

8. How are Chemical Compounds Formed?

- compounds are a result of **chemical bonding** of atoms
- Chemical Bonds:
 - the forces that **attract** atoms to each other in compounds
 - elements combine or 'bond' together because of their **electrons**
 - formed between atoms to make them more stable (octet stability rule!)
- compounds are produced by **chemical reactions**

RECALL

- **valence electrons** are the electrons in the outer shell of an atom
- every atom of every element wants to have **8** electrons in its outer shell
- **OCTET RULE**: wants a full valence shell
 - : wants to be like the Noble Gases (stable)
- Compounds:
 - Substances made of 2 or more elements which are **chemically bonded**
 - = produced by a **chemical reaction**
 - all compounds have names
 - Examples:
 - water is **dihydrogen monoxide**
 - rust is **iron oxide**
 - atoms join in **specific proportions** to form ionic compounds or molecules which are the smallest part of a compound
 - Examples:
 - all rust molecules = 2 iron atoms joined to 3 oxygen atoms

Chemical Formula:

- = a **shorthand** method of representing the **composition** of a compound
- contain: the **symbols** of each element
 - : the **# of atoms of each element (ratio)**
 - shown as a subscript behind the symbol
- Examples:

| Compound | Composition | Ratio |
|--|-------------------|--------------|
| Water (H ₂ O) | hydrogen & oxygen | H to O = 2:1 |
| Hydrogen Peroxide (H ₂ O ₂) | hydrogen & oxygen | H to O = 2:2 |

Is the ratio of atoms/ions of each element important?

| Elements | Compounds |
|---|--|
| Made up of one type of atom | Made from two or more types of atoms that are chemically combined |
| Chemically combine to make compounds | Result from chemical reactions |
| Have a chemical symbol | Have a chemical formula |
| Have individual properties | Have properties different than the component elements |
| Can't be broken down into simpler substances | Can be broken down, or decomposed by chemical means |

Use the periodic table to help you identify the elements in the compounds listed below. Write each element on the lines provided. Then in brackets include the number of each atom that is present in the compound.

Ex. H_2SO_4 Hydrogen (2) Sulfur (1) Oxygen (4)

- 1) $NaCl$ _____ _____
- 2) $NaHCO_3$ _____ _____ _____ _____
- 3) Fe_2O_3 _____ _____
- 4) H_2S _____ _____
- 5) $C_{12}H_{22}O_{11}$ _____ _____ _____
- 6) $CaCO_3$ _____ _____ _____
- 7) NH_3 _____ _____
- 8) $KMnO_4$ _____ _____ _____
- 9) CCl_4 _____ _____
- 10) $CoCl_2$ _____ _____

8. How are Chemical Compounds Formed?

- compounds are a result of _____ of atoms
- Chemical Bonds:
 - the forces that _____ atoms to each other in compounds
 - elements combine or 'bond' together because of their _____
 - formed between atoms to make them more stable (octet stability rule!)
- compounds are produced by _____

RECALL

- _____ are the electrons in the outer shell of an atom
- every atom of every element wants to have _____ electrons in its outer shell
- **OCTET RULE**: wants a full valence shell
: wants to be like the Noble Gases (stable)

-Compounds

- Substances made of 2 or more elements which are chemically bonded
= produced by a _____
- all compounds have names
 - Examples:
 - water is _____
 - rust is _____
- atoms join in _____ to form ionic compounds or molecules which are the smallest part of a compound
 - Example:
 - all rust molecules = _____
- Chemical Formula:
 - = a _____ method of representing the _____ of a compound
 - contain: the _____ of each element
: the _____
 - shown as a subscript behind the symbol
 - Examples:

| Compound | Composition | Ratio |
|--|-------------|----------|
| Water (H ₂ O) | | H to O = |
| Hydrogen Peroxide (H ₂ O ₂) | | H to O = |

Is the ratio of atoms/ions of each element important?

| Elements | Compounds |
|--|---|
| Made up of _____ type of atom | Made from _____ types of atoms that are chemically combined |
| Chemically combine to make _____ | Result from _____ |
| Have a chemical _____ | Have a chemical _____ |
| Have _____ properties | Have properties _____ than the component elements |
| _____ be broken down into simpler substances | _____ broken down, or decomposed by chemical means |

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