URBANDALE
COMMUNITY SCHOOL DISTRICT

Course Title: **Chemistry**
Description: This two-semester course is designed to meet the needs of the student who wants to go on to a 4 year university. The course will focus on the modern concepts of chemistry and on using problem solving effectively. Some topics investigated include atomic structure, periodic law, chemical bonds, chemical composition, chemical equations, gas laws, solution process, acid and bases, and science/society issues pertaining to chemistry. A student must pass the 1st semester to enroll in the 2nd semester.
Physical Sciences
Grade Level Standards
• Use scientific principles and evidence to define and classify matter. • Design a demonstration to compare and contrast **physical** properties and changes with **chemical** properties and changes. • Use mathematical representations to describe the properties and structure of matter. • Perform measurements and other laboratory activities safely and with appropriate equipment and techniques.
• Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles (HS-PS1-3) • Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the **patterns of chemical properties**. (HS-PS1-2) • Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay. (HS-PS1-8)
• Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. (HS-PS1-1) • Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, **trends in the periodic table**, and knowledge of the patterns of chemical properties. (HS-PS1-2)
• Construct and revise an explanation for the outcome of a simple chemical reaction based on the **outermost electron states of atoms**, trends in the periodic table, and knowledge of the patterns of chemical properties. (HS-PS1-2)
• Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy. (HS-PS1-4)
• Construct and revise an explanation for the **outcome of a simple chemical reaction** based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. (HS-PS1-2)
• Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium. (HS-PS1-6) • Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. (HS-PS1-7)
• Apply scientific principles and evidence to provide an explanation about the effects of changing the

temperature or concentration of the reacting particles on the rate at which a reaction occurs. (HS-PS1-5) • Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium. (HS-PS1-6)
• Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs. (HS-PS1-5)
• Perform titration procedures and conduct the corresponding mathematical calculations to determine unknown concentrations (HS-PS-LJ 10-1) • Calculate pH and pOH from acid and base concentrations (HS-PS-LJ 10-2) • Design an experiment to find the concentration of an acidic or basic household substance (HS-PS-LJ 10-3)
Engineering
Grade Level Standards
• Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. (HS-ETS1-1)
• Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. (HS-ETS1-2)
• Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts. (HS-ETS1-3) • Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem. (HS-ETS1-4)