

E3 Redox: Transferring electrons

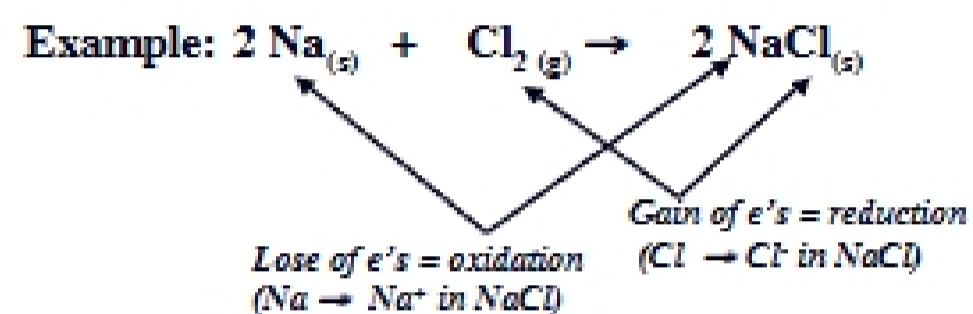
Session one of two

- **First hour: Discussion**
(E1)
- **2nd and 3rd hour: Lab**
(E3, Parts 1 and 2A)



Oxidation-Reduction (Redox)

- Reactions involve electron transfer.
- Change in charge (oxidation state) of reactants.



LEO the lion says "GER"

- Loss of electrons (**LEO**) = oxidation
- Gain of electrons (**GER**) = reduction

Redox reaction



DEMO



REDOX Half Reactions

Oxidation (> in oxidation state)	Reduction (< in oxidation state)
$2 (\text{Na} \rightarrow \text{Na}^+ + e^-)$	$(\text{Cl}_2 + 2e^- \rightarrow 2\text{Cl}^-)$

- Half reactions always written to show electron GAIN.
- The final equation reflects the sum of the balanced half reactions so that electrons lost = electrons gained:



OXIDIZING AGENT

Gains electrons
and **is reduced** (GER)



REDUCING AGENT

Loses electrons
and **is oxidized** (LEO)

- An oxidizing agent brings about the oxidation of another substance.
- A reducing agent bring about the reduction of another substance.

Redox Agents

Q. Identify the reducing agents (RA) and oxidizing agents (OA) in the reaction:



RA OA OA RA



Oxidation State versus Family Number

Metals lose electrons Non-metals gain electrons

1A											IIIA	IVA	VA	VIA	VIIA	VIIIA																								
1 H											3 B	4 C	5 N	6 O	7 F	8 Ne																								
2 Li	IIA										13 Al	14 Si	15 P	16 S	17 Cl	18 Ar																								
3 Na	Mg										19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr												
4 Rb	Sr										37 Y	38 Zr	39 Nb	40 Mo	41 Tc	42 Ru	43 Rh	44 Pd	45 Ag	46 Cd	47 In	48 Sn	49 Sb	50 Te	51 I	52 Xe														
5 Cs	Ba										53 La	54 Ce	55 Pr	56 Nd	57 Pm	58 Sm	59 Eu	60 Gd	61 Tb	62 Dy	63 Ho	64 Er	65 Tm	66 Yb	67 Lu	68 Hf	69 Ta	70 W	71 Re	72 Os	73 Ir	74 Pt	75 Au	76 Hg	77 Tl	78 Pb	79 Bi	80 Po	81 At	82 Rn
6 Fr	Ra										83 Ac											84 Po	85 At	86 Rn																

→ Element symbolized, but no official name assigned

