| | Mathematics – Mastery Expectations Grade 6 |
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| | *Note: * = No state testing* |
| | ***Number Sense & Operations*** |
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| 6N1 | Demonstrate an understanding of positive integer exponents, in particular, when used in powers of ten. |
| 6N2 | Demonstrate an understanding of place value to billions and thousandths. |
| 6N3 | Represent and compare very large (billions) and very small (thousandths) positive numbers in various forms such as expanded notation without exponents. |
| 6N4 | Demonstrate an understanding of fractions as a ratio of whole numbers, as parts of unit wholes, as parts of a collection, and as locations on the number line. |
| 6N5 | Identify and determine common equivalent fractions, mixed numbers, decimals, and percents. |
| 6N6 | Find and position integers, fractions, mixed numbers, and decimals (both positive and negative) on the number line. |
| 6N7 | Compare and order integers (including negative integers), and positive fractions, mixed numbers, decimals, and percents. |
| 6N8 | Apply number theory concepts-including prime and composite numbers, prime factorization, greatest common factor, least common multiple, and divisibility rules for 2, 3, 4, 5, 6, 9 and 10 – to the solution of problems. |
| 6N9 | Select and use appropriate operations to solve problems involving addition, subtraction, multiplication, division, and positive integer exponents with whole numbers, and with positive fractions, mixed numbers, decimals, and percents. |
| 6N10 | Use the number line to model addition and subtraction of integers, with the exception of subtracting negative integers. |
| 6N11 | Apply the Order of Operations for expressions involving addition, subtraction, multiplication, and division with grouping symbols (+, -, x, ÷ ) |
| 6N12 | Demonstrate an understanding of the inverse relationship of addition and subtraction, and use that understanding to simplify computation and solve problems. |
| 6N13 | Accurately and efficiently add, subtract, multiply, and divide (with double-digit divisors) whole numbers and positive decimals. |
| 6N14 | Accurately and efficiently add, subtract, multiply, and divide positive fractions and mixed numbers. Simplify fractions. |
| 6N15 | Add and subtract integers, with the exception of subtracting negative integers. |
| 6N16 | Estimate results of computations with whole numbers, and with positive fractions, mixed numbers, decimals, and percents. Describe reasonableness of estimates. |
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| | ***Patterns, Relations & Algebra*** |
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| 6P1 | Analyze and determine the rules for extending symbolic, arithmetic, and geometric patterns and progressions. |
| 6P2 | Replace variables with given values and evaluate/simplify. |
| 6P3 | Use the properties of equality to solve problems, e.g., if $\Delta + 7 = 13$, then $\Delta = 13 - 7$, therefore $\Delta = 6$; if $3 \times \Delta = 15$, then $1/3 \times 3 \times \Delta = 1/3 \times 15$, therefore $\Delta = 15$. |
| 6P4 | Represent real situations and mathematical relationships with concrete models, tables, graphs, and rules in words and with symbols, e.g., input – output tables. |
| 6P5 | Solve linear equations using concrete models, tables, graphs, and paper-pencil methods. |
| 6P6 | Produce and interpret graphs that represent the relationship between two variables in everyday situations. |
| 6P7 | Identify relationships between 2 variables with a constant rate of change. Contrast these with relationships where the rate of change is not constant. |
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| | ***Geometry*** |
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| 6G1 | Identify polygons based on their properties, including types of interior angles, perpendicular or parallel sides, and congruence of sides, e.g., squares, rectangles, rhombuses, parallelograms, trapezoids, and isosceles, equilateral, and right triangles. |
| 6G2 | Identify three-dimensional shapes (e.g., cubes, prisms, spheres, cones, and pyramids) based on their properties, such as edges and faces. |
| 6G3 | Identify relationships among points, lines, and planes, e.g., intersecting, parallel, perpendicular. |
| 6G4 * | Graph points and identify coordinates of points on the Cartesian coordinate plane (all four quadrants). |
| 6G5 | Find the distance between two points on horizontal or vertical number lines. |
| 6G6 | Predict, describe, and perform transformations on two-dimensional shapes, e.g., translations, rotations, and reflections. |
| 6G7 | Identify types of symmetry, including line and rotational. |
| 6G8 | Determine if two shapes are congruent by measuring sides or a combination of sides and angles, as necessary; or by motions or series of motions. |
| 6G9 | Match three-dimensional objects and their two-dimensional representations, e.g., nets, projections, and perspective drawings. |
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| | ***Measurement*** |
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| 6M1 | Apply the concepts of area and perimeter to the solution of problems. Apply formulas where appropriate. |
| 6M2 | Identify measure, describe, classify, and construct various angles, triangles, and quadrilaterals. |
| 6M3 | Solve problems involving proportional relationships and units of measurement, e.g., same system unit conversions, scale models, maps and speed. |
| 6M4 | Find area of triangles and parallelograms. Recognize that shapes with the same number of sides but different appearances can have the same area; Develop strategies to find the area of more complex shapes. |
| 6M5 | Identify, measure, and describe circles and the relationships of the radius, diameter, circumference, and area (e.g., d = 2r, p = C/d), and use the concepts to solve problems. |
| 6M6 | Find volumes and surface areas of rectangular prisms. |
| 6M7 | Find the sum of angles in simple polygons, up to eight sides (with and w/o measuring the angles). |
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| | ***Data Analysis, Statistics and Probability*** |
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| 6D1 | Describe and compare data sets using the concepts of median, mean, mode, maximum and minimum, and range. |
| 6D2 | Construct and interpret stem and leaf plots, line plots, and circle graphs. |
| 6D3 | Use tree diagrams and other models (e.g., lists and tables) to represent possible or actual outcomes of trials. Analyze the outcomes. |
| 6D4 | Predict the probability of outcomes of simple experiments (e.g., rolling a die) and test the predictions. Use appropriate ratios between 0 and 1 to represent the probability of the outcome and associate the probability with the likelihood of the event. |