NOTE: *The AFRL NM STEM Academy Mission to Mars is typically conducted in partnership with participating 5th grade teachers. For that reason, the Content Standards provided below align Mission to Mars actitivities with 5th grade Content Standards. This year, we have transitioned to a virtual Mission to Mars and opened participation to 4th - 6th grade students, however, due to time constraints, we have not updated this Content Standard alignment for 4th and 6th grade.*

Virtual Mission to Mars Activities
Aligned with Common Core, NGSS, & National Standards

			Mission Patch	Mars Facts	Life Support System	Telecommunications	Habitat Design	Lunch on Mars Planning	Livestreamed Event
Common Core Standards for English Language Arts (Grade 5)									
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
◆	**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		
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		
		d. Use precise language and domain-specific vocabulary to inform about or explain the topic.			X		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		
	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		
◆	**Research to Build and Present Knowledge**								
	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		
	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
		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
		b. Follow agreed-upon rules for discussions and carry out assigned roles.							X
		c. Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others.							X
		d. Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.							X
	2.	Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.							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
	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

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	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
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
		c. Use verb tense to convey various times, sequences, states, and conditions.			X		X		X
	2.	Demonstrate command of the conventions of standard English capitalization , punctuation, and spelling when writing.							
		a. Use punctuation to separate items in a series.							
		e. Spell grade-appropriate words correctly, consulting references as needed.							
◆	**Knowledge of Language**								
	3.	Use knowledge of language and its conventions when writing, speaking, reading, or listening.			X		X		X
		a. Expand, combine, and reduce sentences for meaning, reader/listener interest, and style.			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
Common Core Standards for Mathematics (Grade 5)									
Mathematical Practices									
1.		Make sense of problems and persevere in solving them.			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	
5.		Use appropriate tools strategically.						X	
6.		Attend to precision.				X			
7.		Look for and make use of structure.			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			

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◆	**Perform operations with multi-digit whole numbers and with decimals to hundredths.**				X	X			
	5.	Fluently multiply multi-digit whole numbers using the standard algorithm.			X	X		X	
	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			
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	
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)									
Physical Science									
5-PS2	**Motion and Stability**								
	1.	Support an argument that the gravitational force exerted by Earth on objects is directed down.		X	X				
Life Sciences									
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				
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				
Earth and Space Sciences									
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					

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5-ESS2	**Earth's Systems**								
	1.	Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.		X	X		X		X
Engineering, Technology, and Applications of Science									
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	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	X
Next Generation Science Standards Cross Cutting Concepts (Grades 3-5)									
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
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		
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					
◆	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		
◆	Matter is transported into, out of, and within systems				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		
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					
◆	Some systems appear stable, but over long periods of time will eventually change.			X			X		

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Influence of Engineering, Technology, and Science on Society and the Natural World									
◆	People's needs and wants change over time as do their demands for new and improved technologies			X	X		X		X
◆	Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks and meet societal			X	X		X		X
National Educational Technology Standards									
Creativity and Innovation									
◆	**Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.**								
	◆	Students apply existing knowledge to generate new ideas, products, or processes.	X		X		X		
	◆	Students create original works as a means of personal or group expression.	X		X		X		
Communications and Collaboration									
◆	**Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.**								
	◆	Students communicate information and ideas effectively to multiple audiences using a variety of media and formats.			X		X		X
	◆	Students develop cultural understanding and global awareness by engaging with learners of other cultures.				X			X
◆	**Students communicate information and ideas effectively to multiple audiences using a variety of media and formats.**								
	◆	Students contribute to project teams to produce original works or solve problems.							X
Research and Information Fluency									
◆	**Students apply digital tools to gather, evaluate, and use information.**								
	◆	Students locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.		X	X	X	X		
	◆	Students evaluate and select information sources and digital tools based on the appropriateness to specific tasks.	X	X	X		X		
	◆	Students process data and report results.		X	X	X	X		X
Critical Thinking, Problem Solving, Decision Making									
◆	Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and								
	◆	Students identify and define authentic problems and significant questions for investigation.			X		X		
	◆	Students plan and manage activities to develop a solution or complete a project.			X	X	X		
	◆	Students collect and analyze data to identify solutions and/or make informed decisions.			X	X	X		
	◆	Students use multiple process and diverse perspectives to explore alternative solutions.			X		X		
Digital Citizenship									
◆	**Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.**								
	◆	Students exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity.	X	X	X	X	X	X	X
	◆	Students exhibit leadership for digital citizenship.							X