



Ionic Puzzle Piece Activity

You have had some experience balancing ionic-compound formulas, and getting the cations and anions properly balanced. In order to make an ionic compound you need a cation and an anion. Well, how do I know exactly how many cations and anions I need for the compound? To get a visual feel for how to combine ions, let's use ion puzzle pieces to make ionic compounds.

Background Information

Cation ~~Anion~~ puzzle pieces are "acceptors". The piece will dent inward. 

Anion ~~Cation~~ puzzle pieces are "donators". The piece will stick outward. 

The number of bumps or grooves depends on the number of unshared pairs of electrons. For example, the anion piece above could represent a sulfur ion. Sulfur has 6 valence electrons and thus two unshared pairs. In other words, sulfur needs two electrons to complete the octet. When sulfur receives these two electrons it becomes a -2 ion.

Keep in mind these puzzle pieces represent more than one element. Think about it... is there more than one element that has a +2 charge... YES!!!

Part 1- The Task

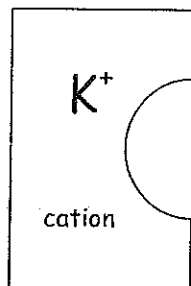
You will make compounds from the elements listed below. You will not use all of the puzzle pieces, so save yourself some time and cut out only the pieces you need for the compounds you are creating. You will need to use at least one anion and one cation piece to create the compound. Your job is to figure out what pieces to use. *Your hint is----- the finished compound should make a rectangular shape with no empty holes or piece sticking out. And you may have to trim the edges just a little bit so that the pieces fit better.*

Copper +1 and chlorine
Copper +2 and iodine
Magnesium and oxygen
Gold +3 and oxygen
Sodium and bromine

Lead +2 and sulfur
Aluminum and fluorine
Iron +3 and chlorine
Aluminum and nitrogen

Note: the charge of the transition element is given to you.

Use the coloring guide below to color in the puzzle pieces correctly. You will also need to label each piece with the element symbol, charge, and whether it is a cation or an anion. A finished puzzle piece would look like this:



Coloring Guide:

Copper - Blue	Gold - Yellow
Magnesium - Red	Oxygen - Orange
Iodine - Purple	Chlorine - Green Stripes
Sodium - Blue Stripes	Bromine - White
Lead - Green	Fluorine - Pink
Aluminum - Gray	Sulfur - Yellow Dots
Iron - Red Stripes	Nitrogen - Orange Dots

Part 2- The formulas

Now that you have created your compounds and glued them down, it is time to write the formulas for the compounds. You will need to use the criss-cross method that you learned in class. Simply drop the signs (+ or -) and criss cross the numbers you have remaining. Be sure to write the numbers as subscripts not superscripts aka exponents!!! Write the formulas for your compounds underneath the picture of the compound.

Part 3- Naming

Using your flowchart, correctly name each compound. The names need to be written under the formulas for each compound.

What did you learn???

1. What was the overall charge on all of the molecules (formula units) that you constructed? _____

2. Compare your pieces with the Periodic Table and answer these questions.

Do nonmetals form anions or cations? _____

Do metals form anions or cations? _____

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

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

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

Do cation pieces fit with other cation pieces? _____ Do anion pieces fit with other anion pieces? _____ Why? _____

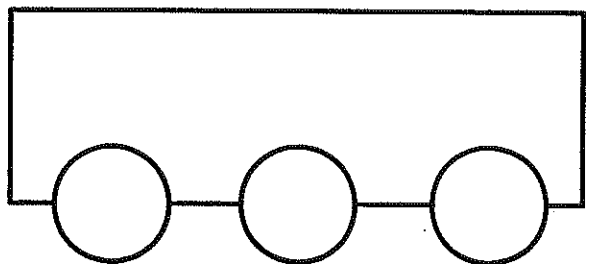
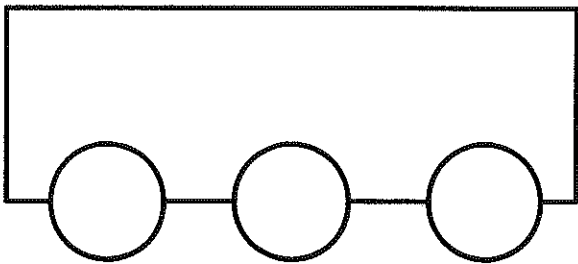
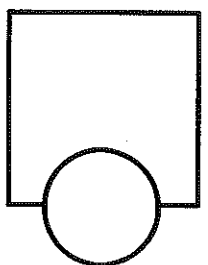
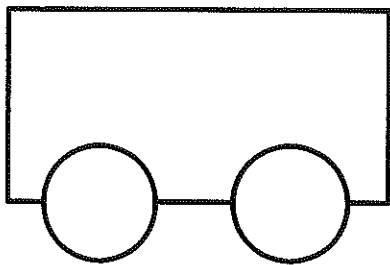
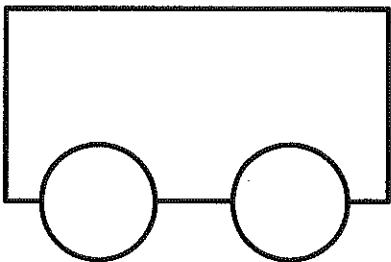
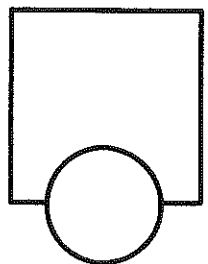
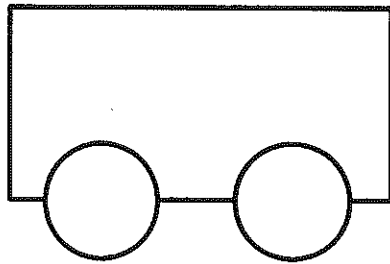
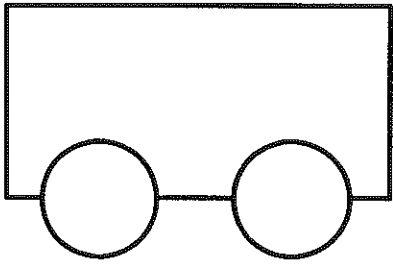
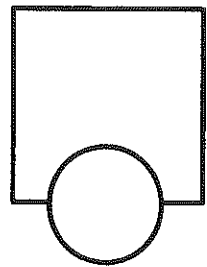
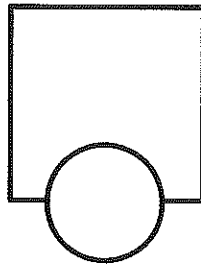
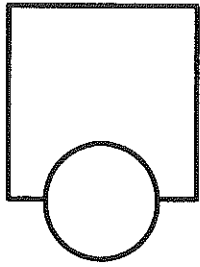
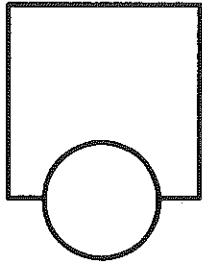
3. What type of elements (metals, metalloids, or nonmetals) form ionic bonds with metals?

4. What type of elements (metals, metalloids, or nonmetals) form ionic bonds with nonmetals?

5. What is the name of the method we use to create a formula form any ions that have bonded together? _____

6. When naming a compound, what ending do you use for the anion if it is a monatomic ion? _____

Anions



Cations

