

CURRICULUM MAP
Cluster: Science, Technology, Engineering and Math
CTE Program of Study: ST2460 Pre-Engineering – Project Lead the Way

STANDARD	%	SKILL SET/COMPETENCY Pre-Engineering/ Engineering Technology Test Code: 3475	REQUIRED CORE COURSES FOR COMPLETION		
			1 st Course 2461 Introduction to Engineering Design (PLTW)	2 nd Course 2463 Principles of Engineering (PLTW)	Specializations: (Must select two:) 2468 Aerospace Engineering (PLTW) 2466 Civil Engineering and Architecture (PLTW) 2465 Computer Integrated Manufacturing (PLTW) 2462 Digital Electronics (PLTW) 2464 Engineering Design and Development (PLTW) 2469 Environmental Sustainability (PLTW) 2806: Computer Science Principles (PLTW)
Overview of Engineering	10%	Describe major engineering fields	X	X	X
		Identify functions an engineer performs	X	X	X
		Describe education required to be an engineer	X	X	X
		Identify ethics related to engineering situations	X	X	X

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		Describe relationships between the engineer and other technical personnel	X	X	X
		Identify the progression of the engineering field	X	X	X
Design Process/Problem Solving	11%	Identify principles of the problem-solving process	X	X	X
		Outline the steps in the design process	X	X	X
		Translate word problems into mathematical statements		X	X

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		Analyze solutions, identifying strengths and weaknesses	X	X	X
		Develop details of a solution	X	X	X
		Develop, test, and redesign prototypes	X	X	X
Manufacturing	12%	Explain components of set up, machining, casting, molding, welding, and finishing		X	X
		Identify and use common hand tools	X	X	X
		Identify and properly use fasteners	X	X	X

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		Estimate and measure the size of objects using SI and US units	X	X	X
		Explain the role of quality control in manufacturing	X	X	X
		Measure with precision tools and instruments	X	X	X
Assembly and Fabrication	5%	Explain the role of quality control in assembly and fabrication	X	X	X
		Identify situations of supplying and outsourcing		X	X

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		Identify the order and methodology of the assembly process		X	X
Materials	6%	Identify common materials	X	X	X
		Compare and contrast physical properties of materials	X	X	X
		Select correct materials for specific functions		X	X
		Test materials for specific characteristics		X	X
Communication and Teamwork	10%	Read and understand design documentation and technical manuals	X	X	X
		Write technical reports	X	X	X

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		Make an oral presentation	X	X	X
		Interpret critical aspects and/or types of engineering drawings and plans	X	X	X
		Express data in tables, graphs, and charts	X	X	X
		Contribute to a team project	X	X	X
Safety	8%	Exhibit knowledge of appropriate personal safety procedures	X	X	X
		Describe the role of OSHA in the technical workplace	X	X	X
		Describe and use safety equipment	X	X	X

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		Describe the function of safety devices	X	X	X
Engineering Systems	38%	Solve problems using vectoring, predict resultant forces		X	X
		Demonstrate the effect of resistance		X	X
		Apply Ohm's Law, Watt's Law, and Kirchoff's Law		X	X
		Identify series, parallel, and combination circuits		X	X
		Apply knowledge of AC and DC systems		X	X

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		Identify what causes resistance in a fluid system		X	X
		Apply knowledge of hydraulic and pneumatic systems		X	X
		Identify the three ways heat is transferred		X	X
		Explain the difference between Celsius and Fahrenheit scales	X	X	X
		Describe heat conductors and insulators		X	X
		Solve thermal problems using appropriate units		X	X

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		Identify the six simple machines and their applications	X	X	X
		Solve problems using appropriate units in engineering systems	X	X	X
		Identify the uses and types of inductors and capacitors		X	X
		Use appropriate electrical units to solve problems		X	X
		Draw a circuit diagram and lay out the circuit		X	X

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		Identify the difference between analog and digital signals		X	X
		Identify direction of heat flow given differences in temperature		X	X
		Understand the use of insulation to minimize heat flow		X	X
		Identify electrical components and their functions		X	X

These courses align with Project Lead The Way (PLTW). In order to teach PLTW courses, teachers must attend and successfully complete a course-specific training session at one of the PLTW University Affiliates. Required skill sets are dispersed at this time.