

Aim: How do we determine the oxidation state (number) of an element?

Chemists use oxidation numbers to keep track of the electrons involved in a redox reaction. The oxidation number is the charge which an atom has or appears to have in a compound.

Rules for assigning oxidation (states) numbers:

#1) The oxidation number of any **uncombined (free) element = 0.**



#2) The **sum** of the oxidation numbers in a **compound = 0.**



Oxidation numbers to be assigned **in order of importance:**

1st) **Group 1** metals are always **+1** in compounds. $\text{Li}^+, \text{Na}^+, \text{K}^+ \dots$
Group 2 metals are always **+2** in compounds. $\text{Be}^{+2}, \text{Mg}^{+2}, \text{Ca}^{+2} \dots$

2nd) **Group 17** nonmetals (F, Cl, Br & I) are **-1** when written **last** in the formula.
 (Except when Cl, Br & I are bonded to O, then they have + oxidation states.)

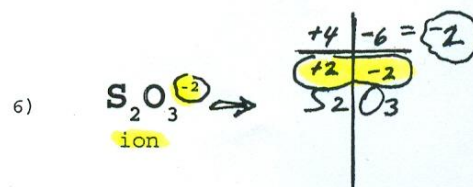
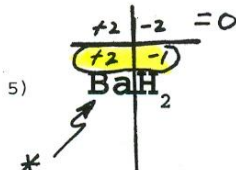
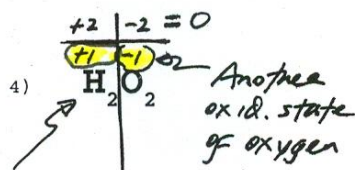
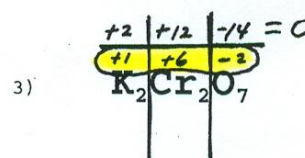
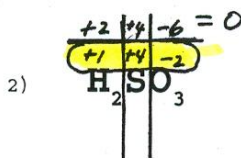
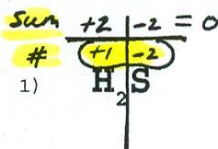
3rd) **H** is always **+1** unless this violates the above rules.

4th) **O** is always **-2** unless this violates the above rules.

REM: "1 & 2, 17 when last then H, O"

#3) The **sum** of the oxidation numbers in **a ion = its charge.** SEE 6) & 7) Below

Assign oxidation numbers to **all** of the elements in each of the compounds and ions.



* More important, label 1st

