

USING OXIDATION NUMBERS TO FIND FORMULAS

You can use oxidation numbers to figure out the formula for any simple compound. All you need to know are the symbols and the oxidation numbers of the elements that make up the compound. **JUST CRISS-CROSS THE OXIDATION NUMBERS.**

Water is made up of hydrogen (H) and oxygen (O). The oxidation number of hydrogen is +1 (H^{+1}). The oxidation number of oxygen is -2 (O^{-2}).

For example, this is how to write the formula for water:

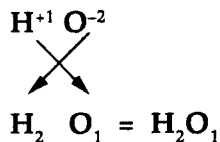
Step 1 Write down the symbol of each element.
List the element with the plus (+) oxidation number first.



Step 2 Write down the oxidation number of each element next to the element like this:



Step 3 Criss-cross the numbers in the oxidation number only. Leave out the signs.



One molecule of water, then, contains 2 atoms of hydrogen and 1 atom of oxygen.

In a final formula, we do not write any 1's. So the formula for water is H_2O .

Table salt is made up of atoms of sodium (Na) and chlorine (Cl). The oxidation number of sodium is +1 (Na^{+1}). The oxidation number of chlorine is -1 (Cl^{-1}).

Write it down. $Na^{+1}Cl^{-1}$

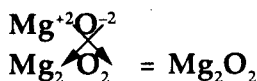
Cross over the numbers. $Na^{+1}Cl^{-1}$
 Na_1Cl_1

Cancel out the ones. Na_1Cl_1

The formula for table salt is $NaCl$.

Table salt is sodium chloride. One molecule of sodium chloride has 1 atom of sodium and 1 atom of chlorine. Altogether one molecule of salt contains 2 atoms.

What do you do if both oxidation numbers (not the signs) are the same? This is the case when magnesium and oxygen combine.



Cancel out both numbers like this: Mg_2O_2 .

The formula, then is MgO .

There are some compounds where the numbers are not canceled out, but these compounds will not be covered in this book.