**Science Department Competencies and Assessments**

**Academic Chemistry**

**Course description:** The Academic Chemistry course at MRHS is a laboratory based science course investigating the matter and the changes in matter. The course is based on understanding and integrating the atomic/.molecular model. The over-arching concepts are:

1. What is matter?

2. How does matter change?

3. Why does matter change?-

|  |  |
| --- | --- |
| **Course Power Standards** | **Assessment Tools** |
| **I. Lab Skill and Safety**: *Students demonstrate understanding of:*   1. all pertinent safety rules. 2. selecting and using appropriate materials for laboratory investigation. 3. obtaining, analyzing and presenting laboratory data(i.e. use of data tables, graphs, percent error) | * Quizzes * Homework * Class work * Laboratory work |
| **II. Communication** *Students demonstrate understanding of:*   1. communicating using appropriate scientific vocabulary, notations and mathematics. 2. using and defining the scientific method to investigate problems. 3. reading scientific articles critically. | * Quizzes * Homework * Class work * Tests * Article reviews * Seminar project   t |
| **III. Atomic Structure:** *Students demonstrate understanding of:*   1. the make-up of the atomic nucleus and differences between elemental nuclei. 2. basic electron distribution. 3. how the outermost electrons determine how atoms interact with each other. 4. the history of current atomic structure theory. 5. the relationship between electron configuration and the properties and location of elements on periodic table of the elements. | * Quizzes * Homework * Class work * Tests * Laboratory work |
| **IV. Bonding:** *Students demonstrate understanding of:*   1. differences between ionic and covalent bonding 2. formation of anions and cations 3. formation of ionic and covalent bonds 4. binary nomenclature | * Quizzes * Homework * Class work * Tests * Laboratory work |

|  |  |
| --- | --- |
| **Course Power Standards** | **Assessment Tools** |
| **V. Molar relationships:** *Students demonstrate understanding of:*   1. Avogadro’s number and the concept of the mole as a unit of count. 2. converting between the mole and other measurements 3. understanding empirical and molecular formulas 4. the five (5) general types of chemical reactions. 5. the Law of the Conservation of Mass 6. balancing equations based on the Law of the Conservation of Mass 7. stoichiometry including limiting reagents, theoretical yield and percent yield | * Quizzes * Homework * Class work * Tests * Laboratory work |
| **VI. Matter and Change:** *Students demonstrate understanding of:*   1. the difference on the atomic level of solids, liquids and gases 2. physical and chemical properties and changes 3. ionic and covalent bonding 4. mixtures 5. the Gas Laws 6. solutions and the various methods of expressing concentrations of solutions 7. Solving problems involving experimental or theoretical probability. | * Quizzes * Homework * Class work * Tests * Laboratory work |
| **VII. Thermodynamics:** *Students demonstrate understanding of:*   1. how to determine the enthalpy changes involved in chemical processes (The First Law of Thermodynamics) | * Quizzes * Homework * Class work * Tests * Laboratory work |
| **VIII. Equilibrium:** *Students demonstrate understanding of:*   1. reversible reactions 2. dynamic equilibrium 3. calculations and usage of various equilibrium constants | * Quizzes * Homework * Class work * Tests * Laboratory work |
| **IX. (If time permits) Acid-Base:** *Students demonstrate understanding of:*   1. Bronsted-Lowry definition of acids and bases 2. strong versus weak acids/bases 3. autoionization of water 4. pH, pOH, pKa, pKw | * Quizzes * Homework * Class work * Tests * Laboratory work |

**All prospective students must complete all three assessment types to the standards listed below and subsequent attachments.**

**Assessment #1- Projects and Summative Assessments**

These are based on concepts and projects that are covered with all Algebra classes during the course of each year. Prospective Students must complete all components of each project. The cooperating teacher must sign off on each component with a label of “meets expectations”.

**Assessment #2- Homework, Class work, and Formative Assessments**

Daily assessments of student performance and understanding used to inform instructional decisions.

**Assessment #3- Exam**

These are based on concepts and information that the students are exposed to each year. Each must be completed with the prospective student attaining a 65% or higher proficiency.