**Lesson Plan Title: Lewis Bond Structure**

**Teacher’s Name: Mr.Gomez Subject/Course: Chemistry**

**Unit: Bonding Grade Level: College Prep/Honors**

**Overview of and Motivation for Lesson:**

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| **Stage 1-Desired Results** | | |
| **Standard(s):**  HS-PS1-2. Use the periodic table model to predict and design simple reactions that result in two main classes of binary compounds, ionic and molecular. Develop an explanation based on given observational data and the electronegativity model about the relative strengths of ionic or covalent bonds. Clarification Statements: \* Simple reactions include synthesis (combination), decomposition, single displacement, double displacement, and combustion. \* Predictions of reactants and products can be represented using Lewis dot structures, chemical formulas, or physical models. \* Observational data include that binary ionic substances (i.e., substances that have ionic bonds), when pure, are crystalline salts at room temperature (common examples include NaCl, KI, Fe2O3); and substances that are liquids and gases at room temperature are usually made of molecules that have covalent bonds (common examples include CO2, N2, CH4, H2O, C8H18). | | |
| **Aim/Essential Question:**   * How do lone pairs of electrons affect the shape of molecular compounds | | |
| **Understanding(s):**  *Students will understand that . . .*   * Molecular compounds have a certain orientation * The element written first is the central atom * A single line signifies a single bond made up of 2 electrons | | |
| **Content Objectives:**  *Students will be able to . . .*   * Draw Lewis Structure for molecular compounds with single bonds | | **Language Objectives:**  ELD Level 4 *Students will be able to . . . in English*   * Explain the steps in your own words involved in drawing Lewis structures to a partner (Day 2)   ELD Level 2 *Students will be able to . . . in English*   * State the central atom based on listening for chemical formula (Day 1) |
| **Key Vocabulary**   * Single Bond: A bond between atoms made up of two electrons * Lewis Structure: diagrams that show the bonding between atoms of a molecule | | |
| **Stage 2-Assessment Evidence** | | |
| **Performance Task or Key Evidence**   * Students will get at least a 75% on the Lewis structure worksheet given out on day 2 | | |
| **Key Criteria to measure Performance Task or Key Evidence**   * Click here to enter text. | | |
| **Stage 3- Learning Plan** | | |
| **Learning Activities:**  Do Now/Bell Ringer/Opener (Day 1): Students will go to their folders and answer two questions about Electron dot sturctures with their plicker card.    How many valence electrons does a nitrogen atom have?  a)3  b)5  c)7  d)15  Is the following electron dot diagram for chlorine correct?  Image result for electron diagram for chlorine  a) Yes  b) No  Day 2: None  Learning Activity 1 Day 1:  Students should take out periodic table and piece of lined paper to copy down review example problems from Electron dot diagrams  Teacher will ask students for four elements from the periodic table one element each from row 1A,3A,5A,7A. The elements will be put side to side to demonstrate how the electrons slowly build up until they have a full octet (eight electrons). The teacher will ask the student how many valence electrons each element has and write number of valence electrons above the element  Learning Activity 2 Day 1:  Students on a new or same piece of paper will write down the steps to draw Lewis structures for molecular compounds  Teacher will use the board and write out the steps involved in writing Lewis structures. Steps will also be on a worksheet  Step 1: Calculate the total number of valence electrons  Example CH4 C=4 valence electrons H=1 valence electron\*4=4 total valence electrons  Step 2: Pick Central Atom  In CH4 the carbon is the center atom, typically the atom written first is the center atom  Step 3: Draw Skeletal Structure  Connect atoms with a single line which represent a single bond made up of 2 electrons  Step 4: Subtract electrons used in step 3 from Step 1  If all electrons are used, then you are done. If not, then continue with steps  Step 5: Calculate number of electrons need for each atom to have a full octet  If you have the necessary number of valence electrons, then fill each atoms octet  If you are missing valence electrons, then keep going on  Step 6: Draw another line (2 electrons) connecting an atom to the central atom  Step 7: Repeat steps 4-6 until all electrons are drawn  Teacher will demonstrate the application of these rules through doing example that include only single bonds and not double bonds  CH4  NH3  F2  PCl3  H2O\*  Cl2\*  BF3\*  CCl4\*  \*= Student done problems  Learning Activity 1 Day 2:   * Students will work independently or with a partner to finish the worksheet given to the students at the beginning of the class. The worksheet will be collected at the end of the period and graded   Application  **Lewis structure helps demonstrate**  Summary/Closing (End of Second day)  **Teacher will lead a discussion based on this question: Do you think every single molecular compound looks the same? Why or Why not?**  **Multiple Intelligences Addressed:**   |  |  |  |  | | --- | --- | --- | --- | | Linguistic | Logical-Mathematical | Musical | Bodily-kinesthetic | | Spatial | Interpersonal | Intrapersonal | Naturalistic |   **Student Grouping**  Whole Class  Small Group  Pairs  Individual  **Instructional Delivery Methods**  Teacher Modeling/Demonstration  Lecture  Discussion  Cooperative Learning  Centers  Problem Solving  Independent Projects | | |
| **Accommodations**  Student with broken arm will work with another person and participate orally. Grade will be based upon the worksheet done by student and partner | **Modifications**  none | |
| **Homework/Extension Activities:**  None | | |
| **Materials and Equipment Needed:**   * Worksheet * Pencils * White Board | | |

**Adapted from Grant Wiggins and Jay McTighe-*Understanding by Design***