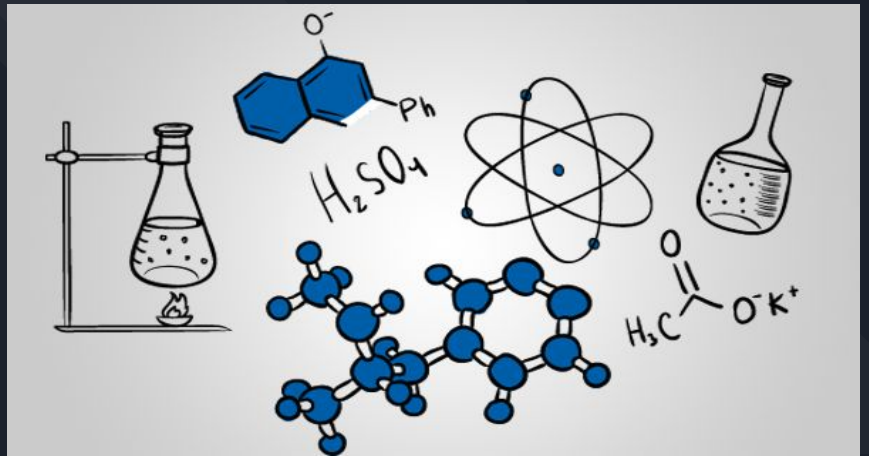
Matter and Chemical Change



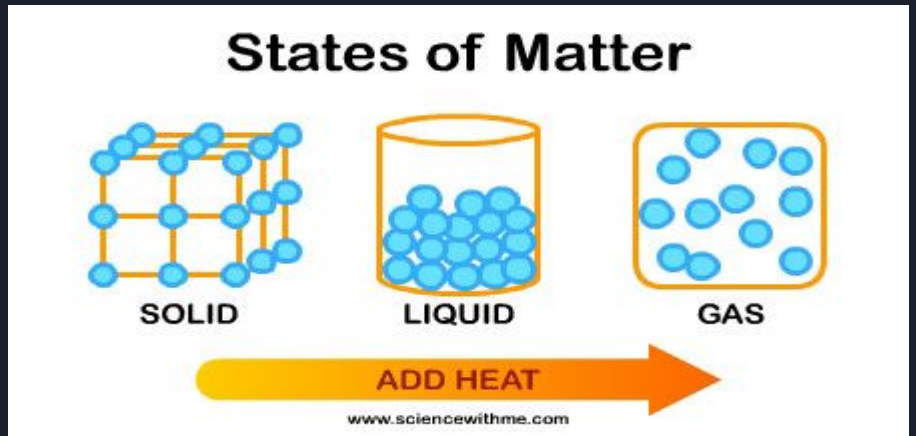
Topic 1 - Exploring Matter

Chemistry

- Chemistry is the study of matter
- Chemists study the properties between matter and the changes in matter during reactions

Matter

- Matter is anything that:
  - Has mass
  - Takes up space
- Energy does not take up space or have mass



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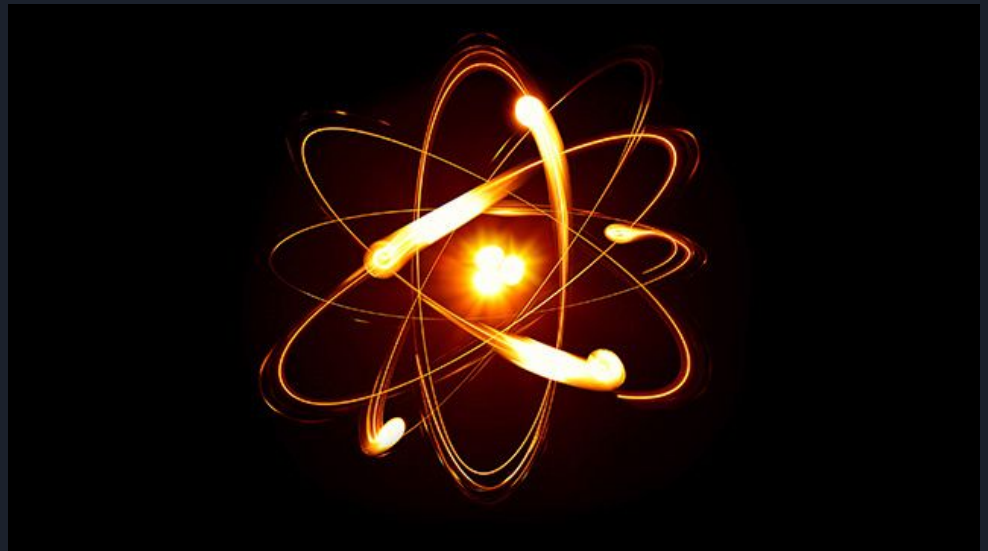
Properties of Matter

- Many chemicals are caustic and will burn, corrode or destroy organic tissue
- Ex. Acids and strong bases

Particle Model of Matter

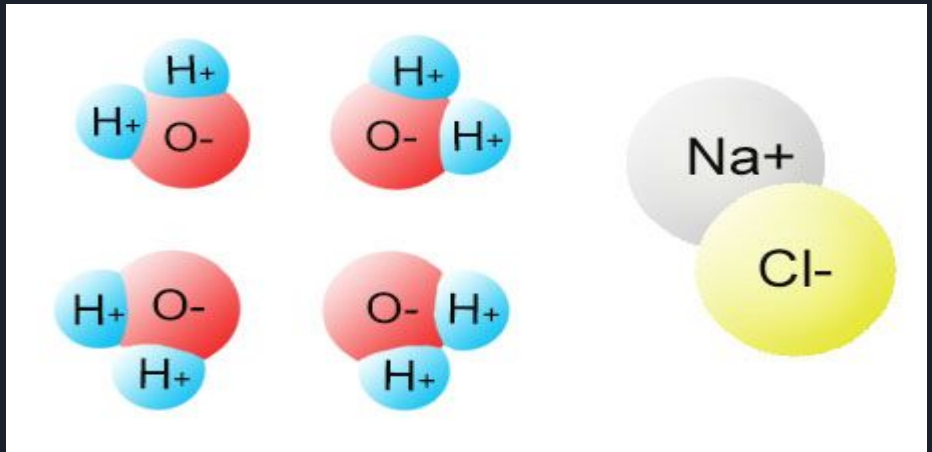
- Matter is most often described using the Particle Model of Matter

1. All matter is made up of tiny particles.



2. Each pure substance has its own kind of particles that are unique.

- The particles of one type are all identical to each other and are different from other particles of other pure substance.



3. Particles attract each other.

Objects with stronger attraction between their particles are solids.

Objects that have weak attraction between particles are gases.

4. Particles are always moving.
Vibrating, rotating , bumping into each other.

5. As the temperature increases, the particles move faster (expand).
If the temperature decreases, the particles move slower (contract).

Faster moving particles take up more space as they bump into each other causing the object to expand. As the temperature decreases, the particles get tighter together and the object contracts.

	Gas	Liquid	Solid
Attraction between the particles	Very weak	Weak	Strong
Distance between particles	Far	Small, but particles can slide past each other	Small
Compressible	Yes	No	No
Shape	Fills the container	Takes the shape of the container	Has a fixed shape

Classification according to composition

Matter - > Solid Liquid or Gas - > Pure substance or mixture

Pure Substance: Has only one type of particle with set properties

Ex. Water made of H_2O, boils at 100 ^{o}C

Salt is made NaCl

Mixture is made of more than type of particle

Mixtures

Mixtures can be further broken down into

Heterogeneous mixtures (Mechanical mixtures) and homogeneous mixtures (solutions)

Mechanical mixtures - have varying sizes of particles in the mixtures

Can be further classified into mechanical mixtures, suspensions, and colloids

Homogenous mixtures look like one substance, due to similar sized particles

Heterogenous Mixtures

Ordinary Mechanical Mixtures: Can see different parts, parts stay mixed, Ex. Cookie dough, gravel

Suspensions : One substance with two separate parts that will separate over time ex dust and water, oil and vinegar unmixed

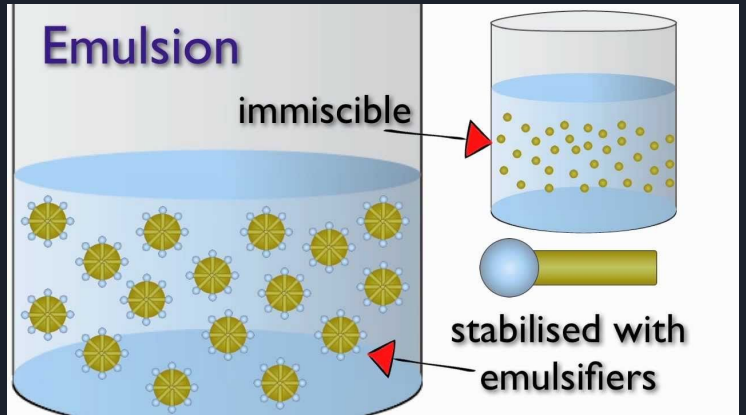
Colloids - Small particles of one substance suspended and mixed into another

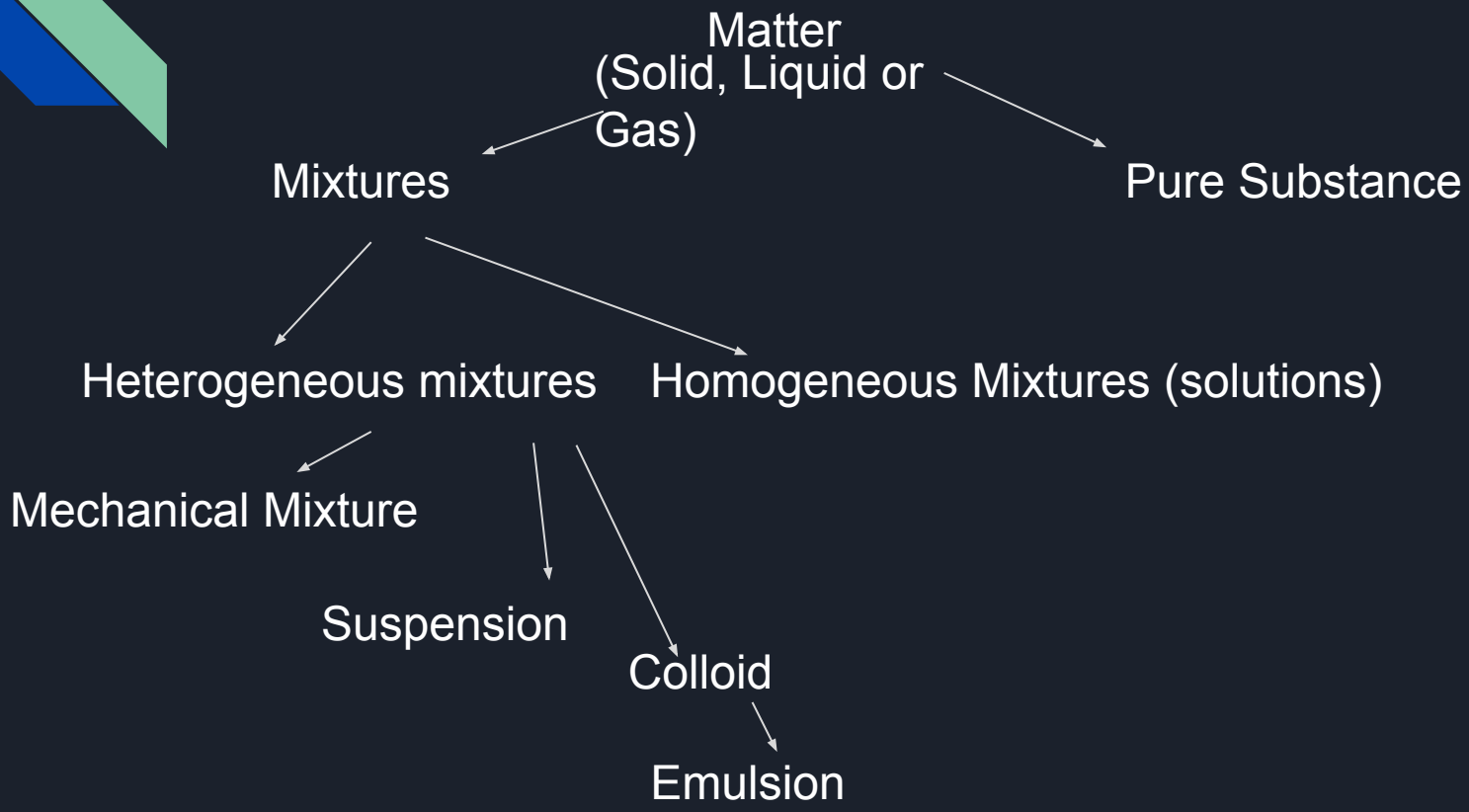
Ex. Pumice, hair gel, fog

Colloids

A colloid involving a liquid mixed into another liquid is known as an emulsion

Layers will sometimes separate in an emulsion, creating the need for emulsifying agents, which keep the liquids mixed together - Ex. Eggs

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Mixtures
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Heterogeneous mixtures
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Mechanical Mixture
Suspension
Colloid
Emulsion

Homework

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