Pequannock Township School District Curriculum Syllabus

Mathematics Grade 4

Course Description:

In this fourth grade mathematics course, students will gain a deep understanding and strong foundation in mathematics. They will develop number sense while also gaining fluency in multiplication and division. Students' understanding of place value will deepen as they explore methods of adding and subtracting numbers up to 100,000, comparing and ordering numbers as well as relating place value concepts to multiplication and division of larger numbers. As students study multiplication and division, a strong emphasis will be placed on understanding and finding factors and multiples. Such concepts will prove helpful to students as they later learn to add and subtract fractions. Topics such as fractions, decimals, measurement, and geometry will also be understood at a higher level than previous years. Students will extend their knowledge of fractions by moving beyond the pictorial representation to a more abstract level. Newer concepts such as equivalent fractions, adding and subtracting like and unlike fractions and converting mixed numbers to improper fractions and improper fractions to mixed numbers will be studied within this course. Students will also begin to make connections between fractions and decimals through models and number lines. Measurement concepts such as making conversions between the units of measures of length, weight and time will also be studied. Concepts such as properties of squares and rectangles, angles and finding area and perimeter will also be explored in the geometry unit. Students will utilize problem solving and 21st century skills throughout this course to keep mathematics relevant to students' real world experiences.

Course Proficiencies:

The following is a list of proficiencies that describe what students are expected to know and be able to do as a result of successfully completing this course. The following proficiencies are the basis of the assessment of student achievement. The learner will demonstrate mastery of:

Operations & Algebraic Thinking

1. Use the four operations with whole numbers to solve problems.
   4.OA.A.1, 4.OA.A.2, 4.OA.A.3
2. Gain familiarity with factors and multiples.
   4.OA.B.4
3. Generate and analyze patterns.
   4.OA.C.5

Number & Operations in Base Ten

4. Generalize place value understanding for multi-digit whole numbers.
   4.NBT.A.1, 4.NBT.A.2, NBT.A.3
5. Use place value understanding and properties of operations to perform multi-digit arithmetic.
   4.NBT.B.4, 4.NBT.B.5, 4.NBT.B.6

Number & Operations -- Fractions
6. Extend understanding of fraction equivalence and ordering.
   4.NF.A.1, 4.NF.A.2
7. Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. *4.NF.B.3, 4.NF.B.3a-d, 4.NF.B.4, 4.NF.B.4.A, 4.NF.B.4.B, 4.NF.B.4.C*
8. Understand decimal notation for fractions, and compare decimal fractions.
   4.NF.C.5, 4.NF.C.6, 4.NF.C.7

Measurement & Data
9. Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
   4.MD.A.1, 4.MD.A.2, 4.MD.A.3
10. Represent and interpret data.
    4.MD.B.4
11. Understand concepts of angle and measure angles.
    4.MD.C.5, 4.MD.C.5.A, 4.MD.C.5B, 4.MD.C.6, 4.MD.C.7

Geometry
12. Draw and identify lines and angles, and classify shapes by properties of their lines and angles.
    4.G.A.1, 4.G.A.2, 4.G.A.3

Standards for Mathematical Practice
1. Make sense of problems and persevere in solving them. *SMP1*
2. Reason abstractly and quantitatively. *SMP2*
3. Construct viable arguments and critique the reasoning of others. *SMP3*
4. Model with mathematics. *SMP4*
5. Use appropriate tools strategically. *SMP5*
6. Attend to precision. *SMP6*
7. Look for and make use of structure. *SMP7*
8. Look for and express regularity in repeated reasoning. *SMP8*

Scope and Sequence

Unit 1: Place Value and Introduction to Multiplication & Division (Trimester 1)

This unit is divided into 3 major concepts: place value and beginning concepts of multiplication and division. Students learned in earlier grades to represent numbers up to

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10,000 in word form, standard form and expanded form and to recognize the value of each digit in a number. In this unit, students will build on these previously learned concepts and extend their learning to 5-digit numbers. Skills related to place-value that will be covered within this unit are comparing and ordering larger numbers, identifying patterns and finding the rule to continue a pattern. In this unit, students will be introduced to factors, multiples, least common multiples and greatest common factors. Then, they are introduced to prime and composite numbers.

Unit 2: Multiplication and Division (Trimester 1)

They will learn how to multiply and divide numbers with and without regrouping. By the end of this unit, students should be able to multiply and divide using the vertical form. Students will also be encouraged to use vocabulary such as *product, quotient and remainder* as they describe solutions to division problems. The second and third part of this unit will cover introductory multiplication and division. In the second part of this unit, students will extend their knowledge of multiplication to three multi-digit multiplication situations: mental multiplication, multiplying without regrouping and multiplying with regrouping. Students will also make use of place value concepts to help them multiply in vertical form. The strategies learned in this unit will also be applied to real-world problems involving multiplication. In the last part of this unit, students will extend their knowledge of division to situations with and without remainders. Students will be aware that the dividend doesn't always divide exactly into equal groups and can sometimes leave a remainder. Students will also learn how to apply division strategies to 2-digit numbers. The vertical division form is used to divide a two-digit number by finding and subtracting partial products. Like multiplication, students will also connect place value concepts and regrouping to division.

Unit 3: Fractions and Decimals (Trimester 2)

This unit is composed of two extensive topics: fractional concepts and decimals. The introductory lessons presented in this unit will help students develop a deeper understanding of the meanings and uses of fractions, such as representing parts of a whole, parts of a set, and points or distances on a number line. In previous years, students learned about the pictorial representation of fractions to illustrate real-world problems. In this unit, students will move beyond the pictorial representation to a more abstract level of fractions.
    New and extended concepts such as equivalent fractions, adding and subtracting like and unlike fractions with and without renaming and converting mixed numbers to improper fractions and improper fractions to mixed numbers will be taught within this unit. Students will also use their knowledge of finding common factors and multiples as they add and subtract fractions with unlike denominators. The last half of this unit will emphasize decimals as an extension of the base-ten system. Students will learn to read, write and round decimals to tenths and hundredths. Students will also apply their knowledge of equivalent fractions and decimals through models and number lines.

Unit 4: Measurement (Trimesters 2 and 3)

In this unit, students will become proficient in conversions between the units of measures of length, weight and time. Students will use bar models to solve one-step and two-step real-world problems. Drawing the various bar models allows students to think about how the given information in a problem is related. This understanding will lead students to eventually find a solution to any one-step or two-step problem.

Unit 5: Geometry (Trimester 3)

This unit is divided into 3 major topics: angles, properties of squares and rectangles, and finding area and perimeter of squares and rectangles. In the first part of this unit, students will learn that angles can be seen everywhere around them. Angles are formed when two rays and sides of a figure meet. Students will learn how to estimate angle measures, measure angles and draw angles with a protractor. In the second half of this unit, students will learn the properties of squares and rectangles. They will apply their knowledge of angles and perpendicular and parallel line segments to identify and define squares and rectangles. A square has 4 sides of equal length and four right angles. The opposite sides of a square are parallel. A rectangle has four sides and four right angles. The opposite sides of a rectangle have the same length. The opposite sides of a rectangle are also parallel. A square is a subset of a rectangle which means that all squares are rectangles, but not all rectangles are squares. In the third and final part of this unit, students will learn to find the area and perimeter of figures using formulas. Area is the amount of surface covered by a figure. Perimeter is the distance around a figure. In earlier grades, students learned to add the lengths of all sides to find the perimeter of a figure. In this unit, they will extend this skill to composite figures.

Unit Plan 6: Adding and Subtracting Decimals (If time permits)

In this unit, students will learn to add and subtract decimals up to two places. They will learn that the algorithms for adding and subtracting decimals are the same as for whole numbers. Students should take care to line up the decimal points correctly so that all the other digits in the numbers will be in the correct place. Students will also extend their knowledge of decimals to drawing bar models for real-world problems involving decimals. Students will also solve two-step real-world decimal problems. In today's world, students need to be proficient with adding and subtracting decimals as they relate to money, measurement and fractions. These skills will help students solve real-world problems independently.

Assessments

Evaluation of student achievement in this course will be based on the following:

a. Observational data collected by teachers as students are learning
b. Formative assessments given by teachers to gauge progress toward each standard
c. Math standards-based report card rubrics
d. Districtwide Trimester math assessments

Curriculum Resources

Instructional Resources:
Math in Focus: Grades Three and Four
Number Talks: Whole Number Computation, Grades K-5
Math in Practice: Teaching Fourth-Grade Math
Math in Practice: A Guide for Teachers

Additional Technology Resources:
NC Lessons for Learning: http://tools4ncteachers.com/fourth-grade/
Georgia Lessons for Grade 4: https://www.georgiastandards.org/Georgia-Standards/Pages/Math-K-5.aspx
Illustrative Mathematics: www.illustrativemathematics.org

Home and School Connection
The following are suggestions and/or resources that will help parents support their children:
- Educational games:
  - https://www.abcya.com/grades/4/numbers
  - http://www.sheppardsoftware.com/math.htm
- Tutorials:
  - Kahn Academy (how-to videos and practice problems): https://www.khanacademy.org/math/cc-fourth-grade-math
  - Learnzillion (how-to videos, search by topic): https://learnzillion.com/resources/99913-math-instructional-videos/
- Other parent resources:
  - YouCubed parent resources: https://www.youcubed.org/resource/parent-resources/
  - Table Talk Math parent resources: https://www.tabletalkmath.com/resources.html