

2.1 – Properties of Matter



What's this?

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Substances

What is matter?

Anything with mass that takes up space.

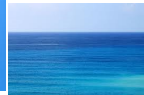
Pure substance: Matter with unchanging and uniform composition.

Is water a pure substance?



Distilled water – Yes – Hydrogen and Oxygen

Tap water – No – Different minerals at different locations



Sea water – No – Different components – organisms, minerals, etc.

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States of Matter

Matter occurs in different forms:

Solid: Definite shape and volume

Liquid: Definite volume, takes shape of its container, flows.

Gas: Flows, fills entire volume of its container, particles far apart. Compressible.

Plasma: Gas like state of matter where atoms have been separated from their electrons. Stars, Eye of the Storm.

Demo: Jacob's Ladder.



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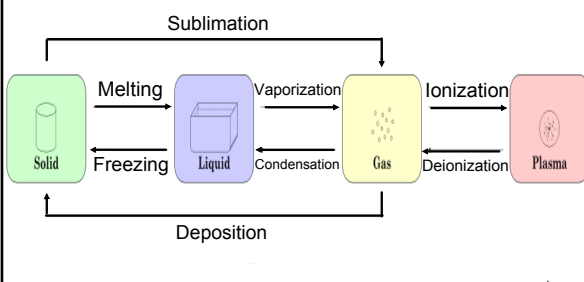
Gas vs. Vapor

Gas - exists as only a gas at room temperature (Or whatever temperature the conditions are set to).

Vapor - gaseous form of a solid or liquid at room temperature. Example: Water can be in gaseous form at room temperature or lower.

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States of Matter - Pictorial



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Physical Properties of Matter

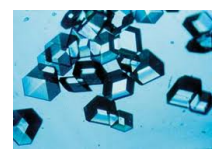
Can be observed or measured without changing the sample's composition.

Examples?

Density, color, hardness, melting/boiling point, shape, crystal structure.



Melting Lead



Crystals Forming

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Physical Property Types

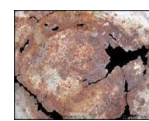
Extensive property – Depends on amount of substance present.
Ex: Length, mass, volume.

Intensive property – Independent of amount of sample.
Ex: Density, color, crystal structure, melting point.

Chemical Property

Ability of a substance to combine with or change into one or more other substances.

Ex. Iron forming rust. How is this a chemical change?



Make it



Use it



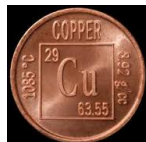
Rust it

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Copper Questions:

Which are chemical properties? Which are physical?
Copper is reddish brown and shiny – Physical
Its density is 8.92 g/mL – Physical
Its melting point is 1,085 °C – Physical
It forms green copper carbonate when in moist air – Chemical
It makes new substances with nitric acid – Chemical
It's a good conductor of heat and electricity – Physical



Demo: Dropping CaC₂ into H₂O

Make observations and decide if you are seeing chemical or physical change.



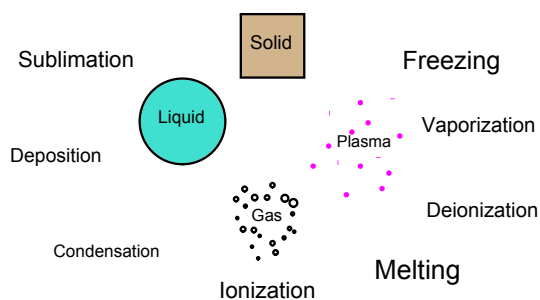
Acetylene Headlamp

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States of Matter - Jumble

Help! The states of matter have been scrambled into an unidentifiable mess! Can you unness them?
Move words and shapes around, and connect them with arrows.



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Homework

Read 3.1 & 3.2 of your book
2.1 Problems in your Booklet
Due: Next Class.

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