GANADO MIDDLE SCHOOL

(Ganado Unified School District No.20)
Navajo Route 1, Highway 264, Ganado, AZ 86505

PACING GUIDE FOR STEM

S.Y. 2022-2023

(FIRST AND SECOND SEMESTER)

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Resources	AZ College and Career Readiness Standards	Essential Question (HESS Matrix)	Learning Goal	Vocabulary (Content/Academic)
Safety Expectations While there are no specific standards that address laboratory or field safety, it is a required part of science education to instruct and guide students in using appropriate safety precautions for all investigations. Reducing risk and preventing accidents in science classrooms	Identify and explain the intended use of safety equipment available in the classroom. For example, demonstrate how to properly inspect, use, and maintain safe operating procedures with tools and equipment. Incorporate safety procedures and complete safety test with 100 percent accuracy.	**What is STEM?** **What is the safety expectations of STEM?** **What is a hazard?**	• Day 1 Ice Breaker AND Syllabus • What is STEM? Poster/PPT Design: Students will create a poster/PPT to using words and pictures to describe the 4 aspects of STEM • Set up Engineering Notebook (OneNote) • Safety Rules/Procedures (Notes, PPT) • Safety Quiz (must	**OSHA** **EPA** **Hazard**

begins with planning that meets all local, state, and federal requirements, including Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA) requirements for safe handling and disposal of laboratory materials. The following four steps are recommended for carrying out a hazard and risk assessment for any investigations: 1) Identify hazards. Hazards may be physical, chemical, health, or environmental. 2) Evaluate the type of risk associated with each hazard. 3) Instruct students on all procedures and necessary safety precautions			score a 100%) • Engineering Design Process (EDP) Notes/PPT	

in such a way as to eliminate or reduce the risk associated with each hazard. 4) Prepare for any emergency that might arise despite all the required safety precautions.				
6.EE.A.2: Write, read, and evaluate algebraic expressions. a. Write expressions that record operations with numbers and variables. b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, and coefficient); view one or more parts of an expression as a single entity. c. Evaluate expressions given specific values of their variables. Include expressions that arise from formulas used to solve				

mathematical problems and problems in real-world context. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).				
"Science Explorer, Chemical Building Blocks", Prentice Hall "Integrated Science", Glencoe "General Science", AGS (American Guidance Service) "Introduction to Matter", Holt Science and Technology	Physical Science P1: All matter in the Universe is made of very small particles. P2: Objects can affect other objects at a distance.	What is a matter? What are the properties of matter? What are the phases of matter? What are the Properties and Characteristics of Matter? What is force?	Students will be able to describe matter Students will be able to identify properties of matter Students will be able to explain the phases of matter and give examples of each phase. Students will be able to make a model of an atom Students will be able to describe force using simple demonstration and examples in the laboratory	Matter Atom Proton Electron Neutron Phases of Matter Solid Phase Liquid Phase Gas Phase Intrinsic/Extrinsic property Intensive/Extensive property Kinematic Quantities Units of Measure Distance Speed

"Science" Harcourt School Publishers "Science", ACCESS Building Literacy Through Learning	P3: Changing the movement of an object requires a net force to be acting on it. P4: The total amount of energy in a closed	What are the kinematic quantities? What are the different forces in nature? How is force affected by object's motion? What are the three Laws of Motion? How does acceleration is affected by mass and force? What is Law of Inertia?	Students should be able to discuss kinematic quantities Students should be able to give the different forces in nature using laboratory works and simple demonstration Students should be able to make a model showing how mass and force affects the acceleration of an object Students should be able to demonstrate laws of motion by simple laboratory works and simple demonstration Students should be able to conduct a research work on how the mass and force affects the acceleration of an object Students will be able to show an example of Law of Inertia through simple demonstration and laboratory work Students will be	Measuring Materials Metric System English System Triple Beam Balance Yardstick Force Tension Force Weight Acceleration Gravity Displacement Motion/Movement Inertia Mass Contact Forces Non-Contact Forces Weak Nuclear Force Strong Nuclear Force Buoyant Force Spring Force Tension Force Air Frictional Force Friction Laws of Motion Law of Inertia Law of Acceleration Law of Interaction/Action-Reaction Law

	system is always the same but can be transferred from one energy store to another during an event.	What is an Energy? What are the different Sources and Forms of Energy? What is a Heat? What is temperature? How does transfer of heat takes place? What is the First Law of Thermodynamics? What is the Law of Transformation of Energy?	able to describe Energy. Students will be able to identify the different forms and sources of Energy. Students will be able to give the definition of Heat. Students will be able to describe Temperature. Students will be able to explain how heat is transferred by simple laboratory work and simple demonstration Students will be able to perform laboratory work and simple demonstration based from what they understand in the First Law of Thermodynamics Students will be able to explain the Law of Conservation of Energy	Energy Forms and Sources of Energy Heat Temperature Heat Transfer Conduction Convection Radiation First Law of Thermodynamics/Law of Conservation of Energy Law of Conservation of Energy

" General Science", AGS (American Guidance Service) "Science" Harcourt School Publishers "Science", ACCESS Building Literacy Through Learning	Earth and Space Science E1: The composition of the Earth and its atmosphere and the natural and human processes occurring within them shape the Earth's surface and its climate.	What is Earth? What are the Composition of Earth? What are the Three Layers of the Earth? What is an Atmosphere? What are the Layers of the Atmosphere? What are environmental problems that mankind is facing nowadays and in the future?	Students will be able to describe Earth. Students will be able to give the composition of Earth. Students will be able to make a model of Three Layers of the Earth. Students will be able to propose ways on how to maintain a healthy atmosphere. Students will be able to describe and give the composition of each layer of the atmosphere through model making. Students will be able to submit a research work that suggest ways on how to diminish environmental problems/risks in the community.	Earth Crust Mantle Core Composition of the earth Atmosphere Troposphere Stratosphere Mesosphere Ionosphere Exosphere Ozone layer
	E2: The Earth and our solar system	What is a season?		Weather Season

	are a very small part of one of many galaxies within the Universe.	Why does season change? How does rotation, movement, shape of the earth has something to do with different seasons? How does the Earth was formed? What is a solar system? What are the celestial bodies in our solar system?	Students will be able to describe Weather and Season in different areas/continent of the Earth using a globe or a map. Students will be able to explain how seasons change through simple demonstration using models. Students will be able to relate the position, tilt of the Earth in the season's change. Students will be able to give the Theories that explain the Origin of the Earth and the Solar System. Students will be able to code and describe the Planets in the Solar System. Students will be able to describe Celestial Bodies in the Solar System using simple demonstrations and models.	Tilt Axis Rotation Revolution Solar system and universe Planets Galaxies Comets Asteroids Meteors Celestial Bodies

		What is the difference between Asteroid, Comets and Meteors?	Students will be able to make a research on Comets, Asteroids and Meteors.	
"Cells and Heredity", Prentice Hall Science Explorer "Cells and Heredity", Interactive Science "General Science", AGS (American Guidance Service) "Science" Harcourt School Publishers "Science", ACCESS Building Literacy Through Learning	Life Science L1: Organisms are organized on a cellular basis and have a finite life span.	What is a Biosphere? What are the compositions of the Biosphere? What are the things needed by an organism to survive? How Biotechnology helps mankind? How do plants make food?	Students will be able to describe biosphere. Students will be able to identify the compositions of the biosphere. Students will be able to give the things needed by an organism to survive. Students should be able to make a research paper on Biotechnology. Students should investigate how plants make food through research work. Students should be able to discuss how	Biosphere Cell Tissue Organ Organ system Organism Population Community Biotechnology Genetically Modified Organism Tissue culture Cloning Genetic Engineering Bioremediation ATP (Adenosine triphosphate) Photosynthesis Cellular Respiration

		How does cell use or get energy?	cells use/breakdown energy through cellular respiration through a research work.	
	L2: Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms.	What is an ecosystem?	Students should be able to make a model of an ecosystem using recyclable materials.	Ecosystem Food chain Food web Producer/Autotroph Consumer/Heterotroph Decomposers Omnivore Carnivore Herbivore Adaptation Commensalism Predation Mutualism Survival of the fittest
		What are the things needed by an organism to survive?		
		What is food chain? Describe food web.	Students should be able to describe food chain and food web.	
		How organisms interact with one another?	Students should be able to explain how organisms interact with one another in an ecosystem.	
	L3: Genetic information is passed down from one generation of organisms to another.	What is a microscope?	Students should be able to identify the parts of the microscope.	Microscope Microscopy Mechanical parts of the microscope Optical parts of the microscope Genetics Gregor Mendel Heredity
		What are the parts of the cell?	Students will be able to make a model of a cell.	

	L4: The unity and diversity of organisms, living and extinct, is the result of evolution.	What are the parts of the microscope? What is Genetics? How do genes pass on from one generation to another? What is the importance of biodiversity in an ecosystem? How does organism become extinct?	Students will be able to use the microscope properly through laboratory work. Students will be able to explain genetics. Students will be able to make a family tree. Students will be able to make a research on the flora and fauna in different continents and major regions of the Earth. Students should be able to propose ways/suggestions on how to avoid extinction of an organism.	Mendelian Genetics Non-Mendelian Genetics Allele Homozygous Heterozygous Phenotype Genotype Monohybrid cross Dihybrid cross Offspring Probability Genetic Engineering Cloning Genetic counselling Biodiversity Extinction Evolution Charles Darwin Theory of Natural Selection