

Curriculum Grid

OBJECTIVE NUMBER	Next Generation Science Standards Framework																										
		BASICS OF GEARS	LEARNING MISSIONS	Controlled Movements	Precise Turns	Turn Using Sensor	Detect a Color	Detect an Object	Follow a Line	Detect and React	Intelligent Movements	SPACE CHALLENGE	Activate Communication	Assemble Your Crew	Free the MSL Robot	Launch the Satellite into Orbit	Return the Rock Samples	Secure Your Power Supply	Initiate Launch	RESEARCH PROJECTS	How Can Humans Survive in Space?	How Do We Generate Energy for Human Outposts?	How Can Robots Help Humans Explore?				
<p>◆ = addresses standard ◐ = partially addresses standard</p>																											
Practices																											
1,1	Asking questions.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
1,2	Developing and using models.	◐																									
1,3	Planning and carrying out investigations.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
1,4	Analyzing and interpreting data.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
1,5	Using mathematics, Informational and Computer Technology, and computational thinking.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
1,6	Constructing explanations and designing solutions.	◐	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
1,7	Engaging in argument from evidence.	◐	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
1,8	Obtaining, evaluating, and communicating information.	◐	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
Cross-Cutting Concepts																											
2,1	Patterns.		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
2,2	Cause and effect: Mechanism and explanation.	◐	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
2,3	Scale, proportion, and quantity.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
2,4	Systems and system models.	◐	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
2,5	Energy and matter: Flows, cycles, and conservation.		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
2,6	Structure and function.																									◆	
2,7	Stability and change.		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Core Ideas: Physical Science																											
3.PS.1	Matter and its interactions.																										
3.PS.2	Motion and stability: Forces and interactions.	◐	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
3.PS.3	Energy.	◐	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
3.PS.4	Waves and their applications in technologies for information transfer.									◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Core Ideas: Life Science																											
3.LS.1	From molecules to organisms.																									◆	
3.LS.2	Ecosystems.																									◆	
3.LS.3	Heredity.																									◆	
3.LS.4	Biological evolution.																									◆	
Core Ideas: Earth and Space Science																											
3.ESS.1	Earth's place in the universe.																									◆	
3.ESS.2	Earth's systems.																									◆	
3.ESS.3	Earth and human activity.																									◆	
Core Ideas: Engineering, Technology, and Application of Science																											
3.ETS.1	Engineering Design.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
3.ETS.2	Links among engineering, technology, science, and society.																									◆	

STANDARD	GRADE	Common Core English Language Arts	◆ = addresses standard ◆ = partially addresses standard	Basics of Gears	Learning Missions	Controlled Movements	Precise Turns	Turn Using Sensor	Detect a Color	Detect an Object	Follow a Line	Detect and React	Intelligent Movements	Calibrate Color Sensor	SPACE CHALLENGE	Activate Communication	Assemble Your Crew	Free the MSL Robot	Launch the Satellite into Orbit	Return the Rock Samples	Secure Your Power Supply	Initiate Launch	RESEARCH PROJECTS	How Can Humans Survive in Space?	How Do We Generate Energy for Human Outposts?	How Can Robots Help Humans Explore?	
Speaking and Listening Standards - Presentation of Knowledge and Ideas																											
	6-8	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on topics, texts, and issues, building on others' ideas and expressing their own clearly.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	6	Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	7	Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	8	Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	6	Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	7	Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	8	Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Reading Standards for Literacy in Science and Technical Subjects																											
1	6-8	Cite specific textual evidence to support analysis of science and technical texts.																						◆	◆	◆	
2	6-8	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.																						◆	◆	◆	
3	6-8	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
4	6-8	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
7	6-8	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
8	6-8	Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.																						◆	◆	◆	
9	6-8	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
10	6-8	By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.																					◆	◆	◆	◆	

Common Core Mathematics Standards		RESEARCH PROJECTS																		
		How Can Robots Help Humans Explore?	How Do We Generate Energy for Human Outposts?	How Can Humans Survive in Space?	Initiate Launch	Secure Your Power Supply	Return the Rock Samples	Launch the Satellite into Orbit	Free the MSL Robot	Assemble Your Crew	Activate Communication									
Practices		SPACE CHALLENGE																		
		Calibrate Color Sensor	Intelligent Movements	Detect and React	Follow a Line	Detect an Object	Detect a Color	Turn Using Sensor	Precise Turns	Controlled Movements	Basics of Gears									
Ratios and Proportional Relationships		LEARNING MISSIONS																		
		Basics of Gears	Basics of Gears	Basics of Gears	Basics of Gears	Basics of Gears	Basics of Gears	Basics of Gears	Basics of Gears	Basics of Gears	Basics of Gears									
The Number System		BASICS OF GEARS																		
		Basics of Gears	Basics of Gears	Basics of Gears	Basics of Gears	Basics of Gears	Basics of Gears	Basics of Gears	Basics of Gears	Basics of Gears	Basics of Gears									
Expressions and Equations		BASICS OF GEARS																		
		Basics of Gears	Basics of Gears	Basics of Gears	Basics of Gears	Basics of Gears	Basics of Gears	Basics of Gears	Basics of Gears	Basics of Gears	Basics of Gears									
<p>◆ = addresses standard</p> <p>◐ = partially addresses standard</p>																				
Practices																				
1,1	Make sense of problems and persevere in solving them.																			
1,2	Reason abstractly and quantitatively.	◐																		
1,3	Construct viable arguments and critique the reasoning of others.																			
1,4	Model with mathematics.	◐																		
1,5	Use appropriate tools strategically.	◆																		
1,6	Attend to precision.	◐																		
1,7	Look for and make use of structure.																			
1,8	Look for and express regularity in repeated reasoning.																			
Ratios and Proportional Relationships																				
Grade 6	Understand ratio concepts and use ratio reasoning to solve problems.	◆																		
Grade 7	Analyze proportional relationships and use them to solve real-world and mathematical problems.	◆																		
The Number System																				
Grade 6	Apply and extend previous understandings of multiplication and division to divide fractions by fractions.																			
Grade 6	Compute fluently with multidigit numbers and find common factors and multiples.																			
Grade 6	Apply and extend previous understandings of numbers to the system of rational numbers.																			
Grade 7	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	◐																		
Grade 8	Know that there are numbers that are not rational, and approximate them by rational numbers.																			
Expressions and Equations																				
Grade 6	Apply and extend previous understandings of arithmetic to algebraic expressions.	◐																		
Grade 6	Reason about and solve one-variable equations and inequalities.																			
Grade 6	Represent and analyze quantitative relationships between dependent and independent variables.																			
Grade 7	Use properties of operations to generate equivalent expressions.																			
Grade 7	Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	◐																		
Grade 8	Work with radicals and integer exponents.																			
Grade 8	Understand the connections between proportional relationships, lines, and linear equations.																			
Grade 8	Analyze and solve linear equations and pairs of simultaneous linear equations.																			

Common Core Mathematics Standards		RESEARCH PROJECTS									
		How Can Robots Help Humans Explore?	How Do We Generate Energy for Human Outposts?	How Can Humans Survive in Space?	Initiate Launch	Secure Your Power Supply	Return the Rock Samples	Launch the Satellite into Orbit	Free the MSL Robot	Assemble Your Crew	Activate Communication
		SPACE CHALLENGE					LEARNING MISSIONS				
		Calibrate Color Sensor	Intelligent Movements	Detect and React	Follow a Line	Detect an Object	Turn Using Sensor	Precise Turns	Controlled Movements	Basics of Gears	BASICS OF GEARS
		<p>◆ = addresses standard ◆ = partially addresses standard</p>									
Functions											
Grade 8	Define, evaluate, and compare functions.										
Grade 8	Use functions to model relationships between quantities.										
Geometry											
Grade 6	Solve real-world and mathematical problems involving area, surface area, and volume.										
Grade 7	Draw, construct, and describe geometrical figures and the relationship between them.										
Grade 7	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.										
Grade 8	Understand congruence, and similarity using physical models, transparencies, or geometry software.										
Grade 8	Understand the Pythagorean theorem.										
Grade 8	Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.										
Statistics and Probability											
Grade 6	Develop understanding of statistical variability.										
Grade 6	Summarize and describe distributions.										
Grade 7	Use random sampling to draw inferences about a population.										
Grade 7	Investigate chance processes and develop, use, and evaluate probability models.										
Grade 8	Investigate patterns of association in bivariate data.										

STANDARD	ITEEA Standards for Technological Literacy	RESEARCH PROJECTS															How Can Robots Help Humans Explore? How Do We Generate Energy for Human Outposts? How Can Humans Survive in Space?			
		Initiate Launch	Secure Your Power Supply	Return the Rock Samples	Launch the Satellite into Orbit	Free the MSL Robot	Assemble Your Crew	Activate Communication	SPACE CHALLENGE	Calibrate Color Sensor	Intelligent Movements	Detect and React	Follow a Line	Detect an Object	Detect a Color	Turn Using Sensor	Precise Turns	Controlled Movements	LEARNING MISSIONS	Basics of Gears
The Nature of Technology																				
1	Students will develop an understanding of the characteristics and scope of technology.																			
2	Students will develop an understanding of the core concepts of technology.																			
3	Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.																			
Technology and Society																				
4	Students will develop an understanding of the cultural, social, economic, and political effects of technology.																			
5	Students will develop an understanding of the effects of technology on the environment.																			
6	Students will develop an understanding of the role of society in the development and use of technology.																			
7	Students will develop an understanding of the influence of technology on history.																			
Design																				
8	Students will develop an understanding of the attributes of design.																			
9	Students will develop an understanding of engineering design.																			
10	Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.																			
Abilities for a Technological World																				
11	Students will develop abilities to apply the design process.																			
12	Students will develop abilities to use and maintain technological products and systems.																			
13	Students will develop abilities to assess the impact of products and systems.																			
The Designed World																				
14	Students will develop an understanding of and be able to select and use medical technologies.																			
15	Students will develop an understanding of and be able to select and use agricultural and related biotechnologies.																			
16	Students will develop an understanding of and be able to select and use energy and power technologies.																			
17	Students will develop an understanding of and be able to select and use information and communication technologies.																			
18	Students will develop an understanding of and be able to select and use transportation technologies.																			
19	Students will develop an understanding of and be able to select and use manufacturing technologies.																			
20	Students will develop an understanding of and be able to select and use construction technologies.																			

◆ = addresses standard
 ◆ = partially addresses standard

STANDARD	ISTE National Education Technology Standards	◆ = addresses standard ◆ = partially addresses standard	RESEARCH PROJECTS										SPACE CHALLENGE										
			How Can Robots Help Humans Explore?	How Do We Generate Energy for Human Outposts?	How Can Humans Survive in Space?	Initiate Launch	Secure Your Power Supply	Return the Rock Samples	Launch the Satellite into Orbit	Free the MSL Robot	Assemble Your Crew	Activate Communication	Calibrate Color Sensor	Intelligent Movements	Detect and React	Follow a Line	Detect an Object	Detect a Color	Turn Using Sensor	Precise Turns	Controlled Movements	LEARNING MISSIONS	Basics of Gears
1. Creativity and Innovation																							
Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.																							
a	Apply existing knowledge to generate new ideas, products, or processes.																						
b	Create original works as a means of personal or group expression.																						
c	Use models and simulations to explore complex systems and issues.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
d	Identify trends and forecast possibilities.																					◆	◆
2. Communication 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.																							
a	Interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media.																						
b	Communicate information and ideas effectively to multiple audiences using a variety of media and formats.																						
c	Develop cultural understanding and global awareness by engaging with learners of other cultures.																						
d	Contribute to project teams to produce original works or solve problems.																						
3. Research and Information Fluency																							
Students apply digital tools to gather, evaluate, and use information.																							
a	Plan strategies to guide inquiry.																						
b	Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.																						
c	Evaluate and select information sources and digital tools based on the appropriateness to specific tasks.																						
d	Process data and report results.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
4. Critical Thinking, Problem Solving, and 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 resources.																							
a	Identify and define authentic problems and significant questions for investigation.																						
b	Plan and manage activities to develop a solution or complete a project.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
c	Collect and analyze data to identify solutions and/or make informed decisions.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
d	Use multiple processes and diverse perspectives to explore alternative solutions.																						

STANDARD	ISTE National Education Technology Standards ◆ = addresses standard ◆ = partially addresses standard	How Can Robots Help Humans Explore?										How Do We Generate Energy for Human Outposts?										How Can Humans Survive in Space?									
		RESEARCH PROJECTS										RESEARCH PROJECTS										RESEARCH PROJECTS									
		Initiate Launch										Initiate Launch										Initiate Launch									
		Secure Your Power Supply										Secure Your Power Supply										Secure Your Power Supply									
		Return the Rock Samples										Return the Rock Samples										Return the Rock Samples									
		Launch the Satellite into Orbit										Launch the Satellite into Orbit										Launch the Satellite into Orbit									
		Free the MSL Robot										Free the MSL Robot										Free the MSL Robot									
		Assemble Your Crew										Assemble Your Crew										Assemble Your Crew									
		Activate Communication										Activate Communication										Activate Communication									
		SPACE CHALLENGE										SPACE CHALLENGE										SPACE CHALLENGE									
		Calibrate Color Sensor										Calibrate Color Sensor										Calibrate Color Sensor									
		Intelligent Movements										Intelligent Movements										Intelligent Movements									
		Detect and React										Detect and React										Detect and React									
		Follow a Line										Follow a Line										Follow a Line									
Detect an Object										Detect an Object										Detect an Object											
Detect a Color										Detect a Color										Detect a Color											
Turn Using Sensor										Turn Using Sensor										Turn Using Sensor											
Precise Turns										Precise Turns										Precise Turns											
Controlled Movements										Controlled Movements										Controlled Movements											
LEARNING MISSIONS										LEARNING MISSIONS										LEARNING MISSIONS											
Basics of Gears										Basics of Gears										Basics of Gears											
BASICS OF GEARS										BASICS OF GEARS										BASICS OF GEARS											
5. Digital Citizenship																															
Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.																															
a	Advocate and practice safe, legal, and responsible use of information and technology.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆							
b	Exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆							
c	Demonstrate personal responsibility for lifelong learning.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆							
d	Exhibit leadership for digital citizenship.																														
6. Technology Operations and Concepts																															
Students demonstrate a sound understanding of technology concepts, systems, and operations.																															
a	Understand and use technology systems.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆							
b	Select and use applications effectively and productively.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆							
c	Troubleshoot systems and applications.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆							
d	Transfer current knowledge to learning of new technologies.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆							