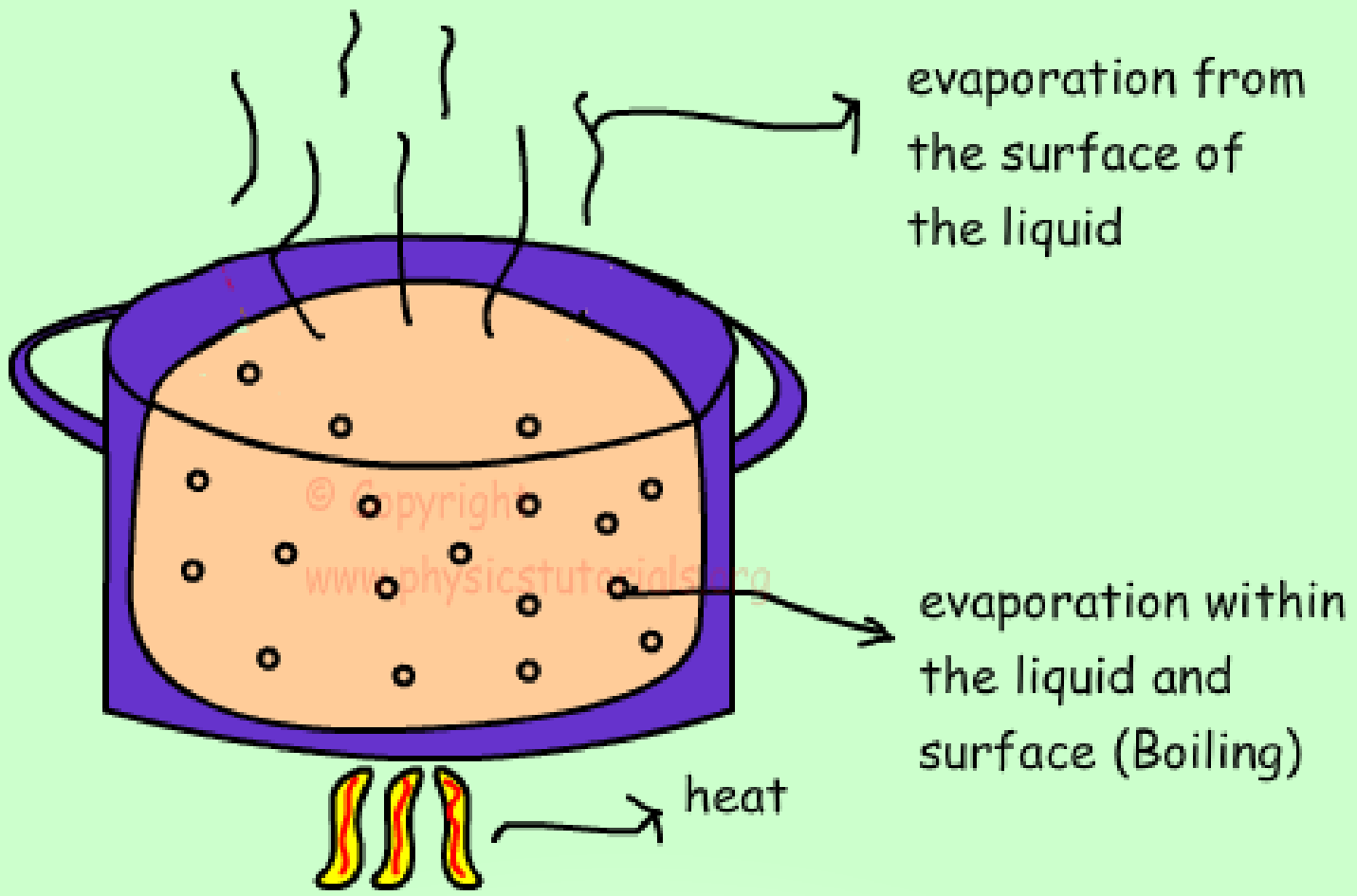
VAPORIZATION

- **Vaporization** – change from liquid to a gas.



VAPORIZATION

- **Evaporation** – vaporization that takes place at the surface of a liquid.
 - **Boiling** – vaporization that takes place below the surface of a liquid.
-



evaporation from the surface of the liquid

evaporation within the liquid and surface (Boiling)

heat

CONDENSATION

- **Condensation** - changing from a gas to a liquid.
- **Opposite of vaporization.**



CHANGES BETWEEN THE SOLID AND GAS STATES

- **Sublimation** – substances change from the **solid** state to **gas** state without ever becoming a **liquid**.
- **Ex: dry ice**



CHANGES BETWEEN THE SOLID AND GAS STATES

- **Desublimation** – substances change from the **gas** state to **solid** state without ever becoming a **liquid**.
- **Ex: snow**



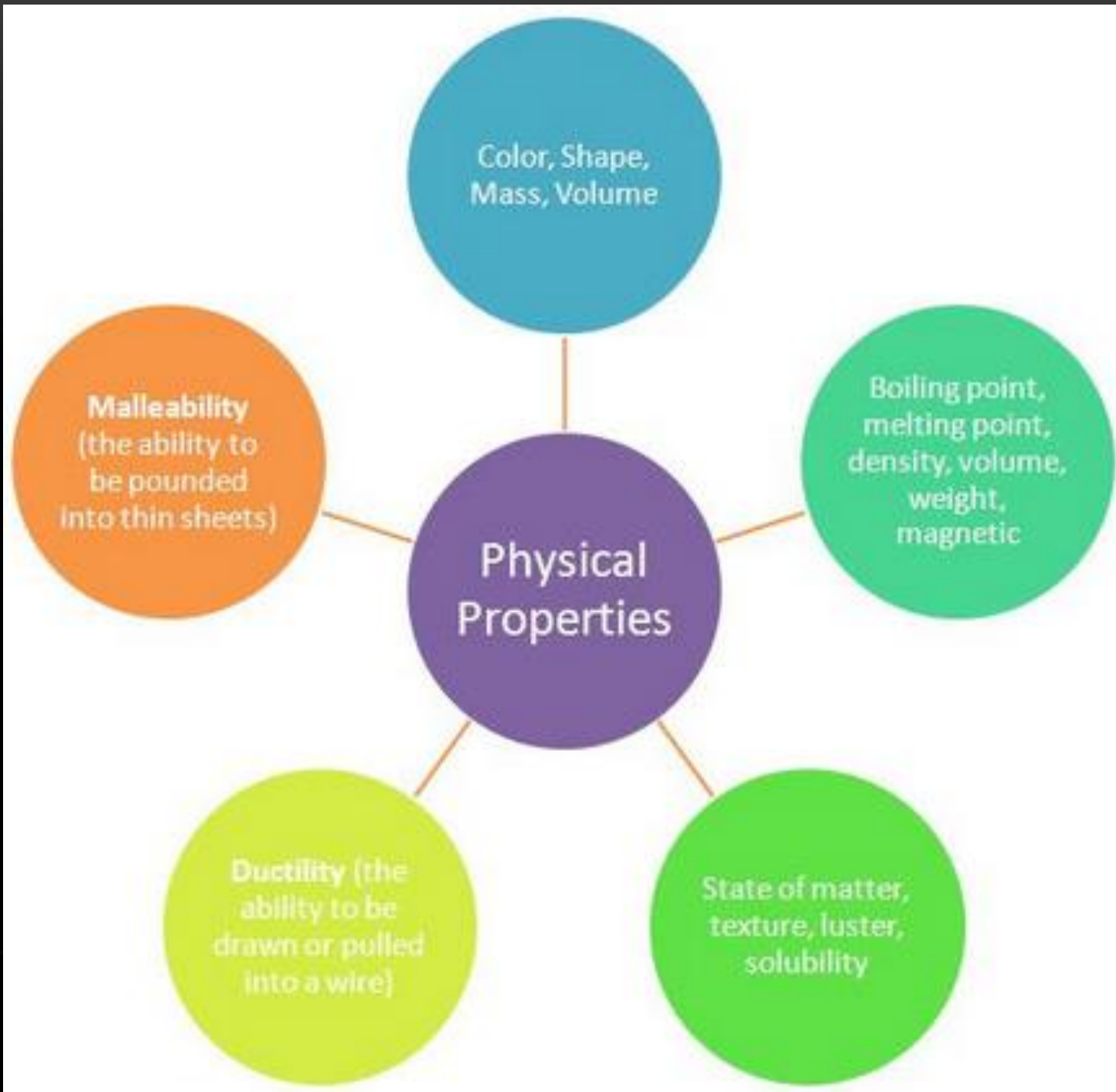
PHYSICAL PROPERTIES

- Can be observed or measured **without** changing the identity of the matter
- Five senses



PHYSICAL PROPERTIES

- **Mass, volume, density, color, odor, state, size, shape**
 - **Hardness, texture, ability to conduct heat and electricity, solubility in water or alcohol**
-



CHEMICAL PROPERTY

- Describes a substance based on its ability to change into a new substance with different properties
- EX: flammability, reactivity with acid, reactivity with water, stability



WAYS TO IDENTIFY A CHEMICAL CHANGE

- **Unexpected Color Change**
- **Formation of a precipitate (solid)**
- **Temperature Change**
- **Gas Formed**
- **EX: Rust (oxidation), burning, milk & vinegar, ice pack**

Leaves turn color in the fall because of chemical changes in the leaves.



When you fry an egg, the heat changes it into different substances with different properties. For example, the clear liquid part turns into a white solid.

Some of these copper pennies are bright and shiny. Others are dark and dull. The dull pennies have tarnished.



Their copper has combined with oxygen in the air to form a new substance with different properties.

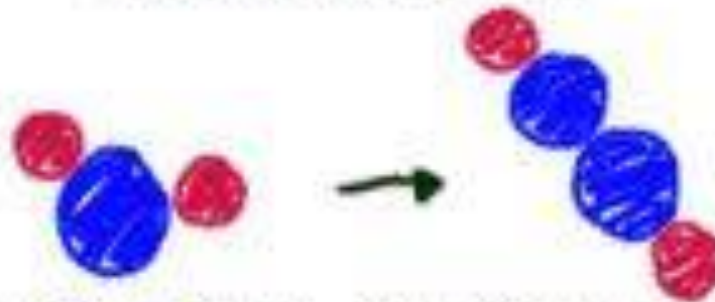


The logs in this campfire are slowly burning down to ashes. The ashes are composed of different substances than the logs. They have a different color and texture than wood.

PHYSICAL VS. CHEMICAL CHANGE



PHYSICAL CHANGE OF
WATER INTO ICE



CHEMICAL CHANGE OF
WATER INTO
HYDROGEN PEROXIDE