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MSAD #54 Science Curriculum

Content Area: Science
Unit: Unifying Themes

Grade: Grade 5
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 3-5**	**MSAD #54 Objectives**	**Instructional Resources/Activities**
A1 Systems	1.Students explain interactions between parts that make up whole man-made and natural things. a.Give examples that show how individual parts of organisms, ecosystems, or man-made structures can influence one another. 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.	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.
A2 Models	2.Students use models to represent objects, processes, and events from the physical setting, the living environment, and the technological world. a.Represent the features of a real object, event, or process using models	Students will: a1. review and practice a model that reflects astronomers' understanding about the causes of the moon's cycle.	a1. Teacher resource-Science: A Closer Look, grade 5, p. 430-438.

	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.	a2. sketch objects that they view in the field and under the microscope.	a2. Microworlds Kit and Mixtures and Solutions, all lessons.
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: a1.review the following grade 3 objective: review and practice a model that reflects astronomers' understanding about the causes of the moon's cycle and the constant changes in the way the moon appears from earth.	
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. b.Use fractions and multiples to make comparisons of scale.	Students will: a1. measure objects in hair widths and make more precise measurements in millimeters. a2. measure solids and liquids.	a1. Microworlds Kit, Lesson 7. a2. Mixtures and Solutions Kit

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MSAD #54 Science Curriculum

Content Area: Science
Unit: Skills & Traits

Grade: Grade 5
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 9-12	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.	Students will:	
	a.Pose investigable questions and seek answers from reliable sources of scientific information and from their own investigations.	a1. students pose their own questions, plan an experiment, and use data and reliable to references answer their questions.	a1.Mixtures and Solutions Kit extensions.
	b.Plan and safely conduct investigations including simple experiments that involve a fair test.	b1. plan and conduct investigations involving concentration, saturation, mystery solutions, and chemical reactions.	b1. Mixtures and Solutions Kit, all investigations.
	c.Use simple equipment, tools, and appropriate metric units of measurement to gather data and extend the senses.	c1. use a variety of magnifiers to observe common items. c2. prepare wet mount and well slides. c3. correctly place an object on the stage of a microscope c4. focus up and down over the surface of an object that has depth.	c1-c6. Microworlds Kit, Lessons 2-10.

		c5. adjust the light and focus easily. c5.develop the concept of field of view. c6. sketch and describe in words what they observe. c7. measure volumes of solids and liquids.	
	d.Use data to construct and support a reasonable explanation. e.Communicate scientific and explanations.	d1.Use data to construct and support a reasonable explanation. e1.Communicate scientific and explanations.	c7-e1. Mixtures and Solutions Kit, all Investigations.
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. a.Identify and explain a simple design problem and a solution related to the problem. b.Propose a solution to a design problem that recognizes constraints including cost, materials, time, space, or safety. c.Use appropriate tools, materials, safe techniques, and	Students will:	

	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. e.Evaluate their own design results, as well as those of others, using established criteria. 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.		

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MSAD #54 Science Curriculum

Content Area: Science
Unit: Scientific & Technological Enterprise

Grade: Grade 5
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 9-12	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 a1.describe how scientists answer questions by developing explanations based on observations, evidence and knowledge of the natural world.	a1. Teacher resource-Science: A Closer Look, grade 5, "Be a Scientist" pp. 2-14, Chapter 9; Mixtures and Solutions Kit, all Lessons.
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:	

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 a1. explain how the invention of the microscope led to the discovery of disease causing organisms in turn led to the discovery of antibiotics and the improved health of humans.	a1.Microworld Kit, Lessons 12-16.
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 5
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 9-12	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.	Students will:	
	a.Show the locations of the sun, Earth, moon, and planets and their orbits.	a1. review the following grade 3 objectives: the locations of the Earth, moon and planets	a1-b1. Teacher resource-Science: A Closer Look, grade 5, p. 32-42 and 418-472.
	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.	b1. review the following grade 3 objectives: review and practice a model that reflects astronomers' understanding about the causes of the moon's cycle.	
	c.Recognize that the sun is a star and is similar to other stars in the universe.		
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: a1. review the following grade 3 objectives: Explain the effects of the rotation of Earth on the day/night cycle, and how that	a1. Teacher resource-Science: A Closer Look, grade 5, p. 420-429.

	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. c.Give several reasons why the climate is different in different regions of the Earth. d.Explain how wind, waves, water, and ice reshape the surface of Earth. 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.	cycle affects local temperature.	
D3 Matter and Energy	3.Students describe properties of objects and materials before and after they undergo a change or interaction. a.Describe how the weight of an object compares to the sum of	Students will a1. describe how the weight of an object compares to the sum of the weight of its parts.	a1. Teacher-made activities to demonstrate.

	the weight of its parts.		
	b.Illustrate how many different substances can be made from a small number of basic ingredients.	b1. experience the combination of two or more materials forming a material that has properties that are different from the original materials, making it possible to combine materials in many different ways.	b1. Mixtures and Solutions Kit
	c.Describe properties of original materials, and the new material(s) formed, to demonstrate that a change has occurred.	c1. describe properties of original materials, and the new material(s) formed, to demonstrate that a change has occurred.	c1. Mixtures and Solutions Kit, Investigation 4.
	d.Describe what happens to the temperatures of objects when a warmer object is near a cooler object.	d1. describe what happens to the temperatures of objects when a warmer object is near a cooler object.	d1-e1. Teacher resource- Science: A Closer Look, grade 5 pp. 518-521.
	e.Describe how the heating and cooling of water and other materials can change the properties of the materials.	e1.use complete sentences to describe what happens as heat is removed from and added to water.	e1. TOPS- Solutions, Teacher resource- Science: A Closer Look, grade 5, pp. 520-523.
	f.Explain that the properties of a material may change but the total amount of material remains the same.	f1. create several chemical reactions inside plastic bags weighing the components before and after the change.	f1. Mixtures and Solutions Kit; Teacher resource- Science: A Closer Look, grade 5, pp. 540-549.
	g.Explain that materials can be composed of parts too small to be seen without magnification.	g1. create several solutions and mixtures and separate them into their component parts and discuss the fact that some of the components are too small to see without magnification.	g1.Mixtures and Solutions Kit

D4 Force and Motion	4.Students summarize how various forces affect the motion of objects. a.Predict the effect of a given force on the motion of an object. b.Describe how fast things move by how long it takes them to go a certain distance. c.Describe the path of an object. d.Give examples of how gravity, magnets, and electrically charged materials push and pull objects.	Students will:	

MSAD #54 Science Curriculum

Content Area: Science
Unit: The Living Environment

Grade: Grade 5
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 9-12	MSAD #54 Objectives	Instructional Resources/Activities
E1 Biodiversity	1.Students compare living things based on their behaviors, external features, and environmental needs.	Students will:	
	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.	a1. create a variety of classification systems for a variety of animals, plants, and single-celled organisms. a2. articulate that the classification system should be appropriate for its use.	a1-a2.Teacher resource-Science: A Closer Look, grade 5, p. 32-42.
	b.Describe the changes in external features and behaviors of an organism during its life cycle.	b1. observe, record, describe, and illustrate the external features and behaviors of an invertebrate during its life cycle. b2. write a short research paper about an invertebrate including: changes in external features and behaviors as well as the habitats in which the animal lives out its life.	b1-b2.Teacher resource-Science: A Closer Look, grade 5, p.112-121.
E2 Ecosystems	2. Students describe ways organisms depend upon, interact within, and change the living and non-living	Students will:	

	environment as well as ways the environment affects organisms. a.Explain how changes in an organism's habitat can 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.		
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 a1. observe, record, describe, and illustrate a variety of vegetable tissues under the microscope. a2. observe, record, describe, and illustrate a variety of single-celled organisms under the microscope. b1. Compare how needs of living things are met in	a1-b1. Microworlds Kit, Lessons 10-16. Teacher Resource Science: a Closer Look, Grade 5, pp. 22-31.

		single-celled and multi-celled organisms.	
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:	