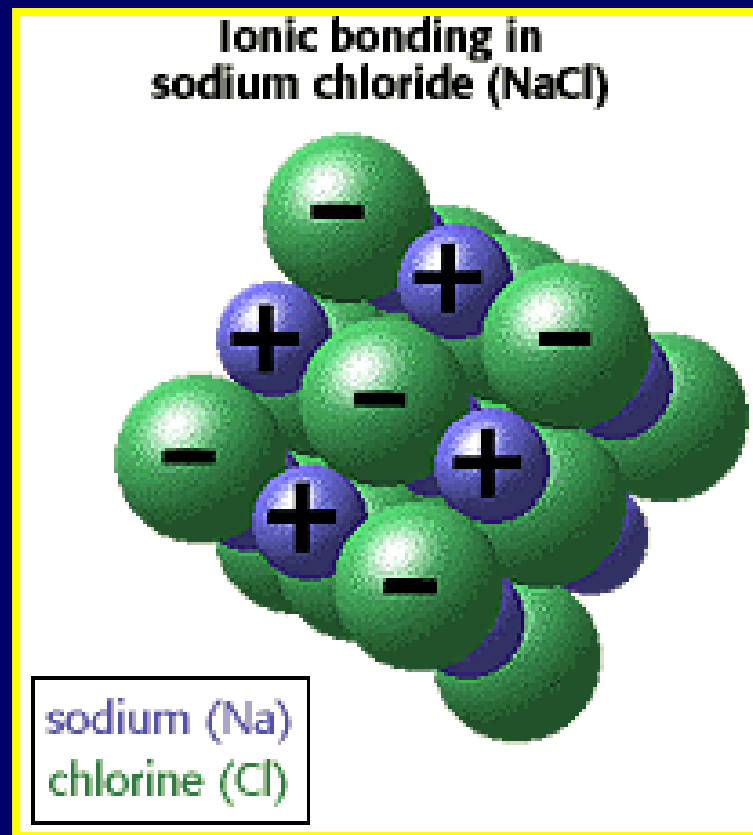


# Ionic Compounds



# Essential Standard 2.2

Understand chemical bonding and chemical interactions.

## Learning Objective 2.2.2

Predict chemical formulas and names for simple compounds based on knowledge of bond formation and naming conventions.

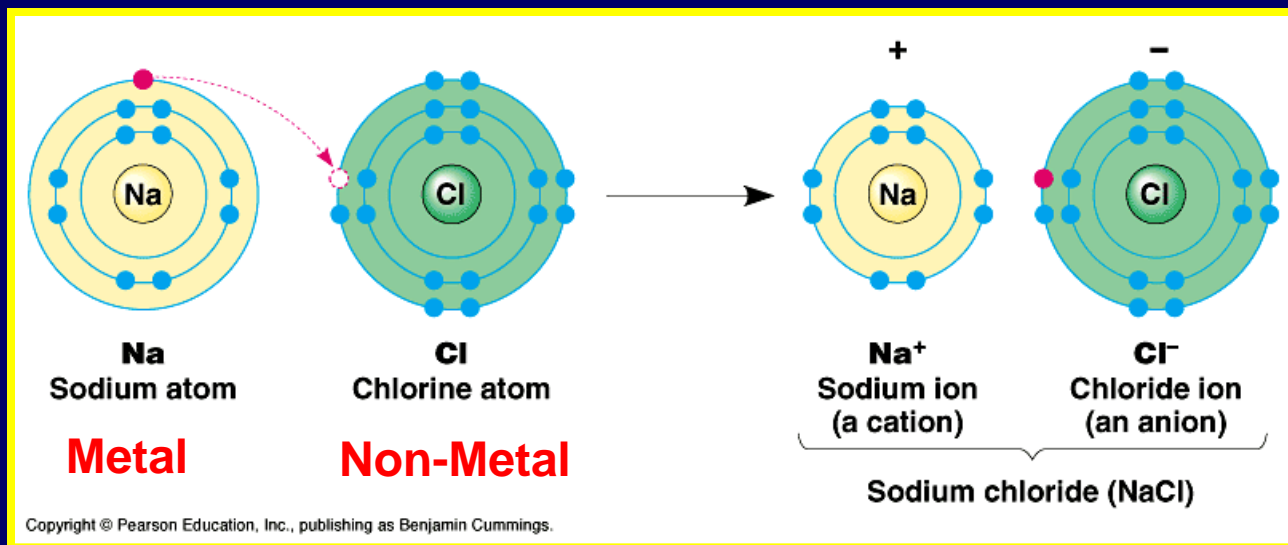
# I Can Statements

At the end of this lesson, you should be able to say, with confidence:

- I can write chemical formulas for binary ionic compounds and polyatomic ionic compounds
- I can name a binary compound and a polyatomic ionic compound given its chemical formula

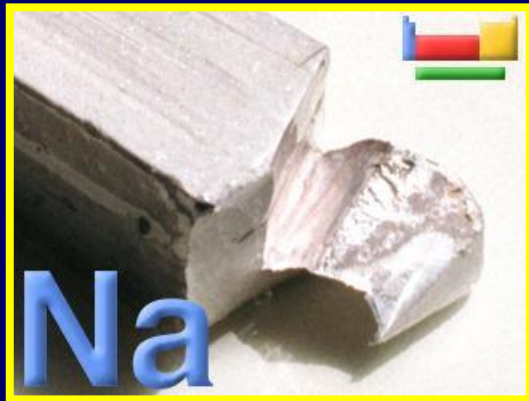
# Ionic Bonds

Recall that ionic compounds are formed when electrons are transferred from a metal atom to non-metal atoms and the oppositely charged ions form an ionic bond.



# Ionic Compounds

Compounds formed by ionic bonds are called ionic compounds and have different properties than their individual atoms.



Explosive  
Metal

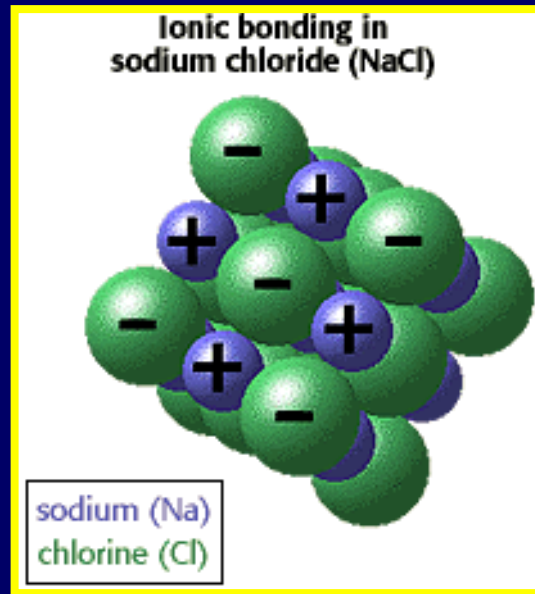


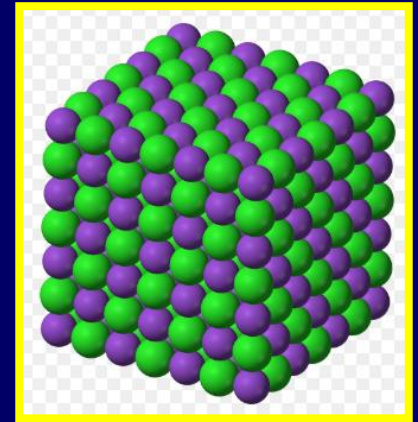
Table Salt



Poisonous  
Gas

# Properties of Ionic Compounds

Ionic compounds form crystals



NaCl

Sodium Chloride



KCl

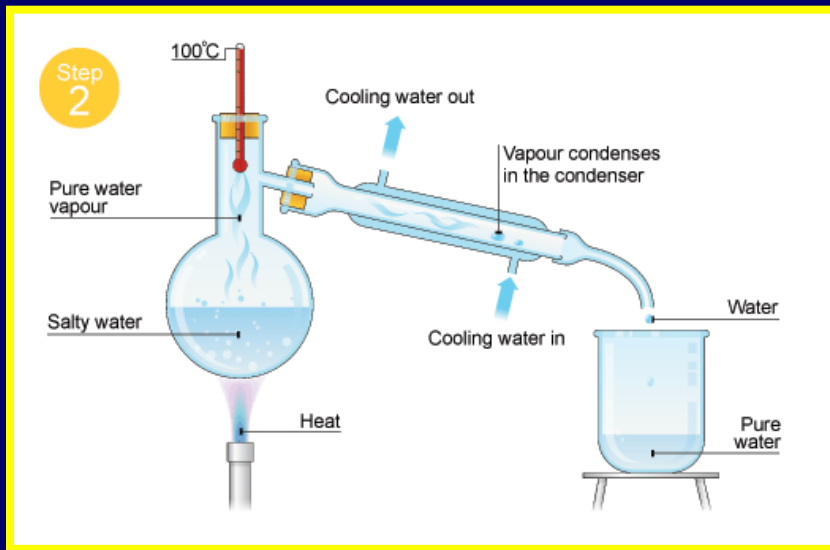


Potassium Chloride

# Properties of Ionic Compounds

Ionic compounds high melting and boiling points

**Sodium Chloride's Melting Point =  $801^{\circ}\text{C}$**



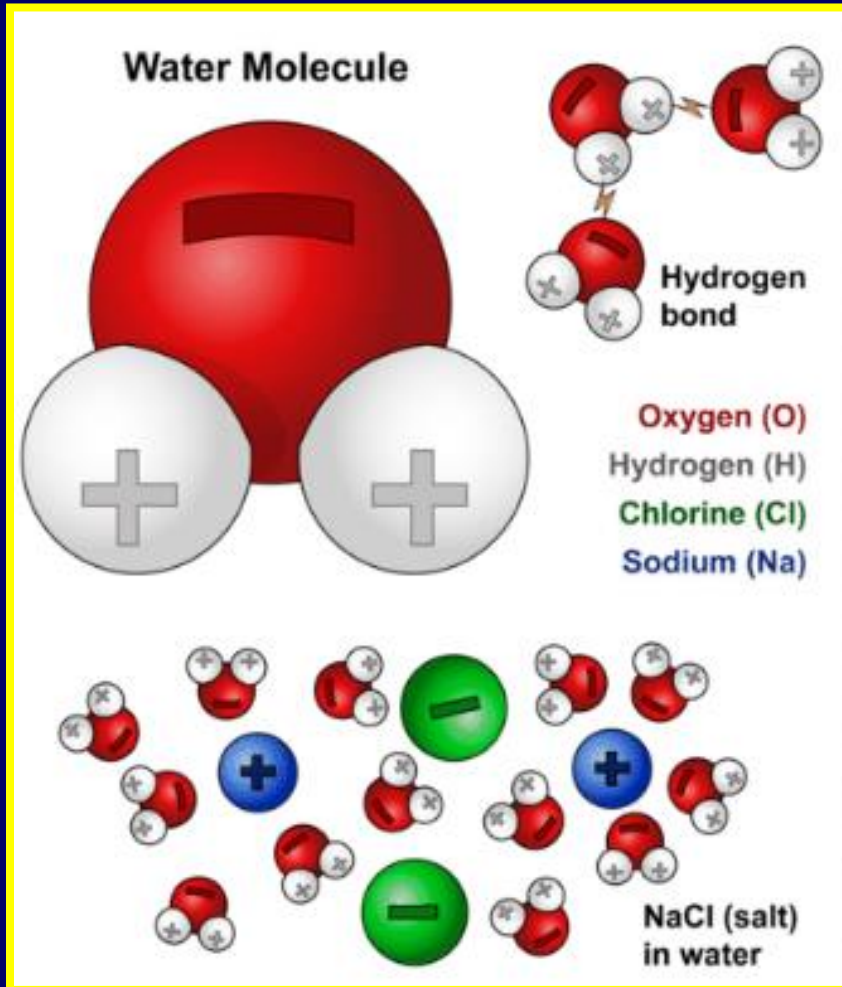
This property allows us to separate the compounds out of water mixtures during distillation.

**Sodium Chloride's Boiling Point =  $1413^{\circ}\text{C}$**



# Properties of Ionic Compounds

Ionic compounds dissolve easily in water.



Because the individual ions have a charge, they are attracted the charges in the water molecule and are easily separated or dissolved.



# Ionic Compounds

When ionic compounds dissolve in water, the charged ions can conduct electricity and are called electrolytes.

$\text{Na}^+$

$\text{Cl}^-$

$\text{K}^+$











**What the heck are electrolytes?**

Electrolytes help maintain the fluid balance in your body.

**Electrolytes include:**

- sodium
- chloride
- potassium
- magnesium
- calcium

**Where to find electrolytes:**

sodium		pickles
	table salt	
chloride		tomatoes
	table salt	
potassium		banana
	potato with skin	
magnesium		spinach
	pumpkin seeds	
calcium		collard greens
	milk	

When you sweat, you lose electrolytes which can throw things out of balance

**Neon Liquid**

warning: may cause you to glow in the dark

yogapancake.com

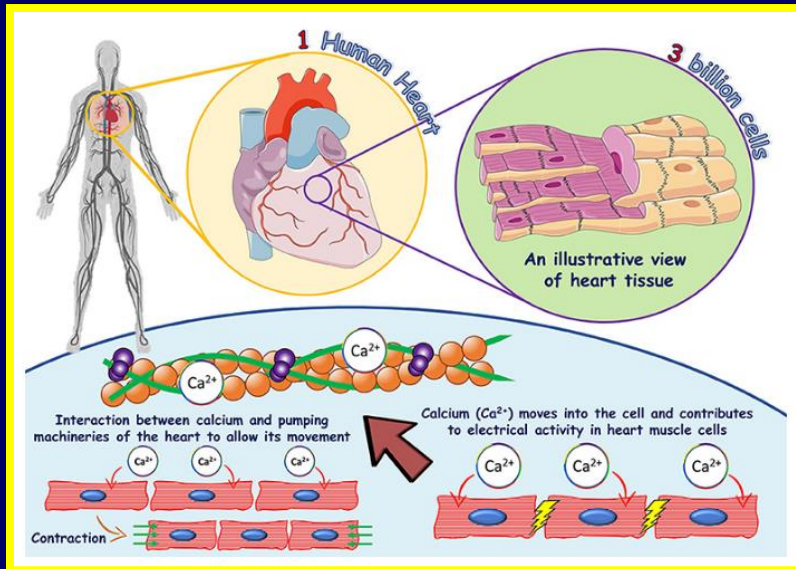
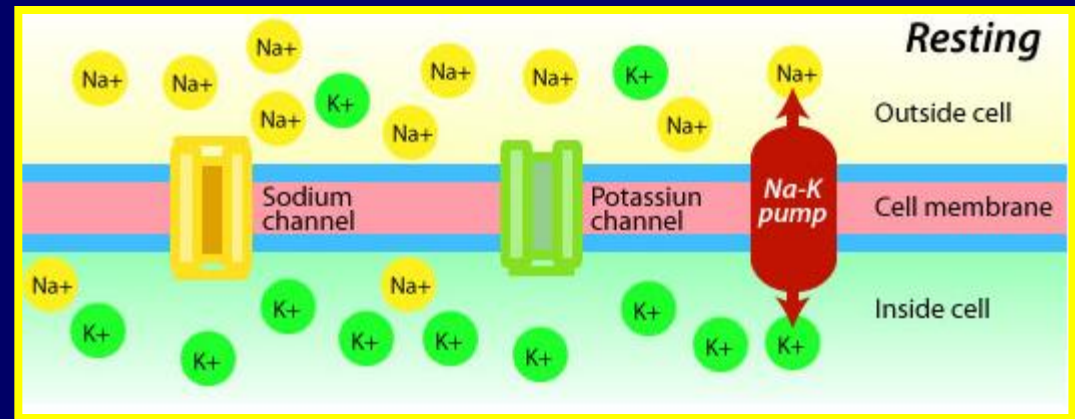
$\text{Mg}^+$

$\text{Ca}^+$

# Electrolytes

Electrolytes are vital to human health.

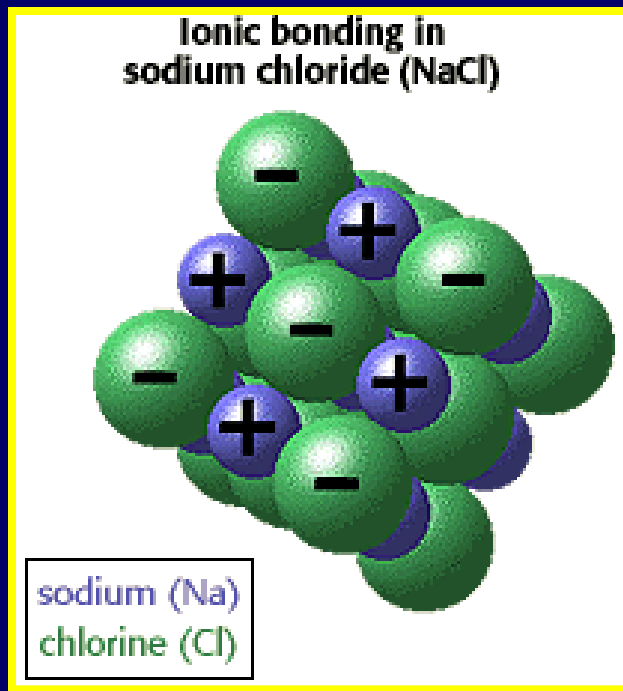
Na<sup>+</sup> and K<sup>+</sup> ions are behind nerve signals.



Ca<sup>+</sup> ions cause your heart to pump blood and helps your heart maintain a rhythm.

# Chemical Formulas

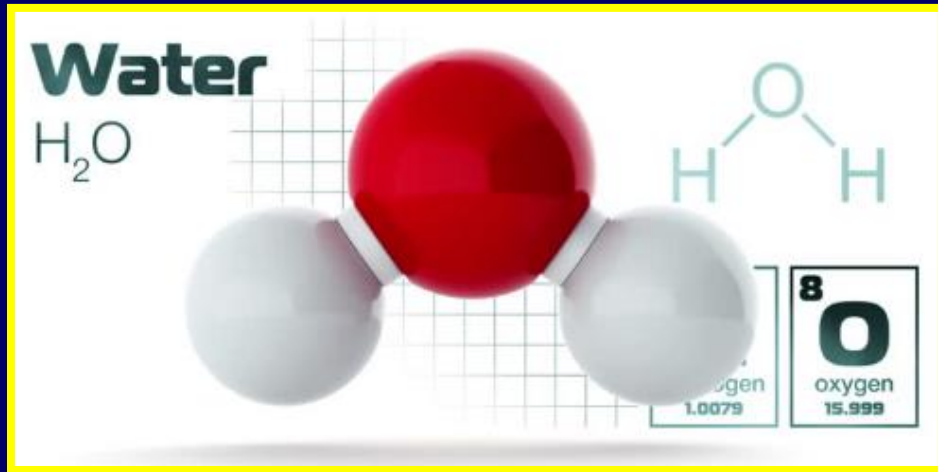
Chemical formulas are used to express the type of atoms and amount of individual atoms are present in a compound.



**1 Na atom**

**1 Cl atom**

# Subscripts



**2 Hydrogen atoms**

**1 Oxygen atom**

Subscripts, written after the element, identify the amount of atoms there are of each element.

The number 1 is not written in chemical formulas.

# Familiar Compounds

Sand



3 atoms



Cane Sugar



45 atoms



Limestone



4 atoms



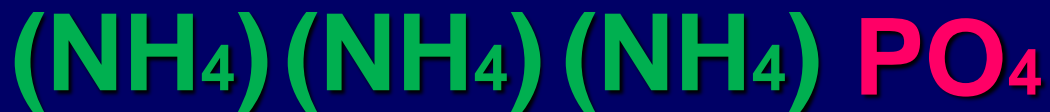


# Parentheses

Some compounds have groups of atoms that always stay together and are placed inside parentheses with a subscript outside the parentheses.



The subscript 3 tells us that there are three  $(\text{NH}_4)$  groups in this compound.



# Parentheses

Multiply each atom in parenthesis by the subscript outside of the parenthesis.



**3 Nitrogen atoms**

**12 Hydrogen atoms**

**1 Phosphorus atom**

**4 Oxygen atoms**



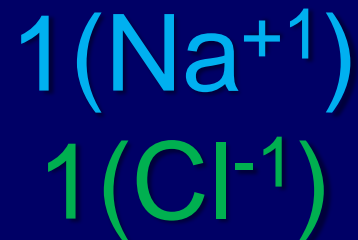
# Writing Formulas

Binary ionic compounds  
have only two types of ions.



Even though the ions  
carry a charge, the  
compounds themselves,  
are neutral.

Therefore, the number of  
negative ions must equal  
the number of positive ions.



# Formula Writing Rules

1. Write the symbol and positive oxidation numbered element first (metal)

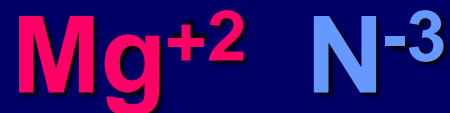
**Magnesium Nitride**



# Formula Writing Rules

2. Write the symbol of the element that has the negative oxidation number (non-metal)

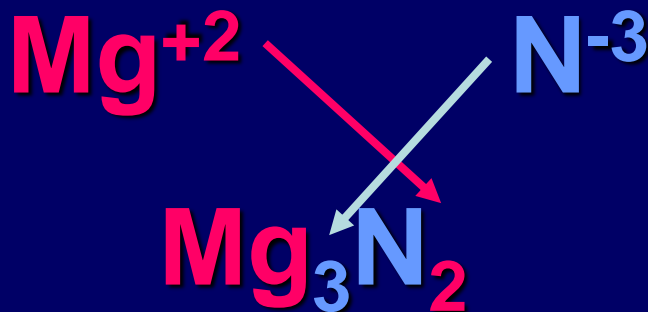
**Magnesium Nitride**



# Formula Writing Rules

3. Write oxidation numbers of each element, without the charge, as the subscript for the other element.  
(Criss Cross)

## Magnesium Nitride



# Formula Writing Rules

Once this is done, the compound will have the same amount of positive ions and negative ions.

## Magnesium Nitride



$$3(+2) = +6$$

$$2(-3) = -6$$

# Writing Names

1. Write the full name of the positive ion

**NaCl**

**Sodium**

2. Write the root name of the negative ion

**NaCl**

**Sodium Chlor**

# Writing Names

3. Add the ending ide to the root



**Sodium Chloride**

**Practice**



**Barium Fluoride**



**Aluminum Oxide**



# Endings for Non-Metals

15 VA	16 VIA	17 VIIA
7 <b>N</b> Nitrogen 14.01	8 <b>O</b> Oxygen 16.00	9 <b>F</b> Fluorine 19.00
15 <b>P</b> Phosphorus 30.97	16 <b>S</b> Sulfur 32.07	17 <b>Cl</b> Chlorine 35.45
		35 <b>Br</b> Bromine 79.90
		53 <b>I</b> Iodine 126.90

Nitride  
Phosphide  
Oxide  
Sulfide  
Fluoride  
Chloride  
Bromide  
Iodide

# The End

