Lewis Dot Structure Online Lab

1. In your own words, EXPLAIN the following terms.
   a. Duet Rule

      _____
      _____

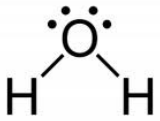
   b. Octet Rule

      _____
      _____

2. How is the total number of valence electrons in a molecule determined?

   _____
   _____

3. Fill in the following table, leaving only the ACTUAL column empty.

Name	Formula	Valence e^-	Prediction	Actual
Hydrogen fluoride				
Molecular fluorine	F_2			
Water				
Carbon dioxide				
Hydrogen peroxide	H_2O_2			
Boron trifluoride				
Ammonia				

4. Go to **http://www.stolaf.edu/depts/chemistry/courses/toolkits/123/js/lewis/** and check your predictions. If they were correct, place a check (√) in the Actual column. If not, draw the correct structure instead.

5. Judging by its Lewis structure, why do you think molecular nitrogen is so stable?

_____

_____

6. Make predictions for the following table.

Name	Formula	Valence e^-	Prediction	Actual
Methanol	CH_3OH			
Ethanol	CH_3CH_2OH			
Acetone	CH_3COCH_3			
Acetyline	HCCH			
Methyl ion	CH_3^+			

7. Based on the naming system you have learned, what other name might acetyline be called?_____
8. Using the same website, check your predictions and fill in the last column appropriately.
9. The formulas written above are variations on the ones you are used to seeing. Why might someone choose to write methanol as CH_3OH rather than CH_4O?

   _____

   _____
10. Judging by its Lewis structure, why do you think the methyl ion is so reactive?

    _____

    _____

11. Make predictions for the following table.

Name	Formula	Valence e^-	Prediction	Actual	Number of resonance structures
Acetate ion					
Nitrite ion					
Nitrate ion					
Ozone	O_3				

12. Using the same website, check your predictions and fill in the last TWO (2) columns appropriately. To find the **resonance structures**, simply click *Show Resonance Structures* on the simulation.
13. Based on the simulation, what is a **resonance structure**?

    _____
    _____

14. Make predictions for the following table.

Name	Formula	Valence e^-	Prediction	Actual	Number of resonance structures
Phosphate ion					
Sulfate ion					

15. Some of the above resonance structures clearly violate the octet rule. What is different about those atoms that allow them to hold "extra" electrons? (Hint: Think about their electron configurations.)

    _____
    _____

16. Based on what you learned in question #15, draw Lewis structures for the following molecules:

PCl_5

SF_6