

MATTER

Classification of Matter

Composition of Matter



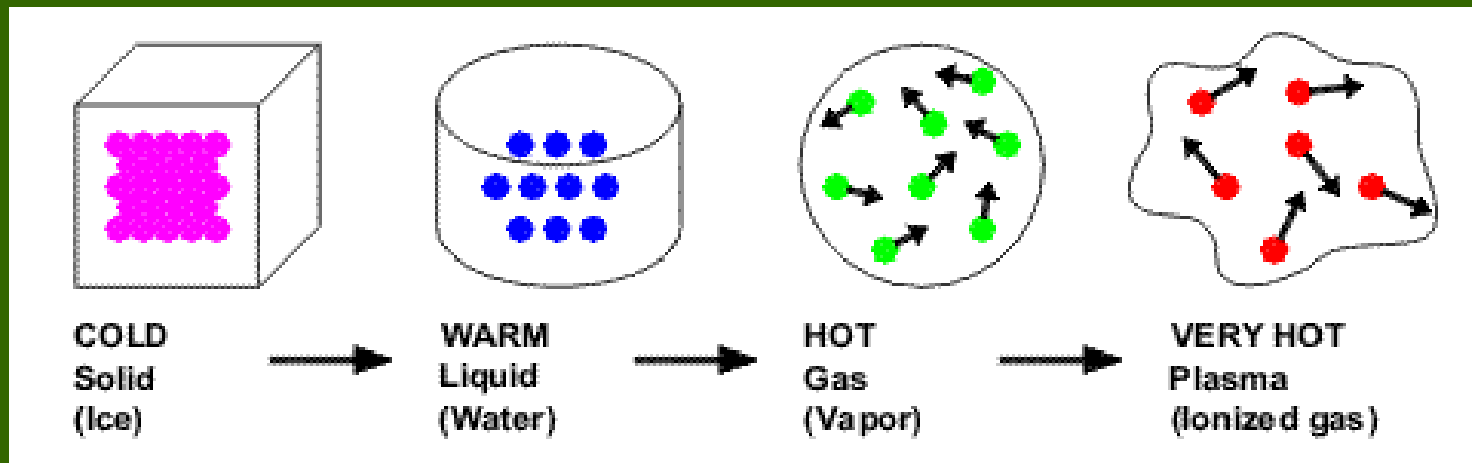


Matter:

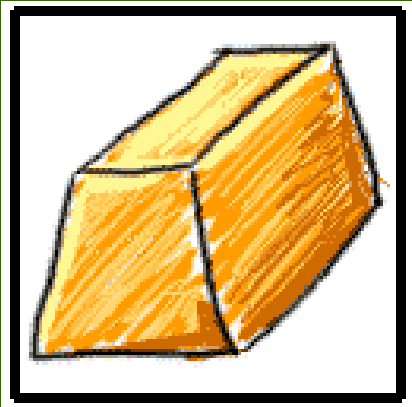
It's what the world is made of.

What is matter?

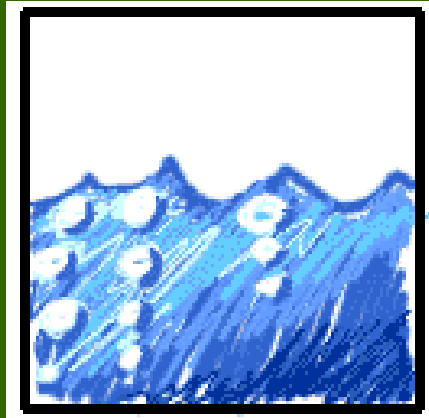
- Matter is anything that has mass and takes up space.



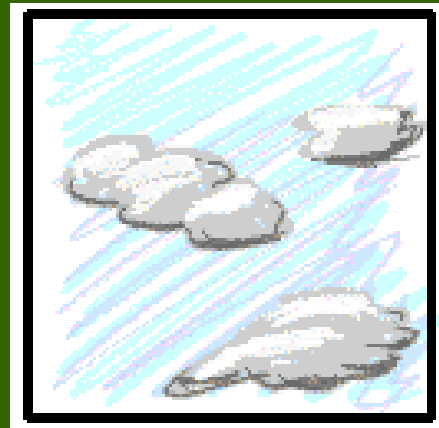
What do you know about matter?



Solids



Liquids



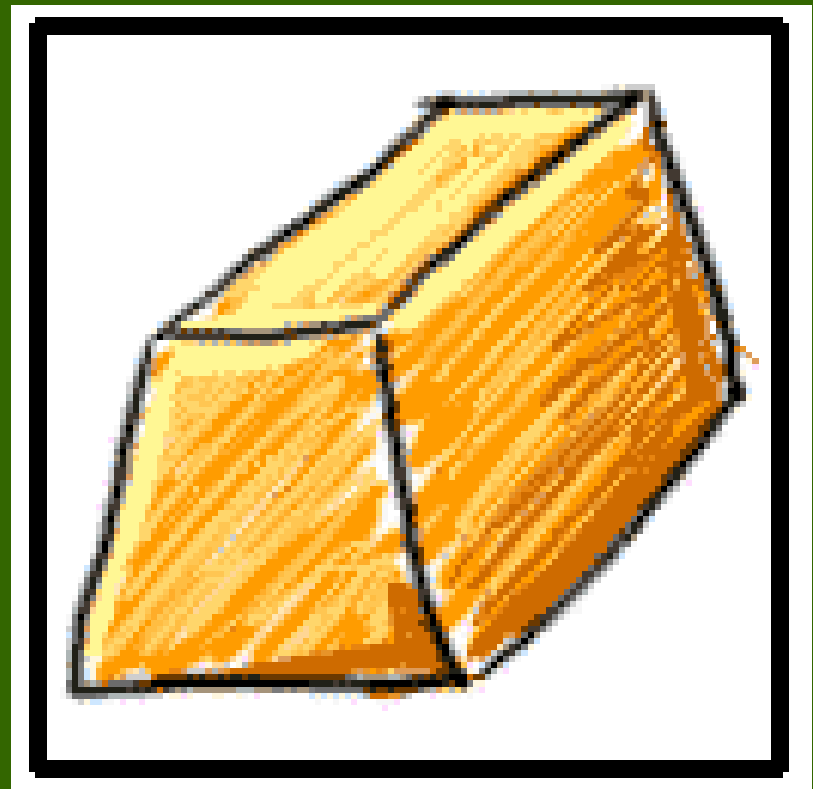
Gases



Plasma

Solids

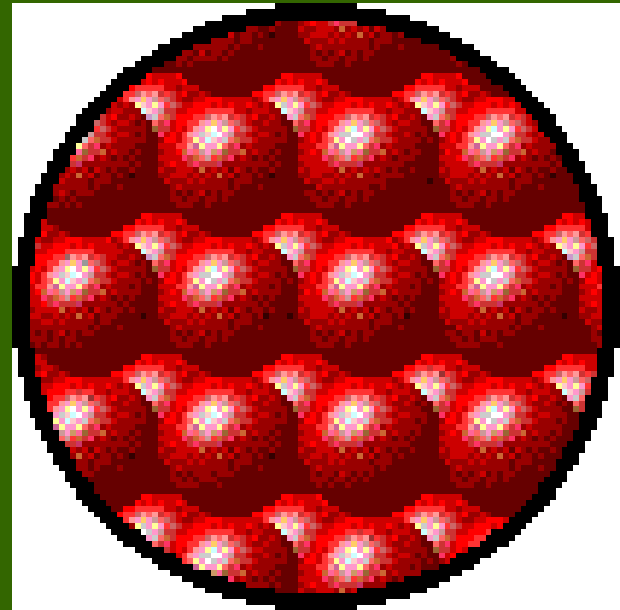
- Solids have definite shape and definite volume.
- Solids have mass.
- Solids take up space.



[Read more!](#)

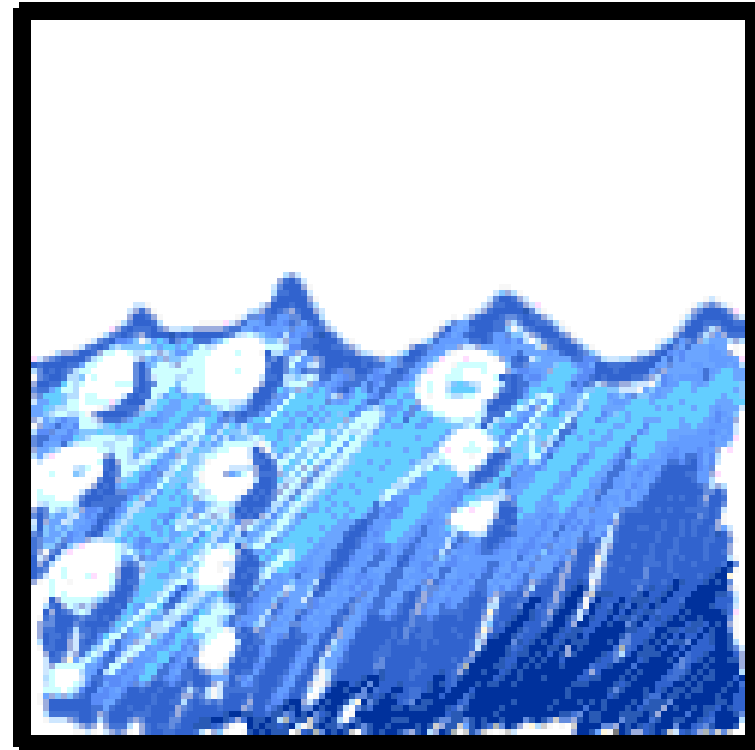
Particles in Solids:

- Are packed tightly together
- Have very little energy
- Vibrate in place



Liquids

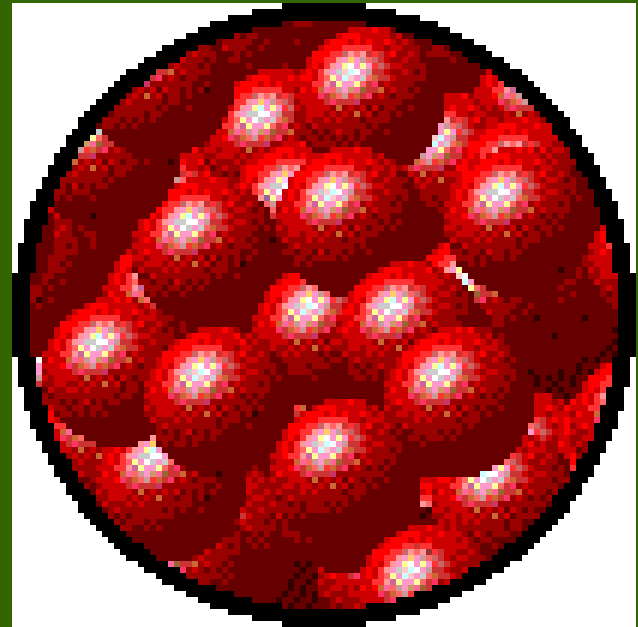
- Liquids take the shape of their container and have definite volume.
- Liquids have mass.
- Liquids take up space.



[Read more!](#)

Particles in Liquids:

- Are loosely packed
- Have medium energy levels
- Particles flow around each other



Gases

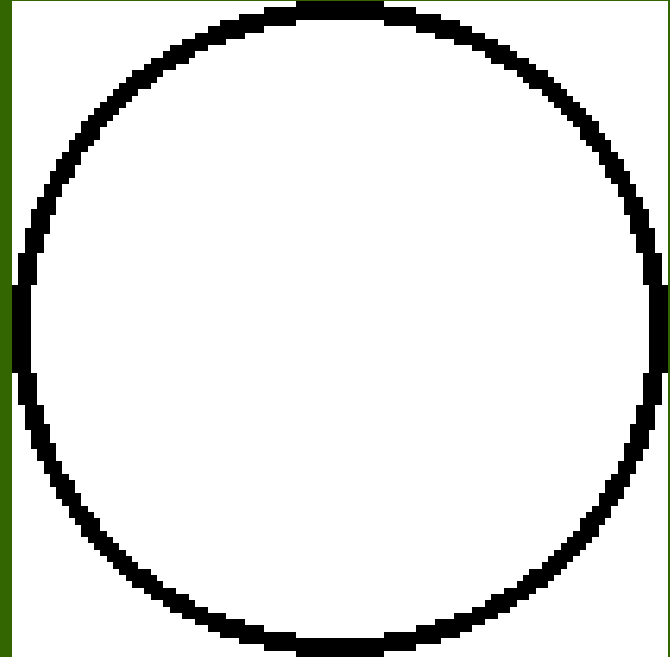
- Gases spread out to fill the entire space given and do not have definite volume.
- Gases have mass.
- Gases take up space.

[Read more!](#)



Particles in Gases:

- Move freely
- Have LOTS of energy



Plasma

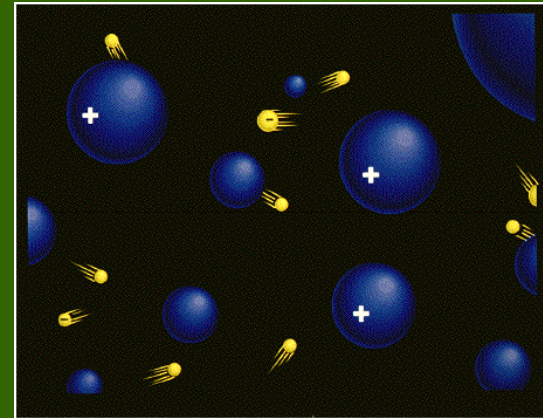
- Lightning is a plasma.
- Used in fluorescent light bulbs and Neon lights.
- Plasma is a lot like a gas, but the particles are electrically charged.

[Read more!](#)

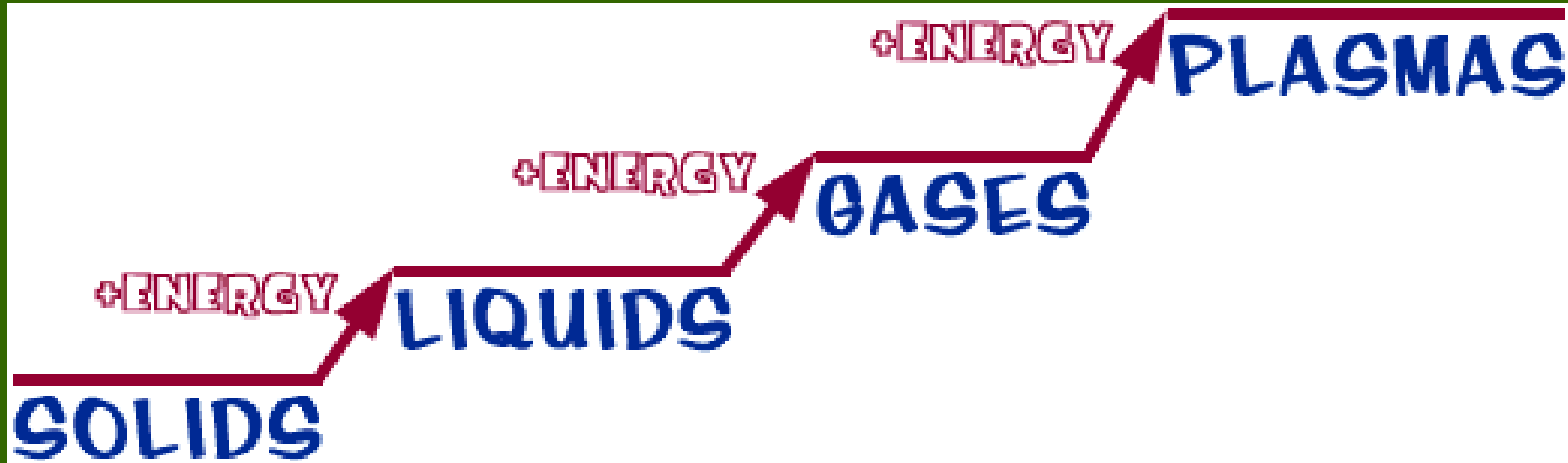


Particles in Plasma:

- Are electrically charged
- Have EXTREMELY high energy levels



Energy determines the state!



As the state of matter changes, so does the amount of energy..

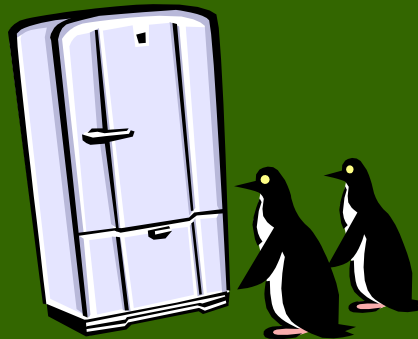


Add or Subtract Energy. . .

When energy is added, particles move faster!



When energy is taken away, particles move slower!



Review Questions

1. What state of matter has definite volume and definite shape?
2. Describe the properties of liquids.
3. Describe the differences between gases and plasma.
4. What is needed for states of matter to change phase?

Pure Substances



- Matter is classified as substances or a mixture of substances.
- A pure substance, or simply a substance, is a type of matter with a fixed composition
- A substance can be either an element or a compound.

Pure Substances

- Element

- matter composed of identical atoms

- EX: copper, gold, lead



Elements

- About 90 elements are found on Earth.
- More than 20 others have been made in laboratories, but most of these are unstable and exist only for short periods of time.
- More on that later...😊

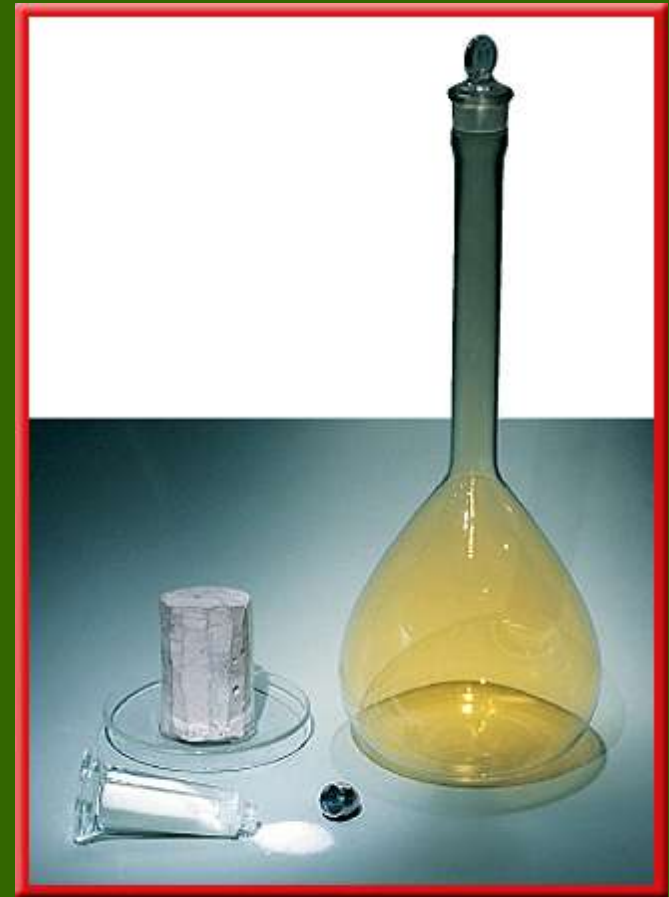
Compounds



- Can you imagine yourself putting something made from a silvery metal and a greenish-yellow, poisonous gas on your food?

Compounds

- Table salt is a chemical compound that fits this description.
 - Even though it looks like white crystals and adds flavor to food, its components—sodium and chlorine—are neither white nor salty.



Pure Substances

- Compound

- matter composed of 2 or more elements in a fixed ratio
- Cannot be separated by a physical means
- properties differ from those of individual elements
- EX: salt (NaCl), water, chalk



Mixtures

- A mixture, such as the pizza or soft drink shown, is a material made up of two or more substances that can be easily separated by physical means.

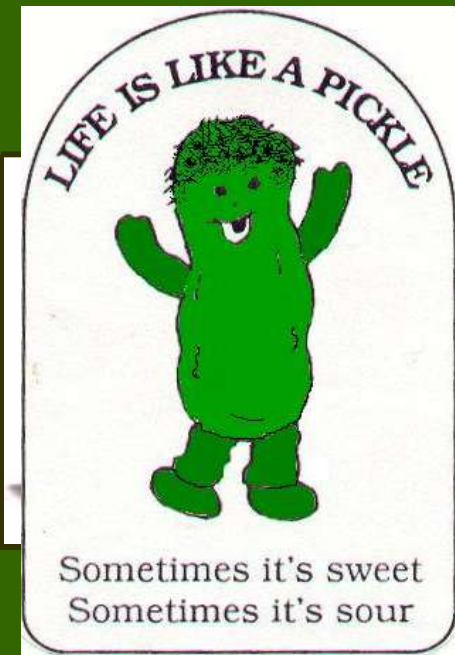


Mixtures

- Variable combination of 2 or more pure substances.

- Homogeneous Mixture (Solution)

- even distribution of components
- very small particles
- particles never settle
- EX: saline solution, fresh pickle juice, vinegar, soda



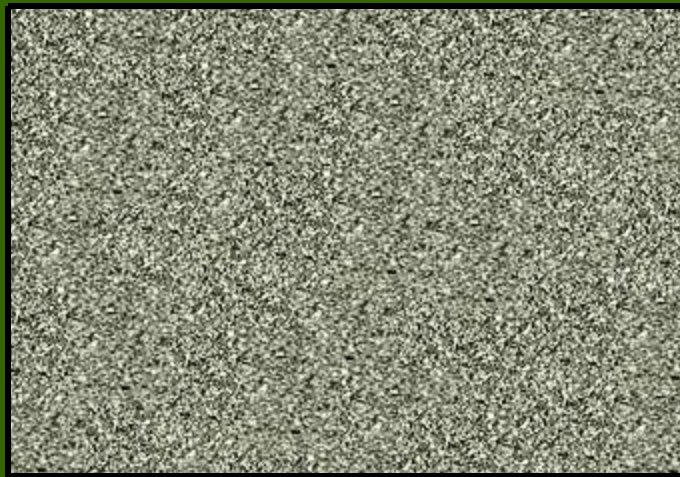
Heterogeneous Mixtures

- Unlike compounds, mixtures do not always contain the same proportions of the substances that make them up.
- A mixture in which different materials can be distinguished easily is called a heterogeneous mixture.

Mixtures

- Heterogeneous Mixture

- uneven distribution of components
- colloids and suspensions
- EX: granite, permanent press fabric



Colloids



- Milk is an example of a specific kind of mixture called a colloid.
- A colloid is a type of mixture with particles that are larger than those in solutions but not heavy enough to settle out.

Mixtures

- Colloid

- medium-sized particles
- Tyndall effect - particles scatter light (looks cloudy)
- particles never settle
- EX: milk, fog, gelatin, paint,



Detecting Colloids

- One way to distinguish a colloid from a solution is by its appearance.
- Fog appears white because its particles are large enough to scatter light.
- Sometimes it is not so obvious that a liquid is a colloid.
- You can tell for certain if a liquid is a colloid by passing a beam of light through it.

Tyndall Effect



Because of the Tyndall effect, A light beam is Scattered by the Colloid suspension On the left, but Passes invisibly Through the solution On the right.

Mixtures

- Suspension

- large particles
- particles scatter light
- particles will settle
(needs to be shaken)
- EX: Italian salad dressing (oil, vinegar, and spices), a river delta, pond

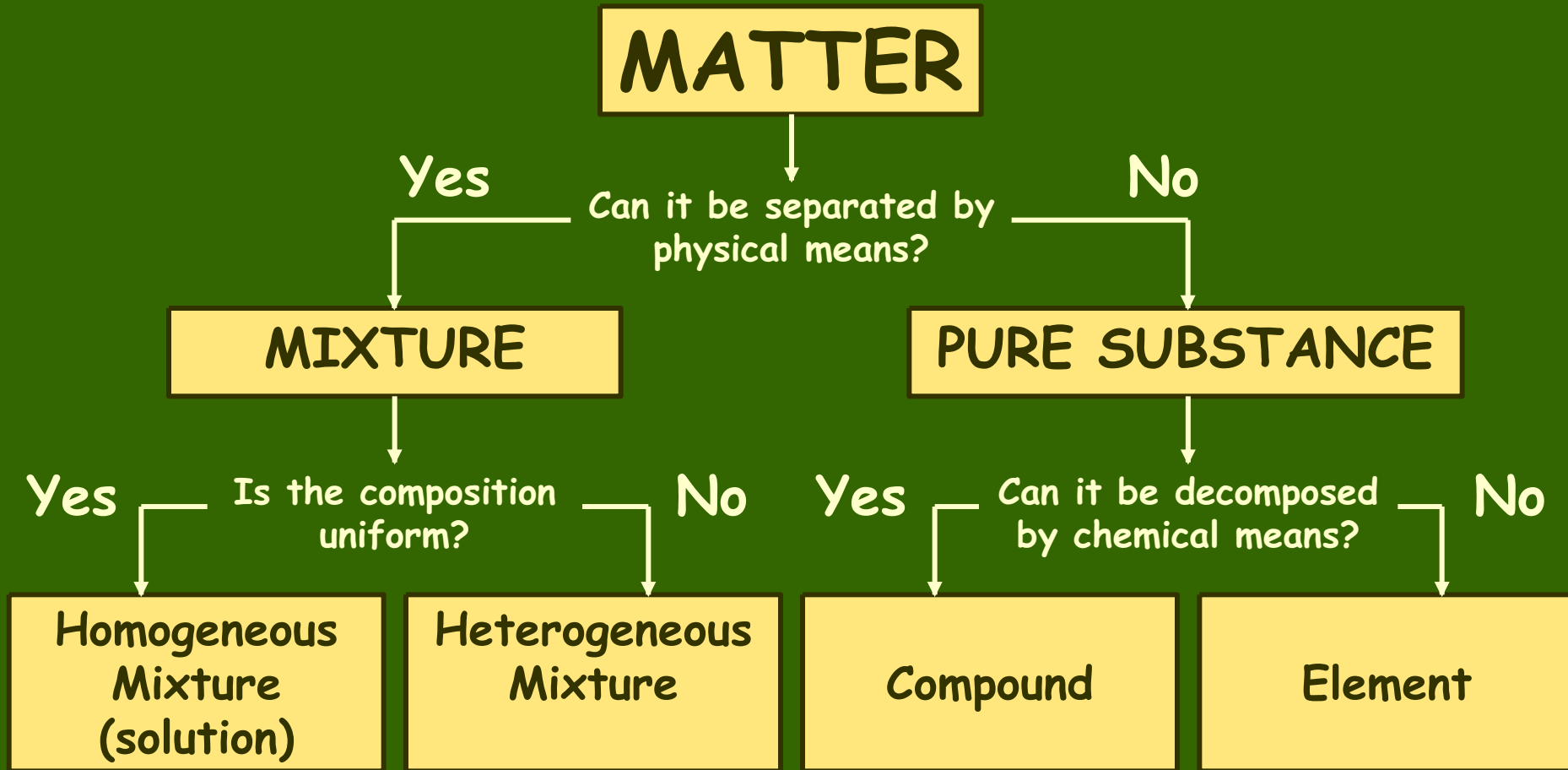


Suspensions

10 The table summarizes the properties of different types of mixtures.

Comparing Solutions, Colloids, and Suspensions			
Description	Solutions	Colloids	Suspensions
Settle upon standing?	no	no	yes
Separate using filter paper?	no	no	yes
Particle size	0.1–1 nm	1–100 nm	>100 nm
Scatter light?	no	yes	yes

Matter Flowchart



Classifying Matter

- Homogenous- contains two or more gaseous, liquid, or solid substance blended evenly throughout
- Solution- homogeneous mixtures containing particles so small they cannot be seen with a microscope and will never settle to the bottom of the container- tap water, salt water, food coloring and water
- Colloid- mixture with large particles that never settle- fog, smoke, ink, glue, milk, cream, butter

Classifying Matter

- Colloid vs. Solution-pass a beam of light through the mixture
 - If the beam is invisible- it is a solution
 - If the beam is visible- it is a colloid
 - The visible beam through the colloid is called the Tyndall effect
- Suspension- heterogeneous mixture containing a liquid in which visible particles settle out over time - like dirty water and Italian salad dressing