

- Okay, you have to know how to draw Lewis structures, there is a method -- VSEPR and a basic idea, the octet rule.

Octet rule: Most atoms want eight valence electrons -- a full outer octet. This gives you an intuitive idea of what to expect. If you draw a Lewis diagram and one of the atoms in the molecule doesn't see 8 electrons, either as lone pairs or shared in covalent bonds, you'd better make sure you haven't made a mistake. The octet rule doesn't hold 100% of the time, just most of the time.

VSEPR: Valence Shell Electron Pair Repulsion theory

- a methodical way to draw Lewis structures of molecules whose atoms follow the octet rule.
- It's also nice because when it breaks down it tips you off to exceptions to the octet rule like the expanded octet.

Step 1: Count the electron pairs needed

- Hydrogen wants 1 pair
- Group II's want 2 pairs
- Group III's want 3 pairs
- Everyone else wants 4 pairs

Step 2: Find the total number of covalent bonds possible

- Total # of possible covalent bonds = sum of the valence e^- divided by 2
- Remember to add or subtract electrons according to any ionic charge

Step 3: Calculate the actual number of covalent bonds

- Actual C.B.'s = step 1 - step 2

If you don't get enough bonds to draw the molecule then it's an expanded octet.

Step 4: Calculate the number of σ bonds, π bonds, and nonbonding pairs

- # of σ bonds = # of atoms in the molecule - 1
- # of π bonds = Actual C.B.'s (step 3) - # of σ bonds
- # of nonbonding pairs = possible C.B.'s (step 2) - Actual C.B.'s (step 3)

Step 5: Draw the molecule (Here are some stereotypical examples)

	CH ₄	NH ₃	H ₂ O	CO ₂
step 1:	8	7	6	12
step 2:	4	4	4	8
step 3:	4	3	2	4
step 4:				
σ	4	3	2	2
π	0	0	0	2
nbp	0	1	2	4

step 5:

