

# Curriculum Grid

OBJECTIVE NUMBER	Next Generation Science Standards											RESEARCH PROJECTS																									
		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	CHALLENGE MISSIONS		Activate Communication	Assemble Your Crew	Free the MSL Robot	Launch the Satellite into Orbit	Return the Rock Samples	Secure Your Power Supply	Initiate Launch	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>																																					
<b>Practices</b>																																					
1	Asking questions	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆									
2	Developing and using models	◐															◐	◐	◐	◐	◐	◐	◐	◐													
3	Planning and carrying out investigations	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆								
4	Analyzing and interpreting data	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆								
5	Using mathematics and computational thinking	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆								
6	Constructing explanations and designing solutions	◐	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆								
7	Engaging in argument from evidence	◐	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆								
8	Obtaining, evaluating, and communicating information	◐	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆								
<b>Crosscutting Concepts</b>																																					
1	Patterns		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆							
2	Cause and effect: Mechanism and explanation	◐	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆							
3	Scale, proportion, and quantity	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆							
4	Systems and system models	◐	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆							
5	Energy and matter: Flows, cycles, and conservation		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆							
6	Structure and function		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆							
7	Stability and change		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆							
<b>Physical Science</b>																																					
MS-PS1	Matter and its Interactions																																				
MS-PS2	Motion and Stability: Forces and interactions	◐	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆						
MS-PS3	Energy	◐	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆						
MS-PS4	Waves and Their Applications in Technologies for Information Transfer								◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆						
<b>Life Science</b>																																					
MS-LS1	From Molecules to Organisms																										◐										
MS-LS2	Ecosystems																										◆	◐									
MS-LS3	Heredity																																				
MS-LS4	Biological evolution																										◐	◐									
<b>Earth and Space Science</b>																																					
MS-ESS1	Earth's Place in the universe																																				
MS-ESS2	Earth's Systems																																				
MS-ESS3	Earth and Human Activity																																				
<b>Engineering Design</b>																																					
MS-ETS1	Engineering Design	◆	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	

STANDARD	GRADE	Common Core English Language Arts	<p>● = addresses standard ◐ = partially addresses standard</p>	CHALLENGE MISSIONS										RESEARCH PROJECTS				
				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	BASICS OF GEARS	How Can Robots Help Humans Explore?	How Do We Generate Energy for Human Outposts?	How Can Humans Survive in Space?
<b>Speaking and Listening Standards - Presentation of Knowledge and Ideas</b>																		
	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.		◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	
<b>Reading Standards for Literacy in Science and Technical Subjects</b>																		
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.														◐	◐	◐







STANDARD	ITEEA Standards for Technological Literacy	RESEARCH PROJECTS										CHALLENGE MISSIONS										
		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
<p>◆ = addresses standard ◐ = partially addresses standard</p>																						
<b>The Nature of Technology</b>																						
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.																					
<b>Technology and Society</b>																						
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.																					
<b>Design</b>																						
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.																					
<b>Abilities for a Technological World</b>																						
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.																					
<b>The Designed World</b>																						
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.																					

STANDARD	ISTE National Education Technology Standards	◆ = 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	CHALLENGE MISSIONS	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?
			<b>1. Creativity and Innovation</b> 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.																						◆	◆	◆
<b>2. Communication and Collaboration</b> 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.			◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
<b>3. Research and Information Fluency</b> 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.	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
<b>4. Critical Thinking, Problem Solving, and Decision Making</b> 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	<b>ISTE National Education Technology Standards</b>  ◆ = 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				Initiate Launch	Secure Your Power Supply	Return the Rock Samples	Launch the Satellite into Orbit	Free the MSL Robot	Assemble Your Crew	Activate Communication	CHALLENGE MISSIONS				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			
		<b>5. Digital Citizenship</b>		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.	◆	◆	◆																												
		<b>6. Technology Operations and Concepts</b>		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.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆