Lewis Structures

CH_2O

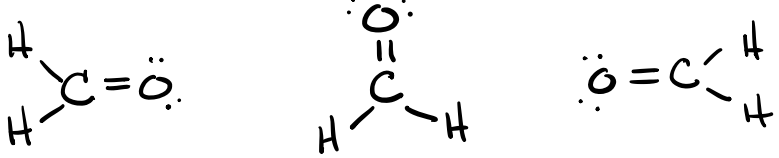
3 atoms

	e^-
C	$1 \times 4 = 4$
H	$2 \times 1 = 2$
O	$1 \times 6 = 6$
	$12e^-$ ✓

1. Count valence e^-
2. Apply common bonding patterns
3. Verify octets ✓
4. Verify e^- used ✓
5. *Check formal charge

Carbon bound to 3 oxygen bound to 1

$\dot{C}=$ $H-$ $\ddot{O}=$



CH_3CO_2H (C-C)

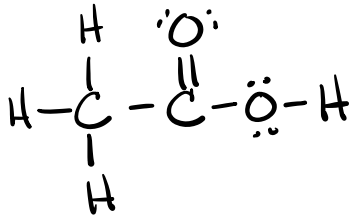
$C_2H_4O_2$ molecular Formula

C	$2 \times 4 = 8$
H	$4 \times 1 = 4$
O	$2 \times 6 = 12$
	24 valence e^-

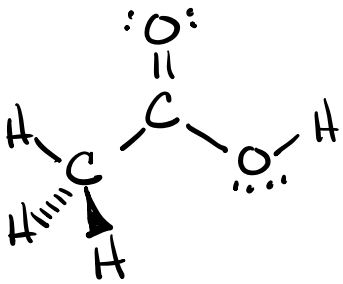
CH_3CO_2H molecular Formula w/ Structural Info

$CH_3 - CO_2H$

CH_3- $-CO_2H$



octets ✓
Valence e⁻ 24 ✓



▬ wedge bond forward

||||| Hash bond Back in Space

— Straight In plane of board

~~~ Wiggly bond Both forwards & backwards used to represent two possibilities
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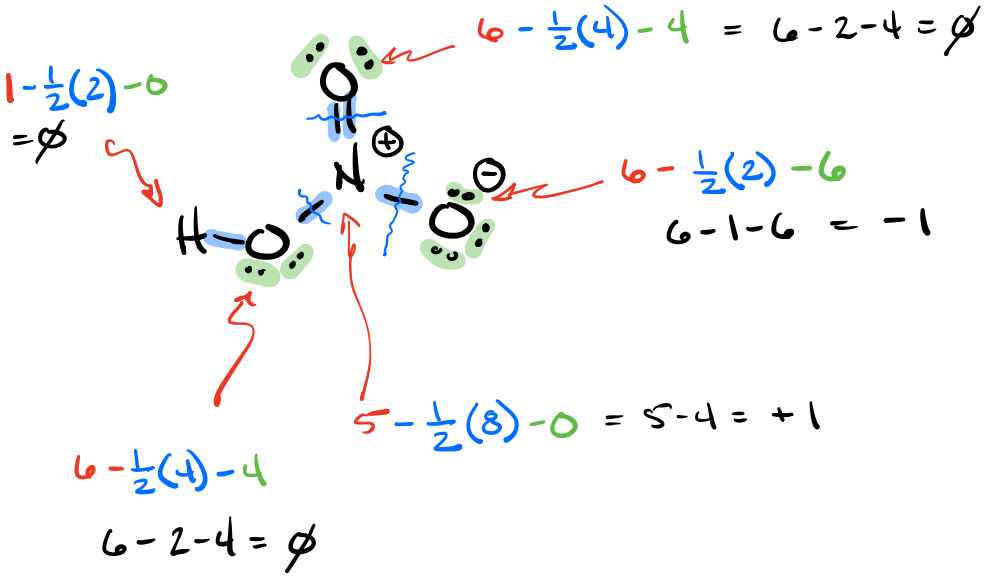
Formal Charge

Formal Charge = Valence e^- + $\frac{1}{2}$ bonding e^- − non-bonding e^-

Valence e^-: # e^- the atom came with

$\frac{1}{2}$ bonding e^- − non-bonding e^-: # e^- being displayed in structure that belong to that atom



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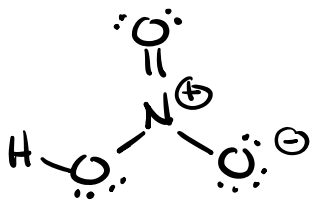
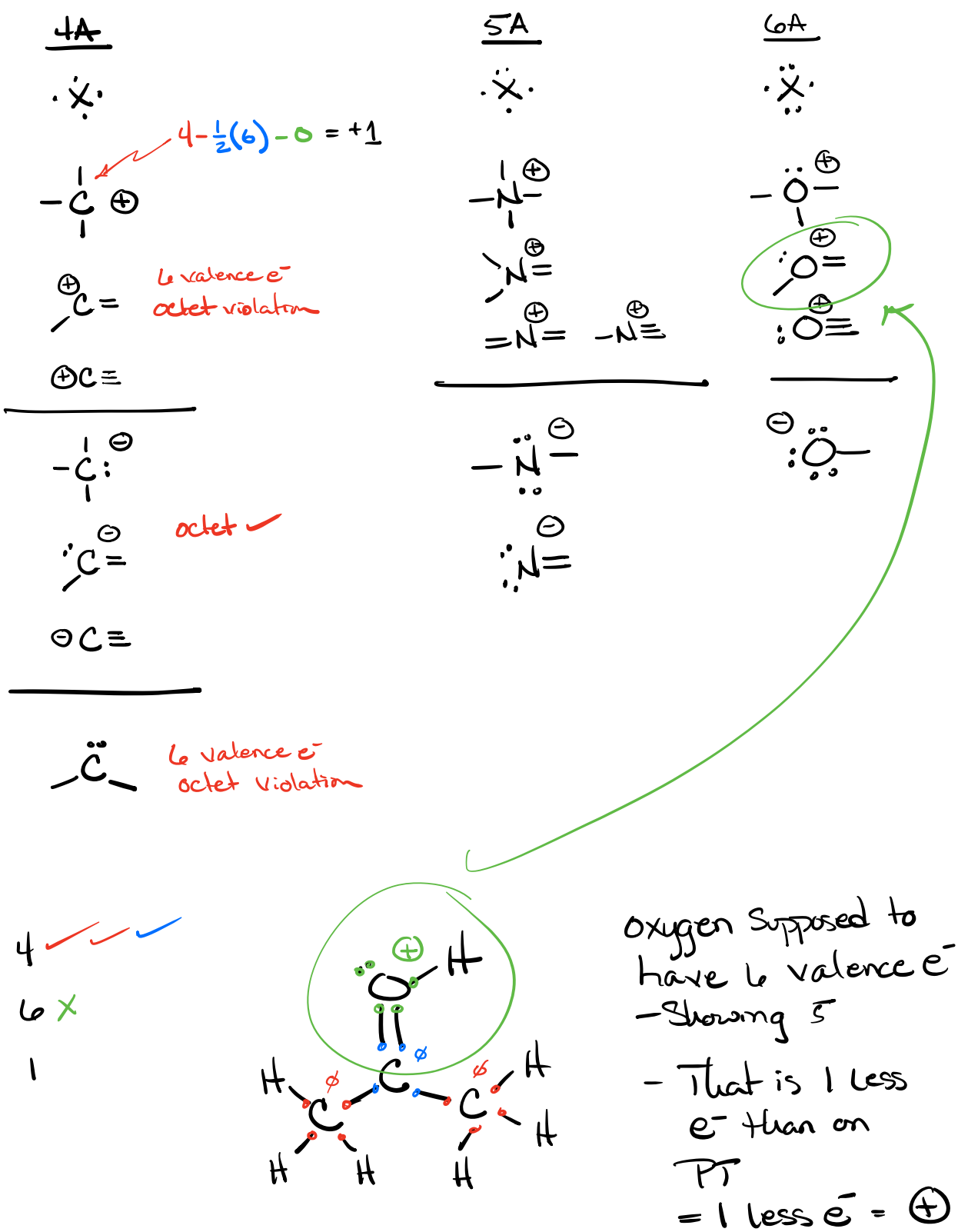


Bonding Patterns that Result in Formal Charge



C 4 ✓✓✓

O 6 ✗

H 1

Oxygen supposed to have 6 valence e⁻
- Showing 5
- That is 1 less e⁻ than on PT
= 1 less e⁻ = ⊕

Induction & Polarity

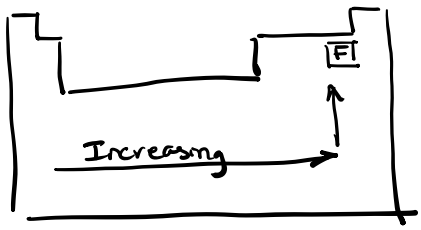
Electronegativity = the ability of an atom to attract (pull) on e^-

The greater the value the stronger the Electronegativity

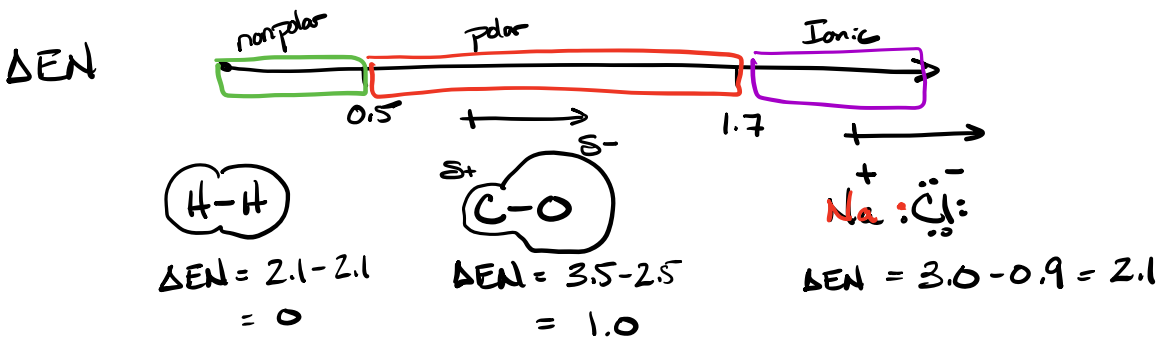
H
2.1

C	N	O	F
2.5	3.0	3.5	4.0

Si	P	S	Cl
1.5	2.1	2.5	3.0



$$\Delta EN = |EN_1 - EN_2|$$



ΔEN = 2.1 - 2.1
= 0

ΔEN = 3.5 - 2.5
= 1.0

ΔEN = 3.0 - 0.9 = 2.1

Dipole moment - molecular polarity

μ = dipole moment = electrical charge × distance between centers of charge

$1e^- = 4.80 \times 10^{-10}$ esu

distance $= 10^{-8}$ cm

$\mu = 10^{-18}$ esu·cm = 1 dybe (D)

Dipole moments are visually represented with a vector.

Vector has magnitude & direction

Look at relative magnitude

C-O $\Delta EN = 1.0$

C-Cl $\Delta EN = 0.5$

C-H $\Delta EN = 0.4$