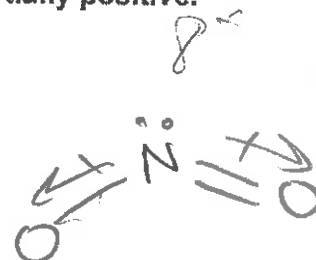
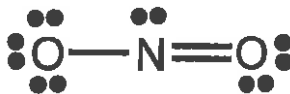


1. Draw the Lewis structure for water, H₂O.



- a) How many "groups" (atoms and lone pairs) surround the central oxygen? **4**
- b) What is the **geometry** of this molecule (look at atoms and lone pairs)? Draw this VSEPR structure next to the Lewis structure.
tetrahedron
- c) What is the **shape** of this molecule (look only at the atoms)?
bent
- d) What is the H-O-H bond angle?
< 109.5 °
- e) Place the partial positive and negative charges on the H and O atoms, based on their relative electronegativities. Is water a **polar** compound?
Oxygen is partially negative; hydrogen is partially positive. Yes, water is a polar compound
2. Draw the Lewis structure for NO₂⁻.

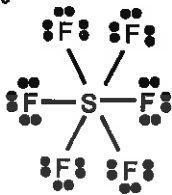


- a) How many "groups" (atoms and lone pairs) surround the central nitrogen?
3
- b) What is the **geometry** of this molecule (look at atoms and lone pairs)? Draw this VSEPR structure next to the Lewis structure.
trigonal planar
- c) What is the **shape** of this molecule (look only at the atoms)?
bent
- d) What is the O-N-O bond angle?
< 120 °
- e) Place the partial positive and negative charges on the N and O atoms, based on their relative electronegativities. Is NO₂⁻ a **polar** compound?
Oxygen is partially negative; nitrogen is partially positive. Yes, NO₂⁻ is a polar compound

3. Draw the Lewis structures for the following 12 compounds and label them with their VSEPR geometry.

a) SF₆

octahedral



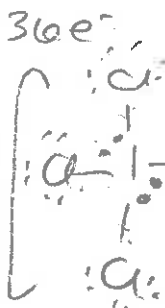
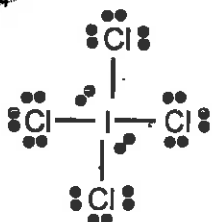
b) ICl₂⁻

trigonal bipyramidal



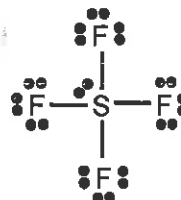
c) ICl₄⁻

octahedral



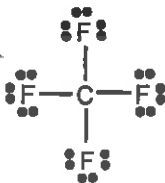
d) SF₄

trigonal bipyramidal



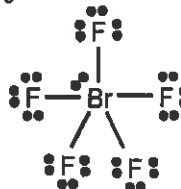
e) CF₄

tetrahedral



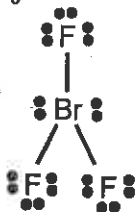
f) BrF₅

octahedral



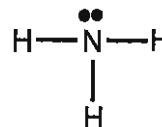
g) BrF₃

trigonal bipyramidal



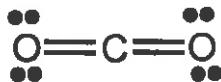
h) NH₃

tetrahedral



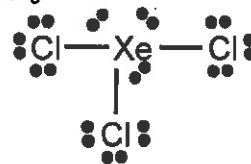
j) CO₂

linear



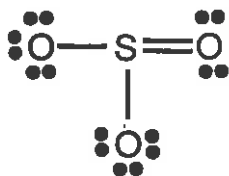
k) XeCl₃⁻

octahedral



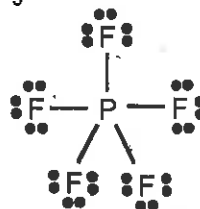
l) SO₃

trigonal planar



m) PF₅

trigonal bipyramidal



Now fill in the missing information in the chart using the structures you have drawn in problems 1 - 3.

compound	atoms on central atom	lone pairs on central atom	geometry	shape	polar
SF ₆	6	0	octahedral	octahedral	no
BrF ₅	5	1	octahedral	square pyramid	yes
ICl ₄ ⁻	4	2	octahedral	square planar	no
XeCl ₃ ⁻	3	3	octahedral	T-shape	yes
PF ₅	5	0	trigonal bipyramid	trigonal bipyramid	no
SF ₄	4	1	trigonal bipyramid	seesaw	yes
BrF ₃	3	2	trigonal bipyramid	T-shape	yes
ICl ₂ ⁻	2	3	trigonal bipyramid	linear	no
CF ₄	4	0	tetrahedral	tetrahedral	no
NH ₃	3	1	tetrahedral	trigonal pyramid	yes
H ₂ O	2	2	tetrahedral	V-shaped (bent)	yes
SO ₃	3	0	trigonal planar	trigonal planar	no
$\left[\begin{array}{c} \text{O} \\ \vdots \\ \text{O}=\text{N}=\text{O} \\ \vdots \\ \text{O} \end{array} \right]^-$ NO ₃ ⁻ 5, 6+ 6+ 1	2	1	trigonal planar	bent	yes
CO ₂	2	0	linear	linear	no

* only ones w/ lone pairs that are non-polar.

