Hazelwood School District
We're on the move!

5th Grade
Mathematics

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Reviewed by Elementary School Math Teachers on January 25, 2017
Reviewed by Curriculum Advisory Committee on February 16, 2017
Approved by the Board of Education on June 20, 2017

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5th Grade Mathematics

Hazelwood School District

Mission Statement

We are a collaborative learning community guided by a relentless focus to ensure each student achieves maximum growth.

Vision Statement

HSD will foster lifelong learners, productive citizens and responsible leaders for an ever-evolving society.

Board of Education on January 5, 2010

Goals

Goal #1: Hazelwood students will meet or exceed state standards in all curricular areas with emphasis in reading, writing, mathematics, science and social studies.

Goal #2: Hazelwood staff will acquire and apply skills necessary for improving student achievement.

Goal #3: Hazelwood School District, the community and all families will support the learning of all children.

Mathematics Curriculum Overview

The Hazelwood School District's (HSD) most recent adoption of elementary mathematics curriculum occurred in 2009. In 2010, Missouri officially adopted the Common Core State Standards and subsequently created and adopted the Missouri Learning Standards in 2016. These changes in state standards and learning progressions have resulted in the need for an intensive curriculum revision to ensure that all students in the Hazelwood School District are adequately prepared to meet grade-level learning expectations and be prepared for entry into college, or equipped to begin securing a career.

During the 2016-2017 school year, HSD piloted Investigations in Number, Data & Space 3rd Edition in 13 classrooms across the district. All pilot teachers were enamored with the updates to the curricular materials and were pleased with the strong alignment to the Missouri Learning Standards. Additionally, as of January 2017, the pilot teachers in grades 3-5 had an average of 46.2% of students meeting proficiency, compared to the district's 38.8% as measured by Evaluate mathematics benchmark assessment. Furthermore, 2016 Missouri Assessment Program data results for Grades 3-5 indicates a need for strengthening our current mathematics curriculum as the district's mathematics students scoring proficient and advanced fell to 34.6% from 37.1%. After a careful review of state and district data, it was determined by the Curriculum Department to revise the curriculum to align with the most recent state adopted standards.

The committee members aligned the curriculum with the 2016 Missouri Learning Standards published by Missouri Department of Elementary and Secondary Education. The curriculum meets all of the state and district requirements for research, technology, workplace readiness skills, gender/racial equity, and disability awareness.

The curriculum contains learning activities and unit assessments components that are rigorous, and outline clear learning expectations. As the curriculum is implemented and taught, the learning activities and assessments may be revised. The assessments are required. The learning activities should be implemented in the order, and with the fervor, as intended by the TERC curriculum writers.
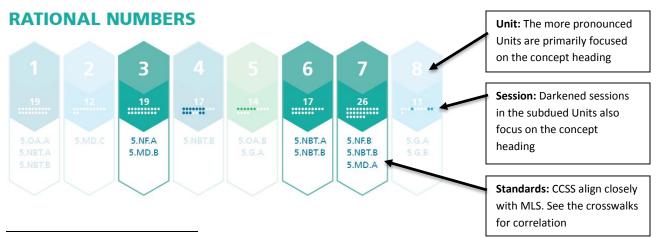
We must be aware that students have mathematical ideas. The curriculum supports all students in developing and expanding those ideas. Also, teachers are engaged in ongoing learning about mathematics content, pedagogy, and student learning. The curriculum supports them in this learning. Moreover, teachers collaborate with the students and curriculum materials to create the curriculum as enacted in the classroom. The curriculum provides a clear, focused, and coherent mathematical agenda and supports teachers in implementing in a way that accommodates the needs of their particular students. Most of the learning activities are very sequential and, when all of them are used, a student should be able to successfully complete the unit assessments.

Mathematics Implementation Plan

The Investigations curriculum requires 55–60 minutes of math time a day in Kindergarten and 70–75 minutes a day in Grades 1–5. This includes a 45-minute (for Kindergarten) or 60-minute session (for Grades 1–5) and 10–15 minutes outside of math time for the daily Classroom Routine (Kindergarten–Grade 2) or Ten-Minute Math (Grades 3–5) activity. Each curriculum unit consists of 2–5 investigations. An investigation focuses on a set of related mathematical ideas, coordinating students' work in hands-on activities, written activities, assessments, and classroom discussions over a period of several days. The duration of an investigation ranges from 4–9 class sessions. Each session begins with a list of all of the activities to help you plan the math time for the day. It is important to move through all of the activities because they are carefully designed to offer coherent and focused work on the main math ideas of the unit.

Mathematics teaching and learning, at its best, is a collaboration among teachers, students, and the curriculum. The curriculum materials provide a coherent, carefully sequenced core of mathematics content for students and supportive professional development material for teachers. Modifying the curriculum and making it work in your classroom requires knowing the curriculum well. It means taking the time to understand the mathematical focus of each lesson, how the Math Focus Points build over many lessons, and how the Mathematical Practices are integrated into the content. Learning the curriculum well means holding back the urge to change activities because you think they are too easy or too difficult for your students before you have tried them and actually seen your students' work. Keep in mind that the way ideas are developed and sequenced has been researched and tested in multiple classrooms[1], and many suggestions for accommodations are already built into the curriculum.

Moreover, the curriculum has been written in a coherent manner and is horizontally and vertically connected. This means that several mathematics ideas and concepts are purposefully introduced in a particular sequence and over a period of time. Therefore, the curriculum should be presented in order, without omitting any session. The following charts below provide a visual of the spiraling of major concepts for grade 5. The darkened dots appear as sessions within units having another major focus.

RATIONAL NUMBERS

1	2	3	4	5	6	7	8
19	12	19	17	14	17	26	11
5.OA.A 5.NBT.A 5.NBT.B	5.MD.C	5.NF.A 5.MD.B	5.NBT.B	5.OA.B 5.G.A	5.NBT.A 5.NBT.B	5.NF.B 5.NBT.B 5.MD.A	5.G.A 5.G.B

Unit: The more pronounced Units are primarily focused on the concept heading

Session: Darkened sessions in the subdued Units also focus on the concept heading

Standards: CCSS align closely with MLS. See the crosswalks for correlation

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[1] http://assets.pearsonschool.com/asset_mgr/current/201021/PEAR_ResSum_InvMath_LoRes.pdf

MULTIPLICATION AND DIVISION

1	2	3	4	5	6	7	8
19	12	19	17	14	17	26	11
5.OA.A 5.NBT.A 5.NBT.B	5.MD.C	5.NF.A 5.MD.B	5.NBT.B	5.OA.B 5.G.A	5.NBT.A 5.NBT.B	5.NF.B 5.NBT.B 5.MD.A	5.G.A, B

GEOMETRY AND MEASUREMENT

1	2	3	4	5	6	7	8
19	12	19	17	14	17	26	11
5.OA.A 5.NBT.A 5.NBT.B	5.MD.C	5.NF.A 5.MD.B	5.NBT.B	5.OA.B 5.G.A	5.NBT.A 5.NBT.B	5.NF.B 5.NBT.B 5.MD.A	5.G.A, B

ANALYZING PATTERNS AND RULES

1	2	3	4	5	6	7	8
19	12	19	17	14	17	26	11
5.OA.A 5.NBT.A 5.NBT.B	5.MD.C	5.NF.A 5.MD.B	5.NBT.B	5.OA.B 5.G.A	5.NBT.A 5.NBT.B	5.NF.B 5.NBT.B 5.MD.A	5.G.A, B

The HSD approach to assessing student learning is a comprehensive, carefully woven one that makes use of multiple sources of data: student written work, written assessments, and informal and formal observation of student behaviors and interactions. These multiple sources of data allow for a more in-depth portrait of each student's understandings of and proficiencies with key mathematical concepts, helping teachers provide more targeted instructional support. Assessments are tied to Unit Benchmarks

that set clear expectations for what students should know and be able to do. These assessments include Embedded Assessments, Quizzes, and Assessment Checklists. Embedded Assessments in each curriculum unit are written activities that provide information on students' progress toward the Benchmarks. Starting in Grade 1, students encounter a Quiz every 5 to 10 sessions. These assessments have the dual purpose of providing evidence of students' progress towards meeting the Benchmarks and offering students exposure to the types assessment items that they are likely to encounter on the Missouri Assessment Program Grade Level Assessments. Finally, some Benchmarks are best assessed by observing students as they are actively engaged in doing mathematics. Because younger students are learning how to communicate their understanding through reading problems and writing responses, Assessment Checklists are used more often in Kindergarten and Grade 1 than in Grades 2–5.

Additional components that are germane to successful implementation of the curriculum include some combination of these five parts on a daily basis: Activity, Discussion, Math Workshop, Assessment Activity, and Session Follow-Up.

ACTIVITY: An Activity is where mathematical ideas are introduced and investigated. Activities are organized as work for the whole class, pairs, small groups, or individuals. Many activities are available as digital presentations, some of which include digital tools. Activities typically require 30-45 minutes.

Discussion: Many sessions include a whole-class Discussion, during which students share strategies and conclusions and compare methods and results. A subset of the session's Math Focus Points helps you guide each discussion. It is essential to allow time for class discussions, giving students an opportunity to articulate their own ideas, compare solutions, and consolidate their understanding. Discussions require 15-20 minutes.

Math Workshop: Some sessions include a Math Workshop, where students choose from and complete a set of activities. Students work individually, in pairs, or in small groups for 30-45 minutes during Math Workshop.

Assessment Activity: Some sessions include an Assessment Activity, where students are assessed on their progress toward unit specific Benchmarks through both written activities and observations. The Assessment Activities range from 10-40 minutes.

Session Follow-Up: Every session has a Session Follow-Up section where details about the review and practice assignments are found. Daily Practice offers ongoing review of materials from previous units or practice of content in the current unit. These practice activities can be completed in class or for homework. Homework offers practice with the content of the unit, review of previous content, or preparation for an upcoming activity.

COURSE TITLE: Investigations in Number, Data and Space

GRADE LEVEL: 5th Grade

CONTENT AREA: Mathematics

Course Description:

Students use arrays and number puzzles to learn about factors, multiples, and other properties of numbers. They solve equations using order of operations. Students develop a number of strategies for solving 2-digit by 2-digit multiplication problems, including breaking numbers apart, solving an equivalent problem, and solving related problems. Students study the volume of rectangular prisms by looking at patterns of boxes and by building rectangular prisms from connecting cubes. They use strategies and volume formulas for finding the volume of any rectangular prism. Students measure the volume of a small rectangular prism, using cubic centimeters. Students use different-sized rectangles to represent fractions and find fraction equivalents. They use fraction equivalents and the relationships of fractions to landmarks such as 1⁄2 and 1 to compare and order fractions. Students use rotation on a clock, rectangles, and the number line to represent and visualize addition and subtraction of fractions. Students review and practice strategies for multiplication, including studying and learning the U.S. standard algorithm. Students refine various strategies for solving division problems with up to 4-digit dividends and 2-digit divisors, using clear and concise notation. They interpret the meaning of points on a coordinate grid and the shape of the graph in terms of the situation. Students develop and compare rules for numerical patterns generated when the area or perimeter of a rectangle is changing in regular ways. They use tables, coordinate graphs, and equations to model the mathematics of these situations. Students use their understanding of fractions and the number system to compare decimals to the thousandths. They add and subtract numbers that include decimals in a variety of contexts and consider how the strategies they use for addition and subtracting of whole numbers apply to adding or subtracting quantities that involve decimals. Students extend their understanding of multiplication and division to multiplication and division of fractions. They use reasoning, contexts, and representations, including fraction strips and arrays, to multiply fractions, and to solve division of fractions problems involving a whole number and unit fraction. Students use reasoning, contexts, and representations to solve multiplication and division problems with decimals to hundredths. They solve problems multiplying and dividing 0.1 and 0.01 by whole numbers and explain the patterns (and reasoning) of the placement of the decimals in these problems. They also use multiplication and division of decimals to solve problems involving conversion of measurements. Students classify polygons by looking at attributes, including number of sides, length of sides, and sizes of angles. They classify 2-D shapes in a hierarchy based on the properties of these shapes. Students build sequences of related polygons to further study area and perimeter. This includes analyzing patterns and relationships they see when side lengths are changed. Some side lengths include fractions and decimals, providing more practice with operations with rational numbers.

Course Rationale:

Investigations in Number, Data, and Space is a K–5 mathematics curriculum designed to engage students in making sense of mathematical ideas. The curriculum is designed to: support students to make sense of mathematics and learn that they can be mathematical thinkers; focus on computational fluency with whole numbers as a major goal of the elementary grades; provide substantive work in important areas of mathematics—rational numbers, geometry, measurement, data, and early algebra—and the connections among them; emphasize reasoning about mathematical ideas; communicate mathematics content and pedagogy to teachers; and engage the range of learners in understanding mathematics.

Course Scope and Sequence		
Unit 1: MULTIPLICATION AND DIVISION 1 (Approx. 19 days)	Unit 2: 3-D GEOMETRY AND MEASUREMENT (Approx. 12 days)	Unit 3: RATIONAL NUMBERS 1: ADDITION AND SUBTRACTION (Approx. 19 days)
Unit 4: MULTIPLICATION AND DIVISION 2 (Approx. 17 days)	Unit 5: ANALYZING PATTERNS AND RULES (Approx. 14 days)	Unit 6: RATIONAL NUMBERS 1: ADDITION AND SUBTRACTION (Approx. 17 days)
Unit 7: RATIONAL NUMBERS 3: MULTIPLICATION AND DIVISION (Approx. 18 days)	Unit 8: 2-D GEOMETRY AND MEASUREMENT (Approx. 10 days)	

Essential Terminology/Vocabulary

multiplication, division, factor, product, array, dimensions, unmarked array, multiple, even number, odd number, prime number, composite number, square number, order of operations, dividend, divisor, quotient, remainder, three-dimensional (3-D), rectangular prism, solid, volume, dimensions, formula, cubic feet, cubic inches, fraction, decimal, equivalent, common denominator, graph, line graph, coordinate graph, axis, x-axis, y-axis, x-coordinate, y-coordinate, ordered pair, area, perimeter, decimal, equivalent, tenths, hundredths, thousandths, ten thousandths, place value, attribute, property, acute triangle, obtuse triangle, right triangle, equilateral triangle, scalene triangle, isosceles triangle, quadrilateral, parallel, trapezoid, parallelogram, rectangle, rhombus, square, perimeter, area, dimension.

Unit Objectives:

Unit 1: MULTIPLICATION AND DIVISION 1 (Approx. 19 days)
- Solve 2-digit by 2-digit multiplication problems efficiently.
- Solve division problems with 1-digit and 2-digit divisors.
- Use the order of operations to solve computation problems.

Unit 2: 3-D GEOMETRY AND MEASUREMENT (Approx. 12 days)
- Find the volume of rectangular prisms, including the use of volume formulas.
- Find the volume of a solid composed of two rectangular prisms.
- Use standard units to measure volume.

Unit 3: RATIONAL NUMBERS 1: ADDITION AND SUBTRACTION (Approx. 19 days)
- Find equivalents and compare fractions.
- Adding and subtracting fractions.
- Adding and subtracting mixed numbers.

Unit 4: MULTIPLICATION AND DIVISION 2 (Approx. 17 days)
- Solving multiplication problems fluently.
- Solving division problems efficiently.
- Using the operations

Unit 5: ANALYZING PATTERNS AND RULES (Approx. 14 days)
- Reading and constructing coordinate graphs.
- Modeling situations with mathematics: Graphs, ordered pairs, tables, and symbolic notation
- Analyzing and comparing mathematical patterns and relationships

Unit 6: RATIONAL NUMBERS 2: ADDITION AND SUBTRACTION (Approx. 17 days)
- Understanding the meaning of decimals
- Comparing decimals
- Adding and subtracting decimals

Unit 7: RATIONAL NUMBERS 3: MULTIPLICATION AND DIVISION (Approx. 26 days)
- Multiplying and dividing fractions, mixed numbers, and whole numbers
- Interpreting fractions as division
- Multiplying with decimals
- Dividing with decimals
- Converting measurements

Unit 8: 2-D GEOMETRY AND MEASUREMENT (Approx. 10 days)
- Classifying two-dimensional figures
- Analyzing numerical patterns in the perimeters and areas of related rectangles

Approved Course Materials and Resources:

Investigations in Number, Data, and Space 3rd Edition
Pearson Education, Inc.
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