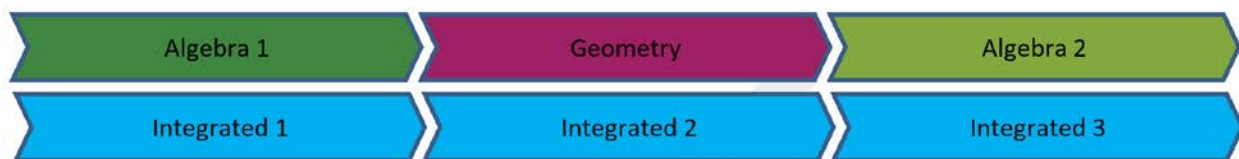


SECTION ONE: Introduction

1A: Common Historical Course Sequences

In Oregon, districts and schools need to plan courses that give the opportunity for students to have access to the adopted high school standards by the end of a three credit sequence or sooner. State law does not prescribe any specific high school math course sequence, only that students have access to the content identified in the adopted state standards. Traditionally, three credits of high school course content have been arranged into either an Algebra, Geometry, Algebra 2 sequence (AGA), or an integrated equivalent.

Figure 1: Common High School Course Options



In 2010, Oregon adopted high school math standards based on the Common Core State Standards (CCSS) which currently identify 111 non-advanced standards for all students. In addition, there are 36 optional advanced (+) standards that could either be included in the core three credit sequence or as additional study. Content is divided into six domains of Algebra, Functions, Modeling, Geometry, and Statistics & Probability.

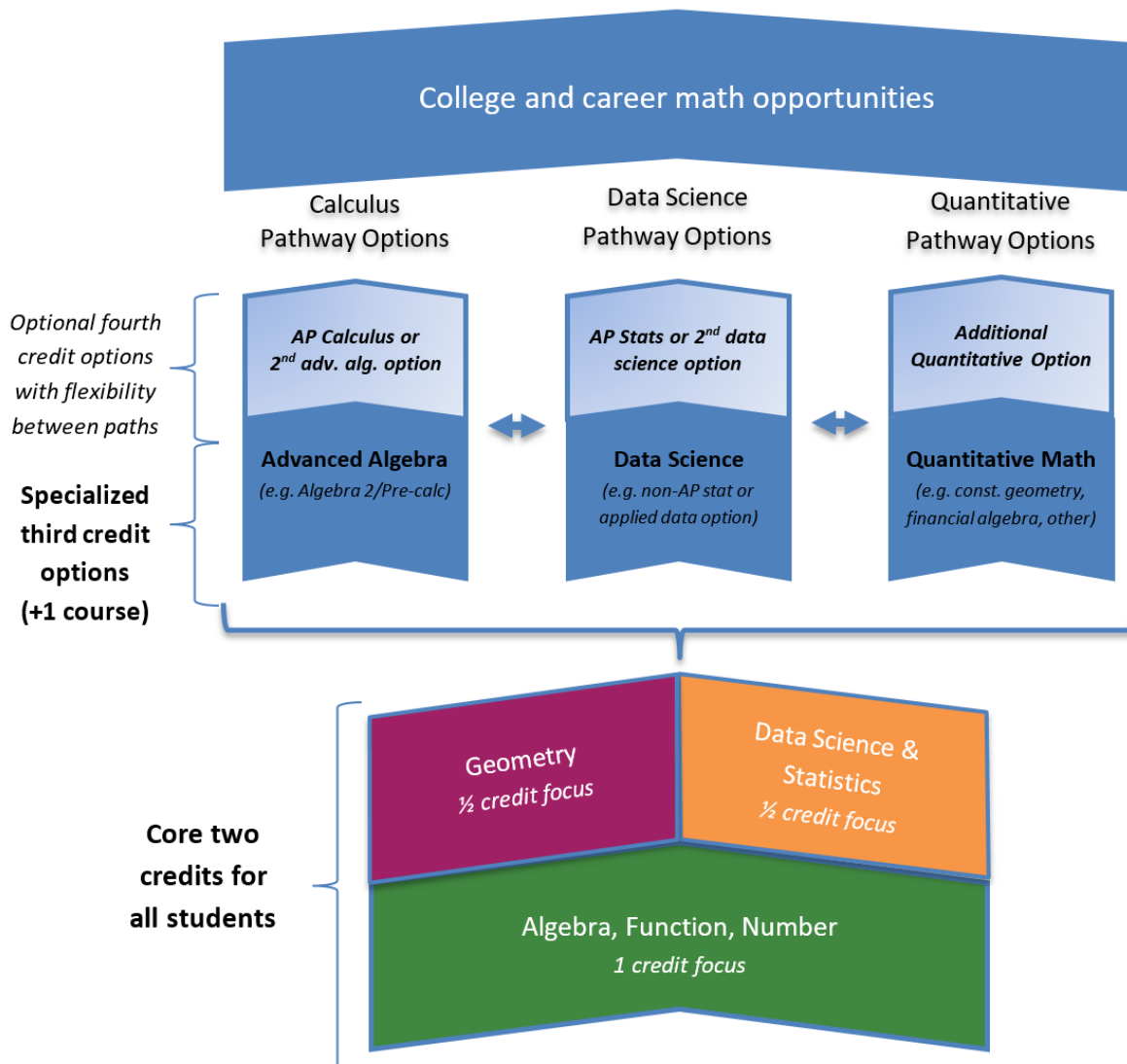
1B: Standards Revision and Future High School Pathways

Oregon [State Standards](#) are reviewed and revised on a regular basis. In mathematics, the planned review by educators occurred in the 2019-20 school year and prepared for adoption by the State Board of Education in the 2020-21 school year. This original timeline included preparing for a state review of instructional materials in the summer of 2022 and district updating of materials in the 2022-23 school year. From the student perspective, statewide implantation in classrooms would occur by the fall of the 2023-24 school year. It is possible the school closures could delay this timeline, but no formal decisions have been made as of July 2020. Updated timelines will be reflected in any future guidance provided.

Pending future State Board of Education approval, the work completed to date includes a comprehensive review and revision of our high school math standards. The working assumption of the high school review was to shift to a new course pathway model with two credits of core content for all students, and create third credit pathway options that align to student interests and goals. This model is referred to as the [2+1 course model](#). Core content would be balanced between approximately one credit of algebra content, $\frac{1}{2}$ credit of geometry, and $\frac{1}{2}$ credit of data science and statistics. For third credit options, Oregon high school staff are invited to innovate by offering new specialized courses within three general paths: (1) a pathway to calculus; (2) a pathway to data science; (3) and a pathway to quantitative mathematics. Figure 2 helps visualize the long term goal of what high school math pathways in the 2+1 model could look like as early as the 2023-24 school year.



Figure 2: Long Term (2023-24) Course Pathway Options



1C: Centering on Equitable High School Mathematics

In June 2020, the Oregon Department of Education released the first version of [Ready Schools, Safe Learners](#) with the goal of providing clear statewide requirements and recommendations for health, safety, equity, and instruction. Students in mathematics have [inequitable access to grade level content](#), and unfinished learning can [accumulate over time](#) creating a system where students find themselves trapped in tracks repeating K-8 mathematics within [high school courses](#).



The absence of in-person instruction in spring 2019 amplified the issue of access to grade level content in mathematics. Accelerating, rather than remediating, content from prior coursework is needed to achieve the central goal of maximizing access to grade level content for all students. ODE has published a [math acceleration summary](#) in support of the call to accelerate learning in mathematics, which is consistent with national guidance from the [TNTP Acceleration Guide](#) and the [NCTM/NCSM COVID-19 Joint Position Statement](#).

Ensuring students have access to high school content will take innovation and creativity to re-imagine what course experiences could look like for Oregon students. The intent of this document is to provide additional guidance specific to planning high school math courses not only for the next school year, but to set each and every Oregon student up for equitable access to course options.

- Additional information and examples can be found in the [Oregon Math Project Practice Brief: Promoting Equity](#)

1D: Detracking Mathematics and Creating Pathways in High School

The Oregon Department of Education supports [national calls to detrack math experiences](#) for our students and teachers. Detracking the first two credits of core math content is a long-term goal for Oregon, and can begin as soon as this next school year. At the same time, ODE supports efforts to create grade 11-14 math pathways that could include specialized third credit course options, such as construction geometry or financial algebra, that align to student goals and aspirations. For the 2020-21 school year, it is likely that existing courses such as Algebra 1, Geometry, and Algebra 2 would still be provided with a focus on prioritized content.

For the purposes of ODE guidance, the term “tracking” will refer to the practice of creating different levels of the same course that group students by perceived abilities. Detracking high school courses would ensure that all students have access to the same content and experiences for any given course.

The term “pathway” refers to a specialized math course sequence that leads to career and college readiness. This could include the traditional advanced algebra pathway to prepare for calculus that all students were locked into, but also include a statistics pathway or quantitative applied pathway that lead to specific career and college options for students after high school graduation.

Further resources to understand this work in Oregon and [nationally](#) in support of grade 11-14 math pathways include [Branching Out: Designing High School Math Pathways for Equity](#), [Dana Center Launch Years Report](#), and [CBMS High School to College Mathematics Pathways](#) forum which our state was invited to share course pathway work described in this document. The time is right for Oregon educators to think innovatively and lead the nation in re-imagining high school math.

- Additional information and examples can be found in the [Oregon Math Project Practice Brief: Tracking](#)



1E: Opportunity to Deepen Equity, Innovation, Care, and Connection

High school pathways described in the [2+1 course model](#) are an innovation that high school faculty can use to create equitable opportunities that connect mathematics to students goals and interests and [prioritize anti-racist mathematics instruction](#). Oregon schools and districts are therefore encouraged to use the 2020-21 and 2021-22 school years to plan a path to create math pathways options for students.

This includes leaning into new and innovative ways to incorporate instructional best practices, such as [NCTM's Principles to Action](#), to create student-centered instructional experiences that continue beyond the current health crisis. Resources and courses created today can lay a strong foundation for high school experiences in the future.

- Additional information and examples can be found in the [Oregon Math Project Practice Brief: Classroom Discourse](#)

1F: Continued Focus on Math Practices & Modeling

Reimagining math pathway options that meet the needs of more students will require a focus on content rather than courses that students need for success. It will also require ensuring the [Standards of Mathematical Practice](#) are attended to as we accelerate learning. This includes finding new ways to infuse applications through [mathematical modeling](#) that supports the natural interconnectedness of math to other disciplines and to community-based problems. Modeling is an opportunity to see mathematics as relevant to students' lives and the questions confronting our world. Now more than ever, we need to find ways to increase student interest and enthusiasm in math by providing more opportunities to engage in interactive, student-centered problems that are based in applied mathematics. Examples of mathematical modeling lessons can be found below with additional examples added over time to the [Oregon Open Learning Mathematics Group](#).

- American Statistical Association - [Statistics Education Web \(STEW\)](#)
- Council for Economic Education - [EconEdLink Lessons](#)
- Modeling with Mathematics through [Three-Act Tasks](#)

Modeling is best interpreted not as a collection of isolated topics but in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout core content in this document as indicated by a star symbol (★).

- Additional information and examples can be found in the [Oregon Math Project Practice Brief: Mathematical Modeling](#)

1G: Connections to National Conversations

The ideas described in this document have been informed and aligned to the call for [re-humanizing school mathematics](#). The National Council of Teachers of Mathematics (NCTM) recognize the need to focus on high school mathematics in [Catalyzing Change in High School Mathematics: Initiating Critical Conversations](#) that outlines the need for change, and recommendations to focus math content that lead to specialized pathways in high school.



Additional national conversations are occurring within professional math organizations that recognize the need to create more options for students that are contextual and connected to a student's interest. [The Common Vision Project](#) is a joint effort of five national math organizations led by the Mathematical Association of America (MAA) calling for a shift in college math instruction to introduce contemporary topics and applications and employ a broad range of examples and applications to motivate students and illustrate how math is used.

SECTION TWO: Planning High School Core Content

2A: Guiding Principles

ODE remains committed to the guiding principles introduced in spring 2020 to generate collective action and leadership for efforts to respond to COVID-19 across Oregon. These principles are updated to reflect the current context:

- **Ensure safety and wellness.** The decision to return to school settings must be driven by health and safety considerations. In planning, prioritize basic needs such as food, shelter, and wellness and create the conditions to support mental, social, and emotional health of students and staff.
- **Cultivate connection and relationship.** Quality learning experiences require deep interpersonal relationships and a learning environment where people are seen, known, and loved. Especially in the midst of returning to school settings from an extended school closure, supporting students and families should begin with connection and relationship.
- **Center equity.** In Oregon, based on data released by Oregon Health Authority, all racial and ethnic groups are disproportionately impacted by COVID-19 as compared to their white peers. Recognize the disproportionate harm and impact that COVID-19 has caused for certain communities. Apply an equity-informed, anti-racist, and anti-oppressive lens to promote culturally sustaining and revitalizing educational systems that support every child.
- **Innovate.** The complex circumstances in which learning is currently situated requires ongoing reflection and iteration to assure deep learning for every student.

2B: Commitment to High School Algebra

Disruption of regularly planned instruction in spring 2020 presents a number of challenges to ensure continuity of learning for our high school students in mathematics. Hybrid and Comprehensive Distance Learning in the 2020-21 school year will require high school math teachers to focus on priority content and equitable teaching practices that support all students within mathematics. Algebra concepts and algebraic thinking are central to the work of high school students. In the coming school years, the collective community of high school educators need to commit to the continuity of algebra content that will maximize opportunities of success for our students after they graduate from high school.

Core high school algebra content identified in the tables in section 3 were the result of conversations among Oregon educators this past year identifying the subset of standards from high school algebra, functions, and number domains that are most critical for students' postsecondary success. Taking time to focus high school course content on the identified standards will help focus instruction in the 2020-21 school year and assist in transition to the 2+1 course structure over the next two school years.



2C: Algebra in First Credit Courses (Algebra 1 or Integrated 1)

High school first credit experiences vary across districts and schools, but all play a critical role in giving students opportunities to engage in high school algebra content. First credit courses in Oregon should prioritize the core algebra content for students in 2020-21 and plan for a transition to long term first courses within the 2+1 course model. Unfinished learning from the first course in 2020-21 should be intentionally attended to in the 2021-22 school year in a student's second credit experience. .

Planning for Core Content in First Credit Courses 2020-21

- Inclusion of as much of the prioritized algebra content in this document as possible. Algebra content that is not included in the first credit course needs to be clearly communicated to other math teachers in the school and district so content not attended to in 2020-21 can be included in a student's second credit course in 2021-22.
- Work with linear and exponential functions should be prioritized.
- Accelerated Learning experiences from priority 6-8 content in the functions (F) domain, expressions and equations (EE) domain, and ratio and proportions (RP) domain. Priority content in these domains can be found in the guidance document for [Student Achievement Partners](#). Such experiences can be embedded throughout the course to prepare students for grade level content.

2D: Algebra in Second Credit Courses (Geometry or Integrated 2)

Students who experienced disrupted learning in spring 2020 while enrolled in a first credit course, may need additional support in mastering core algebra content. Core geometry content identified in section 3 should be approximately $\frac{1}{2}$ credit of work which will create opportunities for learning unfinished core algebra content. Teachers of second credit courses do not necessarily need to replicate, or remediate, prior course content as they plan. However, each second credit course should provide students the opportunity to learn core algebra content and provide necessary support as needed.

Planning for Core Content in Second Credit Courses 2020-21

- Plan for accelerated learning experiences in core algebra concepts identified in this document that could include unfinished learning that may have occurred in algebra courses in the 2019-20 school year.
- Plan for $\frac{1}{2}$ credit Geometry based on prioritized content in this document.
- Prioritize understanding of linear and exponential functions with a wide range of applications.
- Trigonometry functions and applications should be limited to right triangle trigonometry applications.

2E: Algebra in Third Credit Courses (Algebra 2 or Integrated 3)

Students who experienced disrupted learning in spring 2020 while enrolled in a second credit course, may still have had the opportunity to complete a full credit of algebra in the 2018-19 school year. A commitment to deepening students' learning of core algebra content needs to be prioritized in third credit courses. Inclusion of performance tasks and projects that give teachers feedback on student proficiency in core algebra content can be planned for in a third credit course.



Planning for Core Content in third credit courses 2020-21

- Plan for deepening understanding of core algebra concepts identified in this document through mathematical modeling and applications.
- Plan for accelerated learning experiences in core data science concepts identified in this document to understand student proficiency in these topics.
- Prioritize core algebra and data science content over review of unfinished geometry content.
- Prioritize understanding of linear and exponential functions with a wide range of applications.
- Trigonometry functions and applications should be limited to right triangle trigonometry applications.
- Additional algebra topics can be planned for at the discretion of the teacher once sufficient evidence is obtained for proficiency in both core algebra and core data science content.

SECTION THREE: 2020-21 Core High School Mathematics

Priority content identified in this document was done by a panel of Oregon educators as part of the scheduled review and revision of the adopted high school standards during the 2019-20 school year. School closures in spring 2019 occurred after the initial draft was completed and presented in this document as guidance for planning courses in the 2020-21 school year. The next stage of the review process will include a public comment period with the aim of presenting to the State Board of Education for adoption. ODE has no definitive timeline as of this release, but an updated document will be provided in the next year to support planning for the 2021-22 school year that will include any updates to this guidance.

As a system, we need all high school teachers to commit to ensuring that students are given the opportunity to learn the identified content by the end of a three credit sequence.

Content identified in this document should be thought of approximately as 1 credit of algebra content, $\frac{1}{2}$ credit of geometry, and $\frac{1}{2}$ credit of data science. This would open up the opportunity of a full credit to accelerate unfinished learning across a three credit sequence.

- Content not identified in this document could certainly be taught once teachers are confident students are proficient in the core content.
- Modeling is best interpreted not as a collection of isolated topics but in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout core content in this document as indicated by a star symbol (★).

Focus within high school courses could occur in two ways including:

- (1) identification of a subset of our standards on which to focus, and
- (2) narrowing the focus within each standard themselves.

Attention should be paid to not only the named standards in this document, but the specific content identified as a focus within each standard as well. Organization of specific units within a course will need to be determined at the local district and/or school level.



3A: Core Algebra Focus

Focus on High School Number and Quantity (HSN.RN, HSN.Q.A)

Considerations for Addressing <u>PRIORITY</u> Number and Quantity Content	
<p>The standards listed in this table name the priority instructional content for high school algebra. The right-hand column contains consideration for focus content within the standard that would be essential for all students. Specific modeling standards appear throughout core content in this document as indicated by a star symbol (★).</p>	
Standard	Focus Considerations for HSN.RN - The Real Number System
HSN.RN.A.1	<p>Establish properties of positive integer exponents. Use these properties to extend the definition of exponentiation to negative and rational exponents.</p> <p>Integrated with Standard(s): HSN.RN.A.2</p>
Standard	Focus Considerations for HSN.Q - Quantities
HSN.Q.A.1	<p>Choose and interpret units consistently in formulas, graphs and data displays as a way to understand problems and to guide the solution of multi-step problems. (★)</p>
HSN.Q.A.2	<p>Define appropriate quantities in real world situations for the purpose of modeling them and justify these choices. (★)</p> <p>Integrated with Standard(s): HSA.CED.A.1</p>
HSN.Q.A.3	<p>Choose a level of accuracy appropriate to limitations on measurement when reporting quantities in modeling situations. (★)</p>

Remaining Number and Quantity Considerations

Considerations for Addressing <u>REMAINING</u> Number and Quantity Concepts	
<p>The concepts listed in this table represent remaining content that is often taught in high school but should only be attended to if students demonstrate proficiency in priority content. The right-hand column contains considerations where this content could be included, integrated, or excluded as well as reference standards for the identified remaining concepts</p>	
Concept	Considerations
Complex Numbers	<p>Eliminate in first two high school credit courses</p> <p>Reduce in third credit as relevant for an advanced algebra pathway</p> <p>Reference Standards: HSN.CN.A</p>



Focus on High School Algebra (HSA)

Considerations for Addressing <u>PRIORITY</u> Algebra Content	
<p>The standards listed in this table name the priority instructional content for high school algebra. The right-hand column contains consideration for focus content within the standard that would be essential for all students. Specific modeling standards appear throughout core content in this document as indicated by a star symbol (★).</p>	
Standard	Focus Considerations for HSA.SSE - Seeing Structure in Expressions
HSA.SSE.A.1	Interpret an expression which models a quantity by viewing one or more of its parts as a single entity and reasoning about how changes in these parts impact the whole, and vice versa. (★)
HSA.SSE.B.3	Create and recognize an equivalent form of an expression to understand the quantity represented. (★) <i>Integrated with Standard(s): HSA.SSE.B.3c, HSA.APR.A.1, HSA.SSE.A.2</i>
Standard	Focus Considerations for HSA.CED – Creating Equations
HSA.CED.A.1	Define variables and create inequalities with one or more variables and use them to solve problems in real life contexts. (★) <i>Integrated with Standard(s): HSA.CED.A.2</i>
HSA.CED.A.2	Define variables and create equations with two or more variables to represent relationships between quantities in order to solve problems in real life contexts. (★) <i>Integrated with Standard(s): HSA.CED.A.1, HSF.BF.A.1</i>
HSA.CED.A.3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities; interpret solutions as viable or nonviable options in a modeling context. (★)
HSA.CED.A.4	Rearrange formulas and equations to highlight a specific quantity. (★) <i>Integrated with Standard(s): HSA.SSE.A.2</i>



Standard	Focus Considerations for HSA.REI - Reasoning with Equations & Inequalities
HSA.REI.A.1	Construct a viable argument to justify a method for solving a simple equation. <i>Integrated with Standard(s): HSA.REI.B.4, HSA.REI.A.2</i>
HSA.REI.C.6	Solve systems of linear equations exactly through algebraic means and approximately using technology. <i>Integrated with Standard(s): HSA.REI.C.7</i>
HSA.REI.D.10	Understand the solutions to an equation in two variables as a set of points in the coordinate plane that form a curve.
HSA.REI.D.11	Recognize and explain why the point(s) of intersection of two graphs are solutions to the equation $f(x)=g(x)$. Interpret the meaning of the coordinates of these points. (★) <i>Integrated with Standard(s): HSA.REI.C.6</i>
HSA.REI.D.12	Graph and explain why the points in a half plane are solutions to a linear inequality and the solutions to a system of inequalities are the points in the intersection of corresponding half planes. Interpret the meaning of the coordinates of these points in context.



Remaining Algebra (HSA) Considerations

Considerations for Addressing <u>REMAINING</u> Algebra Concepts	
<p>The concepts listed in this table represent remaining content that is often taught in high school but should only be attended to if students demonstrate proficiency in priority content. The right-hand column contains considerations where this content could be included, integrated, or excluded as well as reference standards for the identified remaining concepts.</p>	
Concept	Considerations
Rational Expressions	<p>Eliminate lessons on rational expressions, with possible integration in advanced third credit courses if needed for modeling applications. Reference Standard(s): HSA.REI.A.2, HSA.APR.D.6, HSA.REI.A.2</p>
Rewriting Expressions (Factoring)	<p>Limited to factoring quadratics with technology in the first two credit courses. Reduced emphasis on paper and pencil methods in third credit courses. Reference Standard(s): HSA.SSE.A.2</p>
Polynomial Arithmetic	<p>Integrated use with lessons with simple equivalent expressions across all courses. Limited to use with technology for complex and/or multi-step arithmetic. Reference Standard(s): HSA.APR</p>
Systems of Equations	<p>Limit paper and pencil lessons to systems of linear functions, and combine using technology when possible. Integrate use of technology to solve systems that use nonlinear functions. Reference Standard(s): HSA.REI.C</p>
Sequences & Series	<p>Limited lessons with modeling applications (e.g. HSF.BF.A.2) across all courses. Reference Standard(s): HSA.SSE.B.4, HSF.IF.A.3</p>



Focus on High School Function (HSF)

Considerations for Addressing <u>PRIORITY</u> Function Content	
<p>The standards listed in this table name the priority instructional content for high school algebra. The right-hand column contains consideration for focus content within the standard that would be essential for all students. Specific modeling standards appear throughout core content in this document as indicated by a star symbol (★).</p>	
Standard	Focus Considerations for HSF.IF – Interpreting Functions
HSF.IF.A.1	<p>Understand a function as a rule that assigns a unique output for every input and that functions model situations where one quantity determines another.</p> <p><i>Integrated with Standard(s):</i> HSF.IF.A.2</p>
HSF.IF.A.2	<p>Use function notation and interpret statements that use function notation in terms of the context and the relationship it describes.</p> <p><i>Integrated with Standard(s):</i> HSF.IF.A.1</p>
HSF.IF.B.4	<p>Interpret key features of functions, from multiple representations, and conversely predict features of functions from knowledge of context. (★)</p> <p><i>Integrated with Standard(s):</i> HSF.IF.A.1, HSF.IF.A.2</p>
HSF.IF.B.5	<p>Relate the domain of a function to its graph and to its context. (★)</p>
HSF.IF.B.6	<p>Calculate and interpret the average rate of change of a function over a specified interval. (★)</p>
HSF.IF.C.7	<p>Graph functions to show key features. (★)</p>
HSF.IF.C.9	<p>Compare properties of two functions using multiple representations.</p> <p><i>Integrated with Standard(s):</i> HSF.IF.B.4</p>
Standard	Focus Considerations for HSF.BF – Building Functions
HSF.BF.A.2	<p>Model situations with arithmetic and geometric sequences and explicit formulae for such sequences, and translate between representations. (★)</p>
HSF.BF.B.3	<p>Identify and interpret the effect on the graph of a function when the equation has been transformed.</p>
Standard	Focus Considerations for HSF.LE – Linear, Quadratic, & Exponential Models
HSF.LE.A.1	<p>Explain why a situation can be modeled with a linear function, an exponential function, or neither. (★)</p> <p><i>Explanations should connect to the reasoning required in HSF.LE.A.1a</i></p>



Remaining Function (HSF) Considerations

Considerations for Addressing <u>REMAINING</u> Function Concepts	
<p>The concepts listed in this table represent remaining content that is often taught in high school but should only be attended to if students demonstrate proficiency in priority content. The right-hand column contains considerations where this content could be included, integrated, or excluded as well as reference standards for the identified remaining concepts.</p>	
Concept	Considerations
Quadratic Functions	<p>Combine lessons on quadratic functions with the study of expressions, equations, and functions in support of math modeling applications.</p> <p>Eliminate use of paper and pencil methods (e.g. quadratic formula, factoring trinomials, completing the square) in the first two credit courses, and possible reduced use in third credit courses as applicable for an advanced algebra course.</p> <p>Reference Standard(s): HSA.REI.B.4</p>
Inverse Functions	<p>Eliminate lessons on inverse functions in the first three credit courses with possible inclusion in fourth credit courses such as pre-calculus.</p> <p>Reference Standard(s): HSF.BF.B.4</p>
Interpret expressions for functions	<p>Integrate lessons on interpreting the parameters for functions in context of modeling applications only.</p> <p>Reference Standard(s): HSF.LE.B.5</p>
Trigonometric Functions	<p>Limit lessons to applications using right triangle trigonometry using appropriate technology in first two credits. Possible reduced emphasis of additional trigonometric applications in third and fourth credit courses as applicable for advanced algebra options.</p> <p>Reference Standard(s): HSF.TF</p>
Unit Circle, Periodic Functions	<p>Eliminate lessons in the first two credit courses.</p> <p>Limit emphasis of periodic behavior within third or fourth credit courses as applicable for advanced algebra options.</p> <p>Reference Standard(s): HSF.TF.B.5, HSF.TF.A.1, HSF.TF.A.2</p>
Trigonometric Identities	<p>Eliminate lessons in the first two credits and limited emphasis in a third or fourth credit option.</p> <p>Reference Standard(s): HSF.TF.C.8</p>



3B: Core Geometry Focus

Focus on High School Geometry

Considerations for Addressing <u>PRIORITY</u> Geometry Content	
<p>The standards listed in this table name the priority instructional content for high school geometry. The right-hand column contains consideration for focus content within the standard that would be essential for all students. Specific modeling standards appear throughout core content in this document as indicated by a star symbol (★).</p>	
Standard	Focus Considerations for HSG.CO – Congruence
HSG.CO.A.1	Use definitions of geometric figures and geometric relationships to justify the solutions of problems.
HSG.CO.A.5	Given a figure and a sequence of rigid transformations, draw the transformed figure. Given two congruent figures, specify the transformations that map one figure onto the other. <i>Integrated with Standard(s): HSG.CO.A.2; HSG.CO.A.4</i>
HSG.CO.B.7	Show triangle congruence using rigid motions; or justify triangle congruence using SSS, SAS, ASA, or AAS criteria. <i>Integrated with Standard(s): HSG.CO.B.8</i>
HSG.CO.C.9	Justify theorems of line relationships, angles, triangles, and parallelograms; and use them to solve problems in real world contexts. <i>Integrated with Standard(s): HSG.CO.C.10</i>
HSG.CO.D.12	Perform geometric constructions with a variety of tools and methods.
Standard	Focus Considerations for HSG.SRT – Similarity, Right Triangles, & Trigonometry
HSG.SRT.A.5	Use similarity theorems to determine whether two triangles are similar. Solve problems involving similar triangles. <i>Integrated with Standard(s): HSG.SRT.A.1, HSG.SRT.A.2, HSG.SRT.A.3</i>
HSG.SRT.C.8	Apply sine, cosine, and tangent ratios, along with the Pythagorean Theorem, to solve real-world problems. <i>Integrated with Standard(s): HSG.SRT.C.6, HSG.SRT.C.7</i>



Standard	Focus Considerations for HSG.GPE – Expressing Geometric Properties with Equations
HSG.GPE.A.1	Use the Pythagorean theorem to develop and apply the distance formula and the equation of a circle, $(x-h)^2 + (y-k)^2 = r^2$.
HSG.GPE.B.4	Use Cartesian coordinates to determine parallel and perpendicular relationships, and distance in the coordinate plane.
HSG.GPE.B.5	Use the slopes of segments and the coordinates of the vertices of triangles, parallelograms, and trapezoids to solve problems.
Standard	Focus Considerations for HSG.GMD – Geometric Measurement & Dimension
HSG.GMD.A.1	Solve real world problems using area formulas for triangles, parallelograms, trapezoids, regular polygons, and circles
HSG.GMD.A.3	Use volume formulas for prisms, cylinders, pyramids, cones, and spheres to solve problems and make real world applications. (★)
Standard	Focus Considerations for HSG.MG – Modeling with Geometry
HSG.MG.A.1	Use geometric shapes, their measures, and their properties to describe real world objects, and solve related modeling and design problems. (★) <i>Integrated with Standard(s): HSG.MG.A.3</i>
HSG.MG.A.2	Apply concepts of density based on area and volume in modeling situations. (★)



Remaining Geometry Considerations

Considerations for Addressing <u>REMAINING</u> Geometry Concepts	
<p>The concepts listed in this table represent remaining content that is often taught in high school but should only be attended to if students demonstrate proficiency in priority content. The right-hand column contains considerations where this content could be included, integrated, or excluded as well as reference standards for the identified remaining concepts.</p>	
Concept	Considerations
Congruence Proofs	<p>Limit work to applications of triangle congruence in modeling contexts. Reference Standard(s): HSG.CO.C.9</p>
Additional Proofs	<p>Integrate lessons of logical reasoning with applications of priority geometry content as needed to construct viable arguments (MP.3). Reduce emphasis on the two-column proof procedure, instead emphasizing using deductive reasoning to support conjectures.</p>
Similarity transformations	<p>Combine lessons using dilations and justification of similarity transformations to contrast and complement the focus on congruence and rigid motions. Reference Standard(s): HSG.SRT.A</p>
Polynomial Theorem Proofs	<p>Limit to justification of theorems of line relationships, angles, triangles, and parallelograms in modeling contexts. Reference Standard(s): HSG.CO.C.10, HSG.CO.C.11</p>
Pythagorean Theorem	<p>Integrate use of the Pythagorean Theorem in context with right triangle applications. Eliminate proofs of Pythagorean identities in the first three credits. Reference Standard(s): HSA.APR.C.4, HSF.TF.C.8, HSG.SRT.B.4, HSG.SRT.C.6</p>
Law of Sines and Cosines	<p>Eliminate lessons in the first two credit courses. Reduced emphasis fourth credit courses as applicable for advanced algebra options. Reference Standard(s): HSG.SRT.D.11</p>
Visualize 2-D and 3-D relationships	<p>Eliminate lessons on cross-sections and rotations of two-dimensional objects; Limit applications use of two-dimensional nets of three-dimensional polyhedra. Reference Standard(s): HSG.GMD.B.4</p>
Conic Sections	<p>Limit use of the Pythagorean theorem to develop and apply the distance formula and the equation of a circle. Eliminate lessons deriving formulas for equations of additional conic sections. Reference Standard(s): HSG.GPE.A.1, HSG.GPE.A.2</p>



3C: Core Data Science and Statistics Focus

Focus on High School Data Science and Statistics

Considerations for Addressing <u>PRIORITY</u> Data Science and Statistics Content	
The standards listed in this table name the priority instructional content for high school data science. The right-hand column contains consideration for focus content within the standard that would be essential for all students. Specific modeling standards appear throughout core content in this document as indicated by a star symbol (★).	
Standard	Focus Considerations for HSS.ID (★) – Interpreting Categorical & Quantitative Data
HSS.ID.A.1	Represent the distribution of data multiple ways with plots on the real number line.
HSS.ID.A.2	Use statistics appropriate to the shape of the data distribution to compare center and spread of two or more different data sets.
HSS.ID.A.3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
HSS.ID.A.4	Use the mean and standard deviation of an approximately normally distributed data set to estimate population percentages.
HSS.ID.B.5	Analyze the association between two categorical variables by using two-way tables and comparative bar graphs.
HSS.ID.B.6	Represent data on two quantitative variables on a scatter plot and describe how the variables are related.
HSS.ID.C.7	Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
HSS.ID.C.8	Compute, using technology, and interpret the correlation coefficient of a linear fit.
HSS.ID.C.9	Distinguish between correlation and causation.



Standard	Focus Considerations for HSS.IC (★) – Making Inferences & Justifying Conclusions
HSS.IC.A.1	Students will understand the process of statistical reasoning, take sample data, and make inferences about a population.
HSS.IC.B.3	Recognize the difference between sample surveys, experiments and observational studies and understand the role of randomization in each.
HSS.IC.B.4	Use data from a sample survey to estimate a population parameter.
HSS.IC.B.5	Use data from a randomized experiment to compare two treatments to decide if differences between parameters are significant based on the statistics.
HSS.IC.B.6	Evaluate reports based on data.
Standard	Focus Considerations for HSS.CP (★) – Conditional Probability & the Rules of Probability
HSS.CP.A.1	Describe the possible outcomes for a situation as subsets of a sample space.
HSS.CP.A.5	Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. Integrated with Standard(s): HSS.CP.A.4



Remaining Data Science and Statistics Considerations

Considerations for Addressing <u>REMAINING</u> Data Science & Statistics Concepts	
<p>The concepts listed in this table represent remaining content that is often taught in high school but should only be attended to if students demonstrate proficiency in priority content. The right-hand column contains considerations where this content could be included, integrated, or excluded as well as reference standards for the identified remaining concepts.</p>	
Concept	Considerations
Simulations	<p>Eliminate lessons using simulations to develop a margin of error or decide if differences between parameters are significant. Reference Standard(s): HSS.IC.B.4, HSS.IC.B.5</p>
Independent Events	<p>Limit lessons to conceptual understanding; Eliminate product of probabilities. Reference Standard(s): HSS.CP.A.2, HSS.CP.A.3</p>
Conditional Probability	<p>Limit lessons to conceptual understanding; Eliminate lessons on computation of conditional probabilities. Reference Standard(s): HSS.CP.A.3; HSS.CP.B.6</p>
Addition Rule	<p>Eliminate lessons on applying the addition rule. Reference Standard(s): HSS.CP.B.7</p>
Multiplication Rule	<p>Eliminate lessons on applying the multiplication rule. Reference Standard(s): HSS.CP.B.8</p>
Permutations and Combinations	<p>Limit lessons to conceptual understanding; Eliminate lessons on computation of permutations and combinations. Reference Standard(s): HSS.CP.B.9</p>

