Mohawk Local Schools Chemistry - SCIENCE

Quarter 4 Curriculum Guide

Guiding Principles of the Scientific Inquiry/Learning Cycle:

Evaluate….Engage…Explore…Explain…Extend…Evaluate

Identify ask valid and testable questions
Research books, other resources to gather known information
Plan and Investigate
Use appropriate mathematics, technology tools to gather, interpret data.
Organize, evaluate, interpret observations, measurements, other data
Use evidence, scientific knowledge to develop explanations
Communicate results with graphs charts, tables

Critical Areas of Focus Being Addressed:

- Interactions of Matter
- Scientific Inquiry

Content Statements Addressed and Whether they are Knowledge, Reasoning, Performance Skill, or Product: (DOK1) (DOK2) (DOK3) (DOK4)	Underpinning Targets Corresponding with Standards and Whether they are Knowledge, Reasoning, Performance Skill, or Product: "I can…..", "Students Will Be Able To……."
Chemical Reactions (DOK 3)	• Classify reactions based on surface features (e.g., exchanging partners) as: oxidation/reduction, synthesis, decomposition, single replacement, double

	replacement (precipitation and acid/base), and combustion. (R) • Predict the products of a single- and/or double-replacement reaction as well as a standard hydrocarbon combustion reaction. (R) • Identify which substances are being oxidized and reduced in an oxidation/reduction reaction. (K) • Compare qualitatively the combustion of organic molecules for the energy needs of society to the combustion of organic molecules during cellular respiration. (PS) • Using experimental data calculate the change in energy of a system. (R) • Compare thermal energy to chemical energy. (R) • Using specific heat values to determine which materials would be the best insulator. (R) • Explain how water's specific heat capacity regulates Earth's temperature. (PS) • Calculate thermal energy change, temperature (initial, final, or change in), and mass of a material in calorimetry. (R) • Using graphic representations describe the change in energy involved in forming and breaking bonds. (R) • Predict whether a reaction is exothermic or endothermic given a table of bond energies. (R) • Model behaviors of particles in a chemical reactions including ineffective collisions and effective collisions (R) • Model the activation energy in a reaction without a catalyst to a reaction with a catalyst. (R) • Model the behavior of an enzyme on a substrate molecule. (R) • Conceptually predict the effect of pressure and temperature of a gaseous reaction on its rate of

	reaction. (R) • Use collision theory to compare the rates of reaction of a liquid, gas, and solid. (R) • Conceptually describe how entropy and energy determine the spontaneity of chemical reaction. (R) • Using a graph of the concentrations of products and reactants over time determine the equilibrium concentrations and the time at which equilibrium was reached. (PS) • Model how equilibrium position can be changed by altering reaction conditions (e.g. temperature, pressure, and concentration). (R) • Using an electronegativity table predict which compounds containing hydrogen would be an acid. (R) • Calculate the pH and concentration of hydronium ion in an aqueous acid solution. (R) • Compare Arrhenius acids to Arrhenius bases. (R) • Create a lab procedure to determine the concentration of an unknown acid. (PS) • Compare combustion of organic molecules for the energy needs of society to combustion of organic molecules during cellular respiration. (R) • Explain how the bonding characteristics of carbon can explain the multitude of molecules that it can form, including synthetic polymers, fossil fuels, and biological molecules. (PS) • Show the relationship between the temperature and average kinetic energy. (R) • Research and apply safety precautions when designing and conducting scientific investigations. (PS)
Nuclear Reactions (DOK 3)	• Compare the potential dangers to society from the release of different types of radiation (alpha, beta, gamma, and positron) including mass, charge, potential to ionize, ability to penetrate and origin. (PS)

	• Predict the products of a radioisotope undergoing decay and balance the resulting nuclear equation. (R) • Evaluate the advantages and disadvantages of fission and fusion reactions as a source of energy for society. (PS)