

## TEST ONE SKILLS/OBJECTIVES / OUTCOMES / COMPETENCIES

Ch		<u>TEST ONE</u>	<u>Self-Assessment</u> (Some but not all Graded)	<u>Graded Assessment</u>
1	Structure Determines Properties	<ol style="list-style-type: none"> <li>1. Identify number of bonds and lone pairs for uncharged 2<sup>nd</sup>-row atoms</li> <li>2. Draw and interpret Lewis, condensed, and line-angle structural formulas, including those involving double or triple bonds.</li> <li>3. Recognize when covalent versus ionic bonding exists</li> <li>4. Recognize and calculate formal charges and lone pairs given bond connectivity</li> <li>5. Populate lone pairs given formal charges and bond connectivity</li> <li>6. Identify and draw resonance structures, and use them to predict stabilities.</li> <li>7. Use arrow-pushing to display electron movement between resonance structures</li> <li>8. Use principles of electronegativity to predict bond polarity, predominant resonance form, anion stability, anion basicity, and acidity</li> <li>9. Use arrow-pushing to display electron movement in chemical reactions</li> <li>10. Identify acids and bases, and predict whether an acid-base equilibrium will favor products or reactants</li> <li>11. Predict relative acidities and basicities based on structure, bonding, charge, electronegativity, and resonance of conjugate acid-base pairs.</li> </ol>	<ol style="list-style-type: none"> <li>1. In-lecture in-notes problems</li> <li>2. Practice sets online</li> <li>3. Practice Tests</li> <li>4. Sapling homework problems</li> <li>5. Book practice problems</li> </ol>	<ol style="list-style-type: none"> <li>1. Sapling homework</li> <li>2. Quiz 1 and Quiz 2</li> <li>3. Test 1</li> <li>4. Final Exam</li> </ol>
2	Alkanes and Cycloalkanes: Introduction to Hydrocarbons	<ol style="list-style-type: none"> <li>12. Predict the hybridization, electron geometry, and approximate bond angles relative to atoms in a molecule</li> <li>13. Identify sigma versus pi bonds, and rank bond strengths</li> <li>14. Draw 3-dimensional representation of given molecules, using the hash-wedge convention.</li> <li>15. Identify polar and nonpolar molecules, and predict which ones can engage in hydrogen-bonding.</li> <li>16. Predict general trends in the boiling points and solubilities of compounds, based on their size, polarity, and hydrogen-bonding ability.</li> <li>17. Identify the classes of compounds, the “functional groups”, including hydrocarbons and organic molecules containing oxygen or nitrogen, and draw structural formulas for examples</li> <li>18. Identify when pairs of structures are related as structural isomers, stereoisomers, resonance structures, or as the same.</li> <li>19. Correctly name alkanes and cycloalkane</li> <li>20. Given the name of an alkane, draw the structure and give the molecular formula</li> </ol>	<ol style="list-style-type: none"> <li>1. In-lecture in-notes problems</li> <li>2. Practice sets online</li> <li>3. Practice Tests</li> <li>4. Sapling homework problems</li> <li>5. Book practice problems</li> </ol>	<ol style="list-style-type: none"> <li>1. Sapling homework</li> <li>2. Quiz 2</li> <li>3. Test 1</li> <li>4. Final Exam</li> </ol>
3	Alkanes and Cycloalkanes: Conformation and cis-trans Stereoisomers	<ol style="list-style-type: none"> <li>21. Use Newman projections to compare the energies of alkane conformations</li> <li>22. Draw best and worst Newman projections relative to any individual bond</li> <li>23. Use torsional and steric strain terminology to explain differences in rotation barriers and in Newman-projection stabilities</li> <li>24. Identify, name, and draw cis and trans stereoisomers of di-substituted cycloalkanes</li> <li>25. Compare the energies of cycloalkanes, and explain ring strain</li> <li>26. Draw accurate cyclohexane chair conformation, including cis- or trans- di-substituted cases, and including “left-” and “right-handed” chair conformations</li> <li>27. Illustrate and identify axial versus equatorial substituents on cyclohexane chairs; and predict the most stable conformations of di-substituted cases.</li> <li>28. Based on chemical formula, identify whether an alkane is cyclic or acyclic</li> <li>29. Given a chemical formula for an alkane, draw and name structural isomers</li> </ol>	<ol style="list-style-type: none"> <li>1. In-lecture in-notes problems</li> <li>2. Practice sets online</li> <li>3. Practice Tests</li> <li>4. Sapling homework problems</li> <li>5. Book practice problems</li> </ol>	<ol style="list-style-type: none"> <li>1. Sapling homework</li> <li>2. Test 1</li> <li>3. Final Exam</li> </ol>