CHEMISTRY LAB: ELECTRON DOT DIAGRAMS FOR COVALENT COMPOUNDS

WHAT TO TURN IN: Data Table, Questions #1-4

Objectives

- To review element names and symbols
- To practice writing electron dot diagrams for covalent compounds
- To compare and contrast ionic-bond and covalent-bond compounds
- To relate electron dot diagrams to formation of compounds

Materials: Colored pencils or thin markers, white paper, ruler

Procedure

- 1) Obtain or construct a table with ten rows and six columns as shown below. If making your own:
 - Turn the paper sideways for more room.
 - Use a ruler.
 - The rows must be large enough to write and draw.

1	2	3	4	5	6
Compound Formula	Element #1 Dot Diagram	Element #2 Dot Diagram	Compound Dot Diagram	VSEPR Shape	Is the overall molecule POLAR or NONPOLAR?
1					
2				N/A	
3					
4					
5					
6					
7				N/A	
8					
9					
10					

2) Follow the steps to writing the electron dot diagram of a binary molecular compound:

- Write the compound formula.
- Write the dot diagrams of each element. Ions do not form here!
- Write the formula's dot diagram by sharing the electrons.
- 3) Use the VSEPR table on the back of this sheet to determine molecular shape. *** Note: IBr and Br₂ have no VSEPR shape, as there is no central atom. ***
- 4) For overall molecular polarity: if the molecule is symmetrical all around, is it NONPOLAR. If it is asymmetrical, it is POLAR.
- 5) If the molecule is POLAR, label the partially positive (δ^+) and partially negative (δ^-) areas on the compound dot diagram on column 4.

ENTRIES FOR DATA TABLE				
1) BF ₃				
2) IBr				
3) CH ₄				
4) H ₂ Se				
5) OF ₂				
6) PCl ₃				
7) Br ₂				
8) NH ₃				
9) H ₂ O				
10) CO ₂				

Questions

- 1) Why are all 10 of these compounds *binary molecular* compounds?
- Compare and contrast *molecule* and *formula unit*.
 Which bond is stronger, ionic or covalent? Why?
- 4) How is the electron dot diagram of an ionic compound different from the dot diagram of a molecular (covalent) compound?

VSEPR s	hapes:
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# BONDING PAIRS OF CENTRAL ATOM	# NONBONDING PAIR OF CENTRAL ATOM	S <u>SHAPE</u>	BOND ANGLE
2	0	linear	180°
2	1	angular / bent	116°
2	2	angular / bent	104.5°
3	0	trigonal (triangular) planar	120°
3	1	pyramidal	107.3°
4	0	tetrahedral	109.5°
5	0	trigonal bipyramidal	90° & 120°
6	0	octahedral	90°