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High School Standards Alignment
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			Team Identity	Launching Device Investigation	Payload Protection Device Design	Payload Protection Device Investigation	Device Integration	Final Report	Symposium
Common Core Standards for English Language Arts (Grades 9-12)									
Reading Standards for Informational Text									
	Key Ideas and Details								
Grades 9-10	1.	Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.			X				
Grades 11-12	1.	Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.			X				
	Craft and Structure								
Grades 9-10	4.	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper).	X	X	X	X	X	X	
Grades 11-12	4.	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text (e.g., how Madison defines *faction* in *Federalist* No.10).	X	X	X	X	X	X	
Writing Standards									
	Text Types and Purposes								
Grades 9-10	1.	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.		X	X	X	X	X	
		a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among claim(s), counterclaims, reasons, and evidence.		X	X	X	X	X	
		b. Develop claim(s) and counterclaims fairly, supplying evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge level and concerns.		X	X	X	X	X	
		c. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.		X	X	X	X	X	
		d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.		X	X	X	X	X	
		e. Provide a concluding statement or section that follows from and supports the argument presented.		X	X	X	X	X	
	2.	Write informative/explanatory texts to examine a topic and convey complex ideas, concepts, and information through the effective selection, organization, and analysis of content.		X	X	X	X	X	
		a. Introduce a topic: organize complex ideas, concepts, and information, to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.		X	X	X	X	X	
		b. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.		X	X	X	X	X	
		c. Use appropriate and varied transitions to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.		X	X	X	X	X	
		d. Use precise language and domain-specific vocabulary to manage the complexity of the topic.		X	X	X	X	X	
		e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.		X	X	X	X	X	
		f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).		X	X	X	X	X	
Grades 11-12	1.	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.		X	X	X	X	X	
		a. Introduce precise, knowledgeable claim(s), establish the significance of the claims(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences claim(s). Counterclaims, reasons, and evidence.		X	X	X	X	X	
		b. Develop claim(s) and counterclaims fairly, supplying the most relevant evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge level, concerns, values, and possible biases.		X	X	X	X	X	
		c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion and clarify the relationships between claims(s) and reasons, between reasons and evidence, and between claims(s) and counterclaims.		X	X	X	X	X	
		d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.		X	X	X	X	X	
		e. Provide a concluding statement or section that follows from and supports the argument presented.		X	X	X	X	X	

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	2.	Write informative/explanatory texts to examine a topic and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of relevant content.		X	X	X	X	X	
		a. Introduce a topic; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.		X	X	X	X	X	
		b. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, quotations, or other information and examples appropriate to the audience's knowledge of the topic.		X	X	X	X	X	
		c. Use appropriate and varied transitions and syntax to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.		X	X	X	X	X	
		d. Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.		X	X	X	X	X	
		e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.		X	X	X	X	X	
		f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).		X	X	X	X	X	
	Production and Distribution of Writing								
Grades 9-10	4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1-3 above.)		X	X	X	X	X	
	5.	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (Editing for conventions should demonstrate command of Language standards 1-3 up to and including grades 9-10 on page 54.)		X	X	X	X	X	
	6.	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.		X	X	X	X	X	X
Grades 11-12	4.	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1-3 above.)		X	X	X	X	X	
	5.	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (Editing for conventions should demonstrate command of Language standards 1-3 up to and including grades 11-12 on page 54.)		X	X	X	X	X	
	6.	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.		X	X	X	X	X	X
	Research to Build and Present Knowledge								
Grades 9-10	7.	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.			X				
	8.	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.			X				
Grades 11-12	7.	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.			X				
	8.	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.			X				
	Range of Writing								
Grades 9-10	10.	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.		X	X	X	X	X	
Grades 11-12	10.	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.		X	X	X	X	X	
Speaking and Listening Standards									
	Comprehension and Collaboration								
Grades 9-10	1.	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grades 9-10 topics texts, and issues,* building on others' ideas and expressing their own clearly and persuasively.	X	X	X	X	X	X	
		a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.	X	X	X	X	X	X	
		b. Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed.	X	X	X	X	X	X	
		c. Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.	X	X	X	X	X	X	
		d. Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and , when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented.	X	X	X	X	X	X	

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	2.	Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.	X	X	X	X	X	X	
Grades 11-12	1.	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11-12 topics texts, and issues, building on others' ideas and expressing their own clearly and persuasively	X	X	X	X	X	X	
		a. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.	X	X	X	X	X	X	
		b. Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed.	X	X	X	X	X	X	
		c. Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.	X	X	X	X	X	X	
		d. Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.	X	X	X	X	X	X	
	2.	Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decision and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.	X	X	X	X	X	X	
	Presentation of Knowledge and Ideas								
Grades 9-10	4.	Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.	X	X	X	X	X	X	X
	5.	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.	X	X	X	X	X	X	X
	6.	Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9-10 Language standards 1 and 3 on page 54 for specific expectations.)	X	X	X	X	X	X	X
Grades 11-12	4.	Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.	X	X	X	X	X	X	X
	5.	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.	X	X	X	X	X	X	X
	6.	Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate. (See grades 11-12 Language standards 1 and 3 on page 54 for specific expectations.)	X	X	X	X	X	X	X
Language Standards									
	Conventions of Standard English								
Grades 9-10	1.	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.		X	X	X	X	X	
		a. Use parallel structure.*		X	X	X	X	X	
		b. Use various types of phrases (noun, verb, adjectival, adverbial, participial, prepositional, absolute) and clauses (independent, dependent; noun, relative, adverbial) to convey specific meanings and add variety and interest to writing or presentations.		X	X	X	X	X	
	2.	Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.		X	X	X	X	X	
		c. Spell correctly.		X	X	X	X	X	
Grades 11-12	1.	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.		X	X	X	X	X	
		a. Apply the understanding that usage is a matter of convention, can change over time and is sometimes contested.		X	X	X	X	X	
	2.	Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.		X	X	X	X	X	
		b. Spell correctly.		X	X	X	X	X	
	Vocabulary Acquisition and Use								
Grades 9-10	4.	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grades 9-10 reading and content,* choosing flexibly from a range of strategies.		X	X	X	X	X	
		a. Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.		X	X	X	X	X	
		c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, or its etymology.		X	X	X	X	X	

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		d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).		X	X	X	X	X	
	6.	Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.		X	X	X	X	X	
Grades 11-12	4.	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grades 11-12 reading and content,* choosing flexibly from a range of strategies.		X	X	X	X	X	
		a. Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.		X	X	X	X	X	
		c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, or its etymology, or its standard usage.		X	X	X	X	X	
		d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).		X	X	X	X	X	
	6.	Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.		X	X	X	X	X	
Reading Standards for Literacy in Science and Technical Subjects									
	Key Ideas and Details								
	3.	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.		X		X	X		
	3.	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.		X		X	X		
	Craft and Structure								
Grades 9-10	4.	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 9-10 texts and topic* s.		X	X	X	X		
	5.	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., *force, friction, reaction force, energy*).		X	X	X	X		
Grades 11-12	4.	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 11-12 texts and topics* .		X	X	X	X		
	5.	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.		X	X	X	X		
	Integration of Knowledge and Ideas								
Grades 9-10	7.	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.		X	X	X	X	X	
	8.	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.		X			X		
	9.	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanation or accounts.		X	X	X	X	X	
Grades 11-12	7.	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a questions or solve a problem.		X	X	X	X	X	
	8.	Evaluate the hypotheses, data, analysis, and conclusion in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.		X			X		
	9.	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.		X	X	X	X	X	
	Range of Reading and Level of Text Complexity								
Grades 9-10	10.	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.		X	X	X	X	X	
Grades 11-12	10.	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.		X	X	X	X	X	
Common Core Standards for Mathematics									
Number and Quantity - Mathematical Practices									
	1.	Make sense of problems and persevere in solving them.		X	X	X	X		X

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	2.	Reason abstractly and quantitatively.		X	X	X	X		X
	3.	Construct viable argument and critique the reasoning of others.		X	X	X	X		
	4.	Model with mathematics.		X		X	X		
	5.	Use appropriate tools strategically.		X		X	X		
	6.	Attend to precision.		X		X	X		
	7.	Look for and make use of structure.		X		X	X		
	8.	Look for and express regularity in repeated reasoning.		X		X	X		X
Number and Quantity - Quantities*									
	◆	**Reason quantitatively and use units to solve problems.**							
	1.	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.		X		X	X		
	2.	Define appropriate quantities for the purpose of descriptive modeling.		X	X	X	X		
	3.	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.		X		X	X		
Number and Quantity - Vector and Matrix Quantities									
	◆	**Represent and model with vector quantities.**							
	1.	(+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., $\boldsymbol{v}$, $\lvert \boldsymbol{v} \rvert$, $\lVert \boldsymbol{v} \rVert$, v).				X			
	3	(+) Solve problems involving velocity and other quantities that can be represented by vectors.				X			
	◆	**Perform operations on vectors.**							
	4.	(+) Add and subtract vectors.				X			
		b. Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum.				X			
Algebra - Seeing Structure in Expressions									
	◆	**Interpret the structure of expressions.**							
	1.	Interpret expressions that represent a quantity in terms of its context.*		X		X	X		
		a. Interpret parts of an expression, such as terms, factors, and coefficients.		X		X	X		
		b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret* $P(1 + r)^n$ *as the product of P and a factor not depending on P.*		X		X	X		
	2.	Use the structure of an expression to identify ways to rewrite it. *For example, see* $x^4 - y^4$ *as* $(x^2)^2 - (y^2)^2$*, thus recognizing it as a difference of squares that can be factored as* $(x^2 - y^2)(x^2 + y^2)$.		X		X	X		
	◆	**Write expressions in equivalent forms to solve problems.**							
	3.	3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.*		X		X	X		
		a. Factor a quadratic expression to reveal the zeros of the function it defines.		X		X	X		
Algebra - Creating Equations*									
	◆	**Create equations that describe numbers or relationships**							
	1.	Create equations and inequalities in one variable and use them to solve problems, *include equations arising from linear and quadratic functions, and simple rational and exponential functions.*		X		X	X		
	2.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.		X		X	X		

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	3.	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*		X		X	X		
	4.	Rearrange formulas to highlight a quantity of interest, using the same reasoning as solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.*		X		X	X		
Algebra - Reasoning with Equations and Inequalities									
	◆	**Understand solving equations as a process of reasoning and explain the reasoning.**							
	1.	Explain each step in solving a simple equation as following form the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.		X		X	X		
	2.	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.		X		X	X		
	◆	**Solve equations and inequalities in one variable.**							
	3.	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.		X		X	X		
	4.	Solve quadratic equations in one variable.		X		X	X		
		b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.		X		X	X		
	◆	**Solve systems of equations.**							
	6.	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.		X		X	X		
	◆	**Represent and solve equations and inequalities graphically.**							
	10.	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).		X		X	X		
Functions - Interpreting Functions									
	◆	**Understand the concept of a function and use function notation.**							
	2.	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.		X		X	X		
	◆	**Interpret functions that arise in applications in terms of the context.**							
	4.	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing , positive, or negative; relative maximums and minimums; symmetries; end behavior ; and periodicity.**		X		X	X		
	5.	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. F*or example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.**		X		X	X		
	6.	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.*		X		X	X		
	◆	**Analyze functions using different representations.**							
	7.	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.*		X		X	X		
		a. Graph linear and quadratic functions and show intercepts, maxima, and minima.		X		X	X		
	8.	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.		X		X	X		
		a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.		X		X	X		
Functions - Building Functions									
	◆	**Analyze functions using different representations.**							
	1.	Write a function that describes a relationship between two quantities.*		X		X	X		
		a. Determine an explicit expression, a recursive process, or steps for calculation from a context.		X		X	X		
Functions - Linear, Quadratic, and Exponential Models*									
	◆	**Construct and compare linear, quadratic, and exponential models and solve problems.**							
	2.	Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).		X		X	X		

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	◆	**Interpret expressions for functions in terms of the situation they model.**							
	5.	Interpret the parameters in a linear or exponential function in terms of a context.		X		X	X		
Modeling									
	◆	**Modeling is best interpreted not as a collection of isolated topics but rather in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards indicated by a star symbol (*).**		X		X	X		
Geometry - Congruence									
	◆	**Experiment with transformations in the plane.**							
	1.	Know precise definitions of angle, circle, perpendicular line, parallel line, and line segments, based on the undefined notions of point, line distance along a line, and distance around a circular arc.		X		X	X		
Statistics and Probability - Interpreting Categorical and Quantitative Data									
	◆	**Summarize, represent, and interpret data on a single count or measurement variable.**							
	1.	Represent data with plots on the real number line (dot plots, histograms, and box plots).		X		X	X		
	3.	Interpret differences in shape, center and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).		X					
	◆	**Summarize, represent, and interpret data on two categorical and quantitative variables.**							
	6.	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.		X		X	X		
		a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. *Use given functions or choose a function suggested by the context. Emphasize linear; quadratic, and exponential models.*		X		X	X		
		c. Fit a linear function for a scatter plot that suggests a linear association.		X		X	X		

Next Generation Science Standards (Grades 6 - 8)

Performance Expectations

Physical Science

HS-PS2	**Motion and Stability: Forces and Interactions**								
	3.	Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.* (*Integrates traditional science content with engineering through a Practice or Disciplinary Core Idea.)		X	X	X			
	Disciplinary Core Ideas								
		ETS1.A: Defining and Delimiting Engineering Problems							
	◆	Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (secondary to HS-PS2-3)		X	X	X			
		ETS1.C: Optimizing the Design Solution							
	◆	Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (secondary to HS-PS2-3)		X	X	X			
HS-PS3	**Energy**								
	1.	Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.				X			
	2.	Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects).				X			
	3.	Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.* (*Integrates traditional science content with engineering through a Practice or Disciplinary Core Idea.)		X		X	X		
	Disciplinary Core Ideas								
		PS3.A: Definitions of Energy							
	◆	Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system. That there is a single quantity called energy is due to the fact that a system's total energy is conserved, even as, within the system, energy is continually transferred from one object to another and between its various possible forms. (HSPS3-1),(HS-PS3-2)		X		X	X		
	◆	At the macroscopic scale, energy manifests itself in multiple ways, such as in motion, sound, light, and thermal energy. (HSPS3-2) (HS-PS3-3)				X			

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		PS3.B: Conservation of Energy and Energy Transfer							
	◆	Conservation of energy means that the total change of energy in any system is always equal to the total energy transferred into or out of the system. (HS-PS3-1)				X			
	◆	Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems. (HS-PS3-1),(HS-PS3-4)				X			
	◆	Mathematical expressions, which quantify how the stored energy in a system depends on its configuration (e.g. relative positions of charged particles, compression of a spring) and how kinetic energy depends on mass and speed, allow the concept of conservation of energy to be used to predict and describe system behavior. (HS-PS3-1)				X			
	◆	The availability of energy limits what can occur in any system. (HS-PS3-1)				X			
Engineering Design									
HS-ETS1		**Engineering Design**							
	2.	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.		X	X	X	X	X	X
		Disciplinary Core Ideas							
		ETS1.C: Optimizing the Design Solution							
	◆	Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (HSETS1-2)		X	X	X	X	X	X
Science and Engineering Practices									
Engaging in scientific investigation requires not only skill but also knowledge that is specific to each practice.									
	1.	Asking questions (for science) and defining problems (for engineering)		X	X	X	X	X	
	2.	Developing and using models		X	X	X	X	X	
	3.	Planning and carrying out investigations		X	X	X	X	X	
	4.	Analyzing and interpreting data		X	X	X	X	X	X
	5.	Using mathematics and computational thinking		X	X	X	X	X	X
	6.	Constructing explanations (for science) and designing solutions (for engineering)		X	X	X	X	X	X
	7.	Engaging in argument from evidence		X	X	X	X	X	X
	8.	Obtaining, evaluating, and communicating information		X	X	X	X	X	X
Cross Cutting Concepts									
Patterns: Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.									
◆		Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena.		X	X	X	X	X	
◆		Classifications or explanations used at one scale may fail or need revision when information from smaller or larger scales is introduced; thus requiring improved investigations and experiments.		X	X	X	X	X	
◆		Patterns of performance of designed systems can be analyzed and interpreted to reengineer and improve the system.		X	X	X	X	X	
◆		Mathematical representations are needed to identify some patterns.		X	X	X	X		
◆		Empirical evidence is needed to identify patterns.		X	X	X	X		
Cause and Effect: Mechanism and Prediction: Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.									
◆		Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.		X	X	X	X		

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◆	Cause and effect relationships can be suggested and predicted for complex natural and human designed systems by examining what is known about smaller scale mechanisms within the system.		X	X	X	X		
◆	Systems can be designed to cause a desired effect.		X	X	X	X		
◆	Changes in systems may have various causes that may not have equal effects.		X	X	X	X		
Scale, Proportion, and Quantity: In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change.								
◆	Algebraic thinking is used to examine scientific data and predict the effect of a change in one variable on another (e.g., linear growth vs. exponential growth).		X		X	X		
Systems and System Models: A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems.								
◆	Systems can be designed to do specific tasks.		X	X	X	X		
◆	When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models.		X		X	X		
	Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales.		X			X		
◆	Models can be used to predict the behavior of a system, but these predictions have limited precision and reliability due to the assumptions and approximations inherent in models.		X		X	X		
Energy and Matter: Flows, Cycles, and Conservation: Tracking energy and matter flows, into, out of, and within systems helps one understand their system's behavior.								
◆	Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system.				X			
◆	Energy cannot be created or destroyed—only moves between one place and another place, between objects and/or fields, or between systems.				X			
Structure and Function: The way an object is shaped or structured determines many of its properties and functions.								
◆	Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem.			X	X			
◆	The functions and properties of natural and designed objects and systems can be inferred from their overall structure, the way their components are shaped and used, and the molecular substructures of its various materials.			X	X			
Stability and Change: For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand.								
◆	Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible.		X			X		
◆	Systems can be designed for greater or lesser stability.		X	X	X	X		

International Society for Technology Education Standards

			Team Identity	Launching Device Investigation	Payload Protection Device Design	Payload Protection Device Investigation	Device Integration	Final Report	Symposium
Empowered Learner									
	◆	**Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.**	X	X	X	X	X	X	X
	1c	Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.	X	X	X	X	X	X	X
Digital Citizen									
	◆	**Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical.**	X	X	X	X	X	X	
	2b	Students engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices.	X	X	X	X	X	X	
	2c	Students demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property.			X				
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.**			X				

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	3a	Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.			X				
Innovative Designer									
	◆	**Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources**	X	X	X	X	X	X	
	4a	Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.	X	X	X	X	X	X	
	4c	Students develop, test and refine prototypes as part of a cyclical design process.		X	X	X	X		
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.**		X	X	X	X		
	5b	Students 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.		X		X	X		
	5c	Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.		X	X	X	X		
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.**						X	X
	6a	Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.						X	X
	6b	Students create original works or responsibly repurpose or remix digital resources into new creations.						X	X
	6c	Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.						X	X
	6d	Students publish or present content that customizes the message and medium for their intended audiences.						X	X
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.**	X	X	X	X	X	X	
	7c	Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.	X	X	X	X	X	X	