**Rules for assigning oxidation numbers to atoms:**

<table>
<thead>
<tr>
<th>Rule</th>
<th>Examples</th>
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<tbody>
<tr>
<td><strong>Neutral substances</strong> that contain atoms of only one element have an oxidation number of zero.</td>
<td>Na, He, Cu, Au, H₂, Cl₂</td>
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<td><strong>Monatomic ions</strong> have oxidation states equal to the charge on the ion.</td>
<td>Ca²⁺, S²⁻</td>
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| **Oxygen** may be 0, -1, -2, or -½ | O₂ - oxidation is zero  
  H₂O, SO₂, CaO - oxidation is -2 (common)  
  H₂O₂ - oxidation is -1 in peroxide  
  KO₂ - oxidation is -½ in this superoxide |
| **Group IA** - alkali metals have oxidation states of either zero or +1 | Li metal - oxidation of Li = 0  
  NaCl - oxidation of Na is +1 |
| **Group IIA** - alkaline earth metals have oxidation states of either zero or +2 | Ca metal - oxidation of Ca = 0  
  CaCl₂ - oxidation of Ca is +2 |
| **Group VIIA - halogens**  
  a. zero when diatomic  
  b. -1 when in ionic compounds  
  c. Cl, Br, and I may be positive | Cl₂, Br₂ have oxidation states of zero.  
  NaCl, CuBr₂, NF₃ - halogens have oxidation states of -1  
  NaClO₃ - chlorine has an oxidation state of +5 |
| **Hydrogen** can be +1, 0, -1 | Hydrogen is zero in the diatomic molecule, +1 in most compounds, but it is -1 in hydrides such as NaH - sodium hydride. |

The sum of all the oxidation numbers in a compound must equal the charge on the compound.

**Charges are written with the number first and then the sign of the charge:** 2⁺, 3⁻, etc.  
**Oxidation states are written with the sign first and then the number:** +2, +5, -1, etc.