



Mesquite ISD Curriculum Sequence

High School Science - Biology

4th Six Weeks

Students will investigate the following:

Viruses:

Students will compare the structures of viruses to cells, describe viral reproduction, and describe the role of viruses in causing diseases such as human immunodeficiency virus (HIV) and influenza.

Taxonomy:

Students will categorize organisms using a hierarchical classification system based on similarities and differences shared among groups.

Students will define taxonomy and recognize the importance of a standardized taxonomic system to the scientific community

Students will compare characteristics of taxonomic groups, including archaea, bacteria, protists, fungi, plants, and animals.

Plants:

Students will describe the interactions that occur among systems that perform the functions of transport, reproduction, and response in plants.

Students will describe the flow of matter through the carbon and nitrogen cycles and explain the consequences of disrupting these cycles.

Symbiosis and Food Webs:

Students will interpret relationships, including predation, parasitism, commensalism, mutualism, and competition among organisms.

Analyze the flow of matter and energy through trophic levels using various models, including food chains, food webs, and ecological pyramids.

Students will recognize that long-term survival of species is dependent on changing resource bases that are limited.

Students will investigate and analyze how organisms, populations, and communities respond to external factors.

5th Six Weeks

Students will investigate the following:

Ecological Succession:

Students will describe how events and processes that occur during ecological succession can change populations and species diversity.

Environmental Change

Students will describe how environmental change can impact ecosystem stability.

Natural Selection:

Students will analyze and evaluate the relationship of natural selection to adaptation and to the development of diversity in and among species.

Students will analyze and evaluate how natural selection produces change in populations, not individuals.

Students will analyze and evaluate how the elements of natural selection, including inherited variation, the potential of a population to produce more offspring than can survive, and a finite supply of environmental resources, result in differential reproductive success.

Students will compare variations and adaptations of organisms in different ecosystems.

Students will recognize that long-term survival of species is dependent on changing resource bases that are limited.

Students will investigate and analyze how organisms, populations, and communities respond to external factors.

6th Six Weeks

Students will investigate the following:

Common Ancestry and Evolution:

Students will analyze and evaluate how evidence of common ancestry among groups is provided by the fossil record, biogeography, and homologies, including anatomical, molecular, and developmental.

Students will analyze and evaluate scientific explanations concerning any data of sudden appearance, stasis, and sequential nature of groups in the fossil record.

Students will analyze and evaluate the effects of other evolutionary mechanisms, including genetic drift, gene flow, mutation, and recombination.

Students will analyze and evaluate scientific explanations concerning the complexity of the cell.

Students will analyze and evaluate the evidence regarding formation of simple organic molecules and their organization into long complex molecules having information such as the DNA molecule for self-replicating life.

STAAR EOC Review and Test

Scientific Process Skills and Significant Figures



Mesquite ISD Curriculum Sequence

High School Science - Chemistry

4th Six Weeks

Students will investigate the following:

The Law of Conservation of Mass

The student will use the law of conservation of mass to write and balance chemical equations.

Energy

The student will understand energy and its forms, including kinetic, potential, chemical, and thermal energies.

The student will understand the law of conservation of energy and the processes of heat transfer.

The student will use thermochemical equations to calculate energy changes that occur in chemical reactions and classify reactions as exothermic or endothermic.

The student will perform calculations involving heat, mass, temperature change, and specific heat.

The student will use calorimetry to calculate the heat of a chemical process.

Solution Chemistry

The student will describe the unique role of water in chemical and biological systems.

The student will use general rules regarding solubility through investigations with aqueous solutions.

5th Six Weeks

Students will investigate the following:

Solution Chemistry

The student will calculate the concentration of solutions in units of molarity.

The student will use molarity to calculate the dilutions of solutions.

The student will distinguish between types of solutions such as electrolytes and nonelectrolytes and unsaturated, saturated, and supersaturated solutions.

The student will investigate factors that influence solubilities and rates of dissolution such as temperature, agitation, and surface area.

Stoichiometry

The student will perform stoichiometric calculations, including determination of mass relationships between reactants and products, calculation of limiting reagents, and percent yield.

Acids and Bases

The student will define acids and bases and distinguish between Arrhenius and Bronsted-Lowry definitions and predict products in acid-base reactions that form water.

The student will define pH and use the hydrogen or hydroxide ion concentrations to calculate the pH of a solution.

The student will distinguish between degrees of dissociation for strong and weak acids and bases.

6th Six Weeks

Students will investigate the following:

Types of Reactions

The student will understand and differentiate among acid-base reactions, precipitation reactions, and oxidation-reduction reactions.

Gas Laws

The student will describe and calculate the relations between volume, pressure, number of moles, and temperature for an ideal gas as described by Boyle's law, Charles' law, Avogadro's law, Dalton's law of partial pressure, and the ideal gas law.

The student will perform stoichiometric calculations, including determination of mass and volume relationships between reactants and products for reactions involving gases.

The student will describe the postulates of kinetic molecular theory.

Nuclear Chemistry

The student will describe the characteristics of alpha, beta, and gamma radiation.

The student will describe radioactive decay process in terms of balanced nuclear equations.

The student will compare fission and fusion reactions.



Mesquite ISD Curriculum Sequence

High School Science - Physics

4th Six Weeks

Students will investigate the following:

Energy and Power

(6) Science concepts. The student knows that changes occur within a physical system and applies the laws of conservation of energy and momentum. The student is expected to:

(A) investigate and calculate quantities using the work-energy theorem in various situations;

(B) investigate examples of kinetic and potential energy and their transformations;

(C) calculate the mechanical energy of, power generated within, impulse applied to, and momentum of a physical system;

(D) demonstrate and apply the laws of conservation of energy and conservation of momentum in one dimension;

Thermodynamics

(E) describe how the macroscopic properties of a thermodynamic system such as temperature, specific heat, and pressure are related to the molecular level of matter, including kinetic or potential energy of atoms;

(F) contrast and give examples of different processes of thermal energy transfer, including conduction, convection, and radiation; and

(G) analyze and explain everyday examples that illustrate the laws of thermodynamics, including the law of conservation of energy and the law of entropy.

Static Electricity

(5) Science concepts. The student knows the nature of forces in the physical world. The student is expected to:

(C) describe and calculate how the magnitude of the electrical force between two objects depends on their charges and the distance between them;

(D) identify examples of electric and magnetic forces in everyday life;

(E) characterize materials as conductors or insulators based on their electrical properties;

5th Six Weeks

Students will investigate the following:

Current Electricity

(5) Science concepts. The student knows the nature of forces in the physical world. The student is expected to:

(E) characterize materials as conductors or insulators based on their electrical properties;

(F) design, construct, and calculate in terms of current through, potential difference across, resistance of, and power used by electric circuit elements connected in both series and parallel combinations;

(G) investigate and describe the relationship between electric and magnetic fields in applications such as generators, motors, and transformers; and

Sound and Harmonic Motion

(7) Science concepts. The student knows the characteristics and behavior of waves. The student is expected to:

(A) examine and describe oscillatory motion and wave propagation in various types of media;

(B) investigate and analyze characteristics of waves, including velocity, frequency, amplitude, and wavelength, and calculate using the relationship between wavespeed, frequency, and wavelength;

(C) compare characteristics and behaviors of transverse waves, including electromagnetic waves and the electromagnetic spectrum, and characteristics and behaviors of longitudinal waves, including sound waves;

(D) investigate behaviors of waves, including reflection, refraction, diffraction, interference, resonance, and the Doppler effect;

(F) describe the role of wave characteristics and behaviors in medical and industrial applications.

6th Six Weeks

Students will investigate the following:

Light and Optics

Same as Sound and Harmonic Motion Plus

(E) describe and predict image formation as a consequence of reflection from a plane mirror and refraction through a thin convex lens; and

Modern Physics

(8) Science concepts. The student knows simple examples of atomic, nuclear, and quantum phenomena. The student is expected to:

(A) describe the photoelectric effect and the dual nature of light;

(B) compare and explain the emission spectra produced by various atoms;

(C) describe the significance of mass-energy equivalence and apply it in explanations of phenomena such as nuclear stability, fission, and fusion; and

(D) give examples of applications of atomic and nuclear phenomena such as radiation therapy, diagnostic imaging, and nuclear power and examples of applications of quantum phenomena such as digital cameras.

Mesquite ISD Curriculum Sequence

High School Science - IPC

4th Six Weeks

Students will investigate the following:

Properties of Matter

- Students will examine differences in physical properties of solids, liquids, and gases as explained by the arrangement and motion of atoms, ions, or molecules of the substances and the strength of the forces of attraction between those particles.
- Students will relate chemical properties of substances to the arrangement of their atoms or molecules.
- Students will analyze physical and chemical properties of elements and compounds such as color, density, viscosity, buoyancy, boiling point, freezing point, conductivity, and reactivity.

Classifying Matter

- Students will practice classifying substances as an element, a compound, or a mixture, through active participation in hands-on, minds-on investigations.

Density

- Students will analyze the physical property of density.
- Students will work extensively with the concept by measuring the mass and volume of various materials and computing the value through the equation: $\text{Density} = \text{Mass}/\text{Volume}$. Students will also analyze relative density by making density columns.

Viscosity

- Students will analyze physical properties of elements such as viscosity, which is defined as a material's resistance to flow.

Buoyancy

- Students will understand that water provides an upward force on any submerged object, and if the object has a lower density than water, then it will float.

Phase Changes

- Students will examine differences in physical properties of solids, liquids and gases as explained by the arrangement and motion of atoms, ions, or molecules of the substances and the strength of the forces of attraction between those particles.

5th Six Weeks

Students will investigate the following:

Atomic Structure/Atomic Models

- Students will relate chemical properties of substances to the arrangement of their atoms or molecules.
- Students will understand that relationships exist between the structure and properties of matter.
- Students will relate the physical and chemical behavior of an element, including bonding and classification, to its placement on the Periodic Table.

Periodic Table and History

- Students will use the Periodic Table to determine the reactivity of any element. Students will use the Periodic Table to find other elements that have similar physical and/or chemical properties of another element.

Chemical Bonding

- Students will analyze how atoms of elements combine chemically to form new substances, through a process known as bonding.
- Students will relate the physical and chemical behavior of an element, including bonding and classification, to its placement on the Periodic Table.
- Students will relate the structure of water to its function as a solvent and investigate the properties of solutions and factors affecting gas and solid solubility, including the nature of the solute, temperature, pressure, pH, and concentration.

Classifying Reactions

- Students will investigate changes of state as it relates to the arrangement of particles of matter and energy transfer.
- Students will recognize that chemical changes can occur when substances react to form different substances and that these interactions are largely determined by the valence electrons.
- Students will demonstrate that mass is conserved when substances undergo chemical change and that the number and kind of atoms are the same in the reactants and products.

6th Six Weeks

Students will investigate the following:

Endothermic and Exothermic Reactions

- Students will analyze energy changes that accompany chemical reactions such as those occurring in heat packs, cold packs, and glow sticks and classify them as exothermic or endothermic reactions.

Conservation of Mass

- Students will demonstrate that mass is conserved when substances undergo chemical change and that the number and kind of atoms are the same in the reactants and products.

Balancing Equations

- Students will understand that during any kind of chemical reaction, there is no gain or loss of mass.
- Students will recognize and write chemical formulas and equations.
- Students will practice counting the atoms going in and coming out of a chemical reaction.
- Students will balance equations by adding coefficients.

Nuclear Reactions

- Students will describe types of nuclear reactions such as fission and fusion and their roles in applications such as medicine and energy production.
- Students will research and describe the environmental and economic impact of the end-products of chemical reactions such as those that may result in acid rain, degradation of water and air quality, and ozone depletion.