

Learning Grid

		Lessons			Extensions		Challenges			
		Lesson 1: Basic Chassis	Lesson 2: Ranger Bot Drive Train	Lesson 3: Ranger Bot Movement	Arm & Gripper	Harvester & Transporter	Dispenser	Creative Challenge	Driving Challenge	Competition Challenge
Science (NSTA Grades 9-12)										
Science as Inquiry:	Develop the abilities necessary to do scientific inquiry.									
	Design and conduct a scientific investigation.									
Science and Technology:	Understand the abilities of technological design.									
	Evaluate a solution and its consequence.									
	Understand that creativity, imagination, and a good knowledge base are all required in the work of science and engineering.									
	Identify a problem or design an opportunity.									
	Implement a proposed solution.									
	Communicate the problem, process, and solution.									
Technology (ITEEA Grades 9-12)										
The Characteristics and Scope of Technology:	Develop an understanding of the characteristics and scope of technology.									
	Understand that inventions and innovations are the results of specific, goal-directed research.									
The Core Concepts of Technology:	Understand that systems thinking applies logic and creativity with appropriate compromises in complex real-life problems.									
	Develop an understanding of the core concepts of technology.									
Apply the Design Process:	Understand and apply the design process.									
	Develop and produce a product or system using a design process.									
The Attributes of Design:	Understand that design needs to be continually checked, critiqued, and improved.									
	Develop an understanding of the attributes of design.									
Engineering Design:	Develop an understanding of engineering design.									

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Engineering (NAS Grades 9 – 12)										
	Define the problem and specify the criteria and constraints for potential solutions.	■	■	■	■	■	■	■	■	■
	Represent a model in three-dimensions.	■	■	■	■	■	■	■	■	■
	Test and design through an iterative process.	■	■	■	■	■	■	■	■	■
	Modify technological systems by applying scientific knowledge and engineering design practices.	■	■	■	■	■	■	■	■	■
	Communicate ideas through sketches and diagrams.	■	■	■	■	■	■	■	■	■
	Understand how scientific knowledge is acquired and how scientific explanations are developed.	■	■	■	■	■	■	■	■	■
	Use physical prototypes in various ways to aid in the engineering process. Troubleshoot to identify and describe a problem.	■	■	■	■	■	■	■	■	■
	Design the best solution under given constraints and criteria.	■	■	■	■	■	■	■	■	■
Mathematics (NCTM Grades 9-12)										
Geometry:	Analyze characteristics and properties of two- and three- dimensional shapes and develop mathematical arguments about geometric relationships.	■	■	■	■	■	■	■	■	■
Measurement:	Understand measurable attributes of objects and the units, systems, and processes of measurement.	■	■	■	■	■	■	■	■	■
Numbers and Operations:	Represent and analyze quantitative relationships between dependent and independent variables.	■	■	■	■	■	■	■	■	■
	Understand patterns, relations, and functions.	■	■	■	■	■	■	■	■	■
Problem Solving:	Build new mathematical knowledge through problem solving.	■	■	■	■	■	■	■	■	■
	Recognize and use connections among mathematical ideas.	■	■	■	■	■	■	■	■	■
Communication:	Organize and consolidate mathematical thinking through communication.	■	■	■	■	■	■	■	■	■
Data Analysis and Probability:	Formulate questions that can be addressed with data, collect, organize, and display relevant data.	■	■	■	■	■	■	■	■	■