| **Required Course Numbers** | | | | | | | | | | | | | | | |
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| **Test Content Categories** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| I. Mathematics |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **A. Counting and Operations with Whole Numbers** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1. Counting |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| a. Counts and skip counts whole numbers between 0 and 1,000 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| b. Connects counting to cardinality |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2. Operations with Whole Numbers |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| a. Demonstrates understanding of representations of addition, subtraction, multiplication, and division (including objects such as manipulatives, drawings, and diagrams), and relates these representations of operations to expressions and equations |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| b. Solves mathematical and real-world problems involving the four operations, including solving problems by using properties of operations and Determine the Reasonableness of Results within the context of a given problem |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| c. Identifies properties of operations (e.g., commutative, associative, distributive) and uses them to solve abstract and real-world problems |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| d. Knows how to use basic concepts of number theory, including prime and composite numbers, factors and multiples. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **B. Place Value and Decimals** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1. Place Value and Decimals |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| a. Demonstrates a conceptual understanding of the value of the digits in a number |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| b. Compares multidigit and decimal numbers |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| c. Compares, orders, and classifies rational numbers, presented in different representations. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| d. Rounds multidigit and decimal numbers |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| e. Composes and decomposes multidigit numbers into groupings, and understands why grouping and ungrouping are helpful in performing operations on multidigit and decimal numbers |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| f. Uses drawings and objects such as manipulatives to represent place value, relating these drawings and objects to numerical equations and written descriptions |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **C. Fractions, Operations with Fractions, and Ratios** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1. Fractions and Operations with Fractions |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| b. Demonstrates understanding of equipartitioning, and that it is a building block for understanding fractions as part-whole relationships |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| c. Demonstrates understanding of fraction equivalence |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| d. Uses a variety of strategies for comparing fractions to other fractions or decimals numbers, where there are two or more numbers being compared. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| e. Performs operations such  as addition, subtraction, multiplication, and division with fractions as well as with fractions and whole numbers, understanding and using different strategies for these operations, and building intuition about how the operations work (e.g., recognizing that multiplying a whole number by a fraction that is less than one makes the product smaller) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2. Ratios, Proportions, and Percents |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| a. Understands and applies concept of ratios and unit rates to describe relationships between two quantities and solve problems. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| b. Uses proportional relationships and percents to solve ratio and percent problems |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **D. Early Equations and Expressions, Measurement, and Geometry** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1. Early Equations and Expressions |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| a. Demonstrates understanding of what it means for algebraic terms, expressions, and equations to be considered equivalent, how the equal sign is used to represent relational equivalence, and that equations maintain their equivalence status under certain algebraic manipulations |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| b. Determines whether equations are true, identifies the missing values that would make them true, solves equations using the four operations, and solves relational statements by substitution |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| c. Follows the standard order of operations (including the use of parentheses and the distributive property of multiplication over addition) and uses properties of operations to evaluate and manipulate algebraic expressions, equations, and formulas |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| d. Demonstrates awareness of different interpretations of the word “variable,” including the ideas of quantities that are unknown, which underlies understanding of solving equations, and quantities that vary, which can be connected to patterns and will support later understanding of functional relationships |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| e. Uses the less-than and greater-than relational symbols (<, >) to compare quantities |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2. Measurement |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| a. Recognizes which attributes of objects are measurable and uses common measurable attributes to compare two objects. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| b. Chooses appropriate measurement tools and units of measurement to take measurements |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| c. Calculates and estimates perimeter, area, volume, and measurements of angles in mathematical and real-world problems, including composed shapes. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| d. Knows relative sizes of the US customary units and metric units and converts units within each system. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| e. Knows how to represent and interpret data presented in various displays. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3. Geometry |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| a. Demonstrates understanding of shapes and their attributes |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| b. Demonstrates understanding of lines, line segments, rays, and angles in two-dimensional figures |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| c. Identifies and classifies two-dimensional and three-dimensional figures and classifies two-dimensional figures based on properties |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| d. Knows the components of the coordinate plane and how to graph ordered pairs on the plane |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| II. Science |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **A. Earth and Space Sciences** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1. Earth’s Place in the Universe |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| a. Motion of the Earth, Moon, Sun and stars (e.g., Earth’s rotation on its axis, Earth’s orbit around the Sun) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| b. Observable changes in the length and direction of daily shadows, the amount of daylight throughout the year and the seasonal appearance of some stars in the night sky |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2. Earth Systems |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| a. Earth Materials and Systems • Evidence of change in rock formations and fossils in rock layers  • Effects of weathering or the rate of erosion by water, ice, wind, or vegetation  • Interaction(s) of the geosphere, biosphere, hydrosphere, and/or atmosphere  • Distribution of water on Earth including the percentages of salt water and freshwater in various reservoirs  • Basic patterns of features shown on maps (e.g., mountains, volcanoes, ocean trenches)  • Local weather conditions and typical conditions expected during a season  • Climates in different regions of the world |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| b. Earth and Human Activity • Relationship between the needs of plants and animals (including humans) and the places they live  • Natural hazards (e.g., flooding, earthquakes, fire)  • Environmental impact of human activity (e.g., the use of renewable and nonrenewable energy sources)  • Use of science ideas to protect Earth’s resources and environment |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **B. Life Sciences** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1. Organisms |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| a. Structures and Processes • How plants and animals use internal and external structures for survival, growth, reproduction, and processing information |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| b. Growth and Development • Unique life cycles of plants and animals with common stages (birth, growth, reproduction, death)  • Behavior of parents and offspring that help offspring survive (e.g., forming groups)  • Traits inherited from parents versus those traits influenced by the environment  • Trait variations that help an organism to survive, find a mate, and reproduce in a particular environment |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2. Ecosystems |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| a. Interdependent Relationships and Environmental Change • Models depicting the movement of matter/energy among plants, animals, decomposers, and the environment (e.g., food webs, energy pyramids)  • Methods of seed dispersal and pollination  • Impact of environmental change on the plants and animals within an ecosystem |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| b. Matter and Energy Flow • Survival needs of plants and animals (including humans)  • Sun’s role as the original source of energy in animals’ food |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **C. Physical Sciences** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1. Matter and Interactions |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| a. Structure and Properties of Matter • Understanding that all matter consists of particles too small to be seen  • Physical properties of matter (e.g., mass, volume, color, texture, hardness)  • Identification of materials based on their properties |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| b. Physical and Chemical Changes • Changes (reversible and irreversible) resulting from heating, cooling, or mixing substances  • Understanding that the total mass of matter always stays the same when undergoing a physical or chemical change  • Determining whether the mixing of two or more substances results in a new substance |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2. Forces, Energy, and Waves |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| a. Forces and Motion • Effects of push and pull forces (balanced and unbalanced) on the motion of an object  • Using an object’s motion to predict the future motion of an object  • Electric or magnetic forces between two objects (e.g., attraction/repulsion)  • Earth’s gravitational force exerted on objects in a downward direction |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| b. Energy and Waves • Conservation of energy  • Relationship between the speed and energy of an object  • Transfer of energy from place to place by sound, light, heat, and electric currents  • Changes in energy that occur when objects collide  • Simple diagrams or models of how light, water, and sound waves behave (includes properties such as wavelength, pitch, amplitude, vibration) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |