**Notes: Pure Substances vs Mixtures**



**Elements:**

*
* Can exist as either atoms (e.g. argon) or molecules (e.g. nitrogen)
* Cannot be broken down into a simpler type of matter by either physical or chemical techniques (though some larger elements break-down spontaneously due to being radioactive)





Example 1: Element existing in the form of atoms. Example 2: Element existing in the form of diatomic molecules (i.e. molecules formed from two atoms).

**Compounds:**

*
* Can be broken down into a simpler type of matter (elements) by chemical means; but not by physical means.
* Always contains the same ration of componenet atoms.
* Have properties different from their component elements

(e.g. the comound water (H2O) is a liquid at room temperature and pressure and has different chemical properties from those of the two elements, hydrogen (H2) and oxygen (O2), rom which it is formed).



Example 1: Compound whose molecules consist of one atom of one element chemically joined with two atoms of another element.

**Mixtures:**

*
* Can be separated into their constituent parts by physical means.
* Have many of the properties of their constituent parts.





**Example 1:** Mixture of two elements, both of which exist as atoms rather than molecules.

**Example 2:** Mixture of two elements, one of which exists as atoms, the other as molecules.

**Ex 2**

**Ex 1**

**Example 3:** Mixture of two elements, both of which exist as molecules rather than atoms.





**Example 4:** Mixture of an element (that exists in the form of molecules) and a compound.

**Ex 3**

**Ex 4**

**Separation Tcheniques:**

Filtration:

* How it works:



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*
* Example: Sand and Water

Distillation:

* How it works:
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*
* Example: Water and Ethanol

Chromatography:



* How it works:
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* Example: pigments in ink
* This is why ink “bleeds” on paper when it gets wet.



Using a Magnet:

* How it works:
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* Example: Sulfur powder and iron filings



Crystallization:

* How it works:
*

* As one substance evaporates, the dissolved substance comes out of solution and collects as crystals
* Produces highly pure solids
* Example: Water and sugar (rock candy)