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MSAD #54 Science Curriculum

Content Area: Science
Unit: Unifying Themes

Grade: Grade 4
MLR Span: 3-5

MLR Content Standard: **A: Unifying Themes**
Students apply the principles of systems, models, constancy and change, and scale in science and technology.

*Assessment

Unifying Themes:	**MLR Performance Indicators**	**MSAD #54 Objectives**	**Instructional Resources/Activities**
A1 Systems	1.Students explain interactions between parts that make up whole man-made and natural things.	Students will:	Standards A-C are unifying themes and should be embedded in Standards D and E. Please work to accomplish these objectives when you complete the units in standards D and E.
	a.Give examples that show how individual parts of organisms, ecosystems, or man-made structures can influence one another.		a. All Units
	b.Explain ways that things including organisms, ecosystems, or man-made structures may not work as well (or at all) if a part is missing, broken, worn out, mismatched, or misconnected.		b. Ecosystems Unit, Motion & Design Unit
A2 Models	2.Students use models to represent objects, processes, and events from the physical setting, the living environment, and the technological world.	Students will	

	a.Represent the features of a real object, event, or process using models including geometric figures, number sequences, graphs, diagrams, sketches, maps, or three-dimensional figures and note ways in which those representations do (and do not) match features of the originals.		a. Ecosystems Unit & Land and Water Unit
A3 Constancy and Change	3.Students identify and represent basic patterns of change in the physical setting, the living environment, and the technological world. a.Recognize patterns of change including steady, repetitive, irregular, or apparently unpredictable change. b.Make tables or graphs to represent changes.	Students will:	a-b. All units
A4 Scale	4.Students use mathematics to describe scale for man-made and natural things. a.Measure things to compare sizes, speeds, times, distances, and weights.	Students will:	a. All units

	b.Use fractions and multiples to make comparisons of scale.		b. Ecosystem Unit & Motion & Design Unit

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MSAD #54 Science Curriculum

Content Area: Science
Unit: Skills & Traits

Grade: Grade 4
MLR Span: 3-5

MLR Content Standard: **B. The Skills and Traits of Scientific Inquiry And Technological Design**
Students plan, conduct, analyze data from and communicate results of in-depth scientific investigations; and they use a systematic process, tools, equipment, and a variety of materials to create a technological design and produce a solution or product to meet a specified need.

Skills and Traits	MLR Performance Indicators	MSAD #54 Objectives	Instructional Resources/Activities
B1 Skills and Traits of Scientific Inquiry	1.Students plan, conduct, analyze data from, and communicate results of investigations, including fair tests. a.Pose investigable questions and seek answers from reliable sources of scientific information and from their own investigations. b.Plan and safely conduct investigations including simple experiments that involve a fair test. c.Use simple equipment, tools, and appropriate metric units of measurement to gather data and extend the senses. d.Use data to construct and support a reasonable explanation.	Students will:	a-b. Motion & Design Unit c-e. All Units

	e.Communicate scientific procedures and explanations.		
B2 Skills and Traits of Technological Design	2.Students use a design process, simple tools, and a variety of materials to solve a problem or create a product, recognizing the constraints that need to be considered.	Students will	
	a.Identify and explain a simple design problem and a solution related to the problem.		a. Ecosystem Unit
	b.Propose a solution to a design problem that recognizes constraints including cost, materials, time, space, or safety.		b-c. All Units
	c.Use appropriate tools, materials, safe techniques, and quantitative measurements to implement a proposed solution to a design problem.		
	d.Balance simple constraints in carrying out a proposed solution to a design problem.		d. Motion & Design Unit
	e.Evaluate their own design results, as well as those of others, using established criteria.		e. All Units

	f.Modify designs based on results of evaluations. g.Present the design problem, process and design or solution using oral, written, and/or pictorial means of communication.		f. Motion & Design Unit g. All Units - Using Science Notebooks

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MSAD #54 Science Curriculum

Content Area: Science
Unit: Scientific & Technological Enterprise

Grade: Grade 4
MLR Span: 3-5

MLR Content Standard: **C. The Scientific and Technological Enterprise**
Students understand the history and nature of scientific knowledge and technology, the processes of inquiry and technological design, and the impacts science and technology have on society and the environment.

Scientific & Technological Enterprise	MLR Performance Indicators	MSAD #54 Objectives	Instructional Resources/Activities
C1 Understandings of Inquiry	1.Students describe how scientific investigations results in explanations that are communicated to other scientists. a.Describe how scientists answer questions by developing explanations based on observations, evidence and knowledge of the natural world. b.Describe how scientists make their explanations public.	Students will	a-b. All units
C2 Understandings About Science and Technology	2.Students describe why people use science and technology and how scientists and engineers work. a.Describe how scientists seek to answer questions and explain the natural world. b.Describe how engineers seek solutions to problems through the design and production of products.	Students will	a. Ecosystem Unit b. Motion and Design Unit

C3 Science, Technology, and Society	3.Students identify and describe the influences of science and technology on people and the environment. a.Explain how scientific and technological information can help make safe and healthy decisions. b.Give examples of changes in the environment caused by natural or man-made influences. c.Explain that natural resources are limited, and that reusing, recycling, and reducing materials and using renewable resources is important.	Students will	a. Motion and Design Unit b-c. Ecosystem Unit
C4 History and Nature of Science	No performance indicator.		

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MSAD #54 Science Curriculum

Content Area: Science
Unit: Physical Setting

Grade: Grade 4
MLR Span: 3-5

MLR Content Standard: **D. The Physical Setting**
Students understand the universal nature of matter, energy, force, and motion and identify how these relationships are exhibited in Earth Systems, in the solar system, and throughout the universe.

Physical Setting	MLR Performance Indicators	MSAD #54 Objectives	Instructional Resources/Activities
D1 Universe and Solar System	1.Students describe the positions and apparent motions of different objects in and beyond our solar system and how these objects can be viewed from Earth. a.Show the locations of the sun, Earth, moon, and planets and their orbits. b.Observe and report on observations that the sun appears to move across the sky in the same way every way, but its path changes slowly over the seasons. c.Recognize that the sun is a star and is similar to other stars in the universe.	Students will	
D2 Earth	2.Students describe the properties of Earth's surface materials, the processes that change them, and cycles that affect the Earth.	Students will	

	a.Explain the effects of the rotation of Earth on the day/night cycle, and how that cycle affects local temperature.		
	b.Describe the various forms water takes in the air and how that relates to weather.	b1. observe, record and discuss the process of the water cycle, and the affect it has on the shape of the land.	b1. Land and Water Unit
	c.Give several reasons why the climate is different in different regions of the Earth.	c1. use model ecosystems to learn more about the relationships that exist on earth.	c1. Ecosystems Unit
	d.Explain how wind, waves, water, and ice reshape the surface of Earth.	d. discuss the role moving water has in shaping the land on earth, including canyons, deltas, etc.	d1. Land and Water Unit b1-d1. outdoor nature hike, visit local park, lake, etc.
	e.Describe the kinds of materials that form rocks and soil.		
	f.Recognize that the sun is the source of Earth's surface heat and light energy.		
	f.Explain how the substance called air surrounds things, takes up space, and its movement can be felt as wind.		
D3 Matter and Energy	3.Students describe properties of objects and materials before and after they undergo a change or interaction.	Students will	
	a.Describe how the weight of an object compares to the sum of		

	the weight of its parts. b.Illustrate how many different substances can be made from a small number of basic ingredients. c.Describe properties of original materials, and the new material(s) formed, to demonstrate that a change has occurred. d.Describe what happens to the temperatures of objects when a warmer object is near a cooler object. e.Describe how the heating and cooling of water and other materials can change the properties of the materials. f.Explain that the properties of a material may change but the total amount of material remains the same. g.Explain that materials can be composed of parts too small to be seen without magnification.	c & f. use science notebooks to record all observations, cycles, notes, etc. c1. observe, record and discuss soil components before and after erosion and deposition. f1. observe, record and discuss the wearing away and moving of soil and rock (erosion) and the settling of eroded materials (deposition).	c1 Collect soil samples from local environment to observe. c1. Land and Water Unit f1. Visit local areas to observe erosion and deposition. f1. Land and Water Unit
D4 Force and Motion	4.Students summarize how various forces affect the motion of objects.	Students will a-c. use science notebooks to record all observations, cycles,	

		notes, etc.	
	a.Predict the effect of a given force on the motion of an object.	a1. predict, record, discuss and then test how adding weight (load) to vehicles affects their motion.	a1-c1. Motion & Design Unit
	b.Describe how fast things move by how long it takes them to go a certain distance.	b1. investigate, record and discuss how variable amounts of energy affect the motion of their vehicles.	
	c.Describe the path of an object.	c1. adapt their vehicles and discuss how it might affect their motion, then record results	
	d.Give examples of how gravity, magnets, and electrically charged materials push and pull objects.		

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MSAD #54 Science Curriculum

Content Area: Science
Unit: The Living Environment

Grade: Grade 4
MLR Span: 3-5

MLR Content Standard: **E. The Living Environment**
Students understand that cells are the basic unit of life, that all life as we know it has evolved through genetic transfer and natural selection to create a great diversity of organisms, and that these organisms create interdependent webs through which matter an energy flow. Students understand similarities and differences between humans and other organisms and the interconnections of these interdependent webs.

Living Environment	MLR Performance Indicators	MSAD #54 Objectives	Instructional Resources/Activities
E1 Biodiversity	1.Students compare living things based on their behaviors, external features, and environmental needs. a.Describe how living things can be sorted in many ways, depending on which features or behaviors are used to sort them, and apply this understanding to sort living things.	Students will	
	b.Describe the changes in external features and behaviors of an organism during its life cycle.	b1. use science notebooks to record all observations, cycles, notes, etc. b2. observe, record and discuss changes in features and behaviors of an organism during its lifecycle.	b1-b2. Ecosystem Unit
E2 Ecosystems	2. Students describe ways organisms depend upon, interact within, and change the living and non-living environment as well as ways the environment affects organisms. a.Explain how changes in an organism's habitat can	Students will a-e. use science notebooks to record all observations, cycles, notes, etc. a1. discuss changes in habitats that can influence the survival	a-e. take a nature walk, explore school grounds to observe different ecosystems, organisms and their interactions.

	influence its survival. b.Describe that organisms all over the Earth are living, dying, and decaying and new organisms are being produced by the old ones. c.Describe some of the ways in which organisms depend on one another, including animals carrying pollen and dispersing seeds. d.Explain how the food of most animals can be traced back to plants and how animals use food for energy and repair. e.Explain how organisms can affect the environment in different ways.	of organisms, such as: pollution, sunlight, water, temperature and soil. b1, c1. record and discuss the interactions between organisms and their environments. b2. record and discuss life cycles of organisms. d1. observe, record and discuss that organisms in an ecosystem have dependent and interdependent relationships, which can be illustrated by food webs e1. discuss and record observations of how organisms affect the environment they live in.	a1-e1. Ecosystems Unit
E3 Cells	3.Students describe how living things are made up of one or more cells and the ways cells help organisms meet their basic needs. a.Give examples of organisms that consist of a single cell and organisms that are made of a collection of cells. b.Compare how needs of living things are met in single-celled and multi-celled organisms.	Students will	

E4 Heredity and Reproduction	4.Students describe characteristics of organisms, and the reasons why organisms differ from or are similar to their parents. a.Name some likenesses between children and parents that are inherited, and some that are not. b.Explain that in order for offspring to look like their parents, information related to inherited likenesses must be handed from parents to offspring in a reliable manner.	Students will	
E5 Evolution	5.Students describe the fossil evidence and present explanations that help us understand why there are differences among and between present and past organisms. a.Explain advantages and disadvantages gained when some individuals of the same kind are different in their characteristics and behavior. b.Compare fossils to one another and to living organisms according to their similarities and differences.	Students will	