**Lesson 1: Introduction to Matter and the Atom**

In what contexts have we discussed matter so far this year?

**The Atom**

Matter is defined as anything with **mass** and **volume**. All matter is made up of **atoms**, which are considered the smallest unit of matter. Atoms are composed of a **nucleus** which contains **protons** and **neutrons**, orbited by **electrons** organized in **shells**. The outermost shell is referred to as the **valence** shell.



|  |  |  |  |
| --- | --- | --- | --- |
| **Atomic Particle** | **Location** | **Charge** | **Significance** |
| Proton |  |  |  |
| Neutron |  |  |  |
| Electron |  |  |  |

**Categorizing Matter**

The **number, type and organization** of the atoms within matter can vary. Therefore, we have created subcategories to differentiate between these categories.

**Pure substances:** In a pure substance, every particle is **identical** and cannot be separated by **physical** means.

* Elements
	+ The number of **protons** in an atom determines the **identity** of the atom
	+ For example: all hydrogen atoms will have **one** proton, all carbon atoms will have **six** protons
* Compounds
	+ When two or more atoms **bond** together it is called a **compound**
	+ For example: in a sample containing pure water, every particle will contain two **hydrogen** atoms and one **oxygen** atom

**Mixtures:** A mixture is defined as a **blend** of two or more **pure** substances, meaning there will always be at least **two different** types of particles. Mixtures can be separated through **physical** means.

* Homogeneous mixtures
	+ Homogeneous mixtures are not obviously **mixtures**
	+ In a homogeneous mixture, the two or more substances are mixed **uniformly**
	+ For example: **salt** water is a type of homogeneous mixture
* Heterogeneous mixtures
	+ Heterogeneous mixtures are **obviously** mixtures
	+ In a heterogeneous mixture, the substances are not mixed **uniformly**
	+ For example: **oil** and water is a type of heterogeneous mixture