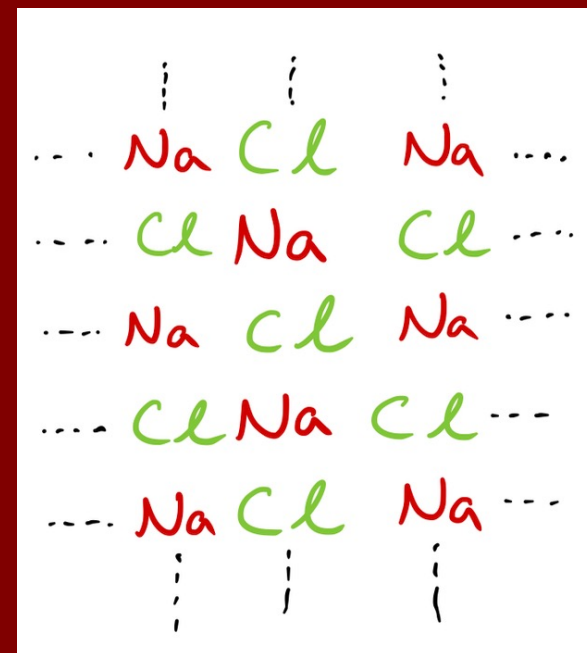


Ionic Compounds

- Ions
- Ionic Compounds
- Drawing Ionic Compounds
- Examples
- Naming Ionic Compounds
- Ionic Compound Formulas
- The Criss-Cross Rule
- Multivalent Compounds
- Properties of Ionic Compounds



Preview File

Please enjoy this preview of your Student Version of the presentation. Please note within this sample file:

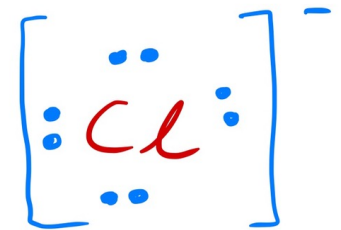
- Some slides appear blank because they have been removed
- Student versions have portions of the text removed which is given in the teacher version and appear as _____ which the students are to fill in
- Other slides may have on them, this represents writing that has been removed on this sample

The paid full version of your resource includes both Google Slides and PowerPoint and is Google Classroom Ready



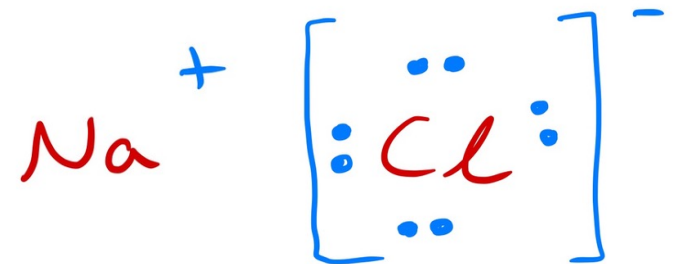
Ions

- Metals (typically on the left of the periodic table) lose their electrons and become “+”
 - Less negative
- Non-Metals (typically on the right of the periodic table) gain electrons and become “-”
 - Becomes more negative
- What is the total charge if you have X^{+1} and Y^{-1}



Ionic Compounds

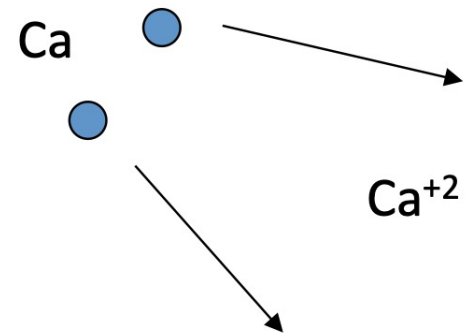
- Metal and a nonmetal combine to form "Ionic Compounds"
- The metal atoms loses electrons to form positive ions
- The nonmetal gains the electrons to form negative ions
- The two ions join together



Ionic Compound - NaCl

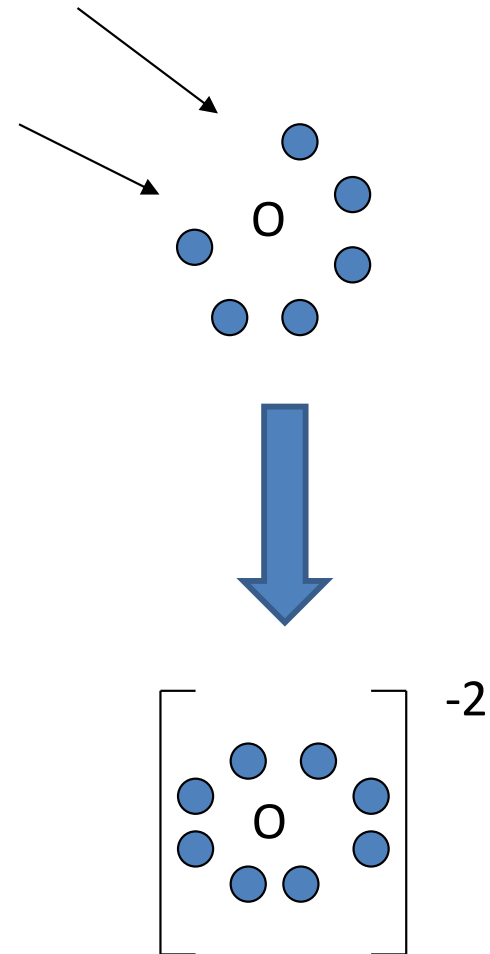
Ionic Compounds

- Ionic compounds are formed when a metal gives one or more of its electrons to a nonmetal
- When all of the electrons are gone, the metal's inner orbit of electrons is full
 - This makes the metal stable
- _____
- _____



Ionic Compounds

- The non-metal receives one or more electrons to fill its outer shell and become stable
- If we draw the Lewis Structure for a nonmetal we include the full valence orbit, brackets and the charge
- Having gained two electrons, the oxygen is now negative
- _____



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Lithium and Oxygen

1. First draw the lewis structures of the atoms on their own.
2. Now use an arrow to show the electron transferring from the Lithium atom to the oxygen atom
3. You can see that the oxygen atom still does not have a complete outer shell. Clearly another lithium atom is required to complete the compound.

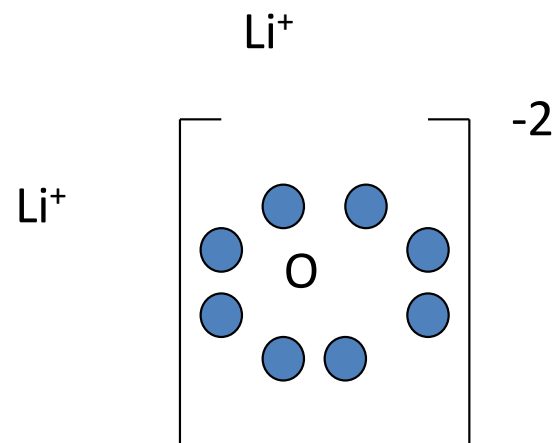
Lithium Oxide Continued

- _____

- _____

- The final Lewis structure is illustrated here.

- _____



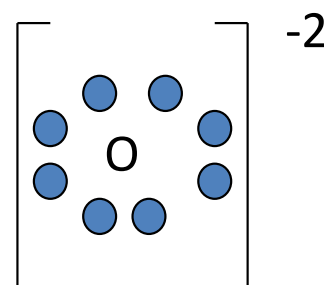
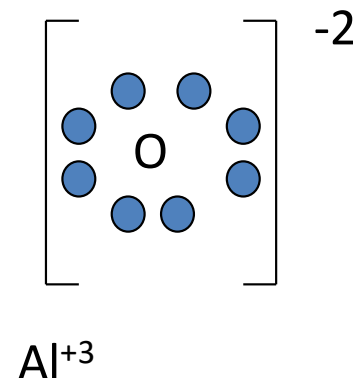
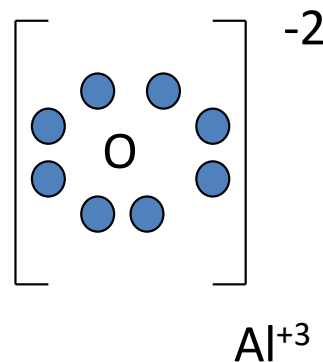
Aluminum and Oxygen

1. Draw the Lewis Structures of the individual atoms
2. Use arrows to show the transfer of electrons
3. Aluminum has one electron left, we need another oxygen atom
4. The oxygen atom now needs more electrons so we need another aluminum atom
5. The extra electrons on the aluminum mean we need another oxygen
6. Since, ...

Aluminum and Oxygen

•

- Having gained 2 electrons, the oxygen has a charge of -2
- Now draw the final Lewis structure
- This structure is designed to illustrate the transfer of electrons while bonding



Naming Ionic Compounds

1. _____

2. _____

Examples – Sodium chloride, Calcium oxide

Metal



Sodium



First element
in compound

Nonmetal



Chloride



Second element
in compound

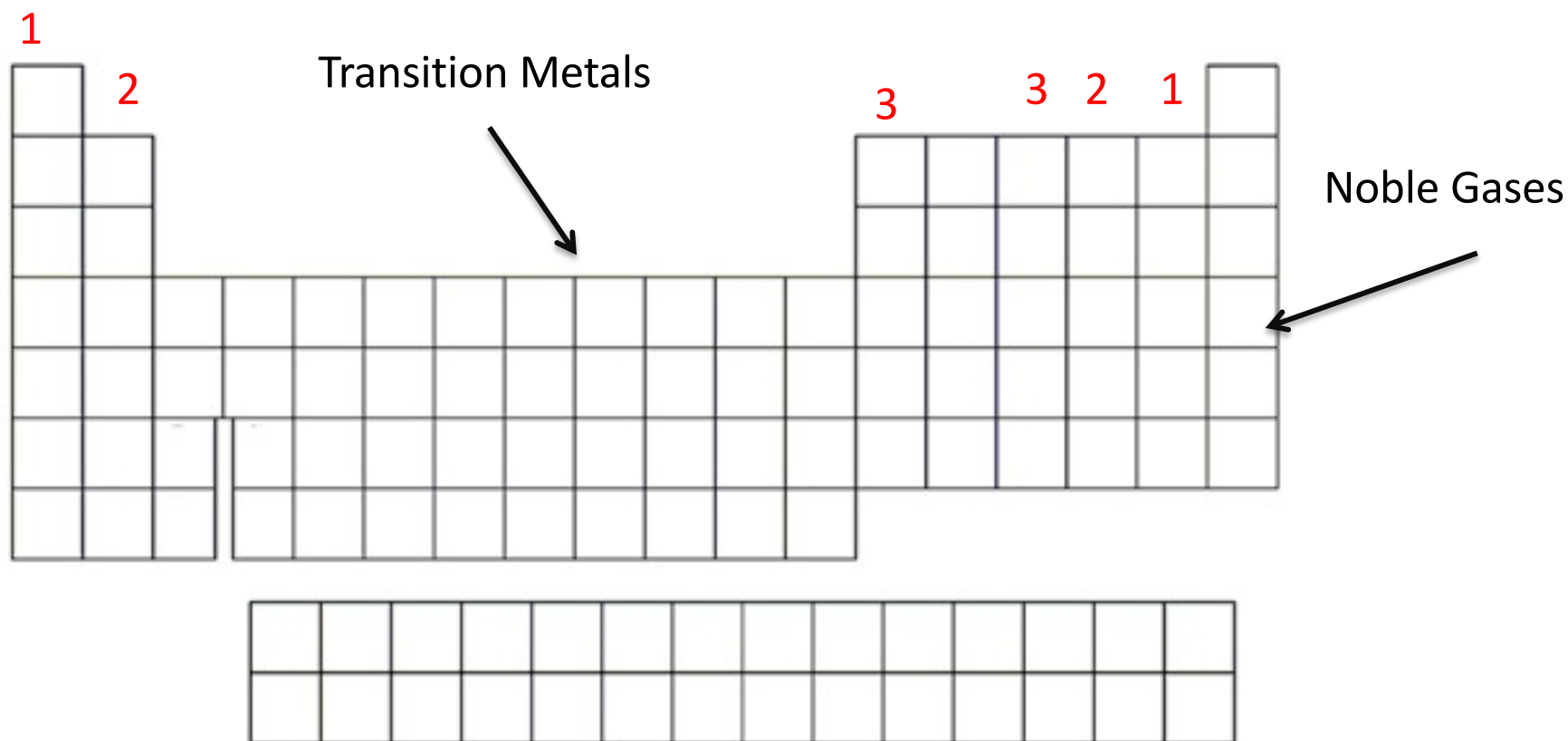
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Writing Ionic Compound Formulas

1. Number the groups 1-3 going from left to right (skip the transition metals)
2. Number the groups 1-3 going from right to left (skip the noble gases)



Writing Ionic Compound Formulas

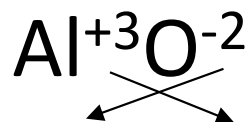
- _____
- _____

[illegible]

Then ...

Write out the atoms with their stable charge

Cross over the numbers to the opposite atom and remove the sign – This is the Criss-Cross Rule



• _____

The Criss-Cross Rule - Aluminum Chloride

Step 1:

Write out name with space

Aluminum

Chloride

Step 2:

Write symbols & valence number



Step 3:

Criss-cross valence number as subscripts



Step 4:

Combine as formula unit
("1" is never shown)
- Reduce if possible



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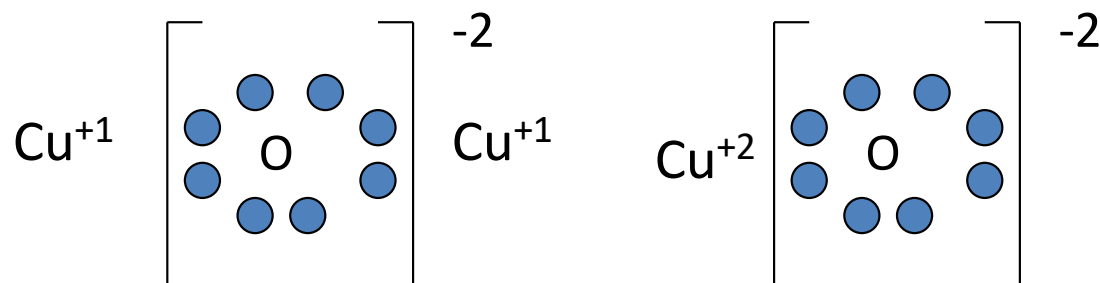
Multivalent Compounds

- _____
- When atoms get larger, their atomic structure can become more complex
- This means

For example if we look at the Lewis structure of Copper. It can have one valence electron or two valence electrons.

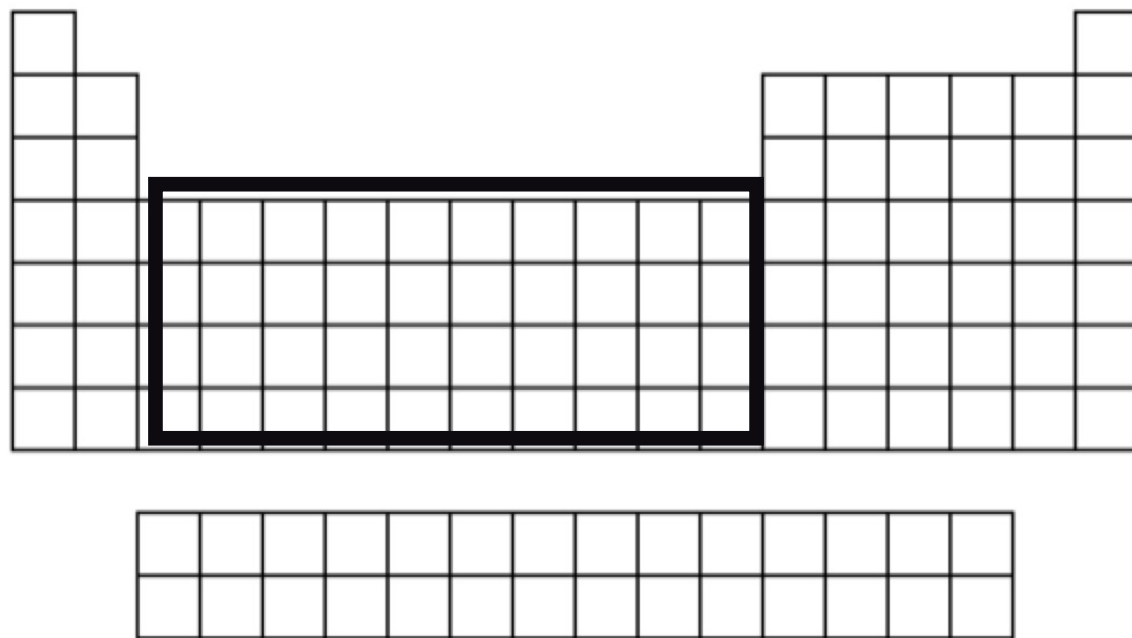
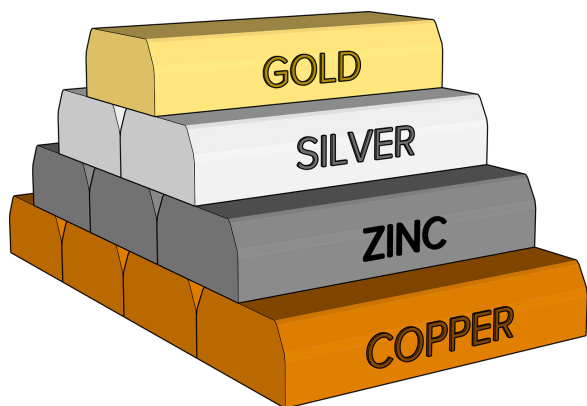


Clearly, this atom can form more than one type of molecule.



Recall: Transition Metals

These are the metals you are most familiar with: copper, tin, zinc, iron, nickel, gold, and silver



Multivalent Compounds

- We need to distinguish between the two or three different ion forms

- _____

Metal Ion charge	Roman Numeral
1+	I
2+	II
3+	III
4+	IV
5+	V
6+	VI
7+	VII

- For example:
 - Nickel can have two ion forms, Ni^{2+} and Ni^{3+}
 - These are named _____

Multivalent Compounds

- When naming these compounds, we need a method of distinguishing,
CuO and Cu₂O

e.g. Try to write the name for the following compounds without looking at the next slide

- _____

CuF

- _____

PbI₂

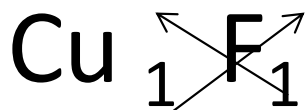
CaF₂

- The roman

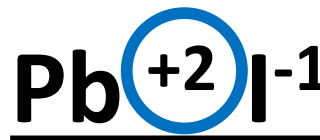
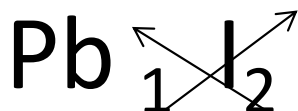
How do we know which roman numeral is being used?

1) CuF

- _____
- _____
- Put the charge for the metal in brackets



2) PbI₂



Exceptions and Things to Keep in Mind

- _____
- _____
- Be careful when you are asked to determine the roman numeral given the formula (e.g. CuS)
 - This would lead you to answer: Copper (I) Sulfide
 - However, we ALWAYS NEED TO CHECK THAT THE CHARGE ON THE ANION IS CORRECT
 - In this
 - Therefore, we need to multiply both charges by 2
 -

Check Your Understanding

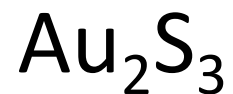
Write the formula:

Calcium nitride

Gold (III) oxide

Check Your Understanding

Write the name:



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Properties of Ionic Compounds

- _____
- Many are also electrolytes which means they conduct electricity when dissolved in water
- Pure water is a poor conductor of electricity, dissolved ions improve this property considerably

