N_2O

$2(5) + 6 = 16$

$-4 \quad +2 = 6$

$\overline{N} = N = \overline{O}$

$\overline{N} = O = \overline{N}$

Formal Charge

cut all bonds, count e⁻ on each atom

compare to "normal" ← how abnormal things are

6e⁻ (normal = 5) 4e⁻ 6e⁻

$\overline{N} \neq N \neq \overline{O}$

$-1 \quad +1 \quad 0$

$\overline{N} \neq O \neq \overline{N}$

$-1 \quad +2 \quad -1$

Σ formal charges = charge

$\Sigma |$ for. charges $|$ ← lower ... so favored

2 4

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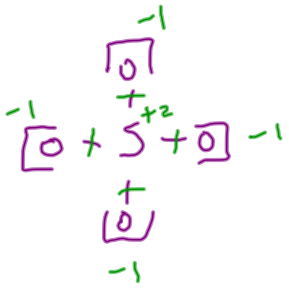
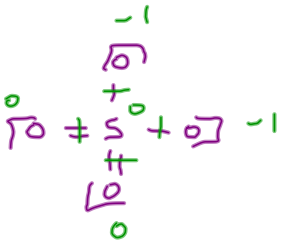
SO_4^{-2}





favored by formal charge

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VSEPR Theory

What it says...

Valence shell electron pair repulsion

What it means...

electron pairs attached to the same central atom, repel, causing molecules to take a defined shape

Some definitions...

things: bonded atoms (not bonds) or lone pairs of e^-

$H - \overline{N} = \overline{O}$

Structure: where the things are

Shape: where atoms are

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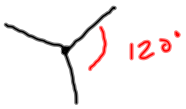
Things and Structure

2 

linear

3



trigonal planar

4 tetrahedron

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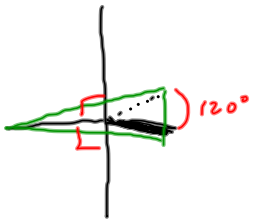
5



trigonal bipyramid

6

all ∡ = 90°

octahedron

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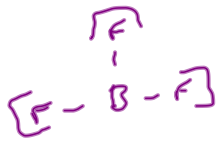
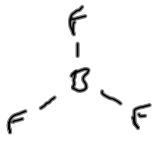
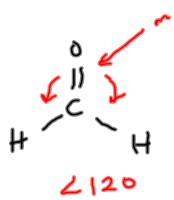
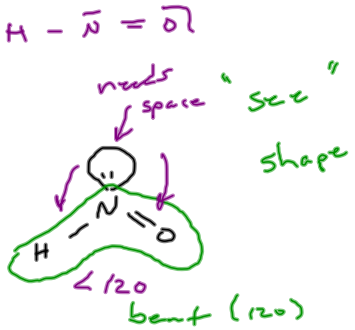
Structure, electron pairs and shape

BF_3, CH_2O, HNO









Some images... The sheet...

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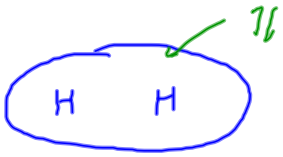
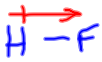
Bond polarity



kind of

F is more EN



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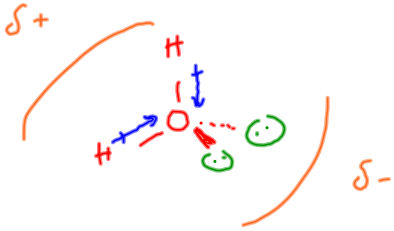
Tying everything (LDS, VSEPR, polarity) together

H_2O H – O – H

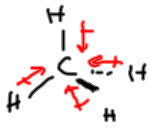
↖ 4 things ... tetrahedron



polar molecule

one outside part = –

" " " = +



non-polar

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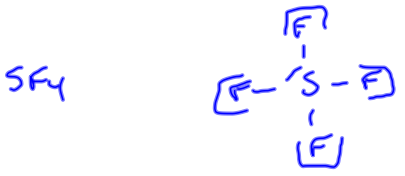

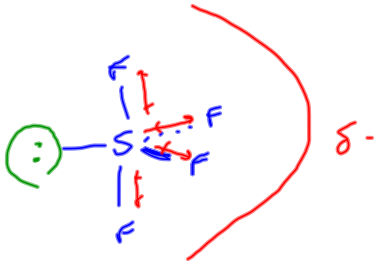

dipole moment
(e- not evenly distributed)

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Some for you to try...

CH_3OH

C_2H_6

NH_3

PH_3

$C_2H_2F_2$

C_3H_8

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SF_6

XeF_2

IF_3

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