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# Illinois Learning Standards

HIGH SCHOOL  
9TH – 10TH

CONDENSED LIST OF STANDARDS

ENGLISH LANGUAGE ARTS 9<sup>TH</sup> -10<sup>TH</sup>

FINE ARTS-INTRODUCTORY/INTERMEDIATE

MATHEMATICS

SCIENCE

PHYSICAL DEVELOPMENT/HEALTH 9<sup>TH</sup> -10<sup>TH</sup>

SOCIAL/EMOTIONAL LEARNING 9<sup>TH</sup> -10<sup>TH</sup>

SOCIAL SCIENCE

Compiled by ISBE Content Specialists

**ENGLISH LANGUAGE ARTS – 9<sup>TH</sup> – 10<sup>TH</sup> GRADES****COLLEGE AND CAREER READINESS ANCHOR STANDARDS FOR READING***Key Ideas and Details*

- CCR.R.1 Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
- CCR.R.2 Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
- CCR.R.3 Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

*Craft and Structure*

- CCR.R.4 Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
- CCR.R.5 Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
- CCR.R.6 Assess how point of view or purpose shapes the content and style of a text.

*Integration of Knowledge and Ideas*

- CCR.R.7 Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
- CCR.R.8 Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
- CCR.R.9 Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

*Range of Reading and Level of Text Complexity*

- CCR.R.10 Read and comprehend complex literary and informational texts independently and proficiently.

**COLLEGE AND CAREER READINESS ANCHOR STANDARDS FOR LANGUAGE***Conventions of Standard English*

- CCR.L.1 Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
- CCR.L.2 Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

*Knowledge of Language*

- CCR.L.3 Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

*Vocabulary Acquisition and Use*

- CCR.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.
- CCR.L.5 Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
- CCR.L.6 Acquire and use accurately a range of 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 encountering an unknown term important to comprehension or expression.

**COLLEGE AND CAREER READINESS ANCHOR STANDARDS FOR WRITING***Text Types and Purposes*

- CCR.W.1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
- CCR.W.2 Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
- CCR.W.3 Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.

*Production and Distribution of Writing*

- CCR.W.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- CCR.W.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
- CCR.W.6 Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

*Research to Build and Present Knowledge*

- CCR.W.7 Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
- CCR.W.8 Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
- CCR.W.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

*Range of Writing*

- CCR.W.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 tasks, purposes, and audiences.

**COLLEGE AND CAREER READINESS ANCHOR STANDARDS FOR SPEAKING AND LISTENING***Comprehension and Collaboration*

- CCR.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.
- CCR.SL.2 Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
- CCR.SL.3 Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.

*Presentation of Knowledge and Ideas*

- CCR.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.
- CCR.SL.5 Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
- CCR.SL.6 Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

**READING STANDARDS FOR LITERATURE***Key Ideas and Details*

- RL.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.
- RL.9-10.2 Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.
- RL.9-10.3 Analyze how complex characters (e.g., those with multiple or conflicting motivations) develop over the course of a text, interact with other characters, and advance the plot or develop the theme.

*Craft and Structure*

- RL.9-10.4 Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language evokes a sense of time and place; how it sets a formal or informal tone).
- RL.9-10.5 Analyze how an author's choices concerning how to structure a text, order events within it (e.g., parallel plots), and manipulate time (e.g., pacing, flashbacks) create such effects as mystery, tension, or surprise.
- RL.9-10.6 Analyze a particular point of view or cultural experience reflected in a work of literature from outside the United States, drawing on a wide reading of world literature.

*Integration of Knowledge and Ideas*

- RL.9-10.7 Analyze the representation of a subject or a key scene in two different artistic mediums, including what is emphasized or absent in each treatment (e.g., Auden's "Musée des Beaux Arts" and Breughel's Landscape with the Fall of Icarus).
- RL.9-10.9 Analyze how an author draws on and transforms source material in a specific work (e.g., how Shakespeare treats a theme or topic from Ovid or the Bible or how a later author draws on a play by Shakespeare).

*Range of Reading and Level of Text Complexity*

- RL.9-10.10 By the end of grade 9, read and comprehend literature, including stories, dramas, and poems, in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.  
By the end of grade 10, read and comprehend literature, including stories, dramas, and poems, at the high end of the grades 9–10 text complexity band independently and proficiently.

**READING STANDARDS FOR INFORMATIONAL TEXT***Key Ideas and Details*

- RI.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.
- RI.9-10.2 Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.
- RI.9-10.3 Analyze how the author unfolds an analysis or series of ideas or events, including the order in which the points are made, how they are introduced and developed, and the connections that are drawn between them.

*Craft and Structure*

- RI.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).
- RI.9-10.5 Analyze in detail how an author's ideas or claims are developed and refined by particular sentences, paragraphs, or larger portions of a text (e.g., a section or chapter).
- RI.9-10.6 Determine an author's point of view or purpose in a text and analyze how an author uses rhetoric to advance that point of view or purpose.

*Integration and Knowledge and Ideas*

- RI.9-10.7 Analyze various accounts of a subject told in different mediums (e.g., a person's life story in both print and multimedia), determining which details are emphasized in each account.
- RI.9-10.8 Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning.
- RI.9-10.9 Analyze seminal U.S. documents of historical and literary significance (e.g., Washington's Farewell Address, the Gettysburg Address, Roosevelt's Four Freedoms speech, King's "Letter from Birmingham Jail"), including how they address related themes and concepts.

*Range of Reading and Level of Text Complexity*

- RI.9-10.10 By the end of grade 9, read and comprehend literary nonfiction in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.  
By the end of grade 10, read and comprehend literary nonfiction at the high end of the grades 9–10 text complexity band independently and proficiently.

**READING STANDARDS FOR LITERACY IN HISTORY/SOCIAL STUDIES 9<sup>th</sup>-10<sup>th</sup> GRADES***Key Ideas and Details*

- RH.9-10.1 Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.
- RH.9-10.2 Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text.
- RH.9-10.3 Analyze in detail a series of events described in a text; determine whether earlier events caused later ones or simply preceded them.

*Craft and Structure*

- RH.9-10.4 Determine the meaning of words and phrases as they are used in a text, including vocabulary describing political, social, or economic aspects of history/social studies.
- RH.9-10.5 Analyze how a text uses structure to emphasize key points or advance an explanation or analysis
- RH.9-10.6 Compare the point of view of two or more authors for how they treat the same or similar topics, including which details they include and emphasize in their respective accounts.

*Integration of Knowledge and Ideas*

- RH.9-10.7 Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text.
- RH.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claims.
- RH.9-10.9 Compare and contrast treatments of the same topic in several primary and secondary sources.

*Range of Reading and Level of Text Complexity*

- RH.9-10.10 By the end of grade 10, read and comprehend history/social studies texts in the grades 9–10 text complexity band independently and proficiently.

**READING STANDARDS FOR LITERACY IN SCIENCE AND TECHNICAL SUBJECTS 9<sup>th</sup> – 10<sup>th</sup> GRADES***Key Ideas and Details*

- RST.9-10.1 Cite specific textual evidence to support analysis of science and technical texts.
- RST.9-10.2 Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
- RST.9-10.3 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.

*Craft and Structure*

- RST.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 topics.
- RST.9-10.5 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
- RST.9-10.6 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.

*Integration of Knowledge and Ideas*

- RST.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.
- RST.9-10.8 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.
- RST.9-10.9 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 explanations or accounts.

*Range of Reading and Level of Text Complexity*

- RST.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.

**WRITING STANDARDS***Text Types and Purposes*

- W.9-10.1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
- W.9-10.1.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.
- W.9-10.1.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.
- W.9-10.1.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.
- W.9-10.1.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.
- W.9-10.1.e Provide a concluding statement or section that follows from and supports the argument presented.
- W.9-10.2 Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
- W.9-10.2.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.
- W.9-10.2.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.

- W.9-10.2.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.
- W.9-10.2.d Use precise language and domain-specific vocabulary to manage the complexity of the topic.
- W.9-10.2.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.
- W.9-10.2.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).
- W.9-10.3 Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.
  - W.9-10.3.a Engage and orient the reader by setting out a problem, situation, or observation, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events.
  - W.9-10.3.b Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters.
  - W.9-10.3.c Use a variety of techniques to sequence events so that they build on one another to create a coherent whole.
  - W.9-10.3.d Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters.
  - W.9-10.3.e Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.

#### *Production and Distribution of Writing*

- W.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- W.9-10.5 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.
- W.9-10.6 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.

#### *Research to Build and Present Knowledge*

- W.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.
- W.9-10.8 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.
- W.9-10.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.
  - W.9-10.9.a Apply grades 9–10 Reading standards to literature (e.g., "Analyze how an author draws on and transforms source material in a specific work [e.g., how Shakespeare treats a theme or topic from Ovid or the Bible or how a later author draws on a play by Shakespeare]").
  - W.9-10.9.b Apply grades 9–10 Reading standards to literary nonfiction (e.g., "Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning").

#### *Range of Writing*

- W.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.

### **WRITING STANDARDS FOR LITERACY IN HISTORY/SOCIAL STUDIES, SCIENCE, AND TECHNICAL SUBJECTS 9<sup>TH</sup> – 10<sup>TH</sup>**

#### *Text Types and Purposes*

- WHST.9-10.1 Write arguments focused on discipline-specific content.
  - WHST.9-10.1.a Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.
  - WHST.9-10.1.b Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.
  - WHST.9-10.1.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.
  - WHST.9-10.1.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.
  - WHST.9-10.1.e Provide a concluding statement or section that follows from or supports the argument presented.
- WHST.9-10.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
  - WHST.9-10.2.a Introduce a topic and organize 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.
  - WHST.9-10.2.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.
  - WHST.9-10.2.c Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.

- WHST.9-10.2.d Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.
- WHST.9-10.2.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.
- WHST.9-10.2.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).

***Production and Distribution of Writing***

- WHST.9-10.6 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.

***Research to Build and Present Knowledge***

- WHST.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.
- WHST.9-10.8 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.
- WHST.9-10.9 Draw evidence from informational texts to support analysis, reflection, and research.

***Range of Writing***

- WHST.9-10.10 Write routinely over extended time frames (time for 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.

**SPEAKING AND LISTENING STANDARDS*****Comprehension and Collaboration***

- SL.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.
- SL.9-10.1.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.
- SL.9-10.1.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.
- SL.9-10.1.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.
- SL.9-10.1.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.
- SL.9-10.2 Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.
- SL.9-10.3 Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.

***Presentation of Knowledge and Ideas***

- SL.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.
- SL.9-10.5 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.
- SL.9-10.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.

**LANGUAGE STANDARDS*****Conventions of Standard English***

- L.9-10.1 Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
- L.9-10.1.a Use parallel structure.
- L.9-10.1.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.
- L.9-10.2 Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
- L.9-10.2.a Use a semicolon (and perhaps a conjunctive adverb) to link two or more closely related independent clauses.
- L.9-10.2.b Use a colon to introduce a list or quotation.
- L.9-10.2.c Spell correctly.

***Knowledge of Language***

- L.9-10.3 Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.
- L.9-10.3.a Write and edit work so that it conforms to the guidelines in a style manual (e.g., MLA Handbook, Turabian's Manual for Writers) appropriate for the discipline and writing type.

***Vocabulary Acquisition And Use***

- L.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.

- L.9-10.4.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.
- L.9-10.4.b Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., analyze, analysis, analytical; advocate, advocacy).
- L.9-10.4.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.
- L.9-10.4.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).
- L.9-10.5 Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
- L.9-10.5.a Interpret figures of speech (e.g., euphemism, oxymoron) in context and analyze their role in the text.
- L.9-10.5.b Analyze nuances in the meaning of words with similar denotations.
- L.9-10.6 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.

## FINE ARTS – Introductory / Intermediate HS Levels

### DANCE

#### CREATING

*Explore – Anchor Standard 1: Generate and conceptualize artistic ideas and work.*

- DA:Cr1.1.I  
Introductory a. Explore a variety of stimuli for sourcing movement to develop an improvisational or choreographed dance study. Analyze the process and the relationship between the stimuli and the movement.

b. Experiment with the elements of dance to explore personal movement preferences and strengths. Select movements that challenge skills and build on strengths in an original dance study or dance.

- DA:Cr1.1.II  
Intermediate a. Synthesize content generated from stimulus materials to choreograph dance studies or dances using original or codified movement.

b. Apply personal movement preferences and strengths with the movement vocabulary of several dance styles or genres to choreograph an original dance study or dance that communicates an artistic intent. Compare personal choices to those made by well-known choreographers.

*Plan – Anchor Standard 2: Organize and develop artistic ideas and work.*

- DA:Cr2.1.I  
Introductory a. Collaborate to design a dance using choreographic devices and dance structures to support a clear artistic intent. Explain how the dance structures clarify the artistic intent.

b. Develop an artistic statement for an original dance study or dance. Discuss how the use of movement elements, choreographic devices, and dance structures serve to communicate the artistic statement.

- DA:Cr2.1.II  
Intermediate a. Work individually and collaboratively to design and implement a variety of choreographic devices and dance structures to develop original dances. Analyze how the structure and final composition inform the artistic intent.

b. Develop an artistic statement that reflects a personal aesthetic for an original dance study or dance. Select and demonstrate movements that support the artistic statement.

*Revise- Anchor Standard 3: Revise, refine, and complete artistic work.*

- DA:Cr3.1.I  
Introductory a. Clarify the artistic intent of a dance by manipulating choreographic devices and dance structures based on established artistic criteria and the feedback from others. Analyze and evaluate the impact of choices made in the revision process.

b. Compare recognized systems to document a section of a dance using writing, symbols, or media technologies.

- DA:Cr3.1.II  
Intermediate a. Clarify the artistic intent of a dance by refining choreographic devices and dance structures, collaboratively or independently, using established artistic criteria, self-reflection, and the feedback from others. Analyze and evaluate the impact of choices made in the revision process.

b. Develop a strategy to record a dance using recognized systems of dance documentation (for example, writing, a form of notation symbols, using media technologies).

#### PERFORMING

*Express- Anchor Standard 4: Select, analyze, and interpret artistic work for presentation.*

- DA:Pr4.1.I  
Introductory a. Develop partner and ensemble skills that enable contrasting level changes through safe lifts, balances, or other means while maintaining a sense of spatial design and relationship. Use space intentionally during phrases and through transitions between phrases. Establish and break relationships with others as appropriate to the choreography.

b. Use syncopation and accent movements related to different tempi. Take rhythmic cues from different aspects of accompaniment. Integrate breath phrasing with metric and kinesthetic phrasing.

c. Connect energy and dynamics to movements by applying them in and through all parts of the body. Develop total body awareness and control so that movement phrases demonstrate variances of energy and dynamics.

- DA:Pr4.1.II  
Intermediate a. Dance alone and with others with spatial intention. Expand partner and ensemble skills to greater ranges and skill levels. Execute complex movement sequences with others while maintaining relationships through focus and intentionality.

b. Perform dance studies and compositions that use time and tempo in unpredictable ways. Use internal rhythms and kinetics as phrasing tools.

c. Initiate movement phrases by applying energy and dynamics. Vary energy and dynamics over the length of a phrase and transition smoothly out of the phrase and into the next phrase.

*Embody- Anchor Standard 5: Develop and refine artistic techniques and work for presentation.*

- DA:Pr5.1.I  
Introductory
- Embody technical dance skills (for example, functional alignment, coordination, balance, core support, clarity of movement, weight shifts, flexibility/ range of motion) to retain and execute dance choreography.
  - Develop a plan for healthy practices in dance activities and everyday life, including nutrition and injury prevention. Discuss implementation of the plan and how it supports personal performance goals.
  - Collaborate with peers to establish and implement a rehearsal plan to meet performance goals. Use a variety of strategies to analyze and evaluate performances of self and others (for example, use video recordings of practice to analyze the difference between the way movements look and how they feel to match performance with visual affect). Articulate performance goals and justify reasons for selecting particular practice strategies.
- DA:Pr5.1.II  
Intermediate
- Dance with sensibility toward other dancers while executing complex spatial, rhythmic, and dynamic sequences to meet performance goals.
  - Apply anatomical principles and healthy practices to a range of technical dance skills for achieving fluency of movement. Follow a personal nutrition plan that supports health for everyday life.
  - Plan and execute collaborative and independent practice and rehearsal processes with attention to technique and artistry informed by personal performance goals. Reflect on personal achievements.

*Present-Anchor Standard 6: Convey meaning through the presentation of artistic work.*

- DA:Pr6.1.I  
Introductory
- Demonstrate leadership qualities (for example commitment, dependability, responsibility, cooperation) when preparing for performances. Demonstrate performance etiquette and performance practices during class, rehearsal, and performance. Post-performance: accept notes from the choreographer and apply corrections to future performances. Document the rehearsal and performance process and evaluate methods and strategies, using dance terminology and production terminology.
  - Evaluate possible designs for the production elements of a performance and select and execute the ideas that would intensify and heighten the artistic intent of the dances.
- DA:Pr6.1.II  
Intermediate
- Demonstrate leadership qualities (for example commitment, dependability, responsibility, cooperation) when preparing for performances. Model performance etiquette and performance practices during class, rehearsal, and performance. Implement performance strategies to reach choreographic intent. Post-performance: accept notes from the choreographer and apply corrections to future performances. Document the rehearsal and performance process and evaluate methods and strategies, using dance terminology and production terminology.
  - Work collaboratively to produce a dance concert on a stage or in an alternative performance venue and plan the production elements that would be necessary to fulfill the artistic intent of the dance works.

## RESPONDING

*Analyze--Anchor Standard 7: Perceive and analyze artistic work.*

- DA:Re7.1.I  
Introductory
- Analyze recurring patterns of movement and their relationships in dance in context of artistic intent.
  - Analyze the movement patterns and their relationships in a variety of genres, styles, or cultural movement practices and demonstrate how their differences impact the meaning of the dance. Use genre-specific dance terminology.
- DA:Re7.1.II  
Intermediate
- Analyze dance works and provide examples of recurring patterns of movement and their relationships that create structure and meaning in dance.
  - Analyze and compare the movement patterns and their relationships in a variety of genres, styles, or cultural movement practices and explain how their differences impact communication and intent within a cultural context. Use genre-specific dance terminology.

*Interpret-- Anchor Standard 8: Construct meaningful interpretations of artistic work.*

- DA:Re8.1.I  
Introductory
- Select and compare different dances and discuss their intent and artistic expression. Use genre-specific dance terminology to explain how the relationships among the elements of dance, use of body, dance technique, and context enhance meaning and support intent.
- DA:Re8.1.II  
Intermediate
- Analyze and discuss how the elements of dance, execution of dance movement principles, and context contribute to artistic expression. Use genre-specific dance terminology.

*Critique – Anchor Standard 9: Apply criteria to evaluate artistic work.*

- DA:Re9.1.I  
Introductory
- Analyze the artistic expression of a dance. Discuss insights using evaluative criteria and dance terminology.
- DA:Re9.1.II  
Intermediate
- Compare and contrast two or more dances using evaluative criteria to critique artistic expression. Consider societal values and a range of perspectives. Use genre-specific dance terminology.

## CONNECTING

*Synthesize – Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art.*

- DA:Cn10.1.I  
Introductory
- Analyze a dance to determine the ideas expressed by the choreographer. Explain how the perspectives expressed by the choreographer may impact one's own interpretation. Provide evidence to support one's analysis.
  - Conduct research using a variety of resources to find information about a social issue of great interest. Use the information to create a dance study that expresses a specific point of view on the topic. Discuss whether the experience of creating and sharing the dance reinforces personal views or offers new knowledge and perspectives.
- DA:Cn10.1.II  
Intermediate
- Analyze a dance and research its context. Synthesize information learned and share new ideas about its impact on one's perspective.
  - Use established research methods and techniques to investigate a topic. Collaborate with others to identify questions and solve movement problems that pertain to the topic. Create and perform a piece of choreography. Discuss orally or



in writing the insights relating to knowledge gained through the research process, the synergy of collaboration, and the transfer of learning from this project to other situations.

*Relate – Anchor Standard 11: Relate artistic ideas and works with societal, cultural, and historical context to deepen understanding.*

DA:Cn11.1.I  
Introductory a. Analyze and discuss dances from selected genres or styles and/ or historical periods. Formulate reasons for the similarities and differences between them in relation to the ideas and perspectives of the peoples from which the dances originate.

DA:Cn11.1.II  
Intermediate a. Analyze dances from several genres or styles, historical periods, and/or world dance forms. Discuss how dance movement characteristics, techniques, and artistic criteria relate to the ideas and perspectives of the peoples from which the dances originate.

## MEDIA ARTS

### CREATING

*Conceive – Anchor Standard 1: Generate and conceptualize artistic ideas and work.*

MA:Cr1.1.I  
Introductory a. Use identified generative methods to formulate multiple ideas, develop artistic goals, and problem solve in media arts creation processes.

MA:Cr1.1.II  
Intermediate a. Strategically utilize generative methods to formulate multiple ideas, refine artistic goals, and increase the originality of approaches in media arts creation processes.

*Develop – Anchor Standard 2: Organize and develop artistic ideas and work.*

MA:Cr2.1.I  
Introductory a. Research and apply aesthetic criteria in developing, proposing, and refining artistic ideas, plans, prototypes, and production processes for media arts productions, considering original inspirations, goals, and presentation context.

MA:Cr2.1.II  
Intermediate a. Apply a personal aesthetic in designing, experimenting, and refining original artistic ideas, prototypes, and production strategies for media arts productions, considering artistic intentions, constraints of resources, and presentation context.

*Construct – Anchor Standard 3: Revise, refine, and complete artistic work.*

MA:Cr3.1.I  
Introductory a. Consolidate production processes to demonstrate deliberate choices in organizing and integrating content and stylistic conventions in media arts productions, demonstrating understanding of associated principles (for example, emphasis, tone).  
b. Analyze, refine, and modify media artworks, honing aesthetic quality and accentuating stylistic elements, to reflect an understanding of personal goals and preferences.

MA:Cr3.1.II  
Intermediate a. Consolidate production processes to demonstrate deliberate choices in organizing and integrating content and stylistic conventions in media arts production, demonstrating understanding of associated principles (for example, continuity, juxtaposition).  
b. Analyze, refine, and elaborate aesthetic elements and technical components to form impactful expressions in media artworks for specific purposes, intentions, audiences, and contexts.

### PRODUCING

*Integrate – Anchor Standard 4: Select, analyze, and interpret artistic work for presentation.*

MA:Pr4.1.I  
Introductory a. Integrate ideas from various media arts and other sources into unified productions, considering the reactions and interactions of a given or intended audience.

MA:Pr4.1.II  
Intermediate a. Integrate ideas from various arts, media arts forms, and other sources into unified media arts productions, considering the reactions and interactions of various audiences.

*Practice – Anchor Standard 5: Develop and refine artistic techniques and work for presentation.*

MA:Pr5.1.I  
Introductory a. Demonstrate progression in artistic, design, technical, and soft skills as a result of selecting and fulfilling specified roles in the production and presentation of a variety of media artworks.  
b. Develop and refine a determined range of creative and adaptive innovation abilities (for example, design thinking, risk taking) in addressing identified challenges and constraints within and through media arts productions.  
c. Demonstrate adaptation and innovation through the combination of tools, techniques, and content, in standard and innovative ways, to communicate intent in the production of media artworks.

MA:Pr5.1.II  
Intermediate a. Demonstrate effective command of artistic, design, technical, and soft skills in managing, producing, and presenting media artworks.  
b. Demonstrate effective ability in creative and adaptive innovation abilities (for example, resisting closure, responsive use of failure) to address sophisticated challenges within and through media arts productions.  
c. Demonstrate the skillful adaptation and combination of tools, styles, techniques, and interactivity to achieve specific expressive goals in the production of a variety of media artworks.

*Present – Anchor Standard 6: Convey meaning through the presentation of artistic work.*

MA:Pr6.1.I  
Introductory a. Design the presentation and distribution of collections of media artworks, considering combinations of artworks, formats, and audiences.  
b. Evaluate and implement improvements in presenting media artworks, considering personal and local impacts (for example, the benefits for self and others).

MA:Pr6.1.II  
Intermediate a. Curate and design the presentation and distribution of collections of media artworks through a variety of contexts (for example, mass audiences, physical and virtual channels).  
b. Evaluate and implement improvements in presenting media artworks, considering personal, local, and social impacts (for example, changes that occurred for people or to a situation).

### RESPONDING

*Perceive – Anchor Standard 7: Perceive and analyze artistic work.*

MA:Re7.1.I  
Introductory a. Analyze the qualities of and relationships between the components, style, and preferences communicated by media artworks and artists.

b. Analyze how a variety of media artworks shape audience experience and create meaning through multimodal presentations.

- MA:Re7.1.II  
Intermediate
- a. Analyze and synthesize the qualities and relationships of the components in a variety of media artworks and provide feedback on how they impact audience.  
b. Analyze how a wide variety of media artworks shape audience experience, create meaning, and persuade through multimodal presentations.

*Interpret – Anchor Standard 8: Construct meaningful interpretations of artistic work.*

- MA:Re8.1.I  
Introductory
- a. Interpret meanings and reaction to a variety of media artworks, focusing on personal and cultural contexts.

- MA:Re8.1.II  
Intermediate
- a. Interpret meanings and influence of a variety of media artworks, based on personal, societal, historical, and cultural contexts.

*Evaluate – Anchor Standard 9: Apply criteria to evaluate artistic work.*

- MA:Re9.1.I  
Introductory
- a. Evaluate media artworks and production processes with developed criteria, considering context and artistic goals.

- MA:Re9.1.II  
Intermediate
- a. Evaluate media artworks and production processes at decisive stages, using identified criteria and considering context and artistic goals.

## CONNECTING

*Synthesize – Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art.*

- MA:Cn10.1.I  
Introductory
- a. Access, evaluate, and integrate personal and external resources (for example, experiences, interests, cultural experiences) to inform the creation of original media artworks.  
b. Explain and demonstrate the use of media artworks to expand meaning and knowledge and to create cultural experiences (for example, learning and sharing through online environments).

- MA:Cn10.1.II  
Intermediate
- a. Synthesize internal and external resources (for example, cultural connections, introspection, research, exemplary works) to enhance the creation of persuasive media artwork.  
b. Explain and demonstrate the use of media artworks to synthesize new meaning and knowledge and reflect and form cultural experiences (for example, new connections between themes and ideas, local and global networks, personal influence).

*Relate- Anchor Standard 11: Relate artistic ideas and works with societal, cultural, and historical context to deepen understanding.*

- MA:Cn11.1.I  
Introductory
- a. Demonstrate and explain how media artworks and ideas relate to various contexts, purposes, and values (for example, social trends, power, equality, cultural identity).  
b. Critically evaluate and effectively interact with legal, technological, systemic, and vocational contexts of media arts, considering ethics, media literacy, social media, virtual worlds, and digital identity.

- MA:Cn11.1.II  
Intermediate
- a. Demonstrate the relationships of media arts ideas and works to various contexts, purposes, and values (for example, markets, systems, propaganda, truth).  
b. Critically investigate and ethically interact with legal, technological, systemic, and vocational contexts of media arts, considering ethics, media literacy, digital identity, and artist audience interactivity.

## MUSIC

### CREATING

*Anchor Standard 1: Generate and conceptualize artistic ideas and work.*

- MU:Cr1.1.I  
Introductory
- a. Compose and/or improvise melodic, rhythmic, and harmonic ideas for simple melodies and accompaniments for given melodies.

- MU:Cr1.1.II  
Intermediate
- a. Compose and/or improvise melodic, rhythmic, and harmonic ideas and chordal accompaniments in a variety of patterns and styles.

*Anchor Standard 2: Organize and develop artistic ideas and work.*

- MU:Cr2.1.I  
Introductory
- a. Select, develop, and use notation and/or audio/video recording to document melodic, rhythmic, and harmonic ideas for drafts of simple melodies.  
b. Use standard and/ or iconic notation and/ or audio/video recording to document personal rhythmic phrases, melodic phrases, and harmonic sequences.

- MU:Cr2.1.II  
Intermediate
- a. Select, develop, and use notation and/or audio/video recording to document draft melodies, harmonies, and rhythmic passages and accompaniments for given melodies.  
b. Use standard and/ or iconic notation and/ or audio/video recording to document personal rhythmic phrases, melodic phrases, and harmonic sequences.

*Anchor Standard 3: Revise, refine, and complete artistic work.*

- MU:Cr3.1.I  
Introductory
- a. Evaluate, critique, and refine draft compositions and improvisations based on knowledge, skill, and teacher-provided criteria.  
b. Present the final version of a personal composition or arrangement, using musicianship and originality to utilize various compositional techniques and convey expressive intent.  
c. Share personally developed and refined melodic and rhythmic ideas or motives – individually or as an ensemble – that demonstrate understanding of characteristics of music or texts studied in class.

- MU:Cr3.1.II  
Intermediate
- a. Evaluate and refine draft melodies, rhythmic passages, arrangements, and improvisations based on established criteria, including the extent to which they address identified purposes.  
b. Present the final version of a personal composition or arrangement, using musicianship and originality to utilize various compositional techniques and convey expressive intent.  
c. Share personally developed and refined arrangements, sections, and short compositions of increasing complexity – individually or as an ensemble – that address identified purposes.

**PERFORMING***Anchor Standard 4: Select, analyze, and interpret artistic work for presentation.*

MU:Pr4.1.I  
Introductory

a. Explain the teacher selected criteria used to select a varied repertoire to study based on an understanding of theoretical and structural characteristics of the music, the technical skill of the individual or ensemble, and the purpose or context of the performance.

b. Demonstrate or analyze, using music reading skills, how compositional devices of musical works impact and inform prepared or improvised performances.

c. Demonstrate an understanding of context in a varied repertoire of music through prepared and improvised performances.

d. Perform contrasting pieces of music, demonstrating as well as explaining how the music's intent is conveyed by their interpretations of the elements of music and expressive qualities (for example, dynamics, tempo, timbre, articulation/style, phrasing) as developmentally appropriate.

MU:Pr4.1.II  
Intermediate

a. Develop and apply criteria to select a varied repertoire to study and perform based on an understanding of theoretical and structural characteristics and expressive challenges in the music, the technical skill of the individual or ensemble, and the purpose and context of the performance.

b. Document, demonstrate, and analyze, using music reading skills, how compositional devices of musical works may impact and inform prepared and improvised performances.

c. Demonstrate how understanding the notated style, genre, and context of a varied repertoire of music influences prepared and improvised performances.

d. Perform contrasting pieces of music, demonstrating as well as explaining how the music's intent is conveyed by their interpretations of the elements of music and expressive qualities (for example, dynamics, tempo, timbre, articulation/style, phrasing) as developmentally appropriate.

*Practice – Anchor Standard 5: Develop and refine artistic techniques and work for presentation.*

MU:Pr5.1.I  
Introductory

a. Develop criteria to critique individual and small-group performances of a varied repertoire of music, create rehearsal strategies to address performance challenges, and refine the performances.

MU:Pr5.1.II  
Intermediate

a. Develop and apply criteria to critique individual and small group performances of a varied repertoire of music, create rehearsal strategies to address performance challenges, and refine the performances.

*Anchor Standard 6: Convey meaning through the presentation of artistic work.*

MU:Pr6.1.I  
Introductory

a. Demonstrate technical accuracy and expressive qualities, as well as an understanding of expressive intent, in prepared and improvised performances of a varied repertoire of music representing diverse cultures, styles, and genres.

b. Demonstrate technical accuracy and expressive qualities, as well as an understanding of expressive intent, in prepared and improvised performances of a varied repertoire of music representing diverse cultures, styles, and genres.

MU:Pr6.1.II  
Intermediate

a. Demonstrate understanding of the technical demands and an understanding of expressive qualities and intent of the music in prepared and improvised performances of a varied repertoire representing diverse cultures, styles, genres, and historical periods.

b. Demonstrate understanding of the technical demands and an understanding of expressive qualities and intent of the music in prepared and improvised performances of a varied repertoire representing diverse cultures, styles, genres, and historical periods.

**RESPONDING***Anchor Standard 7: Perceive and analyze artistic work.*

MU:Re7.1.I  
Introductory

a. Apply teacher provided criteria to select music for specified purposes, supporting choices by citing characteristics found in the music and connections to interest, purpose, and context.

b. Compare passages in musical selections and explain how the elements of music and context inform the response.

c. Identify and compare the context of programs of music from a variety of genres, cultures, and historical periods as developmentally appropriate.

MU:Re7.1.II  
Intermediate

a. Apply teacher provided and/or personally developed criteria to select music for a variety of purposes, justifying choices citing knowledge of the music and the specified purpose and context.

b. Explain how the analysis of the musical works and context of contrasting selections inform the response.

c. Identify and compare the context of programs of music from a variety of genres, cultures, and historical periods as developmentally appropriate.

*Anchor Standard 8: Construct meaningful interpretations of artistic work.*

MU:Re8.1.I  
Introductory

a. Explain and support the meaning of musical works, citing as evidence the elements of music, context, and personal research.

MU:Re8.1.II  
Intermediate

a. Explain and support interpretations of the expressive intent and meaning of musical selections, citing as evidence the elements of music, context, and varied researched sources.

*Anchor Standard 9: Apply criteria to evaluate artistic work.*

MU:Re9.1.I  
Introductory

Evaluate works and performances based on collaboratively developed criteria, including analysis of the structure and context.

MU:Re9.1.II  
Intermediate

Evaluate works and performances based on research, as well as personally and collaboratively developed criteria, including analysis and interpretation of the structure and context.

**CONNECTING***Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art.*

MU:Cn10.1.I  
Introductory

a. Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music as developmentally appropriate.

- MU:Cn10.1.II Intermediate a. Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music as developmentally appropriate.  
*Anchor Standard 11: Relate artistic ideas and works with societal, cultural, and historical context to deepen understanding.*
- MU:Cn11.1.I Introductory a. Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life as developmentally appropriate.
- MU:Cn11.1.II Intermediate a. Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life as developmentally appropriate.

## THEATRE

## CREATING

*Envision/Conceptualize – Anchor Standard 1: Generate and conceptualize artistic ideas and work.*

- TH:Cr1.1.I Introductory a. Create a symbol or metaphor to unify the concept of a drama/ theatre work.  
 b. Explore the impact of technology on design choices in a drama/ theatre work.  
 c. Use script analysis to generate ideas about a character that is believable and authentic in a drama/theatre work.
- TH:Cr1.1.II Intermediate a. Apply research to construct ideas about the unified concept of a drama/theatre work.  
 b. Understand and apply technology to design solutions for a drama/ theatre work.  
 c. Use personal experiences and knowledge to develop a character that is believable and authentic in a drama/theatre work.
- Develop – Anchor Standard 2: Organize and develop artistic ideas and work.*
- TH:Cr2.1.I Introductory a. Explore the function of history and culture in the development of a dramatic concept through a critical analysis of original ideas in a drama/ theatre work.  
 b. Investigate the collaborative nature of the actor, director, playwright, and designers (creative team) and explore their interdependent roles in a drama/theatre work.
- TH:Cr2.1.II Intermediate a. Refine a dramatic concept to demonstrate a critical understanding of historical and cultural influences of original ideas applied to a drama/theatre work.  
 b. Cooperate as a creative team to make interpretive choices for a drama/theatre work.
- Develop – Anchor Standard 3: Revise, refine, and complete artistic work.*
- TH:Cr3.1.I Introductory a. Practice and revise a unified devised or scripted drama/theatre work using theatre conventions.  
 b. Explore physical, vocal, and psychological choices to develop a performance that is believable, authentic, and relevant to a drama/theatre work.  
 c. Refine technical design choices to support the symbols or metaphors to unify the concept in a devised or scripted drama/ theatre work.
- TH:Cr3.1.II Intermediate a. Use the rehearsal process to analyze the dramatic concept and technical design elements of a devised or scripted drama/theatre work.  
 b. Use research and script analysis to revise physical, vocal, and psychological choices impacting the believability and relevance of a drama/theatre work.  
 c. Reimagine and revise technical design choices during the course of a rehearsal process to enhance the unified concept in a devised or scripted drama/theatre work.

## PERFORMING

*Select – Anchor Standard 4: Anchor Standard 4: Select, analyze, and interpret artistic work for presentation.*

- TH:Pr4.1.I Introductory a. Apply choices to the interpretation of a drama/theatre work.  
 b. Shape character choices using given circumstances in a drama/theatre work.
- TH:Pr4.1.II Intermediate a. Explore various choices to the interpretation of a drama/theatre work.  
 b. Identify essential text information, research from various sources, and the director's concept that influence character choices in a drama/theatre work.
- Prepare – Anchor Standard 5: Develop and refine artistic techniques and work for presentation.*
- TH:Pr5.1.I Introductory a. Practice various acting techniques to expand skills in a rehearsal or drama/ theatre performance.  
 b. Research technical elements to increase the impact of a design for a drama/theatre production.
- TH:Pr5.1.II Intermediate a. Refine a range of acting skills to build a believable and sustainable drama/ theatre performance.  
 b. Apply technical elements and research to create a design that communicates the concept of a drama/ theatre production.

## PERFORMING

*Share, Present*

- TH:Pr6.1.I Introductory a. Express a theme through the unified concept in the performance of a drama/theatre work.
- TH:Pr6.1.II Intermediate a. Express a theme through the unified concept in the performance of a drama/theatre work for a specific purpose.

## RESPONDING

*Reflect – Anchor Standard 7: Perceive and analyze artistic work.*

- TH:Re7.1.I Introductory a. Justify personal reactions to artistic choices made in a drama/theatre work.
- TH:Re7.1.II Intermediate a. Recognize the validity of multiple interpretations of artistic choices in a drama/theatre work.

*Interpret – Anchor Standard 8: Construct meaningful interpretations of artistic work.*

- TH:Re8.1.I Introductory a. Identify and compare artistic choices developed from personal experience, textual evidence, and appropriate criteria in a drama/theatre work.

- b. Identify and compare cultural perspectives and contexts that may influence the interpretation of a drama/theatre work.
- c. Support and explain personal aesthetics through participation in, and observation of, a drama/theatre work.

TH:Re8.1.II  
Intermediate

- a. Analyze personal experience, textual evidence, and appropriate criteria to reinforce artistic choices when participating in or observing a drama/ theatre work.
- b. Apply cultural perspectives and understandings to interpret a drama/ theatre work.
- c. Justify how aesthetics inform artistic decisions in a drama/theatre work.

*Evaluate – Anchor Standard 9: Apply criteria to evaluate artistic work.*

TH:Re9.1.I  
Introductory

- a. Examine a drama/ theatre work using supporting evidence and criteria, while considering art forms, history, culture, and other disciplines.
- b. Judge the effectiveness of production elements in conveying the theme of the drama/theatre work while respecting others' interpretations.
- c. Assess the impact of a drama/theatre work on a specific audience.

TH:Re9.1.II  
Intermediate

- a. Analyze and assess a drama/theatre work by connecting it to art forms, history, culture, and other disciplines using supporting evidence and criteria.
- b. Citing evidence, evaluate the production elements in conveying the theme of a drama/theatre work.
- c. Articulate how a drama/theatre work communicates for a specific purpose and audience.

## CONNECTING

*Empathize – Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art.*

TH:Cn10.1.I  
Introductory

- a. Choose and interpret a drama/theatre work to reflect or question personal beliefs.

TH:Cn10.1.II  
Intermediate

- a. Investigate how community ideas and personal beliefs impact a drama/theatre work.

*Interrelate – Anchor Standard 11: Relate artistic ideas and works with societal, cultural, and historical context to deepen understanding.*

TH:Cn11.1.I  
Introductory

- a. Explore how cultural, global, and historic belief systems affect creative choices in a drama/theatre work.

TH:Cn11.1.II  
Intermediate

- a. Develop a drama/ theatre work that identifies and questions cultural, global, and historic belief systems.

*Research - Anchor Standard 11: Relate artistic ideas and works with societal, cultural, and historical context to deepen understanding.*

TH:Cn11.2.I  
Introductory

- a. Research how other theatre artists apply creative processes to tell stories in a devised or scripted drama/theatre work.
- b. Use basic theatre research methods to better understand the social and cultural background of a drama/ theatre work.

TH:Cn11.2.II  
Intermediate

- a. Discuss creative choices for a devised or scripted drama/theatre work based on research about selected topics.
- b. Present and support an opinion about the social, cultural, and historical understandings of a drama/theatre design, based on critical research.

## VISUAL ARTS

### CREATING

*Investigate, Plan, Make – Anchor Standard 1: Generate and conceptualize artistic ideas and work.*

VA:Cr1.1.I  
Introductory

- a. Use multiple approaches to begin creative endeavors.

VA:Cr1.1.II  
Intermediate

- a. Individually or collaboratively formulate new creative problems based on student's existing artwork.

*Anchor Standard 1: Generate and conceptualize artistic ideas and work.*

VA:Cr1.2.I  
Introductory

- a. Shape an artistic investigation of an aspect of present day life using a contemporary practice of art or design.

VA:Cr1.2.II  
Intermediate

- a. Choose from a range of materials and methods of traditional and contemporary artistic practices to plan works of art and design.

*Investigate – Anchor Standard 2: Organize and develop artistic ideas and work.*

VA:Cr2.1.I  
Introductory

- a. Engage in making a work of art or design without having a preconceived plan.

VA:Cr2.1.II  
Intermediate

- a. Through experimentation, practice, and persistence, demonstrate acquisition of skills and knowledge in a chosen art form.

*Investigate – Anchor Standard 2: Organize and develop artistic ideas and work.*

VA:Cr2.2.I  
Introductory

- a. Explain how traditional and nontraditional materials may impact human health and the environment and demonstrate safe handling of materials, tools, and equipment.

VA:Cr2.2.II  
Intermediate

- a. Demonstrate awareness of ethical implications of making and distributing creative work.

*Investigate – Anchor Standard 2: Organize and develop artistic ideas and work.*

VA:Cr2.3.I  
Introductory

- a. Collaboratively develop a proposal for an installation, artwork, or space design that transforms the perception and experience of a particular place.

VA:Cr2.3.II  
Intermediate

- a. Redesign an object, system, place, or design in response to contemporary issues.

*Reflect, Refine, Continue – Anchor Standard 3: Revise, refine, and complete artistic work.*

VA:Cr3.1.I  
Introductory

- a. Apply relevant criteria from traditional and contemporary cultural contexts to examine, reflect on, and plan revisions for works of art and design in progress.

VA:Cr3.1.II  
Intermediate

- a. Engage in constructive critique with peers, then reflect on, reengage, revise, and refine works of art and design in response to personal artistic vision.

**PRESENTING***Relate – Anchor Standard 4: Select, analyze, and interpret artistic work for presentation.*

VA:Pr4.1.I a. Analyze, select, and curate artifacts or artworks for presentation and preservation.

Introductory

VA:Pr4.1.II a. Analyze, select, and critique personal artwork for a collection or portfolio presentation.

Intermediate

*Select – Anchor Standard 5: Develop and refine artistic techniques and work for presentation.*

VA:Pr5.1.I a. Analyze and evaluate the reasons and ways an exhibition is presented.

Introductory

VA:Pr5.1.II a. Evaluate, select, and apply methods or processes appropriate to display artwork in a specific place.

Intermediate

*Analyze – Anchor Standard 6: Convey meaning through the presentation of artistic work.*

VA:Pr6.1.I a. Analyze and describe the impact that an exhibition or collection has on personal awareness of social, cultural, or political beliefs and understandings.

Introductory

VA:Pr6.1.II a. Make, explain, and justify connections between artists or artwork and social, cultural, and political history.

Intermediate

**RESPONDING***Share – Anchor Standard 7: Perceive and analyze artistic work.*

VA:Re7.1.I a. Hypothesize ways in which art influences perception and understanding of human experiences.

Introductory

VA:Re7.1.II a. Recognize and describe personal aesthetic and empathetic responses to the natural world and constructed environments.

Intermediate

*Perceive – Anchor Standard 7: Perceive and analyze artistic work.*

VA:Re7.2.I a. Analyze how one's understanding of the world is affected by experiencing visual imagery.

Introductory

VA:Re7.2.II a. Evaluate the effectiveness of an image or images to influence ideas, feelings, and behaviors of specific audiences.

Intermediate

*Anchor Standard 8: Construct meaningful interpretations of artistic work.*

VA:Re8.1.I a. Construct meaningful interpretations, supported by evidence, of an artwork or collection of works through describing and analyzing feelings, subject matter, formal characteristics, artmaking approaches, contextual information, and key concepts.

Introductory

VA:Re8.1.II a. Construct and support meaningful interpretations, supported by evidence, of an artwork or collection of works through describing and analyzing feelings, subject matter, formal characteristics, artmaking approaches, contextual information, and key concepts.

Intermediate

*Analyze – Anchor Standard 9: Apply criteria to evaluate artistic work.*

VA:Re9.2.I a. Establish relevant criteria in order to evaluate a work of art or collection of works.

Introductory

VA:Re9.2.II a. Determine the relevance of criteria used by others to evaluate a work of art or collection of works.

Intermediate

**CONNECTING***Interpret – Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art.*

VA:Cn10.1.I a. Document the process of developing ideas from early stages to fully elaborated ideas.

Introductory

VA:Cn10.1.II a. Utilize inquiry methods of observation, research, and experimentation to explore unfamiliar subjects through art making.

Intermediate

*Synthesize – Anchor Standard 11: Relate artistic ideas and works with societal, cultural, and historical context to deepen understanding.*

VA:Cn11.1.I a. Describe how knowledge of culture, traditions, and history may influence personal responses to art.

Introductory

VA:Cn11.1.II a. Compare uses of art in a variety of societal, cultural, and historical contexts and make connections to uses of art in contemporary and local contexts.

Intermediate

**MATHEMATICS – HIGH SCHOOL**  
**STANDARDS FOR MATHEMATICAL PRACTICE**

MP

- MP.1 Make sense of problems and persevere in solving them.  
 MP.2 Reason abstractly and quantitatively.  
 MP.3 Construct viable arguments and critique the reasoning of others.  
 MP.4 Model with mathematics.  
 MP.5 Use appropriate tools strategically.  
 MP.6 Attend to precision.  
 MP.7 Look for and make use of structure.  
 MP.8 Look for and express regularity in repeated reasoning.

**ALGEBRA I**  
**THE REAL NUMBER SYSTEM**

RN

*Use properties of rational and irrational numbers.*

- N.RN.3 Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.

**QUANTITIES**

Q

*Reason quantitatively and use units to solve problems.*

- N.Q.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.  
 N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.  
 N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

**SEEING STRUCTURE IN EXPRESSIONS**

SSE

*Interpret the structure of expressions*

- A.SSE.1 Interpret expressions that represent a quantity in terms of its context.  
 A.SSE.1.a Interpret parts of an expression, such as terms, factors, and coefficients.  
 A.SSE.1.b Interpret complicated expressions by viewing one or more of their parts as a single entity.  
 A.SSE.2 Use the structure of an expression to identify ways to rewrite it.

*Write expressions in equivalent forms to solve problems*

- A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.  
 A.SSE.3.a Factor a quadratic expression to reveal the zeros of the function it defines.  
 A.SSE.3.b Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.  
 A.SSE.3.c Use the properties of exponents to transform expressions for exponential functions.

**ARITHMETIC WITH POLYNOMIALS AND RATIONAL EXPRESSIONS**

APR

*Perform arithmetic operations on polynomials*

- A.APR.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

*Understand the relationship between zeros and factors of polynomials*

- A.APR.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

**CREATING EQUATIONS**

CED

*Create equations that describe numbers or relationships*

- A.CED.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.  
 A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.  
 A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.  
 A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

**REASONING WITH EQUATIONS AND INEQUALITIES**

REI

*Understand solving equations as a process of reasoning and explain the reasoning*

- A.REI.1 Explain each step in solving a simple equation as following from 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.

*Solve equations and inequalities in one variable*

- A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.  
 A.REI.4 Solve quadratic equations in one variable.  
 A.REI.4.a Use the method of completing the square to transform any quadratic equation in  $x$  into an equation of the form  $(x - p)^2 = q$  that has the same solutions. Derive the quadratic formula from this form.  
 A.REI.4.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  $b$ .

*Solve systems of equations*

- A.REI.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.

A.REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

*Represent and solve equations and inequalities graphically*

A.REI.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).

A.REI.11 Explain why the x-coordinates of the points where the graphs of the equations  $y = f(x)$  and  $y = g(x)$  intersect are the solutions of the equation  $f(x) = g(x)$ ; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where  $f(x)$  and/or  $g(x)$  are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

A.REI.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

**INTERPRETING FUNCTIONS**

**IF**

*Understand the concept of a function and use function notation*

F.IF.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If  $f$  is a function and  $x$  is an element of its domain, then  $f(x)$  denotes the output of  $f$  corresponding to the input  $x$ . The graph of  $f$  is the graph of the equation  $y = f(x)$ .

F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.

*Interpret functions that arise in applications in terms of the context*

F.IF.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.*

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.

F.IF.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.

*Analyze functions using different representations*

F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

F.IF.7.a Graph linear and quadratic functions and show intercepts, maxima, and minima.

F.IF.7.b Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

F.IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

F.IF.8.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.

F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

**BUILDING FUNCTIONS**

**BF**

*Build a function that models a relationship between two quantities*

F.BF.1 Write a function that describes a relationship between two quantities.

F.BF.1.a Determine an explicit expression, a recursive process, or steps for calculation from a context.

*Build new functions from existing functions*

F.BF.3 Identify the effect on the graph of replacing  $f(x)$  by  $f(x) + k$ ,  $k f(x)$ ,  $f(kx)$ , and  $f(x + k)$  for specific values of  $k$  (both positive and negative); find the value of  $k$  given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

**LINEAR, QUADRATIC, AND EXPONENTIAL MODELS**

**LE**

*Construct and compare linear, quadratic, and exponential models and solve problems*

F.LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.

F.LE.1.a Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.

F.LE.1.b Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.

F.LE.1.c Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

F.LE.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).

F.LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

*Interpret expressions for functions in terms of the situation they model*

F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context.

**INTERPRETING CATEGORICAL AND QUANTITATIVE DATA**

**ID**

*Summarize, represent, and interpret data on a single count or measurement variable*

S.ID.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).

S.ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.



S.ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

*Summarize, represent, and interpret data on two categorical and quantitative variables*

S.ID.5 Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.

S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

S.ID.6.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.*

S.ID.6.b Informally assess the fit of a function by plotting and analyzing residuals.

S.ID.6.c Fit a linear function for a scatter plot that suggests a linear association.

*Interpret linear models*

S.ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

S.ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.

S.ID.9 Distinguish between correlation and causation.

**GEOMETRY  
CONGRUENCE**

CO

*Experiment with transformations in the plane*

G.CO.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

G.CO.2 Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

G.CO.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

G.CO.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

G.CO.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

*Understand congruence in terms of rigid motions*

G.CO.6 Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

G.CO.7 Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.

G.CO.8 Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

*Prove geometric theorems*

G.CO.9 Prove theorems about lines and angles. *Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.*

G.CO.10 Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to  $180^\circ$ ; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.*

G.CO.11 Prove theorems about parallelograms. *Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.*

*Make geometric constructions*

G.CO.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

G.CO.13 Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

**SIMILARITY, RIGHT TRIANGLES, AND TRIGONOMETRY**

SRT

*Understand similarity in terms of similarity transformations*

G.SRT.1 Verify experimentally the properties of dilations given by a center and a scale factor:

G.SRT.1.a A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.

G.SRT.1.b The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

G.SRT.2 Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

G.SRT.3 Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

*Prove theorems involving similarity*

G.SRT.4 Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*

G.SRT.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

*Define trigonometric ratios and solve problems involving right triangles*

- G.SRT.6 Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.
- G.SRT.7 Explain and use the relationship between the sine and cosine of complementary angles.
- G.SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

**CIRCLES****C***Understand and apply theorems about circles*

- G.C.1 Prove that all circles are similar.
- G.C.2 Identify and describe relationships among inscribed angles, radii, and chords. *Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.*
- G.C.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

*Find arc lengths and areas of sectors of circles*

- G.C.5 Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

**EXPRESSING GEOMETRIC PROPERTIES WITH EQUATIONS****GPE***Translate between the geometric description and the equation for a conic section*

- G.GPE.1 Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

*Use coordinates to prove simple geometric theorems algebraically*

- G.GPE.4 Use coordinates to prove simple geometric theorems algebraically.
- G.GPE.5 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).
- G.GPE.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.
- G.GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

**GEOMETRIC MEASUREMENT AND DIMENSION****GMD***Explain volume formulas and use them to solve problems*

- G.GMD.1 Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.
- G.GMD.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.

*Visualize relationships between two-dimensional and three-dimensional objects*

- G.GMD.4 Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

**MODELING WITH GEOMETRY****MG***Apply geometric concepts in modeling situations*

- G.MG.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).
- G.MG.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).
- G.MG.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

**ALGEBRA II****THE REAL NUMBER SYSTEM****RN***Extend the properties of exponents to rational exponents.*

- N.RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.
- N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.

**QUANTITIES****Q***Reason quantitatively and use units to solve problems.*

- N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.

**THE COMPLEX NUMBER SYSTEM****CN***Perform arithmetic operations with complex numbers.*

- N.CN.1 Know there is a complex number  $i$  such that  $i^2 = -1$ , and every complex number has the form  $a + bi$  with  $a$  and  $b$  real.
- N.CN.2 Use the relation  $i^2 = -1$  and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

*Use complex numbers in polynomial identities and equations.*

- N.CN.7 Solve quadratic equations with real coefficients that have complex solutions.

**SEEING STRUCTURE IN EXPRESSIONS****SSE***Interpret the structure of expressions*

- A.SSE.2 Use the structure of an expression to identify ways to rewrite it.

*Write expressions in equivalent forms to solve problems*

- A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

- A.SSE.3.c Use the properties of exponents to transform expressions for exponential functions.
- A.SSE.4 Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems.

**ARITHMETIC WITH POLYNOMIALS AND RATIONAL EXPRESSIONS****APR**

*Understand the relationship between zeros and factors of polynomials*

- A.APR.2 Know and apply the Remainder Theorem: For a polynomial  $p(x)$  and a number  $a$ , the remainder on division by  $x - a$  is  $p(a)$ , so  $p(a) = 0$  if and only if  $(x - a)$  is a factor of  $p(x)$ .
- A.APR.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

*Use polynomial identities to solve problems*

- A.APR.4 Prove polynomial identities and use them to describe numerical relationships.

*Rewrite rational expressions*

- A.APR.6 Rewrite simple rational expressions in different forms; write  $a(x)/b(x)$  in the form  $q(x) + r(x)/b(x)$ , where  $a(x)$ ,  $b(x)$ ,  $q(x)$ , and  $r(x)$  are polynomials with the degree of  $r(x)$  less than the degree of  $b(x)$ , using inspection, long division, or, for the more complicated examples, a computer algebra system.

**CREATING EQUATIONS****CED**

*Create equations that describe numbers or relationships*

- A.CED.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.

**REASONING WITH EQUATIONS AND INEQUALITIES****REI**

*Understand solving equations as a process of reasoning and explain the reasoning*

- A.REI.1 Explain each step in solving a simple equation as following from 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.
- A.REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

*Solve equations and inequalities in one variable*

- A.REI.4 Solve quadratic equations in one variable.

- A.REI.4.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  $b$ .

*Solve systems of equations*

- A.REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
- A.REI.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.

*Represent and solve equations and inequalities graphically*

- A.REI.11 Explain why the  $x$ -coordinates of the points where the graphs of the equations  $y = f(x)$  and  $y = g(x)$  intersect are the solutions of the equation  $f(x) = g(x)$ ; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where  $f(x)$  and/or  $g(x)$  are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

**INTERPRETING FUNCTIONS****IF**

*Understand the concept of a function and use function notation*

- F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.

*Interpret functions that arise in applications in terms of the context*

- F.IF.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.*
- F.IF.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.

*Analyze functions using different representations*

- F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
- F.IF.7.c Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
- F.IF.7.e Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
- F.IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
- F.IF.8.b Use the properties of exponents to interpret expressions for exponential functions.
- F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

**BUILDING FUNCTIONS****BF**

*Build a function that models a relationship between two quantities*

- F.BF.1 Write a function that describes a relationship between two quantities
- F.BF.1.a Determine an explicit expression, a recursive process, or steps for calculation from a context.
- F.BF.1.b Combine standard function types using arithmetic operations.
- F.BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

*Build new functions from existing functions*

- F.BF.3 Identify the effect on the graph of replacing  $f(x)$  by  $f(x) + k$ ,  $k f(x)$ ,  $f(kx)$ , and  $f(x + k)$  for specific values of  $k$  (both positive and negative); find the value of  $k$  given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.
- F.BF.4 Find inverse functions.
- F.BF.4.a Solve an equation of the form  $f(x) = c$  for a simple function  $f$  that has an inverse and write an expression for the inverse.

**LINEAR, QUADRATIC, AND EXPONENTIAL MODELS****LE***Construct and compare linear, quadratic, and exponential models and solve problems*

- F.LE.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).
- F.LE.4 For exponential models, express as a logarithm the solution to  $ab^{ct} = d$  where  $a$ ,  $c$ , and  $d$  are numbers and the base  $b$  is 2, 10, or  $e$ ; evaluate the logarithm using technology.

*Interpret expressions for functions in terms of the situation they model*

- F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context.

**TRIGONOMETRIC FUNCTIONS****TF***Extend the domain of trigonometric functions using the unit circle*

- F.TF.1 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.
- F.TF.2 Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.

*Model periodic phenomena with trigonometric functions*

- F.TF.5 Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.

*Prove and apply trigonometric identities*

- F.TF.8 Prove the Pythagorean identity  $\sin^2(\theta) + \cos^2(\theta) = 1$  and use it to find  $\sin(\theta)$ ,  $\cos(\theta)$ , or  $\tan(\theta)$  given  $\sin(\theta)$ ,  $\cos(\theta)$ , or  $\tan(\theta)$  and the quadrant of the angle.

**EXPRESSING GEOMETRIC PROPERTIES WITH EQUATIONS****GPE***Translate between the geometric description and the equation for a conic section*

- G.GPE.2 Derive the equation of a parabola given a focus and directrix.

**INTERPRETING CATEGORICAL AND QUANTITATIVE DATA****ID***Summarize, represent, and interpret data on a single count or measurement variable*

- S.ID.4 Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

*Summarize, represent, and interpret data on two categorical and quantitative variables*

- S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
- S.ID.6.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.

**MAKING INFERENCES AND JUSTIFYING CONCLUSIONS****IC***Understand and evaluate random processes underlying statistical experiments*

- S.IC.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population.
- S.IC.2 Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation.

*Make inferences and justify conclusions from sample surveys, experiments, and observational studies*

- S.IC.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.
- S.IC.4 Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.
- S.IC.5 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.
- S.IC.6 Evaluate reports based on data.

**CONDITIONAL PROBABILITY AND THE RULES OF PROBABILITY****CP***Understand independence and conditional probability and use them to interpret data*

- S.CP.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").
- S.CP.2 Understand that two events  $A$  and  $B$  are independent if the probability of  $A$  and  $B$  occurring together is the product of their probabilities, and use this characterization to determine if they are independent.
- S.CP.3 Understand the conditional probability of  $A$  given  $B$  as  $P(A \text{ and } B)/P(B)$ , and interpret independence of  $A$  and  $B$  as saying that the conditional probability of  $A$  given  $B$  is the same as the probability of  $A$ , and the conditional probability of  $B$  given  $A$  is the same as the probability of  $B$ .
- S.CP.4 Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.
- S.CP.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.
- Use the rules of probability to compute probabilities of compound events in a uniform probability model*
- S.CP.6 Find the conditional probability of  $A$  given  $B$  as the fraction of  $B$ 's outcomes that also belong to  $A$ , and interpret the answer in terms of the model.
- S.CP.7 Apply the Addition Rule,  $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ , and interpret the answer in terms of the model.

## INTEGRATED PATHWAY MATH 1 QUANTITIES

Q

*Reason quantitatively and use units to solve problems.*

- N.Q.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.
- N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.
- N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

## SEEING STRUCTURE IN EXPRESSIONS

SSE

*Interpret the structure of expressions*

- A.SSE.1 Interpret expressions that represent a quantity in terms of its context
- A.SSE.1.a Interpret parts of an expression, such as terms, factors, and coefficients.
- A.SSE.1.b Interpret complicated expressions by viewing one or more of their parts as a single entity.

*Write expressions in equivalent forms to solve problems*

- A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
- A.SSE.3.c Use the properties of exponents to transform expressions for exponential functions.

## CREATING EQUATIONS

CE

*Create equations that describe numbers or relationships*

- A.CED.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.
- A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.
- A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

## REASONING WITH EQUATIONS AND INEQUALITIES

REI

*Understand solving equations as a process of reasoning and explain the reasoning*

- A.REI.1 Explain each step in solving a simple equation as following from 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.

*Solve equations and inequalities in one variable*

- A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

*Solve systems of equations*

- A.REI.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
- A.REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

*Represent and solve equations and inequalities graphically*

- A.REI.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).
- A.REI.11 Explain why the x-coordinates of the points where the graphs of the equations  $y = f(x)$  and  $y = g(x)$  intersect are the solutions of the equation  $f(x) = g(x)$ ; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where  $f(x)$  and/or  $g(x)$  are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.
- A.REI.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

## INTERPRETING FUNCTIONS

IF

*Understand the concept of a function and use function notation*

- F.IF.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If  $f$  is a function and  $x$  is an element of its domain, then  $f(x)$  denotes the output of  $f$  corresponding to the input  $x$ . The graph of  $f$  is the graph of the equation  $y = f(x)$ .
- F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
- F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.

*Interpret functions that arise in applications in terms of the context*

- F.IF.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.*
- F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
- F.IF.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.

*Analyze functions using different representations*

- F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

F.IF.7.a Graph linear and quadratic functions and show intercepts, maxima, and minima.

F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

**BUILDING FUNCTIONS****BF**

*Build a function that models a relationship between two quantities*

F.BF.1 Write a function that describes a relationship between two quantities

F.BF.1.a Determine an explicit expression, a recursive process, or steps for calculation from a context.

F.BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

*Build new functions from existing functions*

F.BF.3 Identify the effect on the graph of replacing  $f(x)$  by  $f(x) + k$ ,  $k f(x)$ ,  $f(kx)$ , and  $f(x + k)$  for specific values of  $k$  (both positive and negative); find the value of  $k$  given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

**LINEAR, QUADRATIC, AND EXPONENTIAL MODELS****LE**

*Construct and compare linear, quadratic, and exponential models and solve problems*

F.LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.

F.LE.1.a Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.

F.LE.1.b Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.

F.LE.1.c Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

F.LE.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).

F.LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

*Interpret expressions for functions in terms of the situation they model*

F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context.

**CONGRUENCE****CO**

*Experiment with transformations in the plane*

G.CO.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

G.CO.2 Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

G.CO.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

G.CO.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

G.CO.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

*Understand congruence in terms of rigid motions*

G.CO.6 Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

G.CO.7 Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.

G.CO.8 Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

*Prove geometric theorems*

G.CO.9 Prove theorems about lines and angles. *Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.*

G.CO.10 Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to  $180^\circ$ ; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.*

G.CO.11 Prove theorems about parallelograms. *Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.*

**INTERPRETING CATEGORICAL AND QUANTITATIVE DATA****ID**

*Summarize, represent, and interpret data on a single count or measurement variable*

S.ID.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).

S.ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

S.ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

*Summarize, represent, and interpret data on two categorical and quantitative variables*

S.ID.5 Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.

- S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
- S.ID.6.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.
- S.ID.6.b Informally assess the fit of a function by plotting and analyzing residuals.
- S.ID.6.c Fit a linear function for a scatter plot that suggests a linear association.

**Interpret linear models**

- S.ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
- S.ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.
- S.ID.9 Distinguish between correlation and causation.

**INTEGRATED PATHWAY MATH 2****THE REAL NUMBER SYSTEM****RN***Extend the properties of exponents to rational exponents.*

- N.RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.
- N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.

*Use properties of rational and irrational numbers.*

- N.RN.3 Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.

**QUANTITIES****Q***Reason quantitatively and use units to solve problems.*

- N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.

**THE COMPLEX NUMBER SYSTEM****CN***Perform arithmetic operations with complex numbers.*

- N.CN.1 Know there is a complex number  $i$  such that  $i^2 = -1$ , and every complex number has the form  $a + bi$  with  $a$  and  $b$  real.
- N.CN.2 Use the relation  $i^2 = -1$  and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

*Use complex numbers in polynomial identities and equations.*

- N.CN.7 Solve quadratic equations with real coefficients that have complex solutions.

**SEEING STRUCTURE IN EXPRESSIONS****SSE***Interpret the structure of expressions*

- A.SSE.1 Interpret expressions that represent a quantity in terms of its context.
- A.SSE.1.b Interpret complicated expressions by viewing one or more of their parts as a single entity.
- A.SSE.2 Use the structure of an expression to identify ways to rewrite it.

*Write expressions in equivalent forms to solve problems*

- A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
- A.SSE.3.a Factor a quadratic expression to reveal the zeros of the function it defines.
- A.SSE.3.b Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

**ARITHMETIC WITH POLYNOMIALS AND RATIONAL EXPRESSIONS****APR***Perform arithmetic operations on polynomials*

- A.APR.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

**CREATING EQUATIONS****CED***Create equations that describe numbers or relationships*

- A.CED.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.
- A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

**REASONING WITH EQUATIONS AND INEQUALITIES****REI***Understand solving equations as a process of reasoning and explain the reasoning*

- A.REI.1 Explain each step in solving a simple equation as following from 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.

*Solve equations and inequalities in one variable*

- A.REI.4 Solve quadratic equations in one variable.
- A.REI.4.a Use the method of completing the square to transform any quadratic equation in  $x$  into an equation of the form  $(x - p)^2 = q$  that has the same solutions. Derive the quadratic formula from this form.
- A.REI.4.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  $b$ .

*Solve systems of equations*

- A.REI.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.

**INTERPRETING FUNCTIONS****IF***Interpret functions that arise in applications in terms of the context*

- F.IF.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.*
- F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
- F.IF.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.

*Analyze functions using different representations*

- F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
- F.IF.7.a Graph linear and quadratic functions and show intercepts, maxima, and minima.
- F.IF.7.b Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
- F.IF.7.e Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
- F.IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
- F.IF.8.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.
- F.IF.8.b Use the properties of exponents to interpret expressions for exponential functions.
- F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

**BUILDING FUNCTIONS****BF***Build a function that models a relationship between two quantities*

- F.BF.1 Write a function that describes a relationship between two quantities
- F.BF.1.a Determine an explicit expression, a recursive process, or steps for calculation from a context.
- F.BF.1.b Combine standard function types using arithmetic operations.

*Build new functions from existing functions*

- F.BF.3 Identify the effect on the graph of replacing  $f(x)$  by  $f(x) + k$ ,  $k f(x)$ ,  $f(kx)$ , and  $f(x + k)$  for specific values of  $k$  (both positive and negative); find the value of  $k$  given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

**SIMILARITY, RIGHT TRIANGLES, AND TRIGONOMETRY****SRT***Understand similarity in terms of similarity transformations*

- G.SRT.1 Verify experimentally the properties of dilations given by a center and a scale factor:
- G.SRT.1.a A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.
- G.SRT.1.b The dilation of a line segment is longer or shorter in the ratio given by the scale factor.
- G.SRT.2 Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.
- G.SRT.3 Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

*Prove theorems involving similarity*

- G.SRT.4 Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.
- G.SRT.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

*Define trigonometric ratios and solve problems involving right triangles*

- G.SRT.6 Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.
- G.SRT.7 Explain and use the relationship between the sine and cosine of complementary angles.
- G.SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

**GEOMETRIC MEASUREMENT AND DIMENSION****GMD***Explain volume formulas and use them to solve problems*

- G.GMD.1 Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.
- G.GMD.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.

**INTERPRETING CATEGORICAL AND QUANTITATIVE DATA****ID***Summarize, represent, and interpret data on two categorical and quantitative variables*

- S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
- S.ID.6.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.
- S.ID.6.b Informally assess the fit of a function by plotting and analyzing residuals.

**CONDITIONAL PROBABILITY AND THE RULES OF PROBABILITY****CP***Understand independence and conditional probability and use them to interpret data*

- S.CP.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").



- S.CP.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.
- S.CP.3 Understand the conditional probability of A given B as  $P(A \text{ and } B)/P(B)$ , and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.
- S.CP.4 Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.
- S.CP.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.
- Use the rules of probability to compute probabilities of compound events in a uniform probability model*
- S.CP.6 Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.
- S.CP.7 Apply the Addition Rule,  $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ , and interpret the answer in terms of the model.

### INTEGRATED PATHWAY MATH 3 QUANTITIES

Q

*Reason quantitatively and use units to solve problems.*

- N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.

### SEEING STRUCTURE IN EXPRESSIONS

SSE

*Interpret the structure of expressions*

- A.SSE.2 Use the structure of an expression to identify ways to rewrite it.

*Write expressions in equivalent forms to solve problems*

- A.SSE.4 Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems.

### ARITHMETIC WITH POLYNOMIALS AND RATIONAL EXPRESSIONS

APR

*Understand the relationship between zeros and factors of polynomials*

- A.APR.2 Know and apply the Remainder Theorem: For a polynomial  $p(x)$  and a number  $a$ , the remainder on division by  $x - a$  is  $p(a)$ , so  $p(a) = 0$  if and only if  $(x - a)$  is a factor of  $p(x)$ .
- A.APR.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

*Use polynomial identities to solve problems*

- A.APR.4 Prove polynomial identities and use them to describe numerical relationships.

*Rewrite rational expressions*

- A.APR.6 Rewrite simple rational expressions in different forms; write  $a(x)/b(x)$  in the form  $q(x) + r(x)/b(x)$ , where  $a(x)$ ,  $b(x)$ ,  $q(x)$ , and  $r(x)$  are polynomials with the degree of  $r(x)$  less than the degree of  $b(x)$ , using inspection, long division, or, for the more complicated examples, a computer algebra system.

### CREATING EQUATIONS

CF

*Create equations that describe numbers or relationships*

- A.CED.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.
- A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

### REASONING WITH EQUATIONS AND INEQUALITIES

REI

*Understand solving equations as a process of reasoning and explain the reasoning*

- A.REI.1 Explain each step in solving a simple equation as following from 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.
- A.REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

*Represent and solve equations and inequalities graphically*

- A.REI.11 Explain why the x-coordinates of the points where the graphs of the equations  $y = f(x)$  and  $y = g(x)$  intersect are the solutions of the equation  $f(x) = g(x)$ ; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where  $f(x)$  and/or  $g(x)$  are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

### INTERPRETING FUNCTIONS

IF

*Interpret functions that arise in applications in terms of the context*

- F.IF.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.
- F.IF.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.

*Analyze functions using different representations*

- F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
- F.IF.7.c Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.

F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

**BUILDING FUNCTIONS****BF**

*Build new functions from existing functions*

F.BF.3 Identify the effect on the graph of replacing  $f(x)$  by  $f(x) + k$ ,  $k f(x)$ ,  $f(kx)$ , and  $f(x + k)$  for specific values of  $k$  (both positive and negative); find the value of  $k$  given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

F.BF.4 Find inverse functions.

F.BF.4.a Solve an equation of the form  $f(x) = c$  for a simple function  $f$  that has an inverse and write an expression for the inverse.

**LINEAR, QUADRATIC, AND EXPONENTIAL MODELS****LE**

*Construct and compare linear, quadratic, and exponential models and solve problems*

F.LE.4 For exponential models, express as a logarithm the solution to  $ab^{ct} = d$  where  $a$ ,  $c$ , and  $d$  are numbers and the base  $b$  is 2, 10, or  $e$ ; evaluate the logarithm using technology.

**TRIGONOMETRIC FUNCTIONS****TF**

*Extend the domain of trigonometric functions using the unit circle*

F.TF.1 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.

F.TF.2 Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.

*Model periodic phenomena with trigonometric functions*

F.TF.5 Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.

*Prove and apply trigonometric identities*

F.TF.8 Prove the Pythagorean identity  $\sin^2(\theta) + \cos^2(\theta) = 1$  and use it to find  $\sin(\theta)$ ,  $\cos(\theta)$ , or  $\tan(\theta)$  given  $\sin(\theta)$ ,  $\cos(\theta)$ , or  $\tan(\theta)$  and the quadrant of the angle.

**CONGRUENCE****CO**

*Make geometric constructions*

G.CO.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

G.CO.13 Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

**CIRCLES****C**

*Understand and apply theorems about circles*

G.C.1 Prove that all circles are similar.

G.C.2 Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.

G.C.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

*Find arc lengths and areas of sectors of circles*

G.C.5 Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

**EXPRESSING GEOMETRIC PROPERTIES WITH EQUATIONS****GPE**

*Translate between the geometric description and the equation for a conic section*

G.GPE.1 Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

G.GPE.2 Derive the equation of a parabola given a focus and directrix.

*Use coordinates to prove simple geometric theorems algebraically*

G.GPE.4 Use coordinates to prove simple geometric theorems algebraically.

G.GPE.5 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

G.GPE.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.

G.GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

**GEOMETRIC MEASUREMENT AND DIMENSION****GMD**

*Visualize relationships between two-dimensional and three-dimensional objects*

G.GMD.4 Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

**MODELING WITH GEOMETRY****MG**

*Apply geometric concepts in modeling situations*

G.MG.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).

G.MG.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).

G.MG.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

**INTERPRETING CATEGORICAL AND QUANTITATIVE DATA****ID***Summarize, represent, and interpret data on a single count or measurement variable*

S.ID.4 Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

*Summarize, represent, and interpret data on two categorical and quantitative variables*

S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

S.ID.6.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.

S.ID.6.b Informally assess the fit of a function by plotting and analyzing residuals.

**MAKING INFERENCES AND JUSTIFYING CONCLUSIONS****IC***Understand and evaluate random processes underlying statistical experiments*

S.IC.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population.

S.IC.2 Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation.

*Make inferences and justify conclusions from sample surveys, experiments, and observational studies*

S.IC.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.

S.IC.4 Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.

S.IC.5 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.

S.IC.6 Evaluate reports based on data.

**MATHEMATICAL PLUS STANDARDS****THE COMPLEX NUMBER SYSTEM****CN***Perform arithmetic operations with complex numbers.*

N.CN.3 Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.

*Represent complex numbers and their operations on the complex plane.*

N.CN.4 Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.

N.CN.5 Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. For example,  $(-1 + \sqrt{3}i)^3 = 8$  because  $(-1 + \sqrt{3}i)$  has modulus 2 and argument  $120^\circ$ .

N.CN.6 Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.

*Use complex numbers in polynomial identities and equations.*

N.CN.8 Extend polynomial identities to the complex numbers. For example, rewrite  $x^2 + 4$  as  $(x + 2i)(x - 2i)$ .

N.CN.9 Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.

**Vector and Matrix Quantities****VM***Represent and model with vector quantities.*

N.VM.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.,  $v$ ,  $|v|$ ,  $\|v\|$ ,  $v$ ).

N.VM.2 Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.

N.VM.3 Solve problems involving velocity and other quantities that can be represented by vectors.

*Perform operations on vectors.*

N.VM.4 Add and subtract vectors.

N.VM.4.a Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes.

N.VM.4.b Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum.

N.VM.4.c Understand vector subtraction  $v - w$  as  $v + (-w)$ , where  $-w$  is the additive inverse of  $w$ , with the same magnitude as  $w$  and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.

N.VM.5 Multiply a vector by a scalar.

N.VM.5.a Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as  $c(v_x v_y) = (cv_x, cv_y)$ .

N.VM.5.b Compute the magnitude of a scalar multiple  $cv$  using  $\|cv\| = |c|v$ . Compute the direction of  $cv$  knowing that when  $|c|v \neq 0$ , the direction of  $cv$  is either along  $v$  (for  $c > 0$ ) or against  $v$  (for  $c < 0$ ).

*Perform operations on matrices and use matrices in applications.*

N.VM.6 Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.

N.VM.7 Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.

N.VM.8 Add, subtract, and multiply matrices of appropriate dimensions.

- N.VM.9 Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.
- N.VM.10 Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.
- N.VM.11 Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.
- N.VM.12 Work with  $2 \times 2$  matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area.

**ARITHMETIC WITH POLYNOMIALS AND RATIONAL EXPRESSIONS****APR***Use polynomial identities to solve problems*

- A.APR.5 Know and apply the Binomial Theorem for the expansion of  $(x + y)^n$  in powers of  $x$  and  $y$  for a positive integer  $n$ , where  $x$  and  $y$  are any numbers, with coefficients determined for example by Pascal's Triangle.

*Rewrite rational expressions*

- A.APR.7 Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.

**REASONING WITH EQUATIONS AND INEQUALITIES****REI***Solve systems of equations*

- A.REI.8 Represent a system of linear equations as a single matrix equation in a vector variable.
- A.REI.9 Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension  $3 \times 3$  or greater).

**INTERPRETING FUNCTIONS****IF***Analyze functions using different representations*

- F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
- F.IF.7.d Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.

**BUILDING FUNCTIONS****BF***Build a function that models a relationship between two quantities*

- F.BF.1 Write a function that describes a relationship between two quantities
- F.BF.1.c Compose functions.

*Build new functions from existing functions*

- F.BF.4 Find inverse functions.
- F.BF.4.b Verify by composition that one function is the inverse of another.
- F.BF.4.c Read values of an inverse function from a graph or a table, given that the function has an inverse.
- F.BF.4.d Produce an invertible function from a non-invertible function by restricting the domain.
- F.BF.5 Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.

**TRIGONOMETRIC FUNCTIONS****TF***Extend the domain of trigonometric functions using the unit circle*

- F.TF.3 Use special triangles to determine geometrically the values of sine, cosine, tangent for  $\pi/3$ ,  $\pi/4$  and  $\pi/6$ , and use the unit circle to express the values of sine, cosine, and tangent for  $\pi-x$ ,  $\pi+x$ , and  $2\pi-x$  in terms of their values for  $x$ , where  $x$  is any real number.
- F.TF.4 Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.

*Model periodic phenomena with trigonometric functions*

- F.TF.6 Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.
- F.TF.7 Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.

*Prove and apply trigonometric identities*

- F.TF.9 Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.

**SIMILARITY, RIGHT TRIANGLES, AND TRIGONOMETRY****SRT***Apply trigonometry to general triangles*

- G.SRT.9 Derive the formula  $A = 1/2 ab \sin(C)$  for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.
- G.SRT.10 Prove the Laws of Sines and Cosines and use them to solve problems.
- G.SRT.11 Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).

**CIRCLES****C***Understand and apply theorems about circles*

- G.C.4 Construct a tangent line from a point outside a given circle to the circle.

**EXPRESSING GEOMETRIC PROPERTIES WITH EQUATIONS****GPE***Translate between the geometric description and the equation for a conic section*

- G.GPE.3 Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.

**GEOMETRIC MEASUREMENT AND DIMENSION****GMD***Explain volume formulas and use them to solve problems*

G.GMD.2 Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.

**CONDITIONAL PROBABILITY AND THE RULES OF PROBABILITY****CP***Use the rules of probability to compute probabilities of compound events in a uniform probability model*S.CP.8 Apply the general Multiplication Rule in a uniform probability model,  $P(A \text{ and } B) = P(A)P(B|A) = P(B)P(A|B)$ , and interpret the answer in terms of the model.

S.CP.9 Use permutations and combinations to compute probabilities of compound events and solve problems.

**USING PROBABILITY TO MAKE DECISIONS****MD***Calculate expected values and use them to solve problems*

S.MD.1 Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.

S.MD.2 Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.

S.MD.3 Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value.

S.MD.4 Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value.

*Use probability to evaluate outcomes of decisions*

S.MD.5 Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.

S.MD.5.a Find the expected payoff for a game of chance.

S.MD.5.b Evaluate and compare strategies on the basis of expected values.

S.MD.6 Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).

S.MD.7 Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).

**PHYSICAL DEVELOPMENT AND HEALTH – 9<sup>th</sup> – 10<sup>th</sup> GRADE****ACQUIRE MOVEMENT AND MOTOR SKILLS AND UNDERSTAND CONCEPTS NECESSARY TO ENGAGE IN MODERATE TO VIGOROUS PHYSICAL ACTIVITY.***Demonstrate Physical Competency In A Variety Of Motor Skills And Movement Patterns.*

19.A.4a Perform skills efficiently in a variety of leisure activities, sports, creative movement, and work-related activities.

19.A.4b Participate daily in moderate to vigorous physical activity while performing movement patterns in a variety of activities.

*Analyze Various Movement Concepts And Applications.*

19.B.4a Analyze various movement patterns for efficiency and effectiveness.

19.B.4b Analyze multiple movement patterns with additional combination movement patterns and their effects on the brain.

*Demonstrate Knowledge Of Rules, Safety And Strategies During Physical Activity.*

19.C.4a Develop rules and safety procedures for physical activities.

19.C.4b Select and apply offensive, defensive, and cooperative strategies in selected activities, games, and sports.

**ACHIEVE AND MAINTAIN A HEALTH-ENHANCING LEVEL OF PHYSICAL FITNESS BASED UPON CONTINUAL SELF-ASSESSMENT.***Know And Apply The Principles And Components Of Health-Related And Skill-Related Fitness As Applied To Learning And Performance Of Physical Activities.*

20.A.4a Interpret the effects of exercise/physical activity on the level of health-related and skill-related fitness.

20.A.4b Participate in various types of fitness training programs (e.g., circuit, cross and interval training) and know the implications of and the benefits from participation in those programs.

*Assess Individual Fitness Levels.*

20.B.4a Record and interpret health-related physiological data (e.g., blood pressure, body mass index, oxygen exchange), with and without the use of technology.

20.B.4b Prepare an individual health-related fitness profile and evaluate fitness level on each component.

20.B.4c Understand and explain the importance of fitness as it relates to academic performance.

*Set Goals Based On Fitness Data And Develop, Implement, And Monitor An Individual Fitness Improvement Plan.*

20.C.4a Set realistic, short-term, health-related fitness goals based on individual profiles.

20.C.4b Analyze personal fitness data and academic performance and describe the correlation between the two.

20.C.4c Evaluate physical fitness services, products, and advertising.

20.C.4d Design and implement a personal fitness program.

**DEVELOP SKILLS NECESSARY TO BECOME A SUCCESSFUL MEMBER OF A TEAM BY WORKING WITH OTHERS DURING PHYSICAL ACTIVITY.***Demonstrate Personal Responsibility During Group Physical Activities.*

21.A.4a Demonstrate decision-making skills both independently and with others during physical activities.

21.A.4b Apply identified procedures and safe practices to all group physical activity settings.

21.A.4c Complete a given task on time.

*Demonstrate Cooperative Skills During Structured Group Physical Activity.*

21.B.4a Work cooperatively with others to achieve group goals in competitive and non-competitive situations (e.g., challenge course, orienteering).

**UNDERSTAND PRINCIPLES OF HEALTH PROMOTION AND THE PREVENTION AND TREATMENT OF ILLNESS AND INJURY.**

*Explain The Basic Principles Of Health Promotion, Illness Prevention And Safety Including How To Access Valid Information, Products, And Services.*

- 22.A.4a Compare and contrast communicable, chronic, and degenerative illnesses (e.g., influenza, cancer, arthritis).
- 22.A.4b Analyze possible outcomes of effective health promotion and illness prevention (e.g., reduction in stress, improved fitness, lessened likelihood of injury and illness).
- 22.A.4c Demonstrate basic procedures in injury prevention and emergency care that can be used in the home, workplace, and community (e.g., first aid, CPR).
- 22.A.4d Research and report about a career in health promotion, health care and injury prevention.

*Describe And Explain The Factors That Influence Health Among Individuals, Groups, And Communities.*

- 22.B.4a Explain social and economic effects of health problems on individuals and society (e.g., cost of health care, reduction in productivity).

*Explain How The Environment Can Affect Health.*

- 22.C.4a Analyze how environmental conditions can affect health on a large scale (e.g., acid rain, oil spills, solid waste contamination, nuclear leaks, ozone depletion).

*Describe How To Advocate For The Health Of Individuals, Families And Communities.*

- 22.D.4a Identify health resources to help influence others in making healthy choices.

**UNDERSTAND HUMAN BODY SYSTEMS AND FACTORS THAT INFLUENCE GROWTH AND DEVELOPMENT.**

*Describe And Explain The Structure And Functions Of The Human Body Systems And How They Interrelate.*

- 23.A.4a Explain how body system functions can be maintained and improved (e.g., exercise/fitness, nutrition, safety).

*Explain The Effects Of Health-Related Actions On The Body Systems.*

- 23.B.4a Explain immediate and long-term effects of health habits on the body systems (e.g., diet/heart disease, exercise/fat reduction, stress management/emotional health).

*Describe Factors That Affect Growth And Development.*

- 23.C.4a Describe changes in physical health and body functions at various stages of the life cycle.

*Describe And Explain The Structures And Functions Of The Brain And How They Are Impacted By Different Types Of Physical Activity And Levels Of Fitness.*

- 23.D.4a Explain how brain functions can be maintained and improved through activity.

**PROMOTE AND ENHANCE HEALTH AND WELL-BEING THROUGH THE USE OF EFFECTIVE COMMUNICATION AND DECISION-MAKING SKILLS.**

*Demonstrate Procedures For Communicating In Positive Ways, Resolving Differences And Preventing Conflict.*

- 24.A.4a Describe the effects (e.g., economic losses, threats to personal safety) of conflict and violence upon the health of individuals, families, and communities.
- 24.A.4b Demonstrate methods for addressing interpersonal differences without harm (e.g., avoidance, compromise, cooperation).

*Apply Decision-Making Skills Related To The Protection And Promotion Of Individual, Family, And Community Health.*

- 24.B.4a Explain how decision making affects the achievement of individual health goals.

*Demonstrate Skills Essential To Enhancing Health And Avoiding Dangerous Situations.*

- 24.C.4a Formulate a plan to achieve individual health goals.

**SCIENCE (NGSS) – HIGH SCHOOL****PHYSICAL SCIENCE****MATTER AND ITS INTERACTIONS****“STUDENTS WHO DEMONSTRATE UNDERSTANDING CAN...”**

- HS-PS1-1 Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.
- HS-PS1-2 Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.
- HS-PS1-3 Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.
- HS-PS1-4 Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.
- HS-PS1-5 Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.
- HS-PS1-6 Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.
- HS-PS1-7 Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.
- HS-PS1-8 Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.

**MOTION AND STABILITY: FORCES AND INTERACTIONS**

- HS-PS2-1 Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.
- HS-PS2-2 Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.

- HS-PS2-3 Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.
- HS-PS2-4 Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.
- HS-PS2-5 Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.
- HS-PS2-6 Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.

**ENERGY**

- HS-PS3-1 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.
- HS-PS3-2 Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as either motions of particles or energy stored in fields.
- HS-PS3-3 Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.
- HS-PS3-4 Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).
- HS-PS3-5 Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction.

**WAVES AND THEIR APPLICATIONS IN TECHNOLOGIES FOR INFORMATION TRANSFER**

- HS-PS4-1 Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.
- HS-PS4-2 Evaluate questions about the advantages of using a digital transmission and storage of information.
- HS-PS4-3 Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.
- HS-PS4-4 Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.
- HS-PS4-5 Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.

**LIFE SCIENCE****FROM MOLECULES TO ORGANISMS: STRUCTURES AND PROCESSES**

- HS-LS1-1 Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.
- HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
- HS-LS1-3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.
- HS-LS1-4 Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.
- HS-LS1-5 Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.
- HS-LS1-6 Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.
- HS-LS1-7 Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.
- HS-LS1-8 Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

**ECOSYSTEMS: INTERACTIONS, ENERGY, AND DYNAMICS**

- HS-LS2-1 Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.
- HS-LS2-2 Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
- HS-LS2-3 Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.
- HS-LS2-4 Use a mathematical representation to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
- HS-LS2-5 Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
- HS-LS2-6 Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
- HS-LS2-7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
- HS-LS2-8 Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.

**HEREDITY: INHERITANCE AND VARIATION OF TRAITS**

- HS-LS3-1 Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.

- HS-LS3-2 Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.
- HS-LS3-3 Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.

### BIOLOGICAL EVOLUTION: UNITY AND DIVERSITY

- HS-LS4-1 Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.
- HS-LS4-2 Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.
- HS-LS4-3 Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.
- HS-LS4-4 Construct an explanation based on evidence for how natural selection leads to adaptation of populations.
- HS-LS4-5 Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.
- HS-LS4-6 Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.

### EARTH and SPACE

#### EARTH'S PLACE IN THE UNIVERSE

- HS-ESS1-1 Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation.
- HS-ESS1-2 Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.
- HS-ESS1-3 Communicate scientific ideas about the way stars, over their life cycle, produce elements.
- HS-ESS1-4 Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.
- HS-ESS1-5 Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks.
- HS-ESS1-6 Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.

#### EARTH'S SYSTEMS

- HS-ESS2-1 Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features.
- HS-ESS2-2 Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.
- HS-ESS2-3 Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection.
- HS-ESS2-4 Use a model to describe how variations in the flow of energy into and out of Earth systems result in changes in climate.
- HS-ESS2-5 Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.
- HS-ESS2-6 Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
- HS-ESS2-7 Construct an argument based on evidence about the simultaneous coevolution of Earth systems and life on Earth.

#### EARTH AND HUMAN ACTIVITY

- HS-ESS3-1 Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
- HS-ESS3-2 Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
- HS-ESS3-3 Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
- HS-ESS3-4 Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.
- HS-ESS3-5 Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.
- HS-ESS3-6 Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

#### ENGINEERING DESIGN

- HS-ETS1-1 Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
- HS-ETS1-2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
- HS-ETS1-3 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.
- HS-ETS1-4 Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.



**SOCIAL / EMOTIONAL LEARNING – 9<sup>th</sup> – 10<sup>th</sup> GRADE****DEVELOP SELF-AWARENESS AND SELF-MANAGEMENT SKILLS TO ACHIEVE SCHOOL AND LIFE SUCCESS.***Identify And Manage One's Emotions And Behavior.*

- 1A.4a Analyze how thoughts and emotions affect decision making and responsible behavior.  
 1A.4b Generate ways to develop more positive attitudes.

*Recognize personal qualities and external supports.*

- 1B.4a Set priorities in building on strengths and identifying areas for improvement.  
 1B.4b Analyze how positive adult role models and support systems contribute to school and life success.

*Demonstrate skills related to achieving personal and academic goals.*

- 1C.4a Identify strategies to make use of resources and overcome obstacles to achieve goals.  
 1C.4b Apply strategies to overcome obstacles to goal achievement.

**USE SOCIAL-AWARENESS AND INTERPERSONAL SKILLS TO ESTABLISH AND MAINTAIN POSITIVE RELATIONSHIPS.***Recognize The Feelings And Perspectives Of Others.*

- 2A.4a Analyze similarities and differences between one's own and others' perspectives.  
 2A.4b Use conversation skills to understand others' feelings and perspectives.

*Recognize Individual And Group Similarities And Differences.*

- 2B.4a Analyze the origins and negative effects of stereotyping and prejudice.  
 2B.4b Demonstrate respect for individuals from different social and cultural groups.

*Use Communication And Social Skills To Interact Effectively With Others.*

- 2C.4a Evaluate the effects of requesting support from and providing support to others.  
 2C.4b Evaluate one's contribution in groups as a member and leader.

*Demonstrate An Ability To Prevent, Manage, And Resolve Interpersonal Conflicts In Constructive Ways.*

- 2D.4a Analyze how listening and talking accurately help in resolving conflicts.  
 2D.4b Analyze how conflict-resolution skills contribute to work within a group.

**DEMONSTRATE DECISION-MAKING SKILLS AND RESPONSIBLE BEHAVIORS IN PERSONAL, SCHOOL, AND COMMUNITY CONTEXTS.***Consider Ethical, Safety, And Societal Factors In Making Decisions.*

- 3A.4a Demonstrate personal responsibility in making ethical decisions.  
 3A.4b Evaluate how social norms and the expectations of authority influence personal decisions and actions.

*Apply Decision-Making Skills To Deal Responsibly With Daily Academic And Social Situations.*

- 3B.4a Evaluate personal abilities to gather information, generate alternatives, and anticipate the consequences of decisions.  
 3B.4b Apply decision-making skills to establish responsible social and work relationships.

*Contribute To The Well-Being Of One's School And Community.*

- 3C.4a Plan, implement, and evaluate one's participation in activities and organizations that improve school climate.  
 3C.4b Plan, implement, and evaluate one's participation in a group effort to contribute to one's local community.

## SOCIAL SCIENCE – HIGH SCHOOL

### INQUIRY SKILLS

#### *Constructing Essential Questions*

SS.IS.1.9-12 Address essential questions that reflect an enduring issue in the field.

#### *Constructing Supporting Questions*

SS.IS.2.9-12 Explain how supporting questions contribute to an inquiry.

#### *Determining Helpful Sources*

SS.IS.3.9-12 Develop new supporting and essential questions through investigation, collaboration, and using diverse sources.

#### *Gathering and Evaluating Sources*

SS.IS.4.9-12 Gather and evaluate information from multiple sources while considering the origin, credibility, point of view, authority, structure, context, and corroborative value of the sources.

#### *Developing Claims and Using Evidence*

SS.IS.5.9-12 Identify evidence that draws information from multiple sources to revise or strengthen claims.

#### *Communicating Conclusions*

SS.IS.6.9-12 Construct and evaluate explanations and arguments using multiple sources and relevant, verified information.

#### *Critiquing Conclusions*

SS.IS.7.9-12 Articulate explanations and arguments to a targeted audience in diverse settings.

#### *Taking Informed Action*

SS.IS.8.9-12 Use interdisciplinary lenses to analyze the causes and effects of and identify solutions to local, regional, or global concerns.

SS.IS.9.9-12 Use deliberative processes and apply democratic strategies and procedures to address local, regional or global concerns and take action in or out of school.

### CIVICS

#### *Civic and Political Institutions*

SS.CV.1.9-12 Distinguish the rights, roles, powers, and responsibilities of individuals and institutions in the political system.

SS.CV.2.9-12 Evaluate the opportunities and limitations of participation in elections, voting, and the electoral process.

SS.CV.3.9-12 Analyze the impact of constitutions, laws, and agreements on the maintenance of order, justice, equality, and liberty.

SS.CV.4.9-12 Explain how the U.S. Constitution established a system of government that has powers, responsibilities, and limits that have changed over time and are still contested while promoting the common good and protecting rights.

#### *Participation and Deliberation: Applying Civic Virtues and Democratic Principles*

SS.CV.5.9-12 Analyze the impact of personal interest and diverse perspectives on the application of civic dispositions, democratic principles, constitutional rights and human rights.

SS.CV.6.9-12 Describe how political parties, the media and public interest groups both influence and reflect social and political interests.

SS.CV.7.9-12 Describe the concepts and principles that are inherent to American Constitutional Democracy

#### *Processes, Rules, and Laws*

SS.CV.8.9-12 Analyze how individuals use and challenge laws to address a variety of public issues.

SS.CV.9.9-12 Evaluate public policies in terms of intended and unintended outcomes and related consequences.

SS.CV.10.9-12 Explain the role of compromise and deliberation in the legislative process.

### ECONOMICS AND FINANCIAL LITERACY

#### *Economic Decision Making*

SS.EC.1.9-12 Analyze how scarcity and incentives influence choices to consume or produce for different individuals and groups.

SS.EC.2.9-12 Use marginal benefits and marginal costs to propose a solution to a significant issue for an individual or community.

#### *Exchange and Markets*

SS.EC.3.9-12 Evaluate how much competition exists within and among sellers and buyers in specific markets.

SS.EC.4.9-12 Evaluate the effectiveness of government policies to improve market outcomes, address inequality, or reduce inefficiencies.

SS.EC.5.9-12 Analyze the ways in which competition and government regulation influence what is produced and distributed in a market system.

#### *National and Global Economy*

SS.EC.6.9-12 Use data and economic indicators to analyze past and current states of the economy and predict future trends.

SS.EC.7.9-12 Describe how government policies are influenced by and impact a variety of stakeholders.

SS.EC.8.9-12 Analyze how advances in technology and investment in capital goods and human capital affect economic growth and standards of living.

SS.EC.9.9-12 Analyze the role of comparative advantage in local, national, and global trade of goods and services.

SS.EC.10.9-12 Explain how globalization trends and policies affect social, political, and economic conditions in different nations.

#### *Financial Literacy*

SS.EC.FL.1.9-12 Analyze the costs and benefits of various strategies to increase income.

SS.EC.FL.2.9-12 Explain how to make informed financial decisions by collecting information, planning, and budgeting.

SS.EC.FL.3.9-12 Explain how time, interest rates, and inflation influence saving patterns over a lifetime.

SS.EC.FL.4.9-12 Analyze costs and benefits of different credit and payment options for goods and services, the role of lenders, and interest.

SS.EC.FL.5.9-12 Evaluate risks and rates of return of diversified investments.

SS.EC.FL.6.9-12 Analyze the costs and benefits of insurance, including the influences of an individual's characteristics and behavior.

**GEOGRAPHY***Geographic Representations, Human-Environment Interaction*

- SS.G.1.9-12 Use maps (created using geospatial and related technologies, if possible), satellite images, and photographs to display and explain the spatial patterns of physical, cultural, political, economic, and environmental characteristics.
- SS.G.2.9-12 Use self-collected or pre-existing data sets to generate spatial patterns at multiple scales that can be used to conduct analyses or to take civic action.

*Human Population*

- SS.G.3.9-12 Analyze and explain how humans impact and interact with the environment and vice versa.
- SS.G.4.9-12 Evaluate how political and economic decisions have influenced cultural and environmental characteristics of various places and regions.
- SS.G.5.9-12 Analyze how human societies plan for and respond to the consequences of human-made and naturally occurring catastrophes and how these events impact trade, politics, and migration.

*Geographic Representations, Human-Environment Interaction, Population*

- SS.G.6.9-12 Analyze how historical events and the diffusion of ideas, technologies, and cultural practices have influenced migration patterns and the distribution of human population.
- SS.G.7.9-12 Evaluate how economic activities and political decisions impact spatial patterns within and among urban, suburban, and rural regions.
- SS.G.8.9-12 Evaluate how short- and long-term climate variability impacts human migration and settlement patterns, resource use, and land uses.

*Global Interconnections*

- SS.G.9.9-12 Describe and explain the characteristics that constitute a particular culture.
- SS.G.10.9-12 Explain how and why culture shapes worldview.
- SS.G.11.9-12 Explain how globalization impacts the cultural, political, economic, and environmental characteristics of a place or region.
- SS.G.12.9-12 Evaluate how competition for scarce natural resources contributes to conflict and cooperation within and among countries.

**HISTORY***Change, Continuity, and Context*

- SS.H.1.9-12 Evaluate how historical developments were shaped by time and place as well as broader historical contexts.
- SS.H.2.9-12 Analyze change and continuity within and across historical eras.
- SS.H.3.9-12 Evaluate the methods utilized by people and institutions to promote change.

*Perspectives*

- SS.H.4.9-12 Analyze how people and institutions have reacted to environmental, scientific, and technological challenges.
- SS.H.5.9-12 Analyze the factors and historical context that influenced the perspectives of people during different historical eras.
- SS.H.6.9-12 Analyze the concept and pursuit of the “American Dream.”
- SS.H.7.9-12 Identify the role of individuals, groups, and institutions in people’s struggle for safety, freedom, equality, and justice.
- SS.H.8.9-12 Analyze key historical events and contributions of individuals through a variety of perspectives, including those of historically underrepresented groups.

*Historical Sources and Evidence*

- SS.H.9.9-12 Analyze the relationship between historical sources and the secondary interpretations made from them.

*Causation and Argumentation*

- SS.H.10.9-12 Analyze the causes and effects of global conflicts and economic crises.
- SS.H.11.9-12 Analyze multiple and complex causes and effects of events in the past.
- SS.H.12.9-12 Analyze the geographic and cultural forces that have resulted in conflict and cooperation.

**ANTHROPOLOGY**

- SS.Anth.1.9-12 Analyze the elements of culture and explain the factors that shape these elements differently around the world.
- SS.Anth.2.9-12 Explain how cultures develop and vary in response to their physical and social environment, including local, national, regional, and global patterns.
- SS.Anth.3.9-12 Explain why anthropologists study culture from a holistic perspective.
- SS.Anth.4.9-12 Evaluate one’s own cultural assumptions using anthropological concepts.
- SS.Anth.5.9-12 Apply anthropological concepts and anthropological knowledge to a variety of everyday, real-world situations.
- SS.Anth.6.9-12 Explain how local actions can have global consequences, and how global patterns and processes can affect seemingly unrelated local actions.

**PSYCHOLOGY**

- SS.Psy.1.9-12 Identify scientific methodologies utilized in psychological research.
- SS.Psy.2.9-12 Evaluate the conclusions made by psychological research, including ethical concerns.
- SS.Psy.3.9-12 Understand a variety of psychological perspectives and apply their concepts and theoretical ideas to the investigation of similarities and differences in behavior and mental processes.
- SS.Psy.4.9-12 Analyze how biological, psychological, and sociocultural factors and their interactions influence individuals’ behavior and mental processes.
- SS.Psy.5.9-12 Evaluate the complexities of human thought and behavior, as well as the factors related to the individual differences among people.
- SS.Psy.6.9-12 Identify and apply psychological thinking to personal and societal experiences and issues.
- SS.Psy.7.9-12 Apply psychological knowledge to their daily lives.
- SS.Psy.8.9-12 Use appropriate psychological terminology with reference to psychologists, their experiments, and theories in order to explain the possible causes of and impact on behavior and mental processes.

## SOCIOLOGY

SS.Soc.1.9-12	Identify and apply the sociological perspective and a variety of sociological theories.
SS.Soc.2.9-12	Analyze the impact of social structure, including culture, institutions, and societies.
SS.Soc.3.9-12	Hypothesize how primary agents of socialization influence the individual.
SS.Soc.4.9-12	Describe the impact of social relationships on the self, groups, and socialization processes
SS.Soc.5.9-12	Explain the social construction of self and groups and their impact on the life chances of individuals.
SS.Soc.6.9-12	Analyze the impact of stratification and inequality on groups and the individuals within them.

The chart below outlines the minimum state-required courses for students graduating in the year shown. \*

ILLINOIS STATE GRADUATION REQUIREMENTS						
Graduation Date	Mathematics	Writing**	Language Arts	Science	Social Science	Electives
<i>2016 and beyond</i> (i.e., students entering as ninth-graders starting in school year 2012-2013)	Of 3 years, 1 year must be Algebra I and 1 year must be a course that includes geometry content.	2 years; 1 year must be an English course and 1 year may be provided as a part of any course offered.	4 years; no content specified.	2 years; no content specified.	2 years; must include 1 year of U.S. history or combination of U.S. history and American government and 1 semester of civics.	1 year; includes art, music, foreign language, or vocational education.
Total***	3 years	2 years	4 years	2 years	2 years	1 years

\*This date assumes a student will graduate in four years.

\*\*The legislative intent of this requirement is not to increase the number of units needed for graduation but rather to have schools incorporate content to meet the two-year writing-intensive requirement into other courses required for graduation, where appropriate.

\*\*\*This represents the number of units of credit required at full implementation for the graduating class of 2012 and beyond (12 units, assuming a unit is equivalent to a year-long course). Additionally, daily physical education, while not a state graduation requirement, is a required course for all students in each of four years of high school (see 105 ILCS 5/27-6). The law and agency rules also require that students during high school take a minimum of 18 weeks (one semester) of health education (see 105 ILCS 110, 105 ILCS 5/27-5 and 23 Ill. Adm. Code 1.440(a)(9)) and one quarter (nine weeks) of consumer education (see 105 ILCS 5/27-12.1 and 23 Ill. Adm. Code 1.440(a)(11)), bringing the total number of state-required courses to 16.75 units.

## RESOURCES TO SUPPORT THE STANDARDS

Illinois Classrooms in Action  
[www.ilclassroomsinaction.org](http://www.ilclassroomsinaction.org)

Illinois Teach & Talk Math  
[www.ilteachandtalk.org](http://www.ilteachandtalk.org)

Illinois Writing Matters  
[www.ilwritingmatters.org](http://www.ilwritingmatters.org)

Illinois Stats Math  
[www.ilstats.weebly.com](http://www.ilstats.weebly.com)

Illinois Standards-Based Reporting Website  
<http://www.isbestandardsbasedreporting.com/>

Achieve the Core  
[www.achievethecore.org](http://www.achievethecore.org)

Illustrative Mathematics  
<https://www.illustrativemathematics.org/>

EdReports  
<http://www.edreports.org/>

Tools for the Common Core Standards  
<http://commoncoretools.me/>

Library of Congress  
<http://www.loc.gov/teachers/>

Ohio Resource Center  
<http://www.ohiorc.org/>

NewsELA  
[www.newsela.org](http://www.newsela.org)  
(Lower ranges of Lexile available after signing up at the bottom of website.)

National Council for the Social Studies  
<http://www.socialstudies.org/>

## COMPLETE ILLINOIS LEARNING STANDARDS

English Language Arts  
[http://www.isbe.net/common\\_core/pls/level1/pdf/ela-standards.pdf](http://www.isbe.net/common_core/pls/level1/pdf/ela-standards.pdf)

Fine Arts \*\*\*Public review DRAFT\*\*\*  
<http://illinoisartslearning.org/#report-and-standards>

Mathematics  
[http://www.isbe.net/common\\_core/pls/level1/pdf/math-standards.pdf](http://www.isbe.net/common_core/pls/level1/pdf/math-standards.pdf)

Science  
<http://www.nextgenscience.org/>

Physical Development/ Health  
<http://www.isbe.net/ils/pdh/standards.htm>

Social and Emotional Learning  
[http://www.isbe.net/ils/social\\_emotional/standards.htm](http://www.isbe.net/ils/social_emotional/standards.htm)

Social Science  
[http://www.isbe.net/ils/social\\_science/pdf/ss-stds-eff012716.pdf](http://www.isbe.net/ils/social_science/pdf/ss-stds-eff012716.pdf)

## PARCC Resources

PARCC Tests – ELA, Math, Systems....  
<http://parcc.pearson.com/>

Partnership Resource Center including Formative Tasks and Released Items and Student Annotations (and other resources)  
<https://prc.parconline.org/>

ISBE PARCC Place  
<http://www.isbe.net/parcc-place/>

Main page and links to evidence statement tables (and other resources)  
<http://parconline.org/>