

Hands-on!

Naming Compounds Puzzle

Teacher Guide:

Use this puzzle to help students review how to name and write the formula for binary ionic compounds, ionic compounds that have a metal with multiple ionic charges, compounds with polyatomic ions and molecular compounds. Choose the size of puzzle that you want to use, and whether or not you want the common misconceptions along the edges of the puzzle, print, laminate (if you like) and cut.

There are two main versions of this puzzle: one has edges and one does not. The names and formulas on the edges do not have matches and have been specially chosen to address common misconceptions about naming and formula writing. For example, nitrogen gas is listed and so is "N" and "N₂". Students will need to remember that nitrogen is diatomic or the puzzle will not come together correctly.

Other misconceptions that are addressed have to do with subscripts, prefixes for molecular compounds, names of polyatomic ions, Roman Numerals, and element symbols.

I prefer to use the puzzle with the edges for both my general and advanced students because we can then discuss and address those common misconceptions that they are having.

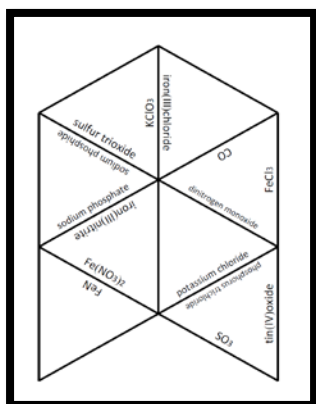
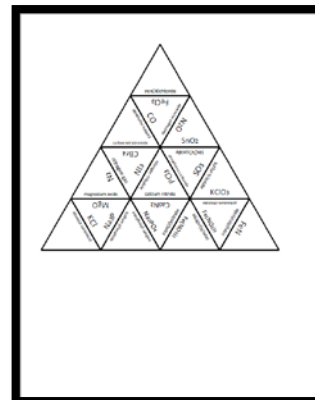
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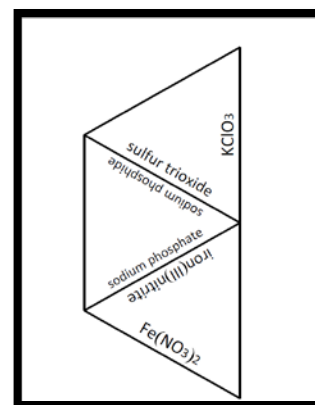
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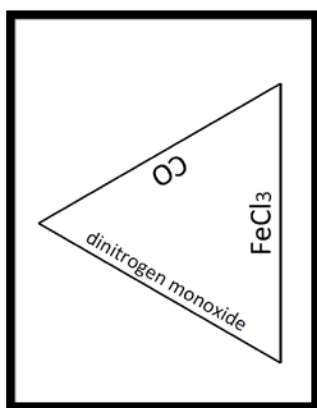
Small (S) size fits on one page and is good for showing the solutions and for individual practice. The finished puzzle's edge is about 17 cm or 7" long.



Medium (M) size prints over 2 pages and is great for individuals or partners to practice. The finished puzzle's edge is about 40 cm or 16" long.



Large (L) size prints over 6 pages and is perfect for small group review. The finished puzzle's edge is about 52 cm or 20" long.



Extra Large (XL) prints over 16 pages! This is great to do as a big group or as a big review race for smaller groups. The finished puzzle's edge is about 80 cm or 32" long.

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Common misconceptions found along the edges

The diagram is a large triangle composed of smaller triangles, each containing a chemical formula. Blue arrows point from text boxes to specific formulas, highlighting common student errors. The formulas and their correct names are as follows:

- Top vertex: Na_3P (sodium phosphate)
- Second row from top:
 - Left: MgO_2 (magnesium oxide)
 - Middle: CO (carbon monoxide)
 - Right: Ni_3 (nickel)
- Third row from top:
 - Left: N_2 (nitrogen gas)
 - Middle: PBr_3 (phosphorus tribromide)
 - Right: SnO_2 (tin(IV) oxide)
- Fourth row from top:
 - Left: MgO (magnesium oxide)
 - Middle: Ca_3N_2 (calcium nitride)
 - Right: KClO_3 (potassium chlorate)
- Fifth row from top:
 - Left: KCl (potassium chloride)
 - Middle: Na_3PO_4 (sodium phosphate)
 - Right: $\text{Fe}(\text{NO}_3)_2$ (iron(II) nitrate)
- Bottom row:
 - Left: MgO (magnesium oxide)
 - Middle: CO (carbon monoxide)
 - Right: $\text{Fe}_3(\text{NO}_3)_2$ (iron(III) nitrate)

Common misconceptions highlighted by arrows:

- The subscripts are incorrect for sodium phosphate because sodium has a +1 charge and phosphorus has a -3 charge (points to Na_3P)
- This doesn't match SnO_2 because oxygen has a -2 ionic charge. This is SnO . (points to Ni_3)
- This incorrectly indicates three nickel atoms because the second letter is lowercase (points to Ni_3)
- The subscripts are incorrect for calcium nitride because Ca has a +2 charge and nitrogen has a -3 charge (points to Ca_3N_2)
- The subscript 3 should be right after the oxygen in order for the polyatomic ion to be "nitrate" (points to $\text{Fe}_3(\text{NO}_3)_2$)
- The "mono" prefix is never used on the first element (points to CO)
- There should be 3 nitrate ions, not 3 iron atoms in iron (III) nitrate (points to $\text{Fe}_3(\text{NO}_3)_2$)
- Ionic compounds do not use prefixes (points to MgO)
- The second element in a molecular compound always has a prefix (points to CO)
- Nitrogen is diatomic (points to N)
- Iron has multiple ionic charges, one of which needs to be listed in Roman Numerals (points to Fe)

Thank you!


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