

**HADDONFIELD PUBLIC SCHOOLS**  
**Mathematics Areas of Focus: Grade Five**

**New Jersey Core Curriculum Content Standard 4.1 Mathematics**

**All students will develop number sense and will perform standard numerical operations and estimations on all types of numbers in a variety of ways.**

**4.1.5A Number Sense:**

Number sense is an intuitive feel for numbers and a common sense approach to using them. It is a comfort with what numbers represent that comes from investigating their characteristics and using them in diverse situations. It involves an understanding of how different types of numbers, such as fractions and decimals, are related to each other, and how each can best be used to describe a particular situation. It subsumes the more traditional category of school mathematics curriculum called numeration and thus includes the important concepts of place value, number base, magnitude, and approximation and estimation.

**Areas of Focus:**

- Use real life experiences, physical materials, and technology to construct meanings for numbers
- Recognize the decimal nature of the U.S. currency and computer with money
- Demonstrate a sense of the relative magnitudes of numbers
- Use whole numbers, fractions, and decimals to represent equivalent forms of the same number
- Develop and apply number theory concepts in problem solving situations: Primes, factors, and multiples
- Compare and order numbers

**4.1.5B Numerical Operations**

Numerical operations are an essential part of the mathematics curriculum, especially in the elementary grades. Students must be able to select and apply various computational methods, including mental math, pencil and paper techniques, and the use of calculators. Students must understand how to add, subtract, multiply, and divide whole numbers, fractions, decimals, and other kinds of numbers. With the availability of calculators that perform these operations quickly and accurately, the instructional emphasis now is on the understanding the meanings and uses of these operations, and on estimation and mental skills, rather than solely on the development of paper and pencil proficiency.

**Areas of Focus:**

- Recognize the appropriate use of each arithmetic operation in problem situations
- Construct, use, and explain procedures for performing addition and subtraction with fractions and decimals with: Pencil and paper, mental math, calculator.
- Use an efficient and accurate pencil and paper procedure for division of a 3-digit number by a 2-digit number
- Check the reasonableness of results of computations
- Understand and use the various relationships among operations and properties of operations

**4.1.5C Estimation**

Estimation is a process that is used constantly by mathematically capable adults, and one that can be easily mastered by children. It involves an educated guess about a quantity or an intelligent prediction of the outcome of a computation. The growing use of calculators makes it more important than ever that students know when a computed answer is reasonable; the best way to make that determination is through the use of strong estimation skills. Equally important is an awareness of the many situations in which an approximate answer is as good as, or even preferable to, an exact one. Students can learn to make these judgments and use mathematics more powerfully as a result.

**Areas of Focus:**

- Determine the reasonableness of an answer by estimating the results of operations
- Determine whether a given estimate is an overestimate or an underestimate

**New Jersey Core Curriculum Content Standard 4.2 Geometry and Measurement**

**All students will develop spatial sense and the ability to use geometric properties, relationships, and measurement to model, describe and analyze phenomena.**

**4.2.5 A Geometric Properties**

This includes identifying, describing and classifying standard geometric objects, describing and comparing properties of geometric objects, making conjectures concerning them, and using reasoning and proof to verify or refute conjectures and theorems. Also included here are such concepts as symmetry, congruence, and similarity.

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Areas of Focus:

- Understanding and apply concepts involving lines and angles: notation for line, ray angle, line segment; properties of parallel, perpendicular, and intersecting lines sum of the measures of interior angles of a triangle is 180
- Identify, describe, compare, and classify polygons: Triangles by angles and sides; Quadrilaterals, including squares, rectangles, parallelograms, trapezoids, rhombi; Polygons by number of sides; Equilateral, equiangular, regular; All points equidistant from a given point from a circle.
- Identify similar figures
- Understand and apply the concepts of congruence and symmetry (line and rotational)

**4.2.5 B Transforming Shapes**

Shape and area can be conserved during mathematics transformations.

Areas of Focus:

- Use a translation, a reflection, or a rotation to map one figure onto another congruent figure
- Recognize, identify, and describe geometric relationships and properties as they exist in nature, art, and other real-world settings

**4.2.5 C Coordinate Geometry**

Coordinate geometry provides an important connection between geometry and algebra. It facilitates the visualization of algebraic relationships, as well as an analytical understanding of geometry.

Areas of Focus:

- Create geometric shapes with specified properties in the first quadrant on a coordinate grid

**4.2.5 D Units of Measurement**

Measurement helps describe our world using numbers. An understanding of how we attach numbers to real-world phenomena, familiarity with common measurement units, and a practical knowledge of measurement tools and techniques are critical for students' understanding of the world around them.

Areas of Focus:

- Select and use appropriate units to measure angles and area
- Convert measurement units within a system (e.g. 3 feet = inches)
- Know approximate equivalents between the standard and metric systems
- Use measurement and estimates to describe and compare phenomena

**4.2.5 E Measuring Geometric Objects**

This area focuses on applying the knowledge and understandings of units of measurement in order to actually perform measurement. While students will eventually apply formulas, it is important they develop and apply strategies that derive from their understanding of the attributes. In addition to measuring objects directly, students apply indirect measurement skills, using, for example, similar triangles and trigonometry.

Areas of Focus:

- Use a protractor to measure angles
- Develop and apply strategies and formula for finding perimeter and area: Square; Rectangle
- Recognize that rectangles with the same perimeter do not necessarily have the same area and vice versa
- Develop informal ways of approximating the measures of familiar objects

**New Jersey Core Curriculum Content Standard 4.3 Patterns and Algebra**

**All students will represent and analyze relationships among variable quantities and solve problems involving patterns, functions, and algebraic concerns and processes.**

**4.3.5 A Patterns**

Algebra provides the language through which we communicate the patterns in mathematics. From the earliest age, students should be encouraged to investigate the patterns they find in numbers, shapes and expressions, and by doing so, to make mathematical discoveries. They should have opportunities to analyze, extend, and create a variety of patterns and to use pattern-based thinking to understand and represent mathematical and other real-world phenomena.

Areas of Focus:

- Recognize, describe, extend, and create patterns involving whole numbers: Descriptions using tables, verbal rules, simple equations, and graphs

**4.3.5 B Functions and Relationships**

The function concept is one of the most fundamental unifying ideas of modern mathematics. Students begin their study of

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functions in the primary grades, as they observe and study patterns. As students grow and their ability to abstract matures, students form rules, display information in a table or chart, and write equations which express the relationships they have observed. In high school, they use the more formal language of algebra to describe these relationships.

Areas of Focus:

- Describe arithmetic operations as functions, including combining operations and reversing them
- Graph points satisfying a function from T-charts, from verbal rules, and from simple equations

**4.3.5 C Modeling**

Algebra is used to model real situations and answer questions about them. This use of algebra requires the ability to represent data in tables, pictures, graphs, equations or inequalities, and rules. Modeling ranges from writing simply number sentences to help solve story problems in the primary grades to using functions to describe the relationship between two variables, such as the height of a pitched ball over time. Modeling also includes some of the conceptual building blocks of calculus, such as how qualities change over time and what happens in the long run (limits).

Areas of Focus:

- Use number sentences to model situations
- Draw freehand sketches of graphs that model real phenomena and use such graphs to predict and interpret events

**4.3.5 D Procedures**

Techniques for manipulating algebraic expressions – procedures – remain important, especially for student who may continue their study of mathematics in a calculus program. Utilization of algebraic procedures includes understanding and applying properties of numbers and operations, using symbols and variables appropriately, working with expressions, equations, and inequalities, and solving equations in inequalities.

Areas Focus:

- Solve simply linear equations with manipulatives and informally: Whole-number coefficients only, answers also while numbers; Variable on one side of equation

**New Jersey Core Curriculum Content Standard 4.4 Data Analysis, Probability and Discrete Mathematics**  
**All students will develop an understanding of the concepts and techniques of data analysis, probability, and discrete mathematics, and will use them to model situations, solve problems, and analyze and draw appropriate inferences from data.**

**4.4.5 A Data Analysis**

In today's information based world, students need to be able to read, understand, and interpret data in order to make informed decisions. In the early grades, students should be involved in collecting and organizing data, and in presenting it using tables, charts, and graphs. As they progress, they should gather data using sampling, and should increasingly be expected to analyze and make inference from data, as well as to analyze data and inference made by others.

Areas of Focus:

- Read, interpret, select, construct, analyze, generate questions about, and draw inferences from displays of data: Bar graph, line graph, circle graph, tables; range, median and mean
- Respond to questions about data and generate their own questions and hypotheses

**4.4.5 B Probability**

Students need to understand the fundamental concepts of probability so that they can interpret weather forecasts, avoid unfair games of chance, and make informed decisions about medical treatments whose success rate is provided in terms of percentages. They should regularly be engaged in predicting and determining probabilities, often based on experiments, but eventually based on theoretical discussion of probability that make use of systemic counting strategies.

Areas of Focus:

- Determine probabilities of events
- Determine probability using intuitive, experimental, and theoretical methods

**4.4.5 C Discrete Mathematics – Systematic Listing and Counting**

Development of strategies for listing and counting can progress through all grade levels, with middle and high school students using the strategies to solve problems in probability. Primary students, for example, might find all outfits that can be worn using two coats and three hats.

Areas of Focus:

- Solve counting problems and justify that all possibilities have been enumerated without duplications: Organized lists, charts, tree diagrams, tables

**4.4.5 D Discrete Mathematics – Systematic Listing and Counting**

Vertex-edge graphs consisting of dots and lines joining them can be used to represent and solve problems based on real-world situations. Students should learn to follow and devise lists of instructions, called "algorithms," and use algorithmic thinking to find

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the best solution to problems like those involving vertex-edge graphs, but also to solve other problems.

Areas of Focus:

- Devise strategies for winning simple games and express those strategies as a set of directions

**New Jersey Core Curriculum Content Standard 4.5 Data Mathematical Processes**

**All students will use mathematical processes of problem solving, communication, connections, reasoning, representations, and technology to solve problems and communicate mathematical ideas.**

**4.5 A Problem Solving**

Problem posing and problem solving involve examining situations that arise in mathematics and other disciplines and in common experiences, describing these situations mathematically, formulating appropriate mathematics questions, and using a variety of strategies to find solution. Though problem solving, students experience the power and usefulness of mathematics. Problem solving is interwoven throughout the grades to provide a context for learning and applying mathematical ideas.

Areas of Focus:

- Solve problems that arise in mathematics and in other contexts
- Select and apply a variety of appropriate problem solving strategies to solve a problem
- Distinguish relevant from irrelevant information and identify missing information

**4.5 B Communication**

Communication of mathematical ideas involves students' sharing their mathematical understandings in oral and written form with their classmates, teachers, and parents. Such communication helps students clarify and solidify their understanding of mathematical and develop confidence in them as learners. It also enables teachers to better monitor student progress.

Areas of Focus:

- Use communication to organize and clarify mathematical thinking: Reading and writing; Discussion, listening, and questioning
- Communicate mathematical thinking coherently and clearly to peers, teachers, and others, both orally and in writing

**4.5 C Connections**

Making connections involves seeing relationships between different topics, and drawing on those relationships in future study. This applies within mathematics, so that students can translate readily between fractions and decimals or between algebra and geometry to other content areas so that students understand how mathematics is used in the sciences, the social sciences, and the arts.

Areas of Focus:

- Apply mathematics in practical situations and in other disciplines

**4.5 D Reasoning**

Mathematical reasoning is the critical skill that enables a student to make use of all other mathematical skills. With the development of mathematical reasoning, students recognize that mathematics makes sense and can be understood. They learn how to evaluate situations, select problem-solving strategies, draw logical conclusions, develop and describe solutions, and recognize how those solutions can be applied.

Areas of Focus

- Use reasoning to support their mathematical conclusions and problem solutions
- Rely on reason, rather than answer keys, teachers, or peers, to check the correctness of their problem solutions

**4.5 E Representations**

Representations refers to the use of physical objects, drawing, charts, graphs, and symbols to represent mathematical concepts and problem situations. By using various representations, students will be better able to communicate their thinking and solve problems. Using multiple representations will enrich the problem solver with alternative perspectives on the problem.

Areas of Focus:

- Create and use representations to organize, record, and communicate mathematical ideas

**4.5 F Technology**

Calculators and computers need to be used along with other mathematical tools by students in both instructional and assessment activities. These tools should be used, not to replace mental math and paper and pencil computational skills, but to enhance understanding of mathematics and the power to use mathematics. Students should explore both new and familiar concepts with calculators and computers and should also become proficient in using technology as it is used by adults (e.g. for assistance in solving real-world problems).

Areas of Focus:

- Use calculators as problem-solving tools

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**Secure Skills by Trimester**

**1<sup>st</sup> Trimester**

- Use a divisibility test to determine if a number is divisible by another number
- Identify prime and composite numbers
- Understand how square numbers and their square roots are related.
- Draw arrays to model multiplication.
- Know multiplication facts
- Identify even and odd numbers
- Find the factors of numbers.
- Make magnitude estimates
- Find the product of multi-digit whole numbers and decimals.
- Identify place value in numbers to billions
- Find the sum and difference of multi-digit whole numbers and decimals
- Identify the maximum, minimum, median, mode, and mean for a data set
- Estimate the measure of an angle
- Measure an angle to within 2°
- Identify types of angles
- Define and create tessellations
- Identify place value in numbers to billions
- Know properties of polygons
- Identify types of triangles

**2<sup>nd</sup> Trimester**

- Estimate the measure of an angle
- Measure an angle within 2 degrees
- Identify types of angles
- Identify types of triangles
- Know properties of polygons
- Define and create tessellations
- Know place value to hundredths
- Find the quotient and remainder of a whole number divided by a 1-digit whole number
- Convert between fractions and mixed numbers.
- Find equivalent fractions
- Convert between fractions, decimals, and percents
- Identify and use data landmarks
- Understand and apply scientific notation

**3<sup>rd</sup> Trimester**

- Understand and apply powers of 10
- Understand and apply the order of operations to evaluate expressions and solve number sentences
- Understand and apply exponential notation
- Add and subtract integers
- Use an algorithm to add mixed numbers
- Order and compare fractions
- Convert among fractions, decimals, and percents
- Convert between fractions and mixed or whole numbers
- Find common denominators
- Understand the concept of volume of a figure
- Plot ordered pairs on a one-quadrant coordinate grid
- Use a formula to find the area of rectangles
- Use a formula to find the area of triangles and parallelograms
- Understand the concept of area of a figure
- Identify the base and height of triangles and parallelograms

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**Resources**

- Everyday Mathematics, Homelinks, Student Journals, Game Kit, Calculators, Manipulatives

**Technology**

- Variety of software programs to enhance learning, appropriate internet resources

**Assessment**

- Units Assessments, Chapter Quizzes, Rubrics, Projects, Collaborative work, Teacher observation

**Parent Involvement**

- Dialogue and discussion are at the heart of *Everyday Mathematics*. **Family Letters** are provided at the beginning of the year, at the end of every unit, and with selected Home Links to establish a partnership between home and school, while explaining upcoming content and activities.