

OXIDATION-REDUCTION REACTIONS



Oxidation and Reduction reactions happen all around you!

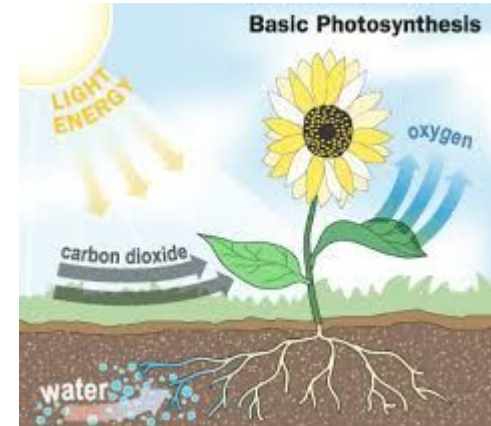
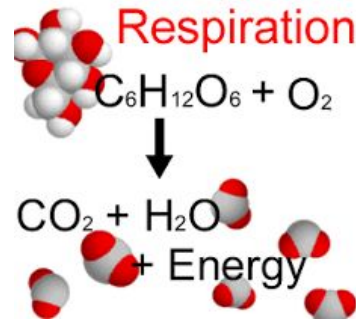
Examples:

Respiration

Photosynthesis

Rust

Combustion



Redox : A chemical reaction that is ALL ABOUT ELECTRONS
Atoms or compounds - Gaining or Losing electrons

Redox reactions deal with Atoms & Compounds

Atom: Ag (silver)

Compound: AgNO₃ (silver nitrate)

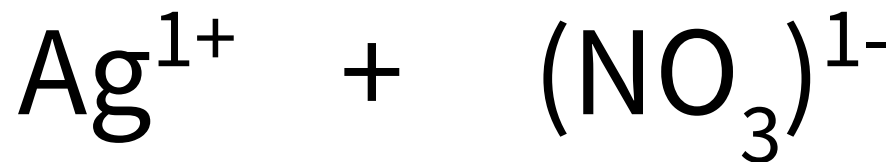
Both have a net *charge* of 0!



Redox reactions deal with Atoms & Compounds

Ionic Compound: Each have a charge they bring to the table

AgNO_3 (silver nitrate)



Atoms in compounds have charges

An atom's charge in an ionic compound is based around its valence electrons

Will it **lose them** or **gain** electrons to form a complete octet?



Metals tend to lose electrons, Non-metals tend to gain electrons

Alkaline Metals: 1+

Alkaline Earth Metals: 2+

Transition Metals: Varies

Group 13: Varies

Group 14: Varies

Group 15: Varies

Group 16: 2-

Halogens: 1-

Fill in periodic table

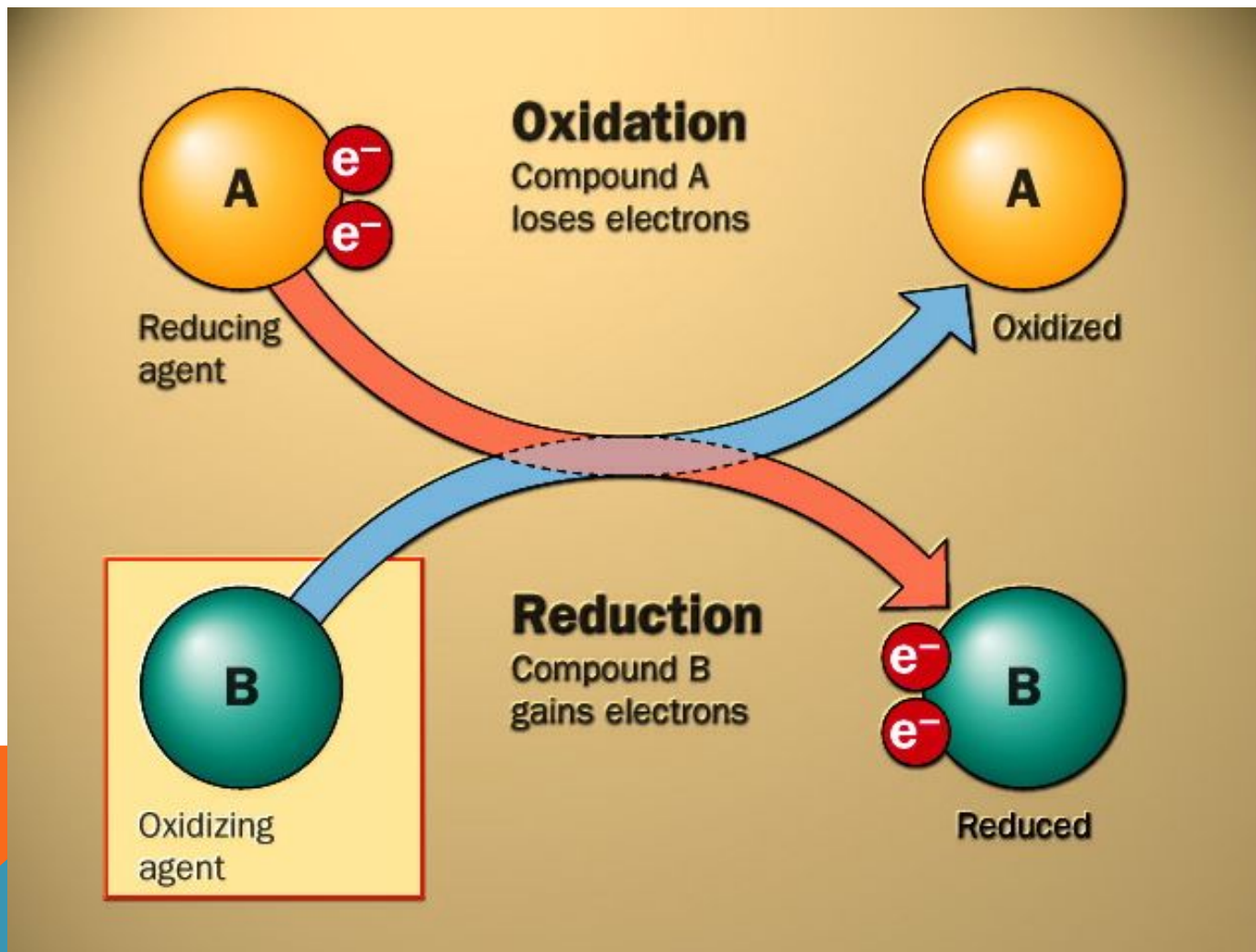
Redox reactions are a **transfer of electrons** between two elements



Atom or compound that donates (loses) an electron is *oxidized*

Atom or compound that accepts (gains) an electron is *reduced*

Oxidation is loss - Reduction is gain



IMPORTANT FACTS CONCERNING REDOX

Oxidation and reduction occur together, you can't have one without the other

No net change in the number of e⁻ in a redox reaction (rxn)

The atom or molecule that is reduced is the *oxidizing agent*

The atom or molecule that is oxidized is *reducing agent*



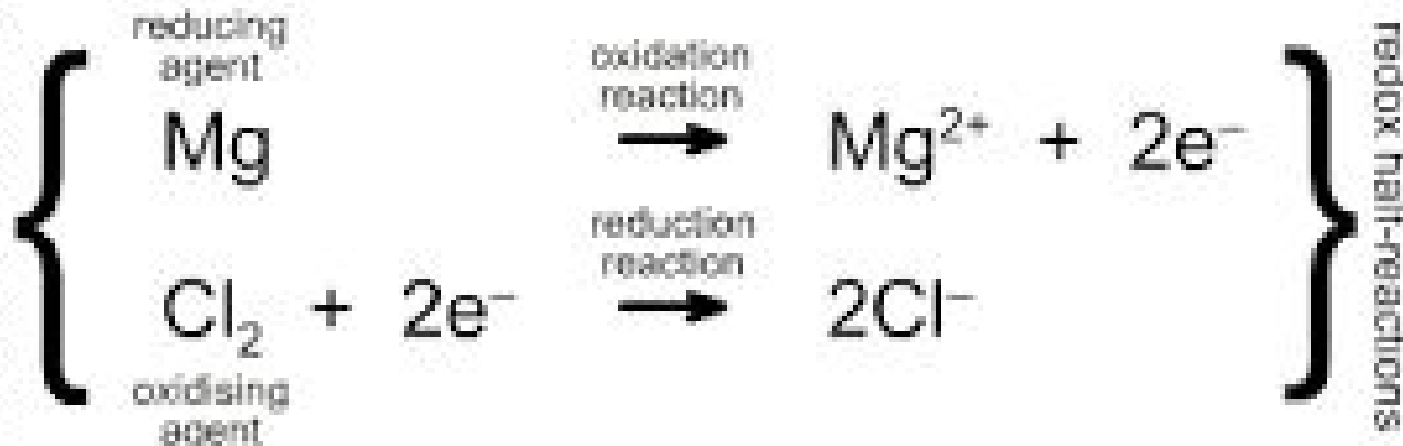
Full Reaction Equation



Ionic Reaction




redox half-reactions



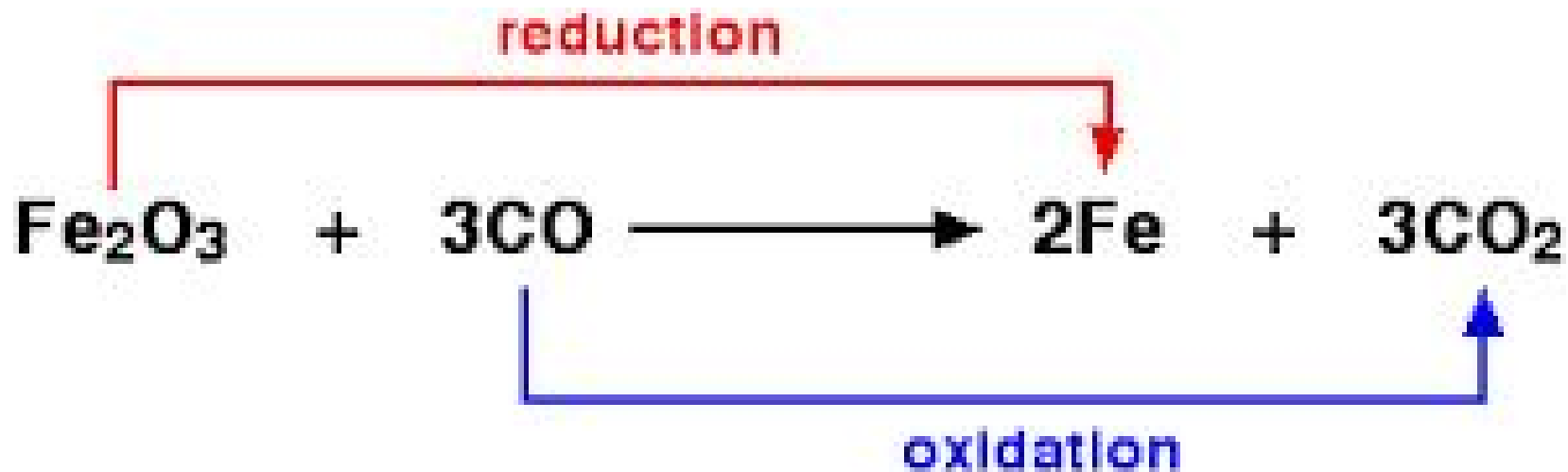
redox half-reactions

Oxidation numbers have rules

Oxidation numbers help chemists decide if electron transfers are occurring, and to determine if a reaction is a REDOX reaction

1. Neutral atoms o.n. = 0 (N, N₂, S₈)
 2. Ions o.n.'s are equal to their charge (Li¹⁺ = +1 Cl¹⁻ = -1)
 3. Fluorine's o.n. = -1
 4. Oxygen's o.n. = -2 (except in peroxides)
 5. Hydrogen o.n. w/ non-metals = +1
 6. Hydrogen o.n. w/ metals = -1
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IDENTIFY WHAT IS GOING ON IN A REDOX REACTION



OIL RIG

Oxidation Is Loss, Reduction Is Gain

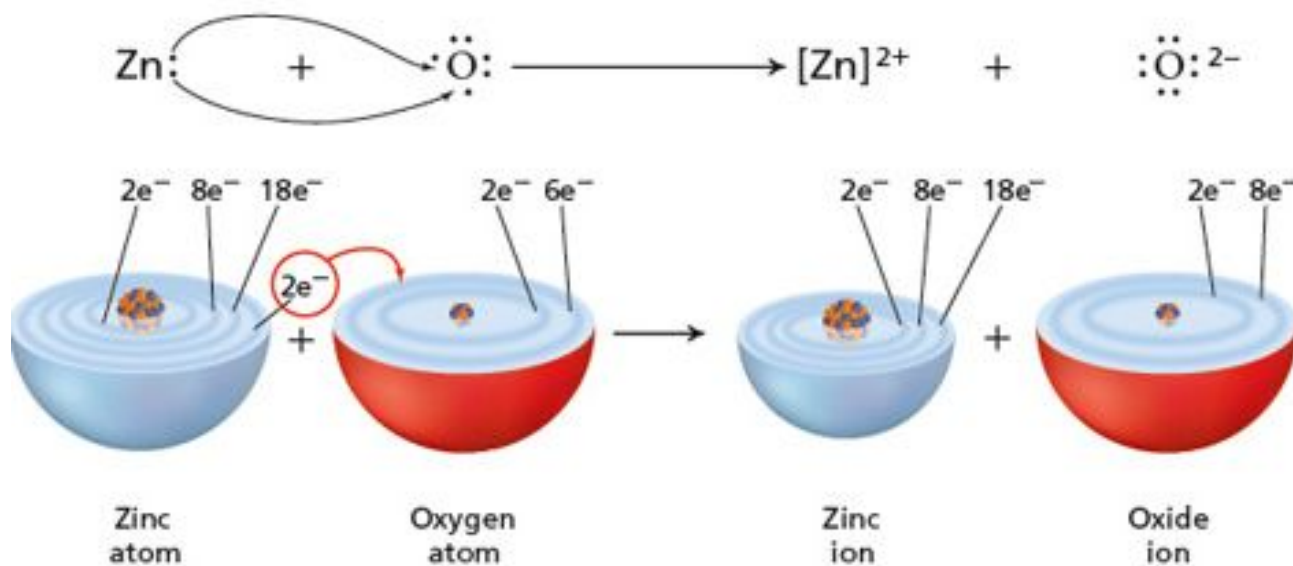


A TABLE THAT MIGHT HELP

Oxidation	Reduction
Loses electrons	Gains electrons
Ends up with net positive charge/ oxidation number	Ends up with net negative charge/ oxidation number
Oxidation number increases	Oxidation number decreases ("reduces")
OIL Oxidation is loss	RIG Reduction is gain
Reducing Agent	Oxidizing Agent

BALANCING REDOX REACTIONS

- The key - keep track of the e- electrons!!
- Zn loses 2 and O gains 2 – they should be equal and balance out



RESOURCES

<http://www.shodor.org/unchem/advanced/redox/>

<http://en.wikipedia.org/wiki/Oxidant>

<http://www.wisegeek.com/what-is-a-combustion-reaction.htm>

<http://www.iun.edu/~cpanhd/C101webnotes/chemical%20reactions/combinations.html>

[**http://artsedge.kennedy-center.org/content/3907/**](http://artsedge.kennedy-center.org/content/3907/)

