

Periodic Nomenclature

NSTA National Meeting - Philadelphia, PA 3/2010

Edmund J. Escudero
Summit Country Day School
Cincinnati, OH 45208
escudero_e@summitcds.org

The acquired skill of correctly writing chemical formulas given the name of a compound and vice versa is absolutely necessary for continued success in the typical introductory chemistry course. Some options for acquiring this skill include: memorizing a few common ions at the beginning of the course and adding to the list as one proceeds through the course. The ACS ChemCom course follows this approach. The other option includes being given a long, exhaustive list of ions that will be encountered and simply memorizing them. I had to deal with the latter option my freshman year. I hated memorizing, unless the memorization entailed dialog from a play. Confronted with this long list of positive and negative ions and only two days to commit them to memory prior to the nomenclature test and realizing that the large periodic table in the lecture room could not be covered up for the test, I decided to try and use the periodic table to help me in memorizing the list. To my surprise, I was able to figure out a way to use the table to derive all but thirteen ions. Now that I am older and wiser, I could pare the list down to 11. I ended up memorizing the thirteen and then used the periodic table to come up with the rest. I aced the test.

Today I give my students the option of memorizing the very long list or memorizing only thirteen and learning and applying some simple rules to determine the rest. My sales job is so good, that they always choose the latter.

Before they are allowed to use my table on future quizzes and tests, each student must earn a perfect score on a quiz that includes only the exceptions. They may take the quiz as many times as needed, but the final score must be perfect. All subscripts, charges, spelling of names of elements, etc must be correct.

The pages that follow are some of the handouts that I give to my students.

The terminology we use in classifying compounds are:

An exception – all taken from the memorized list

Binary ionic – a metal combined with a non-metal, two kinds of elements, name ends in –ide. Left side of table combined with right side of table

Binary covalent – a non-metal combined with a second non-metal, name ends in –ide, Greek numerical prefixes also used in the name. Right side of table with right side of table.

Ternary ionic - a metal combined with an oxyanion (an ion that contains oxygen combined with a non-metal) Names end in –ate or –ite. Use the special chart to derive formulas for each.

Binary acid – two elements in the formula, the first must be a hydrogen, the other a non-metal. The name takes the pattern hydro –non-metal stem – ic acid. There are only six common binary acids (HF, HCl, HBr, HI, H₂S, and HCN).

Ternary acid – a compound that begins with an H, includes a non-metal and varying numbers of oxygen. The name ends in –ic acid or –ous acid. No special prefix. Again, as with the ternary ionics, use the special chart to determine the name and formula of each.

Mixed compound – these usually contain two metal cations and a single anion. The bicarbonates or hydrogen carbonates and the alums fit in this classification. Name usually ends in –ate, -ite, and sometimes –ide. Use the chart to determine the formula of the anion and make sure the positive charges and the negative charges balance each other.

Hydrates – a special class of compound whose formula ends with a raised dot (.) and a number of water molecules attached to a binary ionic, ternary ionic, or a mixed compound. Name ends in Greek numerical prefix and the word hydrate.

During this brief presentation we will go over the procedures that I use. You will have access to all of the handouts. If you find the approach worthwhile, you are encouraged to use it, as is, or adapt it to your needs.