

Lesson Plan – Structures and Resonance

CHM2011- Organic Chemistry I – Discussion Section 100-004 – Friday 8am, 9:30, 2, 3:30 (50 min class)

Learning Outcomes

1. Given a structure in bond line form students will be able to identify all formal charges and lone pairs on all structures.
2. Given a structure in bond line form students will be able to move bonds / lone pairs to convert the structure to create 3 out of the 4 possible resonance structures.
3. Given several resonance structures in bond line form of a compound students will be able to compare structures to choose which one structure is the greatest contributor to the hybrid and be able to defend their reasoning every time.

Materials

PowerPoint Slides

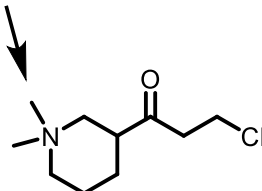
Clicker Base and Clickers

Whiteboard and Markers

Prep Work

Students should read Sections 1.5 Formal Charges and How to Calculate Them, 1.7 How to Write and Interpret Structural Formulas and 1.8 Resonance Theory

Students must bring writing utensil and pieces of blank paper to class

Learning Outcomes	Activities	Formative Assessment
Time: 10 minute lecture, 5 clicker question, 5 minute lecture	Lecture on Formal Charge Calculation: See Notes Clicker Question Slide for Formal Charge, 1st student answer themselves then next round talk with students next to them to “teach” / “learn” from peers What is the formal charge of the Nitrogen in the molecule below?  A) Neutral B) +1 C) +2 D) -1 E) -2 Lecture Slides about basics of Bond Line Formula	Clicker Questions on Formal Charge

Time: 10 minute lecture, 10 minute in class practice, 5 minute clicker	Lecture slides will include important information about Resonance Structures: See Notes Students are asked to complete the resonance structures for an example on their own paper. Afterwards answer will be demonstrated on whiteboard. Emphasize importance of trying on their own at the given time. May request that they turn this in as a formative assessment.	Clicker Questions on Resonance In Class Practice
Time: Focus Listing 5 minute solo, 5 minute build list on board minute	Focused Listing activity on reading in order to list the factors to determine the Greatest Resonance Contributor Call on students to use their list of factors to build list on board as class, discussion on order of importance. Follow by slide summarizing list Short Clicker Question on Resonance Choose which structure below is the most stable resonance structure A B C D E	Students will be asked to focus list the Rules for selecting the Greatest resonance Contributor Rules.
Flex Activity	Work on selected practice questions prepared in advance as a class, using clickers to have students answer solo first followed by a discussion amongst peers and another round of clickers	Clicker Questions on Resonance Rules