Blueprint for the Common Core State Standards for Mathematics
Grade Level Overview

This blueprint assumes 160 days for instruction. The order of the standards included in any instructional focus does not imply a sequence of content within that instructional focus. Some standards may be revisited several times during the course; others may be only partially addressed in different instructional focuses, depending on the mathematical focus. The standards are meant to be viewed as connected ideas that build understanding of key mathematical concepts.

From kindergarten through high school math, students should continue to develop proficiency with the Common Core's eight Standards for Mathematical Practice:

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

These practices should become the natural way in which students come to understand and to do mathematics. While, depending on the content to be understood or on the problem to be solved, any practice might be brought to bear, some practices may prove more useful than others. Opportunities for highlighting certain practices are indicated in each instructional focus, but this highlighting should not be interpreted to mean that other practices should be neglected.

Note: *Content standards with no accompanying text indicate a revisited standard.*

Content: myOER.org (OER—open educational resources = free) is a website containing ELA and Mathematics resources aligned to the Common Core Standards and Standards of Mathematical Practice. The resources added by South Dakota curators have been rated using a strict rubric to support best practices in teaching. (The rubric can be found at myOER.org under the Resources tab.) Only lessons rating a 2 or 3 are uploaded to the myOER by our SD curators. This blueprint offers two examples of content available through myOER. Numerous additional free resources aligned to the CCSS are available at myOER.

Kindergarten

In Kindergarten, instructional time should focus on two critical areas: (1) representing and comparing whole numbers, initially with sets of objects; (2) describing shapes and space. More learning time in Kindergarten should be devoted to number than to other topics.

First Grade

In Kindergarten, students learned to count in order, count to find out "how many", and model addition and subtraction with small sets of objects. Students identified and described geometrical shapes, as well as created and composed shapes.

In Grade 1, instructional time should focus on four critical areas: (1) developing understanding of addition, subtraction, and strategies for addition and subtraction within 20; (2) developing understanding of whole number relationships and place value, including grouping in tens and ones; (3) developing understanding of linear measurement and measuring lengths as iterating length units; and (4) reasoning about attributes of geometric shapes, and composing and decomposing geometric shapes.

Second Grade

In the two years prior to Grade 2, students gained an understanding of whole numbers to 120, begun to develop strategies for addition and subtraction, worked with non-standard measurement, and reasoned about attributes. Students are fluent adding and subtracting within 10. Students have an initial understanding of place value of two-digit numbers.

In Grade 2, instructional time should focus on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes.

Third Grade

In the years prior to Grade 3, students gained an understanding of place value, used strategies based on place value to add and subtract, worked with standard units of measure for length, and described attributes of shapes. Students have an initial understanding of multiplication based on the array model.

In Grade 3, instructional time should focus on four critical areas: (1) developing understanding of multiplication and division and strategies for multiplication and division within 100; (2) developing understanding of fractions, especially unit

fractions (fractions with numerator 1); (3) developing understanding of the structure of rectangular arrays and of area; and (4) describing and analyzing two-dimensional shapes.

Fourth Grade

In the years prior to Grade 4, students gained an understanding of multiplication and division of whole numbers, generalized strategies for addition and subtraction to multi-digit numbers, developed understanding of fractions as numbers, and reasoned with shapes and their attributes. They worked with arrays for multiplication and area.

In Grade 4, instructional time should focus on three critical areas: (1) developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; (3) understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

Fifth Grade

In previous grades, students learned strategies for multiplication and division, developed understanding of structure of the place value system, and applied understanding of fractions to addition and subtraction with like denominators. Students gained understanding that geometric figures can be analyzed and classified based on their properties.

In Grade 5, instructional time should focus on three critical areas: (1) developing fluency with addition and subtraction of fractions, and developing understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions); (2) extending division to 2-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations; and (3) developing understanding of volume.

Sixth Grade

In the three years prior to Grade 6, students acquired a strong foundation in numbers and operations, geometry, measurement and data. Students are fluent in multiplication of multi-digit whole numbers and have a solid conceptual understanding of all four operations with positive rational numbers. Understanding of measurement concepts

(e.g. length, area, volume, angles), as well as the representation and interpretation of data, is also emerging.

In Grade 6, instructional time should focus on four critical areas: (1) connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems; (2) completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers; (3) writing, interpreting, and using expressions and equations; and (4) developing understanding of statistical thinking.

Students in Grade 6 also build on their work with area in elementary school by reasoning about relationships among shapes to determine area, surface area, and volume. They find areas of right triangles, other triangles, and special quadrilaterals by decomposing these shapes, rearranging or removing pieces, and relating the shapes to rectangles. Using these methods, students discuss, develop, and justify formulas for areas of triangles and parallelograms. Students find areas of polygons and surface areas of prisms and pyramids by decomposing them into pieces whose area they can determine. They reason about right rectangular prisms with fractional side lengths to extend formulas for the volume of a right rectangular prism to fractional side lengths. They prepare for work on scale drawings and constructions in Grade 7 by drawing polygons in the coordinate plane.

Seventh Grade

In Grade 6, students developed an understanding of variables from two perspectives- as placeholders for specific values and as representing sets of values represented in algebraic relationships. They applied properties of operations to write and solve simple one-step equations. By the end of sixth grade, students were fluent in all positive rational number operations, and they developed a solid foundation for understanding area, surface area and volume of geometric figures.

In Grade 7, instructional time should focus on four critical areas: (1) developing understanding of and applying proportional relationships; (2) developing understanding of operations with rational numbers and working with expressions and linear equations; (3) solving problems involving scale drawings and informal geometric constructions, and working with two- and three-dimensional shapes to solve problems involving area, surface area, and volume; and (4) drawing inferences about populations based on samples.

Eighth Grade

In the years prior to Grade 8, students began their study of algebraic concepts. They wrote and interpreted expressions, solved equations and inequalities, explored quantitative relationships between dependent and independent variables, and solved

problems involving area, surface area, and volume. Students have also begun to develop an understanding of statistical thinking.

In Grade 8, instructional time should focus on three critical areas: (1) formulating and reasoning about expressions and equations, including modeling an association in bivariate data with a linear equation, and solving linear equations and systems of linear equations; (2) grasping the concept of a function and using functions to describe quantitative relationships; (3) analyzing two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem.

High School Traditional Pathway

Algebra 1

In the three years prior to Algebra I, students began their study of algebraic concepts. They have investigated variables and expressions, solved equations, constructed and analyzed tables, used equations and graphs to describe relationships between quantities, and studied linear equations and systems of linear equations.

The fundamental purpose of this course is to formalize and extend the mathematics that students learned in the middle grades. Because it is built on the new middle grades standards, this is a more ambitious version of Algebra I than has generally been offered. The instructional focuses deepen and extend understanding of linear and exponential relationships by contrasting them with each other and by applying linear models to data that exhibit a linear trend, and students engage in methods for analyzing, solving, and using quadratic functions.

Geometry

In middle school mathematics, students began their study of geometric concepts. They studied area, surface area and volume as well as informal investigations of lines, angles, and triangles. Students also explored transformations, including translations, reflections, rotations, and dilations.

The fundamental purpose of the course in Geometry is to formalize and extend students' geometric experiences from the middle grades. Students explore more complex geometric situations and deepen their explanations of geometric relationships, moving towards formal mathematical arguments. Important differences exist between this Geometry course and the historical approach taken in Geometry classes. For example, transformations are emphasized early in this course. Close attention should be paid to the introductory content for the Geometry conceptual category found in the high school CCSS.

Algebra II

In Algebra I, students began their study of algebraic concepts. They used equations, tables, and graphs to describe relationships between quantities, with a particular focus on linear, quadratic, and exponential functions and equations.

Building on their work with linear, quadratic, and exponential functions, Algebra II students extend their repertoire of functions to include polynomial, rational, and radical functions. Students work closely with the expressions that define the functions. They continue to expand and hone their abilities to model situations and to solve equations, including solving quadratic equations over the set of complex numbers and solving exponential equations using the properties of logarithms.

High School Integrated Pathway

Integrated Mathematics I

In the three years prior to Integrated Math 1, students began their study of algebraic concepts. They investigated variables and expressions, solved equations, constructed and analyzed tables, used equations and graphs to describe relationships between quantities, and studied linear equations and systems of linear equations.

The fundamental purpose of Mathematics I is to formalize and extend the mathematics that students learned in the middle grades. The critical areas, organized into units, deepen and extend understanding of linear relationships, in part by contrasting them with exponential phenomena, and in part by applying linear models to data that exhibit a linear trend. Mathematics 1 uses properties and theorems involving congruent figures to deepen and extend understanding of geometric knowledge from prior grades. The final unit in the course ties together the algebraic and geometric ideas studied.

Integrated Mathematics II

The focus of Mathematics II is on quadratic expressions, equations, and functions; comparing their characteristics and behavior to those of linear and exponential relationships from Mathematics I. The need for extending the set of rational numbers arises and real and complex numbers are introduced to that all quadratic equations ban be solved. The link between probability and data is explored through conditional probability and counting methods, including their use in making and evaluating decisions. The study of similarity leads to an understanding of right triangle trigonometry and connects to quadratics through Pythagorean relationships. Circles, with the quadratic algebraic representations round out the course.

Integrated Mathematics III

It is in Mathematics III that students pull together and apply the accumulation of learning from their previous courses, with content grouped into four critical areas, organized into units. They apply methods from probability and statistics to draw inferences and conclusions from data. Students expand their repertoire of functions to include polynomial, rational, and radical functions. They expand their study of right triangle trigonometry to include general triangles. And, finally, students bring together all of their experience with functions and geometry to create models and solve contextual problems.