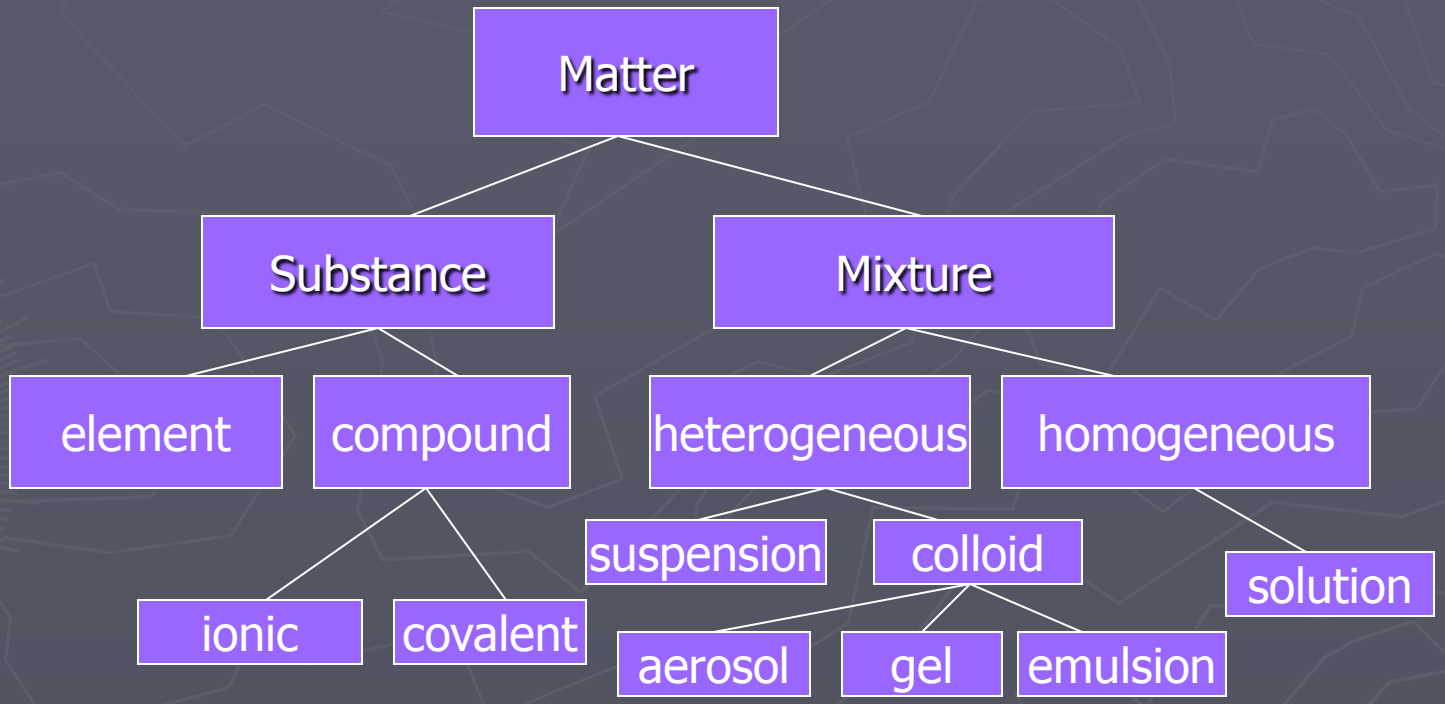
Classification of matter

Types of matter

- Substances
- Mixtures



What are the two main groups that make up all matter?*

Atoms

- The particles that make up all matter*

Substance

- Elements - all atoms in sample are the same kind
- Compounds - made from atoms of two or more elements combined
- Example: Water

Mixtures

- combination of two or more different substances not chemically combined

Heterogenous mixture

- a mixture in which the materials can be easily distinguished

Suspension

- **Suspension - heterogenous mixture in which the visible particles settle Particles are visible in a suspension**

Collioids

- **Colloid is a heterogenous mixture that doesn't settle out**
- **Particles are 1-100 nm**
  - **Tyndall effect - do to the scattering of light by colloidal particles.***
- **Three types of colloids***
  - **Gel - solid in a liquid**
  - **Aerisol - liquid or solid in a gas**
  - **Emulsion - is a liquid in a liquid**

*Be able to explain the Tyndall effect.**

What are the three main types of colloids, and what makes them up?

*What type of mixture is a colloid?**

Homogenous mixture

- **mixed evenly throughout the mixture**
- **Smallest particle - so small that they cannot be seen with a microscope 10^{-9} meters**
- **Example is a solution**
  - **Solute: the part that is dissolved**
  - **Solvent: the part that does the dissolving**

*What is the difference between a colloid, a suspension and a solution?**

*You must be able to identify if the example matter is a compound, element, homogeneous mixture, or heterogeneous mixture.**

Identify if the following matter is a compound, element, homogeneous mixture, or heterogeneous mixture:*

- Water
- Gasoline
- Sugar
- Air
- Tea
- Pop
- Steel
- Iron
- Copper
- Smoke
- Ice
- Cool-aid
- Oxygen

Describing Matter

- Physical Properties and Physical Change
- Chemical Properties and Chemical Change

*You must know the difference between chemical and physical properties.**

Physical Properties

- **any characteristic of a material that you can observe without changing the substance(s) that make up the material**
- **Examples: Color, shape, density, melting point, boiling point, conductivity and magnetism**

*Give physical properties of a metal.**

*How could a sand and sugar mixture be separated?**

Physical Change

- **a change in:**
  - **Size**
  - **Shape**
  - **State of matter**
    - **Solid to liquid – melting**
    - **Liquid to gas – evaporating**
    - **Gas to a liquid – condensing**
    - **Liquid to solid – freezing**
    - **Solid to gas – sublimation***

*Be able to Identify a physical change.**

*Give examples of physical change.**

Chemical change

- **A change of one substance in a material into a different substance**

*Be able to identify a physical property or a chemical property.**

Chemical properties

- how and with what things react to cause chemical change

Law of Conservation of mass*

- **during chemical change there is no mass lost**
  - **$2H_2O \rightarrow 2H_2 + O_2$**
    reactant Product

*Why does there have to be the same number of atoms on each side of the yield sign?**

*How does the number of atoms in the reactants of a chemical reaction compare to the number of atoms in the products?**

Quiz

Name:

1. *Why does there have to be the same number of atoms on each side of the yield sign?*
2. *Explain the Tyndall effect.*
3. *What is the difference between a colloid, suspension and a solution?*
4. *What is the difference between a heterogeneous and a homogeneous mixture?*
5. *Matter is divided into what two main groups ?*