FWSD Science Rubrics
Grade 7: Kilo and Lakota

EALR 1: SYSTEMS

The essential concepts and principles of the physical, earth, space, and life sciences are organized and interwoven by the theme of *systems.* Students connect these *systems* with the understanding of inputs, outputs, and transfers of matter, energy, and information. What science has learned about the universe is described as the properties (1.1), structure (1.2), and changes (1.3) in *systems*.

Use the Systems Approach when teaching all content in EALR 1

Standard	Beginning	Approaching	Meeting	Exceeding
1.2.1 Systems Approach: Describe how the parts of a system interact and influence each other.	List an example of a system.	Identify the parts of a system, how the parts go together, and how they depend on each other.	Describe how the parts of a system interact and influence each other.	Use the process of inquiry, design (problem solving), or the thinking skills *Habits of Mind* to demonstrate a deeper understanding of "Systems Approach".

Science Explorer: Earth's Waters

Standard	Beginning	Approaching	Meeting	Exceeding
1.2.4 Components and Patterns of the Earth System: Describe the components of the earth system, including the solid earth, the hydrosphere, and the atmosphere.	List parts of the earth which are solid and liquid.	Recognize that the earth is a spherical planet with a mainly solid interior and a surface composed of landforms, bodies of water, and an atmosphere.	Describe the components of the earth system, including the solid earth, the hydrosphere, and the atmosphere.	Use the process of inquiry, design (problem solving), or the thinking skills *Habits of Mind* to demonstrate a deeper understanding of "Components and Patterns of the Earth System".
1.1.3 Wave Behavior: Describe sound, water waves, and light, using wave properties, such as wavelength, reflection, refraction, transmission, absorption, scattering, and interference	Describe everyday experiences with sound and light.	Describe experiences with sound, for example vibrations, echoes, and pitch; describe experiences with light in terms of bouncing off, passing through, and changes in path direction.	Describe sound, water waves, and light, using wave properties, such as wavelength, reflection, refraction, transmission, absorption, scattering, and interference	Use the process of inquiry, design (problem solving), or the thinking skills *Habits of Mind* to demonstrate a deeper understanding of "Wave Behavior".
1.3.6 Hydrosphere/ Atmosphere: Relate global atmospheric movement and the formation of ocean currents to weather and climate.	Describe examples of weather in everyday life.	Observe and measure weather indicators such as temperature, wind direction and speed, and precipitation, noting changes and patterns of change from day-to-day an over the seasons.	Relate global atmospheric movement and the formation of ocean currents to weather and climate.	Use the process of inquiry, design (problem solving), or the thinking skills *Habits of Mind* to demonstrate a deeper understanding of "Hydrosphere/Atmosphere".

Science Explorer: Inside the Earth

Standard	Beginning	Approaching	Meeting	Exceeding
1.3.4 Processes and Interactions in the Earth System: Describe constructive and destructive processes at work and how they continually change landforms on earth.	Describe what can happen to the earth if a volcano erupts or if there is an earthquake.	Identify processes that slowly change the surface of the earth such as erosion and weathering, and those that rapidly change the surface of the earth, such as landslides, volcanic eruptions, and earthquakes.	Describe constructive and destructive processes at work and how they continually change landforms on earth.	Use the process of inquiry, design (problem solving), or the thinking skills *Habits of Mind* to demonstrate a deeper understanding of "Processes and Interactions in the Earth System".
1.1.5 Nature and Properties of Earth Materials: Classify rocks and soils into groups based on their chemical and physical properties; describe the processes by which rocks and soils are formed.	Describe rocks or soils based on color, shape, size, and/or texture.	Observe and examine physical properties of earth materials, such as rocks and soil, water (as liquid, solid, and vapor) and gases of the atmosphere.	Classify rocks and soils into groups based on their chemical and physical properties; describe the processes by which rocks and soils are formed.	Use the process of inquiry, design (problem solving), or the thinking skills *Habits of Mind* to demonstrate a deeper understanding of "Nature and Properties of Materials".

Science Explorer: Chemical Building Blocks

Standard	Beginning	Approaching	Meeting	Exceeding
1.1.1 Properties of Substances: Use physical and chemical properties to sort and identify substances, for example, density, boiling point, and solubility.	Sort objects based on similarities.	Use physical properties to sort objects, for example, size, weight, shape, color, texture, and hardness.	Use physical and chemical properties to sort and identify substances, for example, density, boiling point, and solubility.	Use the process of inquiry, design (problem solving), or the thinking skills *Habits of Mind* to demonstrate a deeper understanding of "Properties of Substances".
1.2.3 Structure of Matter: Understand that all matter is made up of atoms, which may be combined in various kinds, ways, and numbers to make molecules of different substances.	List examples of matter.	Know that matter is made of small particles called atoms and molecules.	Understand that all matter is made up of atoms, which may be combined in various kinds, ways, and numbers to make molecules of different substances.	Use the process of inquiry, design (problem solving), or the thinking skills *Habits of Mind* to demonstrate a deeper understanding of "Structure of Matter".
1.3.3 Physical and Chemical Changes: Understand physical and chemical changes at the particle level, and know that matter is conserved.	Know water can change from a solid (ice cube) to a liquid to a gas (water vapor).	Know that matter can undergo changes of state, such as evaporation, condensation, or freezing and thawing.	Understand physical and chemical changes at the particle level, and know that matter is conserved.	Use the process of inquiry, design (problem solving), or the thinking skills *Habits of Mind* to demonstrate a deeper understanding of "Physical and Chemical Changes".

Science Explorer: Motion, Force, and Energy

Standard	Beginning	Approaching	Meeting	Exceeding
1.3.1 Nature of Forces: Know the factors that determine the strength and interactions of various forces.	Describe what happens when a force acts on an object.	Describe forces in terms of strength and direction.	Know the factors that determine the strength and interactions of various forces.	Use the process of inquiry, design (problem solving), or the thinking skills *Habits of Mind* to demonstrate a deeper understanding of "Nature of Forces".
1.1.2 Motion of Objects: Describe the positions, relative speeds, and changes in speed of objects.	Use words to describe an object's motion.	Describe the relative position and motion of objects.	Describe the positions, relative speeds, and changes in speed of objects.	Use the process of inquiry, design (problem solving), or the thinking skills *Habits of Mind* to demonstrate a deeper understanding of "Motion of Objects".
1.3.2 Forces to Explain Motion: Understand the effects of balanced and unbalanced forces on motion of objects along a straight line.	Know a force is required to move objects like a ball or pencil.	Investigate and recognize factors which determine the effects of a push or pull on the motion of objects.	Understand the effects of balanced and unbalanced forces on motion of objects along a straight line.	Use the process of inquiry, design (problem solving), or the thinking skills *Habits of Mind* to demonstrate a deeper understanding of "Forces to Explain Motion".
1.1.4 **Energy Source and Kinds:** Understand that energy is a property of substances and systems and comes in many forms, including stored energy, energy of motion, and heat energy, such as heat, light, electrical, mechanical, sound, nuclear, and chemical.	List an example of energy.	Understand that energy keeps things running and comes in many forms.	Understand that energy is a property of substances and systems and comes in many forms, including stored energy, energy of motion, and heat energy, such as heat, light, electrical, mechanical, sound, nuclear, and chemical.	Use the process of inquiry, design (problem solving), or the thinking skills *Habits of Mind* to demonstrate a deeper understanding of "Energy Source and Kinds".
1.2.2 Energy Transfer and Transformation: Determine factors that affect rate and amount of energy transfer; associate a decrease in one form of energy with an increase in another.	Know energy can be transferred from one object to another.	Know that energy can be transferred from one object to another and can be transformed from one type of energy to another.	Determine factors that affect rate and amount of energy transfer; associate a decrease in one form of energy with an increase in another.	Use the process of inquiry, design (problem solving), or the thinking skills *Habits of Mind* to demonstrate a deeper understanding of "Energy Transfer and Transformation".

Science Explorer: Bacteria to Plants

Standard	Beginning	Approaching	Meeting	Exceeding
1.1.6 Characteristics of Living Things: Categorize plants and animals into groups according to how they accomplish life processes and by similarities and differences in external and internal structures.	List examples of living things.	Distinguish living organisms from nonliving objects, and use characteristics to sort common organisms into plants and animal groups.	Categorize plants and animals into groups according to how they accomplish life processes and by similarities and differences in external and internal structures.	Use the process of inquiry, design (problem solving), or the thinking skills *Habits of Mind* to demonstrate a deeper understanding of "Characteristics of Living Things".

EALR 2 and 3 continued on following pages . . .

EALR 2: INQUIRY

The knowledge and skills necessary to investigate *systems* are focused upon scientific ***inquiry***. Students ask questions and plan valid scientific investigations to answer their questions (2.1). In addition, students demonstrate an understanding of the nature of science ***inquiry*** (2.2).

Standard	Beginning	Approaching	Meeting	Exceeding
2.1.1 Questioning: Generate questions that can be answered through scientific investigations.	Identify a question.	Ask questions about objects, organisms, and events in the environment.	Generate questions that can be answered through scientific investigations.	Study and analyze questions and related concepts that guide scientific investigations.
2.1.2 Planning and Conducting Investigations: Plan, conduct, and evaluate scientific investigations, using appropriate equipment, mathematics, and safety procedures.	Know that an "investigation" and an "experiment" can mean the same thing; know how to plan and conduct some of the steps in an investigation.	Plan and conduct simple investigations, using appropriate tools, measures, and safety rules.	Plan, conduct, and evaluate scientific investigations, using appropriate equipment, mathematics, and safety procedures.	Plan, conduct, and evaluate systematic and complex scientific investigations, using appropriate technology, multiple measures and safe approaches.
2.1.3 Explaining: Use evidence from scientific investigations to think critically and logically to develop descriptions, explanations, and predictions.	Know that "to explain" means to make a statement AND support that statement using evidence or data.	Use data to construct reasonable explanations.	Use evidence from scientific investigations to think critically and logically to develop descriptions, explanations, and predictions.	Formulate and revise scientific explanations and models using logic and evidence; recognize and analyze alternative explanations and predictions.
2.1.4 Modeling: Correlate models of behavior of objects, events, or processes to the behavior of the actual things; test models by predicting and observing actual behaviors or processes.	List an example of a model that represents something in real life.	Model objects, events, or processes by representing them with concrete objects, metaphors, analogies, or other conceptual or physical constructs.	Correlate models of behavior of objects, events, or processes to the behavior of the actual things; test models by predicting and observing actual behaviors or processes.	Use mathematics, computers, and/or related technology to model the behavior of objects, events, or processes; analyze advantages and limitations of models.
2.1.5 Communicating: Communicate scientific procedures, investigations, and explanations visually, orally, in writing, with computer-based technology, and in the language of mathematics.	Know the difference between written, visual, and oral communication.	Record and report observations, explanations, and conclusion using visual, oral, written, and mathematical expression.	Communicate scientific procedures, investigations, and explanations visually, orally, in writing, with computer-based technology, and in the language of mathematics.	Research, interpret, and defend scientific investigations, conclusion, or arguments; use data, logic, analytical thinking as investigative tools; express ideas through visual, oral, written, and mathematical expression.

2.2.6 Intellectual Honesty: Understand the operational and ethical traditions of science and technology such as skepticism, cooperation, intellectual honesty, and proprietary discovery.	Understand why a scientist should not make up data in an investigation.	Understand that all scientific observations should be reported accurately even when they contradict expectations.	Understand the operational and ethical traditions of science and technology such as skepticism, cooperation, intellectual honesty, and proprietary discovery.	Analyze and explain why curiosity, honesty, openness, and skepticism are integral to scientific inquiry.
2.2.7 Limitations of Science and Technology: Understand that scientific investigation is limited to the natural world.	Know certain questions cannot currently be answered due to the lack of technology.	Distinguish between questions that can be answered with science and technology and those that cannot.	Understand that scientific investigation is limited to the natural world.	Identify and analyze factors that limit the extent of scientific investigations.
2.2.8 Evaluating Inconsistent Results: Provide more than one explanation for events or phenomena; defend or refute the explanations using evidence.	Know that while conducting the same investigation, two groups might produce different results.	Explain why similar investigations may not produce similar results.	Provide more than one explanation for events or phenomena; defend or refute the explanations using evidence.	Compare, contrast, and critique divergent results from scientific investigations based on scientific arguments and explanations.
2.2.9 Evaluating Methods of Investigations: Describe how methods of investigation relate to the validity of scientific experiments, observations, theoretical models, and explanation.	Know it is essential to reflect on the methods used during an investigation.	Recognize that results of scientific investigations can come from expected and unexpected sources.	Describe how methods of investigation relate to the validity of scientific experiments, observations, theoretical models, and explanation.	Analyze and evaluate the quality and standards of investigative processes and procedures.
2.2.10 Evolution of Science Ideas: Explain how scientific theory, prediction or hypothesis generation, experimentation, and observation are interrelated and may lead to changing ideas.	Identify an example of how an idea or theory has changed over time.	Know that ideas in science change as new scientific thinking, theories, and evidence arise.	Explain how scientific theory, prediction or hypothesis generation, experimentation, and observation are interrelated and may lead to changing ideas.	Know that science involves testing, revising, and occasionally discarding theories; understand that scientific inquiry and investigation lead to a better understanding of the natural world and not to absolute truth.

EALR 3: DESIGN

The knowledge and skills of science are applied by designing solutions to human problems or challenges. Students use design processes to develop and test scientific solutions to these problems. In addition, students recognize that science and technology are human endeavors, interrelated to each other, to society, and to the workplace.

Standard	Beginning	Approaching	Meeting	Exceeding
3.1.1 Identifying Problems: Identify and examine common, everyday challenges or problems in which science/technology can be or has been used to design solutions.	Identify a problem in a given scenario.	Identify problems found in familiar contexts in which science/technology can be or has been used to design solutions.	Identify and examine common, everyday challenges or problems in which science/technology can be or has been used to design solutions.	Study and analyze challenges or problems from local, regional, national, or global contexts in which science/technology can be or has been used to design a solution.
3.1.2 Designing and Testing Solutions: Identify, design, and test alternative solutions to a challenge or problem.	Propose a solution to a problem.	Propose, design, and test a solution to a problem.	Identify, design, and test alternative solutions to a challenge or problem.	Research, model, simulate, and test alternative solutions to a problem.
3.1.3 Evaluating Potential Solutions: Compare and contrast multiple solutions to a problem or challenge.	Recognize if a solution to a problem solves or does not solve the problem.	Evaluate how well a design or a product solves a problem.	Compare and contrast multiple solutions to a problem or challenge.	Propose, revise, and evaluate the possible constraints, applications, and consequences of solutions to a problem or challenge.
3.2.4 All Peoples Contribute to Science and Technology: Know that science and technology have been developed, used, and affected by many diverse individuals, cultures, and societies throughout human history.	Identify individuals who contribute to science.	Know that science and technology have been practiced by all peoples throughout history.	Know that science and technology have been developed, used, and affected by many diverse individuals, cultures, and societies throughout human history.	Analyze how scientific knowledge and technological advances discovered and developed by individuals and communities in all cultures of the world contribute to changes in societies.
3.2.5 Relationship of Science and Technology: Compare and contrast scientific inquiry and technological design in terms of activities, results, and influence on individuals and society; know that science enables technology and vice versa	Describe an example of technology.	Recognize that people have invented tools for everyday life and for scientific investigations.	Compare and contrast scientific inquiry and technological design in terms of activities, results, and influence on individuals and society; know that science enables technology and vice versa	Analyze how the scientific enterprise and technological advances influence and are influenced by human activity, for example, societal, environmental, economical, political, or ethical considerations.

3.2.6 **Careers and Occupations Using Science, Mathematics, and Technology:** Investigate the use of science, mathematics, and technology within occupational/career areas of interest.	Describe some science careers and occupations.	Identify the knowledge and skills of science, mathematics, and technology used in common occupations.	Investigate the use of science, mathematics, and technology within occupational/career areas of interest.	Investigate the scientific, mathematical, and technological knowledge, training, and experience needed for occupational/career areas of interest.