Grand Island Public Schools
K-12 Science Program Curriculum Framework

Strand 1: Inquiry		
K-12 Program Strands & Curriculum Standards	**K-12 Program Enduring Understanding**	**K-12 Program Essential Questions**
1.1 Investigation & Research	• Scientists construct knowledge based on their own and other scientists' work. • Scientific inquiry progresses through a continuous process of questioning, data collection, analysis, and interpretation. [There is no fixed order of steps that scientists follow, no one path that leads to scientific knowledge.] • Investigational design is shaped by the field of science and driven by the questions of the scientists(s). • By varying just one condition at a time, scientists can hope to identify its exclusive effects on what happens. • Scientists analyze data to determine what evidence is valid and how that informs what they do/think. • Scientists describe changes through observation and scientific knowledge to make reasonably predictions.	• Have I seen this before? How does that connection help? • What information do I have? What information do I need? How do I collect that information? • How do I use and record data to draw a valid conclusion? • How does the way I work affect the quality of the results? • Do the results make sense? • What effect does changing variables have on the result? • Where do I recognize and apply scientific inquiry in my life?
1.2 Communication	• Veracity (validity, quality, quantity, accuracy, precision) of data is dependent upon the scientist being meticulous and honest. • Scientists present research/data in relation to the original inquiry, explain what happened, and suggest possible next steps. • The way in which a scientist presents findings (technical vocabulary, data display, recommended actions) is dependent upon the audience and purpose.	• Who is my audience? How does that affect the way I communicate data and ideas? • How do scientists handle different points of view on the same issue?

Strand 2: Physical Science		
K-12 Program Strands & Curriculum Standards	**K-12 Program Enduring Understanding**	**K-12 Program Essential Questions**
2.1 Chemical and Physical Properties of Matter	• All matter is made up of relatively few kinds of basic materials combined in various ways. • The way matter can be separated determines what type of matter it is. • When two or more substances interact to form new substances, the properties of the new combinations may be very different from those of the old. • The characteristics of atomic or molecular structure determine the physical properties and the ways in which substances react.	• (K-2) How do scientists describe things? OR (3-12) How do scientists distinguish between objects? What do they learn from the comparisons? • What causes a reaction? How do we predict reactions before they happen? • (K-2) How do properties of an object determine its use? OR (3-12) How do the properties of a substance determine its use? • (6-12) How does the structure of the atom affect the physical and chemical properties of the atom?
2.2 Motions & Forces	• An object's motion can be predicted and is the result of the combined effect of all forces acting on the object. • The interaction between energy and matter creates forces (pushes and pulls) that produce predicable patterns of change.	• In what ways can objects move and what makes objects move the way they do? • (K-8) What role do forces play here? (9-12) How are forces produced? What role do forces play here?
2.3 Matter & Energy	• The total amount of matter and energy remains constant, even though their form and location undergo continual change. • The total amount of momentum remains constant in a closed system even though it is transferred between objects. • Although the various forms of energy seem very different, each can be measured in a way that makes it possible to keep track of how much of one form is converted into another. • Machines do not reduce the amount of work that is done, they only change the direction of the force, multiply the force or multiply the distance through which the force is applied. • Vibrations (waves) carry energy away from its source. • Different wavelengths interact with matter in different ways.	• How does energy cause change? • How does energy, matter, and/or momentum, remain constant in a closed system? • How are machines designed and used to do work? • Where does energy come from, how is it transmitted, and where does it go?

Strand 3: Life Science		
K-12 Program Strands & Curriculum Standards	**K-12 Program Enduring Understanding**	**K-12 Program Essential Questions**
3.1 Diversity of Life	• All living things are made of similar chemicals, compounds and elements. Certain compounds and elements make up all living things. • Living things have certain structures that serve necessary functions for growth, response to stimulus, reproduction and use of energy.	• What is the difference between living and non-living things? • What does it mean to be alive? • What are living things made of?
3.2 Classification	• The level of classification systems is an ongoing effort within the science community so that there are meaningful ways to study groups.	• Why and how do scientists classify living things?
3.3 Ecosystems	• Organisms can survive only in environments in which their needs can be met. • The change one organism makes in order to adapt/survive has significant ripple effects.	• How do organisms change, survive and adapt to their environments? • How do living things interact with each other?
3.4 Genetics	• All living things go through predictable phases of life or maturity. • While an organism's traits are inherited, the appearance of those traits can be modified. • Environment has the power to shape/ change how an organism responds/ functions in it's surroundings.	• What are the life cycles of living things? • Where do living things get their traits?

Strand 4: Earth and Space Science		
K-12 Program Strands & Curriculum Standards	**K-12 Program Enduring Understanding**	**K-12 Program Essential Questions**
4.1 Structure, History & Cycles	• Each part of a system is only fully understandable in relation to the rest of the system. • Any part of a system may itself be considered a subsystem with its own internal parts and interactions. • The Earth system is composed of interacting subsystems of the geosphere, hydrosphere, atmosphere, and biosphere. • Systems are not mutually exclusive: they may be so closely related that there is no way to separate all parts of one from all parts of the other. • The elements that make up the molecules of living things are continually recycled. • Materials within the Earth system have physical/chemical properties that make them useful in different ways.	• What are the parts of this system? (eg., solar system, earth-moon system, water cycle, carbon cycle, rock cycles, etc) How do they work together?
4.2 Energy	• Although the various forms of energy appear very different, each can be measured in a way that makes it possible to keep track of how much of one form is converted into another. • Almost all life on earth is ultimately maintained by transformation of energy from the sun. • The wealth, power, and potential of people is greatly affected by their capacity to harness energy. • Energy is responsible for changes to the Earth's/Universe's structures and systems. • Development of new technology to make energy more accessible, powerful, and safe is one of the most critical global issues today.	• In what ways can objects move and what makes objects move the way they do? • (K-8) What role do forces play here? (9-12) How are forces produced? What role do forces play here?
4.3 Origin & Evolution	• .Evidence gathered from the past is used to explain origination of an event, phenomenon, species, system and help predict the future.	• How do scientists work to figure out how the universe began? • How do scientists work to figure out how the universe continues to change over time?