

Ionic Puzzle Piece Activity

Introduction

When metals and non-metals chemically react, the atoms will tend to form **ions** or charged atoms. Ions form because **electrons** are either gained or lost. Metals will generally lose electrons to form **cations** (positive ions). This is because metals tend to **donate electrons** in order to achieve a stable octet. Non-metals will gain electrons to form **anions** (negative ions), since they tend to **accept electrons** in order to achieve a full valence shell (stable octet).

Activity

In this activity you will create models of ionic compounds and observe the chemical formula of the binary ionic compounds you have created. You will need at least one CATION and one ANION for each compound.

To create an ionic compound:

1. Cut out the cation and anion puzzle pieces.
2. Place the cards together, adding additional cards of the same ion until the heights of the cations and anions are equal.
3. Count the number of each ion needed for the heights to be equal and record
4. Record the name of each cation and anion combined.
5. Write both the formula and name for each ionic compound.
6. Make as many compounds as possible!

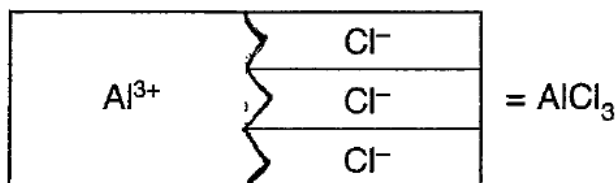


Figure 1: Aluminum chloride

Cation Name	# of Cations	Anion Name	# of Anions	Chemical Formula	Ionic Compound Name
Aluminum +3	1	Chloride -1	3	AlCl_3	Aluminum chloride

Follow – Up Questions:

1. Do metals form anions or cations? _____

2. What is the charge for all elements in Group 1A? _____

What is the charge for all elements in Group 2A? _____

What is the charge for all elements in Group 7A? _____

Do you notice a pattern in the charge for elements in each group? Explain.
(Hint: relate to number of valence electrons and the octet rule)

3. Can an ionic compound ever consist of a cation-cation or anion-anion bond?
Explain.

4. When naming a binary compound, what ending do you use to represent anions?

5. What is the overall charge of ionic compounds?

6. Write formulas and names for the following:

Barium and oxygen

Sodium and nitrogen

Beryllium and bromine

Al ⁺³ Boron	F ⁻¹ Fluoride	Na ⁺¹ Sodium	N ⁻³ Nitride	Mg ⁺² Magnesium
	F ⁻¹ Fluoride	K ⁺¹ Potassium		
	Cl ⁻¹ Chloride	K ⁺¹ Potassium		
Al ⁺³ Aluminum	Cl ⁻¹ Chloride	K ⁺¹ Potassium	P ⁻³ Phosphide	Mg ⁺² Magnesium
	Br ⁻¹ Bromide	Ca ⁺² Calcium		Ag ⁺¹ Silver(I)
	Br ⁻¹ Bromide			Cu ⁺¹ Copper(I)
Mg ⁺² Magnesium	I ⁻¹ Iodide	Sr ⁺² Strontium	S ⁻² Sulfide	Ca ⁺² Calcium
Li ⁺¹ Lithium	N ⁻³ Nitride	Rb ⁺¹ Rubidium	O ⁻² Oxide	Cu ⁺² Copper(II)
Li ⁺¹ Lithium				
Li ⁺¹ Lithium	I ⁻¹ Iodide	Ti ⁺⁴ Titanium (IV)	O ⁻² Oxide	Al ⁺³ Aluminum
Na ⁺¹ Sodium	S ⁻² Sulfide			
Na ⁺¹ Sodium			I ⁻¹ Iodide	