

ACTON PUBLIC SCHOOLS

Grade Four Math Benchmarks

Strand One: Number Sense and Operations

Broad Concepts:

- Understand numbers, ways of representing numbers, relationships among numbers, and number systems.
- Understand meaning of operations and how they relate to one another.
- Compute fluently and make reasonable estimates.

Students engage in problem solving, communicating, reasoning, connecting, and representing:

Mastery Skills/Concepts (M)

- Multiplication and division facts through 12 x 12 (needs practice and review) (4.N.11)

“Working On” Skills/Concepts (W)

- Quantity to 100,000 (read/write, enumerate, compare, order, round) (4.N.1. – 4.N.2)
- Money: making change – add, subtract, multiply, and divide (up to \$100). (4.N.10)
- Expanded notation
- Fractions:
 - ~ Equivalent, mixed numbers, ordering, concept, notations, comparison. (4.N.3, 4.N.4)
 - ~ Add and subtract common fractions, like and unlike denominators; e.g., $\frac{1}{2} - \frac{1}{4}$ (4.N.17)
- Decimals: to hundredths, ordering decimals (4.N.5)
- Commutative, associative, identity properties of operations (4.N.8)
- Multi-digit addition and subtraction with up to five digits, with and without regrouping (4.N.14) W/M
- Inverse operations of addition and subtraction, multiplication and division (understanding multiplication as repeated addition, understanding division as repeated subtraction)
- Double-digit multiplication (4.N.14)
- Divide up to a three-digit whole number with a single-digit divisor (with or without remainders) (4.N.13)
- Multiples and factors, odd and even, number sequences (4.N.7)
- Estimation using a variety of strategies for quantities, measures, and computation (up to three-digit whole numbers and money up to \$1000) (4.N.16, 4.N.17)

Introductory/Exploratory Skills/Concepts (I)

- Investigate ratio and proportion.

- Investigate and develop procedures for multi-digit multiplication (up to three-digit by two-digit) and division with a two-digit divisor, with remainders.
- Investigate number theory concepts; e.g., factors, multiples, prime, square, and composite numbers.

Strand Two: Patterns, Relations, and Algebra

Broad Concepts:

- Understand patterns, relations, and functions.
- Represent and analyze mathematical situations and structures using algebraic symbols.
- Use mathematical models to represent and understand quantitative relationships.

Students engage in problem solving, communicating, reasoning, connecting, and representing:

Mastery Skills/Concepts (M)

- Inequalities with symbolism ($>$ $<$ $=$)
- Patterning and sequences (4.P.1)
- Concept of variable used to represent and solve for unknown quantities in simple equations for addition, subtraction, multiplication, and division (4.P.2, 4.P.3)
- Solve problems involving proportional relationships, including unit pricing and map interpretation (1 inch = 5 miles). (4.P.5)
- Function problems (e.g., input-output machines) (4.P.6)

“Working On” Skills/Concepts (W)

- none identified

Introductory/Exploratory Skills/Concepts (I)

- Investigate how change in one variable relates to a change in a second variable.

Strand Three: Geometry

Broad Concepts:

- Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.
- Specify locations and describe spatial relationships using coordinate geometry and other representational systems.
- Apply transformations and use symmetry to analyze mathematical situations.
- Use visualization, spatial reasoning, and geometric modeling to solve problems.

Students engage in problem solving, communicating, reasoning, connecting, and representing:

Mastery Skills/Concepts (M)

- Spatial awareness and perceptual judgment
- 2D shapes: quadrilaterals, polygons (name, recognize some attributes) (4.G.1, 4.G.2)
- 2D shapes: closed curves, circles (name, recognize some attributes)

- 3D shapes: sphere, cube, cone, triangular prism, rectangular prism, cylinder, triangular pyramid, square pyramid (name, recognize some attributes) (4.G.1, 4.G.2)
- Line symmetry in 2D shapes (4.G.8)
- Identify angles as acute, right or obtuse. (4.G.4)
- Define and differentiate among various quadrilaterals (square, rhombus, rectangle, parallelogram, and trapezoid). (4.G.3)
- Describe and draw intersecting, parallel, and perpendicular lines. (4.G.5)
- Congruence: Describe and apply flips, turns, and slides (4.G.7)
- Predict and validate the results of partitioning, folding, and combining 2D shapes. (4.G.9)
- 1D shapes: point, line, line segment, ray, angle (name, recognize some attributes)

“Working On” Skills/Concepts (W)

- Find and name locations in coordinate systems, such as maps (positive numbers only).

Introductory/Exploratory Skills/Concepts (I)

- Describe effects of transformations (e.g., rotations and reflections) on shapes.
- Investigate two-dimensional representations of three-dimensional objects.
- Investigate types of symmetry, including line and rotational.
- Multiple lines of symmetry

Strand Four: Measurement

Broad Concepts

- Understand measurable attributes of objects and the units, systems, and processes of measurement.
- Apply appropriate techniques, tools, and formulas to determine measurements.

Students engage in problem solving, communicating, reasoning, connecting, and representing:

Mastery Skills/Concepts (M)

- Ruler to 1” and 1/2”, 1/4” and 1/8”
- Time: reading and writing digital and analog, a.m. and p.m. (4.M3) and elapsed time (4.M.3)

“Working On” Skills/Concepts (W)

- Concept and use of appropriate measurement technique and/or tool: length, volume, weight, time, angle size, temperature (4.M.1)
- Perimeter and area of triangles, quadrilaterals, and simple and complex polygons (4.M.4)
- Unit conversions within a system of measurement (e.g., inches to feet, centimeters to meters) (4.M.2)
- Investigate the use of protractors and angle rulers to measure angles.
- Develop strategies for estimating perimeters and areas of irregular shapes.

- Identify common measurements of turns; e.g., 360 degrees in one full turn, 180 degrees in a half turn, and 90 degrees in a quarter turn.
- Metric units: m, cm, km

Introductory/Exploratory Skills/Concepts (I)

- Develop further the concept of area by investigating areas of regular and irregular shapes drawn on coordinate grids or dot paper or created on geoboards.
- Use concrete objects to explore volumes of rectangular prisms, and construct rectangular prisms with different dimensions that have equal volumes.
- Standard units: mi, cup, pt, qt, gal, oz, lb, ton (units, equivalents)
- Circumference
- Ruler to 1/16"

Strand Five: Data Analysis, Statistics, and Probability

Broad Concepts

- Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.
- Understand and apply basic concepts of probability.

Students engage in problem solving, communicating, reasoning, connecting, and representing:

Mastery Skills/Concepts (M)

- Concept of a graph to record data (4.D.1, 4.D.2)

“Working On” Skills/Concepts (W)

- Read, interpret, and make predictions of various forms of data: pictograph, line graph, bar graph, line plot, circle graph, tables, and tallies. (4.D.3)
- Using ordered pairs, graph, locate, identify points, and describe paths.
- Represent the possible outcomes for a simple probability situation, using a table or grid. Determine the chance of a particular outcome. (4.D.4)
- Classify outcomes as likely, unlikely, certain, or impossible by designing and conducting experiments using manipulatives. (4.D.6)
- Collect and organize data using observations, measurements, surveys, or experiments, and identify appropriate ways to display the data. (4.D.1)
- Logic: general reasoning puzzles

Introductory/Exploratory Skills/Concepts (I)

- Use of scales and intervals
- Explore the concepts of mean median, mode, maximum and minimum, and range.