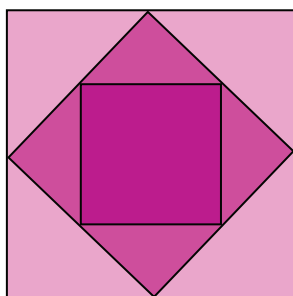


Harford County Public Schools

Meeting the Maryland State Department Voluntary State Curriculum Standards for Mathematics



Fourth Grade

Welcome to fourth grade! In addition to extending their knowledge about numbers and the many ways numbers can be expressed, fourth grade students deepen their understanding of geometric figures, algebraic thinking, and collecting and interpreting data. Fourth grade students also learn about the role of mathematical properties and methods for explaining and justifying mathematical thinking.

Jacqueline C. Haas, Ed.D.,
Superintendent

Fourth Grade Mathematics

Algebra, Patterns and Functions

Fourth grade students will demonstrate an understanding of how patterns, relationships, and functions are connected to the real world. Fourth graders will investigate and model relationships among quantities and apply this knowledge in real world situations.

Fourth grade learning outcomes include:

- Identify, describe, extend, and create numeric patterns by representing and analyzing numeric patterns in a variety of ways, including: skip counting by multiples of three, four, five, six, seven, and nine beginning with any whole number, create a function table using the operations + and - to solve real world problems, complete a function table using +, -, x, or \div , and describe the relationship that generates a rule.
- Identify, copy, describe, create, and extend non-numeric patterns such as growing patterns and repeating patterns by generating a rule for the next level of a growing pattern, generating a rule for a repeating pattern, and creating a non-numeric growing pattern or repeating pattern.
- Identify, write, and solve equations, expressions and inequalities by representing relationships using relational symbols ($<$, $>$, $=$) and operational symbols (+, -, \times , \div) on either side. Students will also find the unknown in an equation using +, -, \times , \div as well as using a number line to represent mixed numbers, proper fractions and decimals.

Geometry

Fourth grade students will analyze and compare the characteristics and properties of two- and three-dimensional geometric shapes. They will explore ways to describe, reason, and solve problems about shape, size, position, or the motion of objects in relationship to their world.

Fourth grade learning outcomes include:

- Analyze and represent the properties of plane geometric figures by identifying properties of angles using manipulatives and pictures. Students will also identify, compare, classify, and describe angles in relationship to another angle, and describe solid figures by the number of edges, faces, or vertices.
- Identify and sketch parallel and intersecting line segments.
- Analyze congruent (similar) figures and analyze a transformation by identifying and describing the results of a translation, reflection, or rotation.

Number

Fourth grade students will continue to build a strong foundation of number sense which is paramount to mathematical thinking since all other areas of mathematics are grounded in numbers. Students will describe, represent, and apply numbers or their relationships when estimating and computing by using mental strategies, paper/pencil, or technology.

Fourth grade learning outcomes include:

- Apply knowledge of whole numbers and place value by reading, writing, and representing whole numbers to 1,000,000 using symbols, words, models, and expanded form (ex. $241 = 200 + 40 + 1$), as well as identifying, comparing, ordering, and describing the place value of a digit in a number.
- Apply knowledge of fractions of a single region, represent proper fractions of a set which has the same number of items as the denominator, and find equivalent fractions.
- Express decimals in expanded form and compare and order decimals, mixed numbers and fractions with or without using symbols.
- Apply knowledge of money by determining the change from \$100.
- Identify and use divisibility rules and identify factors and multiples.
- Add, subtract, multiply, and divide whole numbers as well as add and subtract proper fractions, mixed numbers, and decimals.

Measurement

Fourth grade students will continue to shape their understanding of the attributes, units, processes, and systems of measurement through real world contexts by applying a variety of techniques, formulas, tools, or technology for determining measurement.

Fourth grade learning outcomes include:

- Read and measure customary and metric measurement units by estimating and determining length to the nearest millimeter or $1/4$ inch and estimating and determining weight, mass, and capacity through the selection and use of appropriate tools and units.
- Apply concepts of measurement by estimating and determining perimeter and area, as well as calculating start time, elapsed time, and end time using hour and half-hour intervals.
- Calculate equivalent measurements by determining equivalent units of length (36 inches = 1 yard) and equivalent units of capacity and weight.



Statistics and Probability

Fourth grade students will discover the world of data and how it helps them be informed citizens, employees, and consumers by collecting, organizing, displaying, analyzing, and interpreting data to make decisions and predictions that are relevant to their world. They will experiment with different methods of reasoning to determine probabilities to make predictions or solve problems about events whose outcomes involve random variation.

Fourth grade learning outcomes include:

- Collect and analyze data in tables by conducting surveys and organizing and displaying data in a line plot and frequency table using a variety of categories and sets of data. Students will also interpret line plots and line graphs, and determine median, mean, mode, and range of a set of data.
- Use experimental mental methods of reasoning to determine possibilities when making predictions or solving problems about events whose outcomes involve random variation. Students will determine the probability of an event comprised of equally likely outcome and will express it in the form of a fraction.

Processes of Mathematics

Fourth grade students demonstrate the processes of mathematics by making connections and applying reasoning to solve problems and communicate their findings. Fourth grade students continually weave the interconnectedness of the different areas of mathematics and its relationship to the world.

Fourth grade learning outcomes include:

- Identify the question in a problem, make a plan to solve a problem by applying strategies, show that a problem might have multiple solutions or no solution, extend it to a new problem or situation, and use methods of proof.
- Express mathematical ideas orally and in various written and model forms (pictures, symbols, manipulatives, technology).
- Ask questions about mathematical ideas or problems and give feedback to revise mathematical thinking.

