AFRL NM STEM Academy
Fifth Grade Standards Alignment
for Mission to Mars

Common Core Standards for English Language Arts (Grade 5)

			Mission Patch	Mars Facts	Life Support System	Saga	Colony Location Problem	Habitat Design	Lunch on Mars Planning	Link-Up Day
Reading Standards for Informational Text										
	Key Ideas and Details									
	1.	Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.		X	X		X	X		
	Craft and Structure									
	4.	Determine the meaning of general academic and domain-specific words and phrases in a text relevant to *a grade 5 topic or subject area.*		X	X		X	X		
	Integration of Knowledge and Ideas									
	7.	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.		X	X		X	X		
	9.	Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.			X	X		X		X
	Range of Reading and Level of Text Complexity									
	10.	By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 4-5 text complexity band independently and proficiently.		X	X	X	X	X		
Reading Standards: Foundational Skills										
	Phonics and Word Recognition									
	3.	Know and apply grade-level phonics and word analysis skills in decoding words.		X	X		X	X		
		a. Use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multisyllabic words in context and out of context.		X	X		X	X		
	Fluency									
	4.	Read with sufficient accuracy and fluency to support comprehension		X	X		X	X		
		a. Read on-level text with purpose and understanding.		X	X		X	X		
		c. Use context to confirm or self-correct word recognition and understanding, rereading as necessary.		X	X		X	X		
Writing Standards										
	Text Types and Purposes									
	1.	Write opinion pieces on topics or texts, supporting a point of view with reasons and information.			X			X		
		b. Provide logically ordered reasons that are supported by facts and details.			X			X		
	2.	Write informative/explanatory texts to examine a topic and convey ideas and information clearly.			X	X		X		
		d. Use precise language and domain-specific vocabulary to inform about or explain the topic.			X	X		X		
	3.	Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.				X				
		a. Orient the reader by establishing a situation and introducing a narrator and/or characters; organize an event sequence that unfolds naturally.				X				
		c. Use a variety of transitional words, phrases, and clauses to manage the sequence of events.				X				
		d. Use concrete words and phrases and sensory details to convey experiences and events precisely.				X				

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	Production and Distribution of Writing									
	4.	Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1-3 above.)			X	X		X		
	5.	With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. (Editing for conventions should demonstrate command of Language standards 1-3 up to and including grade 5 on pages 28 and 29.)			X	X		X		
	Production and Distribution of Writing									
	7.	Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.		X	X			X		
	8.	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.			X	X	X	X		
	9.	Draw evidence from literary or informational texts to support analysis, reflection, and research.			X			X		
		b. Apply *grade 5 Reading standards* to informational texts (e.g., "Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point[s]").			X			X		
	Range of Writing									
	10.	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.			X	X		X		
Speaking and Listening Standards										
	Comprehension and Collaboration									
	1.	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-lead) with diverse partners on *grade 5 topics and texts* , building on others' ideas and expressing their own clearly.	X	X	X	X				X
		a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion.	X	X	X	X				X
		b. Follow agreed-upon rules for discussions and carry out assigned roles.	X	X	X	X	X	X	X	X
		c. Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others.	X	X	X	X			X	X
		d. Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.	X		X	X				X
	2.	Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.	X	X	X	X				X
	3.	Summarize the points a speaker makes and explain how each claim is supported by reasons and evidence.								X
	Presentation of Knowledge and Ideas									
	4.	Report on a topic or text or present an opinion sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.	X		X	X				X
	5.	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.	X		X	X				X
	6.	Adapt speech to a variety of contexts and tasks, using formal English when appropriate to task and situation. (See grade 5 Language standards 1 and 3 on pages 28 and 29 for specific expectations.)			X	X				X
Language Standards										
	Conventions of Standard English									
	1.	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.			X	X		X		X
		c. Use verb tense to convey various times, sequences, states, and conditions.			X	X		X		X

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	2.	Demonstrate command of the conventions of standard English capitalization , punctuation, and spelling when writing.				X				
		a. Use punctuation to separate items in a series.				X				
		e. Spell grade-appropriate words correctly, consulting references as needed.				X				
	Knowledge of Language									
	3.	Use knowledge of language and its conventions when writing, speaking, reading, or listening.			X	X		X		X
		a. Expand, combine, and reduce sentences for meaning, reader/listener interest, and style.			X	X		X		X
	Vocabulary Acquisition and Use									
	4.	Determine or clarify the meaning of unknown and multiple-meaning words, and phrases based on *grade 5 reading and content* , choosing flexibly from a range of strategies.		X	X		X	X		X
		a. Use context (e.g., cause/effect relationships and comparison in text) as a clue to the meaning of a word or phrase.		X	X		X	X		X
		c. Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation and determine or clarify the precise meaning of key words and phrases.		X	X		X	X		
	6.	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal contrast, addition, and other logical relationships (e.g., *however, although, nevertheless, similarly, moreover, in addition*).		X	X	X	X	X		X

Common Core Standards for Mathematics (Grade 5)

Mathematical Practices										
1.	Make sense of problems and persevere in solving them.		X	X		X	X	X	X
2.	Reason abstractly and quantitatively.		X	X		X	X	X	X
3.	Construct viable argument and critique the reasoning of others.			X		X	X		X
4.	Model with mathematics.						X	X	
5.	Use appropriate tools strategically.						X	X	
6.	Attend to precision.					X	X		
7.	Look for and make use of structure.			X			X	X	
8.	Look for and express regularity in repeated reasoning.		X				X		X
Number and Operations in Base Ten										
	◆	**Understand the place value system.**								
	1.	Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.					X			
	◆	**Perform operations with multi-digit whole numbers and with decimals to hundredths.**								
	5.	Fluently multiply multi-digit whole numbers using the standard algorithm.						X	X	

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	6.	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays and/or area models.		X				X	X	
	7.	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.					X			
Number and Operations - Fractions										
	5.	Interpret multiplication as scaling (resizing) by:						X		
		a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.						X		
		b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence a/b = (nxa)/(nxb) to the effect of multiplying a/b by 1.						X		
	6.	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.						X		
Measurement and Data										
	◆	**Convert like measurements units within a given measurement system.**								
	1.	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multistep, real world problems.						X	X	
Geometry										
	◆	**Graph points on the coordinate plane to solve real-world and mathematical problems.**								
	1.	Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).					X			
	2.	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.					X			

Next Generation Science Standards (Grade 5)

Performance Expectations

Physical Science										
5-PS2	**Motion and Stability: Forces and Interactions**									
	1.	Support an argument that the gravitational force exerted by Earth on objects is directed down.		X	X					
	Disciplinary Core Ideas									
	PS2.B: Types of Interactions									
	◆	The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. (5-PS2-1)		X	X					
Life Science										
5-LS1	**From Molecules to Organisms: Structures and Processes**									
	1.	Support an argument that plants get the materials they need for growth chiefly from air and water.			X					
	Disciplinary Core Ideas									
	LS1.C: Organization for Matter and Energy Flow in Organisms									
	◆	Plants acquire their material for growth chiefly from air and water. (5-LS1-1)			X					

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5-LS2	**Ecosystems: Interactions, Energy, and Dynamics**									
	1.	Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.			X					
	Disciplinary Core Ideas									
	LS2.A: Interdependent Relationships in Ecosystems									
	◆	The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. (5-LS2-1)			X					
	LS2.B: Cycles of Matter and Energy Transfer in Ecosystems									
	◆	Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment. (5-LS2-1)			X					
Earth and Space Science										
5-ESS1	**Earth's Place in the Universe**									
	1.	Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.		X						
	2.	Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.		X						
	Disciplinary Core Ideas									
	ESS1.A: The Universe and its Stars									
	◆	The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth. (5-ESS1-1)		X						
	ESS1.B: Earth and the Solar System									
	◆	The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day,		X						
5-ESS2	**Earth's Systems**									
	1.	Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.			X					
	Disciplinary Core Ideas									
	ESS2.A: Earth Materials and Systems									
	◆	Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. (5-ESS2-1)		X	X					
Engineering Design										
3-5-ETS1	**Engineering Design**									
	1.	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.			X			X	X	X
	2.	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.			X			X	X	X
	Disciplinary Core Ideas									
	ETS1.A: Defining and Delimiting Engineering Problems									
	◆	Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3-5-ETS1-1)			X			X	X	X

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	ETS1.B: Developing Possible Solutions									
	◆	Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-5-ETS1-2)			X			X	X	X
	◆	At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3-5-ETS1-2)							X	X
Science and Engineering Practices										
Engaging in scientific investigation requires not only skill but also knowledge that is specific to each practice.										
	1.	Asking questions (for science) and defining problems (for engineering)		X	X		X	X	X	X
	2.	Developing and using models			X			X	X	X
	3.	Planning and carrying out investigations		X	X			X		X
	4.	Analyzing and interpreting data		X	X		X	X	X	X
	5.	Using mathematics and computational thinking		X			X	X	X	X
	6.	Constructing explanations (for science) and designing solutions (for engineering)		X	X			X	X	X
	7.	Engaging in argument from evidence			X			X		X
	8.	Obtaining, evaluating, and communicating information		X	X		X	X	X	X
Cross Cutting Concepts										
Patterns: Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.										
◆		Patterns can be used as evidence to support an explanation.		X						
Cause and Effect: Mechanism and Prediction: Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.										
◆		Cause and effect relationships are routinely identified, tested, and used to explain change.		X						
◆		Events that occur together with regularity might or might not be a cause and effect relationship.		X						
Scale, Proportion, and Quantity: In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change.										
◆		Natural objects and/or observable phenomena exist from the very small to the immensely large or from very short to very long time periods.		X						
◆		Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.		X	X		X	X	X	X
Systems and System Models: A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.										
◆		A system is a group of related parts that make up a whole and can carry out functions its individual parts cannot.		X	X			X		X
◆		A system can be described in terms of its components and their interactions.		X	X			X		X
Energy and Matter: Flows, Cycles, and Conservation: Tracking energy and matter flows, into, out of, and within systems helps one understand their system's behavior.										
◆		Matter is made of particles.		X						

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◆	Matter flows and cycles can be tracked in terms of the weight of the substances before and after a process occurs. The total weight of the substances does not change. This is what is meant by conservation of matter. Matter is transported into, out of, and within systems.		X	X					
◆	Energy can be transferred in various ways and between objects.		X	X			X		
Structure and Function: The way an object is shaped or structured determines many of its properties and functions.									
◆	Different materials have different substructures, which can sometimes be observed.		X				X		
◆	Substructures have shapes and parts that serve functions.						X		
Stability and Change: For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand.									
◆	Change is measured in terms of differences over time and may occur at different rates.		X	X					
◆	Some systems appear stable, but over long periods of time will eventually change.		X	X			X		

Computer Science Standards (Grades 5)

Networks and the Internet									
1B-NI-04	Model how information is broken down into smaller pieces, transmitted as packets through multiple devices over networks and the Internet, and reassembled at the destination.					X			
Data and Analysis									
1B-DA-06	Organize and present collected data visually to highlight relationships and support a claim.		X						
1B-DA-07	Use data to highlight or propose cause-and-effect relationships, predict outcomes, or communicate an idea.			X					

International Society for Technology Education Standards

Empowered Learner									
	◆	**Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.**							
	1a	Students articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes		X	X			X	X	
	1c	Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.	X	X	X	X	X	X	X	
Digital Citizen									
	◆	**Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical.**							
	2b	Students engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices.		X						
Knowledge Constructor									
	◆	**Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.**							
	3a	Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.		X	X		X	X		
	3b	Students evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources.		X						

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	3c	Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.		X					X	
	3d	Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.			X			X		
Innovative Designer										
	◆	**Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources**								
	4a	Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.			X			X	X	
	4b	Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.			X			X		
	4c	Students develop, test and refine prototypes as part of a cyclical design process.			X			X		
	4d	Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.			X			X		
Computational Thinker										
	◆	**Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.**								
	5b	Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.		X	X			X	X	
	5c	Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.			X			X		
Creative Communicator										
	◆	**Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.**								
	6d	Students publish or present content that customizes the message and medium for their intended audiences.	X		X			X		