Activity: Ionic Bonding Puzzle

FOR THE TEACHER

Summary
In this activity, students match puzzle pieces to create neutral ionic compounds. Once they have made a neutral ionic compound they can use electron dot diagrams to show the formation of the compounds. Finally they will name the ionic compounds.

Grade Level
High and Middle School

Objectives
By the end of this activity, students should be able to
- Understand that ionic compounds must be neutral
- Use electron dot diagrams to show how ionic compounds form
- Name ionic compounds

Chemistry Topics
This activity supports students’ understanding of
- Ionic Bonding
- Polyatomic ions
- Naming ionic compounds
- Electron dot structures

Time
Teacher Preparation: 1 hour (the first time)
Lesson: 50 minutes

Materials
- Puzzle pieces (cut out in advance)
- Student worksheets for each student or group
- Periodic table

Teacher Notes
- Before this activity can be done the first time, the teacher will need to cut out and bag up all the pieces (they can be laminated, if you want). The puzzle pieces can be copied for as many pairs/groups as there will be. I have found that it is helpful to number the pieces and put them in numbered bags so that you can easily put a dropped piece where it goes (or make the pieces on different colors of paper).
- Teachers should be familiar with the rules for naming and formula writing for ionic compounds.
- I have found it helpful to introduce the activity, have students work in pairs and then debrief as a class and/or have students complete an exit slip at the end of the class time.
- Walking around to monitor student progress and check for understanding is helpful in guiding students through the questions.
- For higher levels you could include more names and formulas. For lower levels you could reduce the size of the so students can focus on the inquiry.
FOR THE STUDENT

Lesson

Activity: Ionic Bonding Puzzle

Background
Ionic compounds are made up of a metal and a non-metal, when the atoms react they form ions (charged atoms). Metals tend to form cations (positive ions) by donating electrons. Non-metals form anions (negative ions) by accepting the electrons that were donated by the metal.

Problem/Objective
In this activity you will create models of ionic compounds. These ionic compounds will then be named and the electron dot diagrams drawn to show the electron formation.

Procedure
1. Place an anion and cation card together until the puzzle pieces form a rectangle (balance the negative and positive charges).
2. Count the number of each ion needed for the charges to balance.
3. Record the name of each cation and anion combined.
4. Record all information in the table below.
5. Write the formula and the name for each ionic compound.
6. Draw the electron dot structure showing the electron formation of each compound.
7. Make as many compounds as possible. You can even make compounds with more than one cation or anion.

Analysis
1. What is required for an ionic compound to form? (Hint: charge)

2. Can an ionic compound ever consist of a cation-cation or anion-anion bond? Why or why not?

3. Research and show the formation of 3 ionic compounds that you use in your everyday life.
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<tr>
<th>Cation Name</th>
<th># of cations</th>
<th>Anion Name</th>
<th># of Anions</th>
<th>Chemical Formula</th>
<th>Chemical Name</th>
<th>Electron Dot Diagram</th>
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