Standards

Standards
Next Generation Science Standards
Common Core State Standards (CCSS) Standards for Mathematical Practice
Common Core State Standards (CCSS) College and Career Readiness Anchor Standards for ELA
Standards for Technological and Engineering Literacy (STEL)
International Society for Technology in Education (ISTE)

This course is under active development. Standards and frameworks will continue to be reviewed and updated as development progresses.

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Next Generation Science Standards

PLTW GATEWAY

		Lesson 1									Lesson 2							Lesson 3	
		A1.1	A1.2	A1.3	A1.4	A1.5	A1.6	A1.7	A1.8	P1.9	A2.1	A2.2	A2.3	A2.4	A2.5	A2.6	P2.7	B3.1	B3.2
MS-PS1 Matter and Its Interactions	MS-PS1-4 Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.													✔					
MS-PS3 Energy	MS-PS3-3 Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.													✔	✔		✔		
	MS-PS3-4 Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.													✔					
	MS-PS-3-5 Construct, use, and present an argument to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.													✔	✔		✔		
MS-ESS3 Earth and Human Activity	MS-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.										✔	✔	✔				✔		
	MS-ESS3-5 Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.																✔		
MS-ETS1 Engineering Design	MS-ETS1-1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	✔	✔	✔				✔		✔	✔	✔	✔	✔			✔		✔
	MS-ETS1-2 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	✔	✔	✔						✔			✔	✔			✔		✔
	MS-ETS1-3 Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.									✔					✔		✔		✔
	MS-ETS1-4 Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.									✔							✔		✔

Common Core State Standards
Standards for Mathematical Practice

MS-PS1 Matter and Its Interactions	Lesson 1									Lesson 2							Lesson 3	
	A1.1	A1.2	A1.3	A1.4	A1.5	A1.6	A1.7	A1.8	P1.9	A2.1	A2.2	A2.3	A2.4	A2.5	A2.6	P2.7	B3.1	B3.2
CCSS.MATH.PRACTICE.MP1 Make sense of problems and persevere in solving them.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CCSS.MATH.PRACTICE.MP2 Reason abstractly and quantitatively.			✓	✓	✓			✓	✓			✓	✓		✓	✓		✓
CCSS.MATH.PRACTICE.MP3 Construct viable arguments and critique the reasoning of others.	✓	✓	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CCSS.MATH.PRACTICE.MP4 Model with mathematics.			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
CCSS.MATH.PRACTICE.MP5 Use appropriate tools strategically.	✓		✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓		✓
CCSS.MATH.PRACTICE.MP6 Attend to precision.			✓	✓	✓		✓	✓	✓			✓	✓	✓		✓		✓
CCSS.MATH.PRACTICE.MP7 Look for and make use of structure.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CCSS.MATH.PRACTICE.MP8 Look for and express regularity in repeated reasoning.					✓			✓	✓	✓	✓	✓	✓	✓	✓	✓		✓

Common Core State Standards
College and Career Readiness Anchor Standards for ELA

		Lesson 1									Lesson 2							Lesson 3	
		A1.1	A1.2	A1.3	A1.4	A1.5	A1.6	A1.7	A1.8	P1.9	A2.1	A2.2	A2.3	A2.4	A2.5	A2.6	P2.7	B3.1	B3.2
Reading	**Integration of Knowledge and Ideas**																		
	CCSS.ELA-Literacy.CCRA.R.7 Integrate and evaluate content presented in diverse media and formats, including visually, and quantitatively, as well as in words.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Range of Reading and Level of Text Complexity																		
	CCSS.ELA-Literacy.CCRA.R.10 Read and comprehend complex literary and informational texts independently and proficiently.							✓											
Writing	**Text Types and Purposes**																		
	CCSS.ELA-Literacy.CCRA.W.1 Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.												✓				✓		✓
	Production and Distribution of Writing																		
	CCSS.ELA-Literacy.CCRA.W.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Speaking and Listening	**Comprehensions and Collaboration**																		
	CCSS.ELA-Literacy.CCRA.SL.1 Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	CCSS.ELA-Literacy.CCRA.SL.2 Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Presentation of Knowledge and Ideas																		
	CCSS.ELA-Literacy.CCRA.SL.4 Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.																		✓
	CCSS.ELA-Literacy.CCRA.SL.6 Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.									✓							✓		✓

	Vocabulary Acquisition and Use																			
Language	CCSS.ELA-Literacy.CCRA.L.4 Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	CCSS.ELA-Literacy.CCRA.L.5 Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Standards for Technological and Engineering Literacy (STEL)

		Lesson 1									Lesson 2							Lesson 3	
		A1.1	A1.2	A1.3	A1.4	A1.5	A1.6	A1.7	A1.8	P1.9	A2.1	A2.2	A2.3	A2.4	A2.5	A2.6	P2.7	B3.1	B3.2
Nature and Characteristics of Technology and Engineering	STEL-1J Develop innovative products and systems that solve problems and extend capabilities based on individual or collective needs and wants.	✓								✓			✓	✓			✓		✓
	STEL-1L Explain how technology and engineering are closely linked to creativity, which can result in both intended and unintended innovations.										✓	✓							
	STEL-1M Apply creative problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.	✓								✓					✓	✓			✓
Core Concepts of Technology and Engineering	STEL-2M Differentiate between inputs, processes, outputs, and feedback in technological systems.													✓	✓	✓			✓
	STEL-2N Illustrate how systems thinking involves considering relationships between every part, as well as how the system interacts with the environment in which it is used.		✓					✓	✓	✓				✓	✓	✓	✓		✓
	STEL-2S Defend decisions related to a design problem.	✓								✓			✓	✓			✓		✓
Integration of Knowledge, Technologies, and Practices	STEL-3E Analyze how different technological systems often interact with economic, environmental, and social systems.										✓	✓	✓						✓
Impacts of Technology	STEL-4K Examine the ways that technology can have both positive and negative effects at the same time.										✓	✓	✓						
	STEL-4L Analyze how the creation and use of technologies consumes renewable and non-renewable resources and creates waste.										✓		✓						
	STEL-4M Devise strategies for reducing, reusing, and recycling waste caused from the creation and use of technology.										✓								

Standards for Technological and Engineering Literacy (STEL) cont.

Category	Standard	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Influence of Society on Technological Development	STEL-5F Analyze how an invention or innovation was influenced by its historical context.														✓				
	STEL-5G Evaluate trade-offs based on various perspectives as part of a decision process that recognizes the need for careful compromises among competing factors.	✓								✓			✓	✓			✓		✓
History of Technology	STEL-6D Engage in a research and development process to simulate how inventions and innovations have evolved through systematic tests and refinements.									✓							✓		✓
Design in Technology and Engineering Education	STEL-7P Illustrate the benefits and opportunities associated with different approaches to design.	✓								✓			✓	✓			✓		✓
	STEL-7Q Apply the technology and engineering design process.	✓								✓							✓		✓
	STEL-7R Refine design solutions to address criteria and constraints.									✓							✓		✓
	STEL-7S Create solutions to problems by identifying and applying human factors in design.		✓	✓						✓							✓		✓
	STEL-7T Assess design quality based upon established principles and elements of design.	✓								✓							✓		✓
	STEL-7U Evaluate the strengths and weaknesses of different design solutions.	✓								✓			✓	✓			✓		✓
	STEL-7V Improve essential skills necessary to successfully design.	✓								✓							✓		✓
Applying, Maintaining, and Assessing Technological Products and Systems	STEL-8I Use tools, materials, and machines to safely diagnose, adjust, and repair systems.	✓		✓			✓	✓	✓						✓		✓		✓
	STEL-8M Use instruments to gather data on the performance of everyday products.											✓	✓						

		Lesson 1									Lesson 2							Lesson 3	
		A1.1	A1.2	A1.3	A1.4	A1.5	A1.6	A1.7	A1.8	P1.9	A2.1	A2.2	A2.3	A2.4	A2.5	A2.6	P2.7	B3.1	B3.2
1.2 Digital Citizen	Students recognize the responsibilities and opportunities for contributing to their digital communities.																		
	1.2.a Manage their digital identity and understand the lasting impact of their online behaviors on themselves and others and make safe, legal, and ethical decisions in the digital world.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1.3 Knowledge Constructor	Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts, and make meaningful learning experiences for themselves and others.																		
	1.3.d Build knowledge by exploring real-world issues and gain experience in applying their learning in authentic settings.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1.4 Innovative Designer	Students use a variety of technologies within a design process to identify and solve problems by creating new, useful, or imaginative solutions.																		
	1.4.a Know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.	✓								✓							✓		✓
	1.4.c Develop, test. and refine prototypes as part of a cyclical design process.									✓							✓		✓
	1.4.d Exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.	✓	✓							✓		✓					✓	✓	✓
1.5 Computational Thinker	Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.																		
	1.5.b Collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.												✓	✓	✓				
	1.5.c Break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving	✓	✓							✓			✓				✓	✓	✓

International Society for Technology in Education (ISTE) cont.

1.6 Creative Communicator	Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats, and digital media appropriate to their goals.																		
	1.6.d Publish or present content that customizes the message and medium for their intended audiences.								✓							✓		✓
1.7 Global Collaborator	Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.																		
	1.7.c Contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

PLTW Gateway is a middle school STEM curriculum that engages students in hands-on, project-based learning focused on engineering, biomedical science, computer science, and skilled trades. Throughout the units, students build problem-solving, collaboration, and critical thinking abilities as they apply math, science, and literacy skills to solve real-world challenges and explore careers.

Designed for grades 6–8, PLTW Gateway connects to state and national standards; supports a strong transition into high school STEM and CTE pathways; and provides curriculum, materials, educator training, and ongoing support.

To find out more about the PLTW Gateway program and how it serves the needs of districts across the country, visit **pltw.org/gateway**.