# USD #447 Cherryvale-Thayer Schools
# MATH

**KINDERGARTEN**

**Standard 1 - Numbers and Computation**

**Benchmark - Number Sense**

1.1K1 Establishes a one-to-one correspondence with whole numbers from 0-20 using concrete objects and identifies, states, and writes the appropriate cordinal number.

1.1K2 Compares and orders whole numbers from 0-20 using concrete objects.

1.1K3 Recognizes a whole, a half, and parts of a whole using concrete objects.

1.1K4 Identifies positions as first and last.

1.1K5 Identifies pennins and dimes and states the value of the coins using money models.

1.1A1 Solves real-world problems using equivalent representations and concrete objects to compare and order whole numbers from 0-10.

**Benchmark - Number Systems and Their Properties**

1.2K1 Reads and writes whole numbers from 0-20 in numerical form.

1.2K2 Represents whole numbers from 0-20 in numerical form.

1.2K3a Counts: whole numbers from 0-20.

1.2K3b Counts: whole number from 10-0 backwards.

1.2K3c Counts: subsets of whole numbers from 0-20

1.2K4 Groups objects by 5's and by 10's.

1.2K5 Uses the concept of the zero property of addition (additive identity) with whole numbers from 0-20 and demonstrates its meaning using concrete objects.

1.2A1 Solves real-world problems with whole numbers from 0-20 using place value models.

1.2A2 Counts forwards and backwards from a specific whole number using a number line from 0-10.

**Benchmark - Estimation**

1.3K1 Determines if a group of 20 concrete objects or less has more, less, or about the same number of concrete objects as a second set of the same kind of objects.

1.3A1 Compares two randomly arranged groups of 10 concrete objects or less and states the comparison using the terms: more, less, about the same.

**USD #447 Cherryvale-Thayer Schools**
**MATH**

**Benchmark - Computation**

1.4K1 Adds and subtracts using whole numbers from 0-10 and various mathematical models.

1.4K2 Uses repeated addition (multiplication) with whole numbers to find the sum when given the number of groups (three or less) and given the same number of concrete objects in each group (five or less).

1.4K3 Uses repeated subtraction (division) with whole numbers when given the total number of concrete objects in each group to find the number of groups.

1.4A1 Solves one-step real-world addition or subtraction problems with whole numbers from 0-10 using concrete objects in various groupings and explains reasoning.

**Standard 2 - Algebra**
**Benchmark - Patterns**

2.1K1a Uses concrete objects, drawings, and other representations to work with types of patterns: A - Repeating Patterns

2.1K1b Uses concrete objects, drawings, and other representations to work with types of patterns: B - Growing (extending) patterns

2.1K2a Uses these attributes to generate patterns: A - Whole Numbers

2.1K2b Uses these attributes to generate patterns: B - Geometric shapes with one attribute change

2.1K2c Uses these attributes to generate patterns: C - Things related to daily life

2.1K3 Identifies and continues a pattern presented in various formats including numeric (list or table), visual (picture, table, or graph), verbal (oral description), and kinsesthetic (action)

2.1K4a Generates: A - Repeating patterns for the AV pattern, the AVC pattern, and the AAB pattern

2.1K4b Generates: B - Growing (extending) patterns that add 1,2,or 10 to continue the pattern.

2.1K5 Classifies and sorts concrete objects by similar attributes.

2.1A1a Generalizes the following patterns using pictorial, and/or oral descriptions including the use of concrete objects: A - Repeating patterns for the AV pattern, the ABC pattern, and the AAB pattern.

2.1A1b Generalizes the following patterns using pictorial, and/or oral descriptions including the use of concrete objects: B - Patterns using geometric shapes with one attribute change.

2.1A2 Recognizes multiple representations of the AB pattern.

2.1A3a Uses concrete objects to model a whole number pattern: A - Counting by ones.

2.1A3b Uses concrete objects to model a whole number pattern: B - Counting by twos.

2.1A3c Uses concrete objects to model a whole number pattern: C - Counting by tens.

**Benchmark - Variables, Equations, and Inequalities**

**USD #447 Cherryvale-Thayer Schools**

**MATH**

2.2K1 Finds the unknown sum using the basic facts with sums through 10 using concrete objects and pictures

2.2A1 Describes real-world problems using concrete objects and pictures and the basic facts with sums through 10.

**Benchmark - Functions**

2.3K1 Locates whole numbers from 0-20 on a number line.

2.3A1 Represents and describes mathematical relationships for whole numbers

**Benchmark - Models**

2.4K1a Knows, explains, and uses mathematical models to prepresent mathematical concepts, procedures, and relationships. Mathematical models include: A - Process models (concrete objects, pictures, number lines, unifix cubes, measurement tools, or calendars) to model computational procedures and mathematical relationships, to compare and order numerical quantities, and to represent fractional parts.

2.4K1b Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: B - Place vale models (ten frames, unifix cubes, bundles of straws, or base ten blocks) to represent numerical quantities.

2.4K1c Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: C - Fraction models (fraction strips or pattern blocks) to represent numerical quantities.

2.41Kd Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: D - Money models (base ten blocks or coins) to represent numerical quantities.

2.4K1e Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: E - Two-dimensional geometric models (geoboards, dot paper, or attribute blocks), three-dimensional geometric models (solids), and real-world objects to compare size and to model attributes of geometric shapes.

2.4K1f Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: F - Two-dimensional geometric models (spinners), three-dimensional geometric models (number cubes), and concrete objects to model probability.

2.4K1g Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mahtematical models include: G - Graphs using concrete objects, pictographs, and frequency tables to organize and display data.

2.4K2 Uses concrete objects, pictures, drawings, diagrams, or dramatizations to show the relationship between two or more things.

2.4A1a Recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: A - process models (concrete objects, pictures, number lines, unifix cubes, measurement tools, or calendars) to model computational procedures and mathematical relationships, to compare and order numerical quantities, and to model problem situations.

2.4A1b Recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: B - Place value models (ten frames,unifix cubes, bundles of straws, or base ten blocks) to represent numerical quantities.

2.4A1c Recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: C- Two-dimensional geometric models (geoboards, dot paper, or attribute blocks), three-dimensional geometric models (solids), and real-world objects to compare size and to model attributes of goemetric shapes.

2.4A1d Recognizes that various mathematical moels can be used to represent the same problem situation. Mathematical models include: D - Two-dimensional goemetirc models (spinners), three-dimensional geometric models (number cubes), and concrete objects to model probability.

2.4A1e Recognizes that various mathe mathematical models can be used to represent the same problem situation. Mathematical models include: E - Graphs using concrete objects, pictographs, and frequency tables to organize and display data.

**Standard 3 - Geometry**
**Benchmark - Geometric Figures and Their Properties**

3.1K1 Recognizes circles, squares, rectangles, triangles, and ellipses (ovals) (plane figures/two-dimensional figures).

3.1K2 Recognizes and investigates attributes of circles, squares, rectangles, triangles, and ellipses using concrete objects, drawings, and/or appropriate technology.

3.1K3 Sorts cubes, rectangular prisms, cylinders, cones, and spheres (solids/three-dimensional figures) by their attributes using concrete objects.

3.1A1 Demonstrates how several plane figures (circles, squares, rectangles, triangles, ellipses) can be combined to make a new shape.

3.1A2 Sorts by one attribute real-world geometric shapes that are representations of the solids (cubes, rectangular prisms, cylinders, cones, shperes).

3.1A3a Recognizes: A - Circles, squares, rectangles, triangles, and ellipses (plane figures) within a picture.

3.1A3b Recognizes: B - Cubes, rectangular prisms, cylinders, cones, and spheres (solids) within a picture.

**USD #447 Cherryvale-Thayer Schools**
**MATH**

**Benchmark - Measurement and Estimation**

3.2K1 Uses whole number approximations (estimations) for length using nonstandard units of measure.
3.2K2a Compares two measurements using these attributes: A - longer, shorter.
3.2K2b Compares two measurements using these attributes: B - Taller, shorter.
3.2K2c Compares two measurements using these attributes: C - Heavier, lighter.
3.2K2d Compares two measurements using these attributes: D - Hotter, colder.
3.2K3 Reads and tells time at the hour using analog and digital clocks.
3.2A1 Compares and orders concrete objects by length or weight.
3.2A2 Locates and names concrete objects that are about the same length or weight as a given concrete object.

**Benchmark - Trnasformational Geometry**

3.3K1 Describes the spatial relationship between two concrete objects using appropriate vocabulary.
3.3K2 Identifies two like objects or shapes from a set of four objects or shapes.

3.3A1 Shows two concrete objects or shapes are congruent by physically fitting one object or shape on top of the other.
3.3A2 Follows directions to move concrete objects from one location to another using appropriate vocabulary.

**Benchmark - Geometry from an Algebraic Perspective**

3.4K1 Locates and plots whole numbers from 0-20 on a horizontal number line.
3.4K2 Counts forwards and backwards from a given whole number from 0-10 on a number line.
3.4A1 Solves real-world problems involving counting whole numbers from 0-20 using a number line.

**Standard 4 - DATA**

**Benchmark - Probability**

4.1K1 Recognizes whether an event is impossible or possible.
4.1K2 Recognizes and states whether a simple event in an experiment or simulation including the use of concrete objects can have more than one outcome.
4.1A1 Conducts an experiment or simulation with a simple event and records the results in a graph using concrete objects or frequency tables (tally marks).

**Benchmark - Statistics**

4.2K1a Records numerical (quantitative) and non-numerical (qualitative) data including concrete objects, graphs, and tables using these data displays: A - Graphs using concrete objects.

**USD #447 Cherryvale-Thayer Schools**
**MATH**

| | |
|---|---|
| 4.2K1b | Records numerical (quantitative) and non-numerical (qualitative) data including concrete objects, graphs, and tables using these data displays: B - Pictographs with a whole symbol or picture representing one (no partial symbols or pictures). |
| 4.2K1c | Records numerical (quantitative) and non-numerical (qualitative) data including concrete objects, graphs, and tables using these data displays: C - Frequency tables (tally marks). |
| 4.2K2 | Collects data related to familiar everyday experiences by counting and tallying. |
| 4.2K3 | Determines the mode (most) after sorting by one attribute. |
| 4.2A1 | Communicates the results of data collection from graphs using concrete objects and frequency tables. |

USD #447 Cherryvale-Thayer Schools
MATH

**First Grade**

**Standard 1 - Number and Computation**

**Benchmark - Number Sense**

**1.1K1** Knows, explains, and represents whole numbers from 0-100 using concrete objects.

**1.1K2a** Compares and orders: A - Whole numbers from 0-100 using concrete objects.

**1.1K2b** Compares and orders: B - Fractions with like denominators (halves and fourths) using concrete objects.

**1.1K3** Recognizes a whole, a half, and a fourth and represents equal parts of a whole (halves, fourths) using concrete objects, piectures, diagrams, fraction strips, or pattern blocks.

**1.1K4** Identifies and uses ordinal numbers first (1st) through tenth (10th)

**1.1K5** Identifies coins (pennies, nickels, dimes, quarters) and currency ($1, $5, $10) and states the value of each coin and each type of currency using money models.

**1.1K6** Recognizes and counts a like group of coins (pennies, nickels, dimes).

**1.1A1** Solves real-world problems using equivalent representations and concrete objects to compare and order whole numbers from 0-50.

**1.1A2** Determines whether or not numerical values using whole numbers from 9-50 are reasonable.

**1.1A3** Demonstrates that smaller whole numbers are within larger whole numbers using whole numbers from 0-30.

**Benchmark - Number Systems and Their Proerties**

**1.2K1** Reads and writes whole numbers from 0-100 in numerical form.

**1.2K2** Represents whole numbers from 0-100 using various groupings and place value models (place value mats, hundred charts, or base ten blocks) emphasizing ones, tens, and hundreds.

**1.2K3** Counts subsets of whole numbers from 0-100 both forwards and backwards

**1.2K4** Writes in words whole numbers from 0-10.

**1.2K5** Identifies the place value of the digits in whole numbers from 0-100.

**1.2K6** Identifies any whole number from 0-30 as even or odd.

**1.2K7a** Uses the concepts of these properties with whole numbers from 0-100 and demonstrates their meaning using concrete objects: A - Commutative Property of Addition.

**1.2K7b** Uses the concepts of these properties with whole numbers from 0-100 and demonstrates their meaning using concrete objects: B - Zero Property of Addition (Additive Identity).

**1.2A1a** Solves real-world problems with whole numbers from 0-50 using place value models (place value mats, hundred charts, or base ten blocks) and the concepts of these properties to explain reasoning: A - Commutative Property of Addition.

**1.2A1b** Solves real-world problems with whole numbers from 0-50 using place value models (place value mats, hundred charts, or base ten blocks) and the concepts of these properties to explain reasoning: B - Zero Property of Addition.

**Benchmark - Estimation**

**1.3K1** Estimates whole number quantities from 0-100 using various comptational methods including mental math, paper and pencil, concrete objectgs, and appropriate technology.

**1.3K2** Estimates to check whether or not results of whole number quantities from 0-100 are reasonable.

**1.3A1** Adjusts original whole number estimate of a real-world problem using whole numbers from 0-50 based on additional information (a frame of reference).

**Benchmark - Computation**

**1.4K1** Computes with efficiency and accuracy using various computational methods including mental math, paper and pencil, concrete objects, and appropriate technology.

**1.4K2** States and uses with efficiency and accuracy basic addition facts with sums from 0-10 and corresponding subtraction facts.

**1.4K3** Skip counts by 2s, 5s, and 10s through 50.

**1.4K4** Uses repeated addition (multiplication)with whole numbers to find the sum when given the number of groups (ten or less) and given the same number of concrete objects in each group (ten or less).

**1.4K5** Uses repeated subtraction (division) with whole numbers when given the total number of concrete objects in each group to find the number of groups.

**1.4K6a** Performs and explains these computational procedures: A - Adds whole numbers with sums through 99 without regrouping using concrete objects.

**1.4K6b** Performs and explains these computational procedures: B - Subtracts two-digit whole numbers without regrouping using concrete objects.

**1.4K7** Shows that addition and subtraction are inverse operations using concrete objects.

**1.4K8** Reads and writes horizontally and vertically the same addition expression.

**1.4A1** Solves one-step real-world addition or subtraction problems with various groupings of two-digit whole numbers without regrouping.

USD #447 Cherryvale-Thayer Schools
MATH

**Standard 2 - Algebra**
**Benchmark - Patterns**

**2.1K1a** Uses concrete objects, drawings, and other representations to work with types of patterns: A - Repeating Patterns.
**2.1K1b** Uses concrete objects, drawings, and other representations to work with types of patterns: B - Growing (extending) Patterns.
**2.1K2a** Uses the following attributes to generate patterns: A - Counting numbers related to number theory.
**2.1K2b** Uses the following attributes to generate patterns: B - Whole numbers that increase.
**2.1K2c** Uses the following attributes to generate patterns: C - Geometric shapes.
**2.1K2d** Uses the following attributes to generate patterns: D - Measurements.
**2.1K2e** Uses the following attributes to generate patterns: E - the calendar.
**2.12Kf** Uses the folling atributes to generate patterns: F - Money and Time.
**2.1K2g** Uses the following attributes to generate patterns: G - Things related to daily life.

**2.1K2h** Uses the following attributes to generate patterns: H - Things related to size, shape, color, texture, or movement.
**2.1K3** Identifies and continues a pattern presented in various formates including numeric (list or table), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written.
**2.1K4a** Generates: A - Repeating patterns for the AB pattern, the ABC pattern, and the AAB pattern.
**2.1K4b** Generates: B - Growing patterns that add 1, 2, 5, or 10.
**2.1A1a** Generalizes the following patterns using p;ictorial, oral, and/or written descriptions including the use of concrete objects: A - Whole number patterns.
**2.1A1b** Generalizes the following patterns using pictorial, oral, and/or written descriptions including the use of concrete objects: B - patterns using geometric shapes.
**2.1A1c** Generalizes the following patterns using pictorial, oral, and/or written descriptions including the use of concrete objects: C - Calendar patterns.
**2.1A1d** Generalizes the following patterns using pictorial, oral, and/or written descriptions including the use of concrete objects: D - Patterns using size, shape, color, texture, or movement.
**2.1A2** Recognizes multiple representations of the same pattern.
**2.1A3a** Uses concrete objects to model a whole number pattern: A - Counting by ones.
**2.1A3b** Uses concrete objects to model a whold number pattern: B - Counting by twos.
**2.1A3c** Uses concrete objects to model a whole number pattern: C - Counting by fives.
**2.1A3d** Uses concrete objects to model a whole number pattern: D - Counting by tens.

**Benchmark - Variables, Equations, and Inequalities**

**2.2K1** Explains and uses symbold to represent unknown whole number quantities from 0-20.

**2.2K2** finds the unknown sum or difference of the basic facts using concrete objects.

**2.2K3** Describes and compares two whole numbers from 0-100 using the terms: is equal to, is less than, is greater than.

**2.2A1** Represents real-world problems using concrete objects, pictures, oral descriptions, and symbols and the basic addition and subtraction facts with one operation and one unknown.

**2.2A2** Generates and solves problem situations using the basic facts to find the unknosn sum or difference with concrete objects.

**Benchmark - Functions**

**2.3K1** Plots whole numbers from 0 through 100 on segments of a number line.

**2.3K2** States mathematical relationships between whole numbers from 0 through 50 using various methods including mental math, paper and pencil, and concrete objects.

**2.3K3** States numerical relationships for whole numbers from 0 through 50 in a horizontal or vertical function table (input/output machine, T-table).

**2.3A1** Represents and describes mathematical relationships for whole numbers from 0 through 50 using concrete objects, pictures, oral descriptions, and symbols.

**2.3A2** Generates and solves problem situations using the basic facts to find the unknown sum or difference with concrete objects.

**Benchmark - Models**

**2.4Ka** Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: A - process models (concrete objects, pictures, diagrams, number lines, unifix cubes, hundred charts, measurement tools, or calendars) to model computational procedures and mathematical relationships, to compare and order numerical quantities, and to represent fractional parts.

**2.4K1b** Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: B - place value models (place value mats, hundred charts, or base ten blocks) to compare, order, and represent numerical quantities and to model computational procedures.

**2.4K1c** Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: C - fraction models (fraction strips or pattern blocks) to compare, order, and represent numerical quantities.

| | |
|---|---|
| **2.4K1d** | Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: D - money models (base ten blocks or coins) to compare, order, and represent numerical quantities. |
| **2.4K1e** | Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: E - function tables (input/output machines, T-tables) to model numerical relationships. |
| **2.4K1f** | Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: F - two-dimensional geometric models (geoboards, dot paper, pattern blocks, tangrams, or attribute blocks), three-dimensional geometric models (solids), and real-world objects to compare size and to model attributes of geometric shapes. |
| **2.4K1g** | Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: G - two-dimensional geometric models (spinners), three-dimensional geometric models (number cubes), and concrete objects to model probability. |
| **2.4K1h** | Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: H - graphs using concrete objects, pictographs, frequency tables, horizontal and vertical bar graphs, and Venn diagrams or other pictorial displays to organize, display, and explain data. |
| **2.4K1i** | Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: I - Venn diagrams to sort data. |
| **2.4K2** | Uses concrete objects, pictures, diagrams, drawings, or dramatizations to show the relationship between two or more things. |
| **2.4A1a** | Recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: A - process models (concrete objects, pictures, diagrams, number lines, unifix cubes, measurement tools, or calendars) to model computational procedures and mathematical relationships, to compare and order numerical quantities, and to model problem situations. |
| **2.4A1b** | Recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: B - place value models (place value mats, hundred charts, or base ten blocks) to compare, order and represent numerical quantities and to model computational procedures. |
| **2.4A1c** | Recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: C - two-dimensional geometric models (geoboards, dot paper, pattern blocks, tangrams, or attribute blocks), three-dimensional geometric models (solids), and real-world objects to compare size and to model attributes of geometric shapes. |

| | |
|---|---|
| **2.4A1d** | Recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: D - two-dimensional geometric models (spinners), three-dimensional geometric models (number cubes), and concrete objects to model probability. |
| **2.4A1e** | Recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: E - graphs using concrete objects, pictographs, frequency tables, and horizontal and vertical bar graphs to organize, display, and explain data. |

**Standard 3 - Geometry**

**Benchmark - Geometric Figures and Their Properties**

| | |
|---|---|
| **3.1K1** | Recognizes and draws circles, squares, rectangles, triangles, and ellipses (ovals) (plane figures/two-dimensional figures). |
| **3.1K2** | Recognizes and investigates attributes of circles, squares, rectangles, triangles, and ellipses (plane figures) using concrete objects, drawings, and appropriate technology. |
| **3.1K3** | Recognizes cubes, rectangular prisms, cylinders, cones, and spheres (solids/three-dimensional figures). |
| **3.1A1a** | Demonstrates how: a. a geometric shape made of several plane figures (circles, squares, rectangles, triangles, ellipses) can be separated to make two or more different plane figures. |
| **3.1A1b** | Demonstrates how: b. several plane figures (circles, squares, rectangles, triangles, ellipses) can be combined to make a new geometric shape. |
| **3.1A1c** | Demonstrates how: c. several solids (cubes, rectangular prisms, cylinders, cones, spheres) can be combined to make a new geometric shape. |
| **3.1A2** | Sorts plane figures and solids (circles, squares, rectangles, triangles, ellipses, cubes, rectangular prisms, cylinders, cones, spheres) by a given attribute. |

**Benchmark - Measurement and Estimation**

| | |
|---|---|
| **3.2K1** | Uses whole number approximations (estimations) for length and weight using nonstandard units of measure. |
| **3.2K2a** | Compares two measurements using these attributes: A - longer, shorter (length). |
| **3.2K2b** | Compares two measurements using these attributes: B - taller, shorter (height). |
| **3.2K2c** | Compares two measurements using these attributes: C - heavier, lighter (weight). |
| **3.2K2d** | Compares two measurements using these attributes: D - hotter, colder (temperature). |
| **3.2K3** | Reads and tells time at the hour and half-hour using analog and digital clocks. |
| **3.2K4** | Selects appropriate measuring tools for length, weight, volume, and temperature for a given situation. |
| **3.2K5** | Measures length and weight to the nearest whole unit using nonstandard units. |
| **3.2K6** | States the number of days in a week and months in a year. |

**3.2A1** Compares and orders concrete objects by length or weight.
**3.2A2** Compares the weight of two concrete objects using a balance.

**3.2A3** Locates and names concrete objects that are about the same length, weight, or volume as a given concrete object.

**Benchmark - Transformational Geometry**
**3.3K1** Describes the spatial relationship between two concrete objects using appropriate vocabulary.

**3.3K2** Recognizes that changing an object's position or orientation does not change the name, size, or shape of the object.
**3.3K3** Describes movement of concrete objects using appropriate vocabulary.

**3.3A1** Shows two concrete objects or shapes are congruent by physically fitting one object or shape on top of the other.

**3.3A2** Gives and follows directions to move concrete objects from one location to another using appropriate vocabulary.

**Benchmark - Geometry from an Algebraic Perspective**
**3.4K1** Locates and plots whole numbers from 0 through 100 on a segment of a number line (horizontal/vertical).
**3.4K2** Describes a given whole number from 0 to 100 as coming before or after another number on a number line.
**3.4K3** Uses a number line to model addition and counting using whole numbers from 0 to 100.
**3.4A1** Solves real-world problems involving counting and adding whole numbers from 0 to 50 using a number line.

**Standard 4 - Data**
**Benchmark - Probability**

**4.1K1** recognizes whether an outcome of a simple event in an experiment or simulation is impossible, possible, or certain.
**4.1K2** recognizes and states whether a simple event in an experiment or simulation including the use of concrete objects can have more than one outcome.
**4.1A1** makes a prediction about a simple event in an experiment or simulation, conducts the experiment or simulation, and records the results in a graph using concrete objects, a pictograph with a symbol or picture representing only one, or a bar graph.

**Benchmark - Statistics**

| | |
|---|---|
| **4.2K1a** | Displays and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, and whole number intervals using these data displays: a. graphs using concrete objects. |
| **4.2K1b** | Displays and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, and whole number intervals using these data displays: b. pictographs with a whole symbol or picture representing one (no partial symbols or pictures). |
| **4.2K1c** | Displays and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, and whole number intervals using these data displays: c. frequency tables (tally marks). |
| **4.2K1d** | Displays and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, and whole number intervals using these data displays: d. horizontal and vertical bar graphs. |
| **4.2K1e** | Displays and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, and whole number intervals using these data displays: e. Venn diagrams or other pictorial displays. |
| **4.2K2** | Collects data using different techniques (observations or interviews) and explains the results. |
| **4.2K3** | Identifies the minimum (lowest) and maximum (highest) values in a data set. |
| **4.2K4** | Determines the mode (most) after sorting by one attribute. |
| **4.2K5** | Sorts and records qualitative (non-numerical, categorical) data sets using one attribute. |
| **4.2A1a** | Communicates the results of data collection and answers questions (identifying more, less, fewer, greater than, or less than) based on information from: a. graphs using concrete objects. |
| **4.2A1b** | Communicates the results of data collection and answers questions (identifying more, less, fewer, greater than, or less than) based on information from: b. a pictograph with a whole symbol or picture representing only one (no partial symbols or pictures). |
| **4.2A1c** | Communicates the results of data collection and answers questions (identifying more, less, fewer, greater than, or less than) based on information from: c. a horizontal or vertical bar graph. |
| **4.2A2** | Determines categories from which data could be gathered. |

**Second Grade**

**Standard 1 - Number and Computation**

**Benchmark - Number Sense**

**1.1K1** Knows, explains, and represents whole numbers from 0 through 1,000 using concrete objects.

**1.1K2a** Compares and orders: a. whole numbers from 0 through 1,000 using concrete objects.

**1.1K2b** Compares and orders: b. fractions greater than or equal to zero with like denominators (halves, fourths, thirds, eighths) using concrete objects.

**1.1K3** Uses addition and subtraction to show equivalent representations for whole numbers from 0 through 100.

**1.1K4** Identifies and uses ordinal positions from first (1st) through twentieth (20th).

**1.1K5** Identifies coins, states their values, and determines the total value to $1.00 of a mixed group of coins using pennies, nickels, dimes, quarters, and half-dollars.

**1.1K6** Counts a like combination of currency ($1, $5, $10, $20) to $100.

**1.1A1a** Solves real-world problems using equivalent representations and concrete objects to: a. compare and order whole numbers from 0 through 1,000.

**1.1A1b** Solves real-world problems using equivalent representations and concrete objects to: b. add and subtract whole numbers from 0 through 100.

**1.1A1c** Solves real-world problems using equivalent representations and concrete objects to: c. compare and order a mixed group of coins to $1.00.

**1.1A1d** Solves real-world problems using equivalent representations and concrete objects to: d. find equivalent values of coins to $1.00 without mixing coins.

**1.1A2** Determines whether or not numerical values that involve whole numbers from 0 through 1,000 are reasonable.

**Benchmark - Number Systems and Their Properties**

**1.2K1a** Reads and writes: a. whole numbers from 0 through 1,000 in numerical form.

**1.2K1b** Reads and writes: b. whole numbers from 0 through 100 in words.

**1.2K1c** Reads and writes: c. whole numbers from 0 through 1,000 in numerical form when presented in word form.

**1.2K2** Represents whole numbers from 0 through 1,000 using various groupings and place value models emphasizing 1s, 10s, and 100s; explains the groups; and states the value of the digit in ones place, tens place, and hundreds place.

**1.2K3** Counts subsets of whole numbers from 0 through 1,000 forwards and backwards.

**1.2K4** Identifies the place value of the digits in whole numbers from 0 through 1,000.

**1.2K5** Identifies any whole number from 0 through 100 as even or odd.

**1.2K6a** Uses the concepts of these properties with whole numbers from 0 through 100 and demonstrates their meaning including the use of concrete objects: a. commutative property of addition.

**1.2K6b** Uses the concepts of these properties with whole numbers from 0 through 100 and demonstrates their meaning including the use of concrete objects: b. zero property of addition (additive identity).

**1.2K6c** Uses the concepts of these properties with whole numbers from 0 through 100 and demonstrates their meaning including the use of concrete objects: c. associative property of addition.

**1.2K6d** Uses the concepts of these properties with whole numbers from 0 through 100 and demonstrates their meaning including the use of concrete objects: d. symmetric property of equality applied to basic addition and subtraction facts.

**1.2A1a** Solves real-world problems with whole numbers from 0 through 100 using place value models and the concepts of these properties to explain reasoning: a. commutative property of addition.

**1.2A1b** Solves real-world problems with whole numbers from 0 through 100 using place value models and the concepts of these properties to explain reasoning: b. zero property of addition.

**1.2A2a** Performs various computational procedures with whole numbers from 0 through 100 using these properties and explains how they were used: a. commutative property of addition (5 + 6 = 6 + 5).

**1.2A2b** Performs various computational procedures with whole numbers from 0 through 100 using these properties and explains how they were used: b. zero property of addition (17 + 0 = 0 + 17).

**Benchmark - Estimation**

**1.3K1** Estimates whole number quantities from 0 through 1,000 and monetary amounts through $50 using various computational methods including mental math, paper and pencil, concrete objects, and appropriate technology.

**1.3K2** Uses various estimation strategies to estimate whole number quantities from 0 through 1,000.

**1.3A1** Adjusts original whole number estimate of a real-world problem using numbers from 0 through 1,000 based on additional information (a frame of reference).

**1.3A2** Estimates to check whether or not the result of a real-world problem using whole numbers from 0 through 1,000 and monetary amounts through $50 is reasonable and makes predictions based on the information.

**1.3A3** Selects a reasonable magnitude from three given quantities, a one-digit numeral, a two-digit numeral, and a three-digit numeral (5, 50, 500) based on a familiar problem situation and explains the reasonableness of the selection.

**Benchmark - Computation**

**1.4K1** Computes with efficiency and accuracy using various computational methods including mental math, paper and pencil, concrete objects, and appropriate technology.

**1.4K2** States and uses with efficiency and accuracy basic addition facts with sums from 0 through 20 and corresponding subtraction facts.

**1.4K3** Skip counts by 2s, 5s, and 10s through 100 and skip counts by 3s through 36.

**1.4K4** Uses repeated addition (multiplication) with whole numbers to find the sum when given the number of groups (ten or less) and given the same number of concrete objects in each group (twenty or less).

**1.4K5** Uses repeated subtraction (division) with whole numbers when given the total number of concrete objects in each group to find the number of groups.

**1.4K6** Fair shares/measures out (divides) a total amount through 100 concrete objects into equal groups.

**1.4K7a** Performs and explains these computational procedures: a. adds and subtracts three-digit whole numbers with and without regrouping including the use of concrete objects.

**1.4K7b** Performs and explains these computational procedures: b. adds and subtracts monetary amounts through .99 using cent notation (not decimals)(.25 + .52) and money models.

**1.4K8** Identifies basic addition and subtraction fact families (facts with sums from 0 through 20 and corresponding subtraction facts).

**1.4K9** Reads and writes horizontally and vertically the same addition or subtraction expression.

**1.41a** Solves one-step real-world addition or subtraction problems with various groupings of: a. two-digit whole numbers with regrouping.

**1.41b** Solves one-step real-world addition or subtraction problems with various groupings of: b. monetary amounts to .99 with regrouping.

**1.4A2** Generates a family of basic addition and subtraction facts given one fact/equation.

**Standard 2 - Algebra**
**Benchmark - Patterns**

**2.1K1a** Uses concrete objects, drawings, and other representations to work with types of patterns: a. repeating patterns.

**2.1K1b** uses concrete objects, drawings, and other representations to work with types of patterns: b. growing (extending) patterns.

**2.1K2a** Uses the following attributes to generate patterns: a. counting numbers related to number theory.

**2.1K2b** Uses the following attributes to generate patterns: b. whole numbers that increase or decrease.

**2.1K2c** Uses the following attributes to generate patterns: c. geometric shapes.

**2.1K2d** Uses the following attributes to generate patterns: d. measurements.

**2.1K2e** Uses the following attributes to generate patterns: e. the calendar.

**2.1K2f** Uses the following attributes to generate patterns: f. money and time.

**2.1K2g** Uses the following attributes to generate patterns: g. things related to daily life.

**2.1K2h** Uses the following attributes to generate patterns: h. things related to size, shape, color, texture, or movement.

**2.1K3** Identifies and continues a pattern presented in various formats including numeric (list or table), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written.

**2.1K4** Generates repeating patterns.

**2.1A1a** Generalizes these patterns using a written description: a. whole number patterns.

**2.1A1b** Generalizes these patterns using a written description: b. patterns using geometric shapes.

**2.1A1c** Generalizes these patterns using a written description: c. calendar patterns.

**2.1A1d** Generalizes these patterns using a written description: d. money and time patterns.

**2.1A1e** Generalizes these patterns using a written description: e. patterns using size, shape, color, texture, or movement.

**2.1A2** Recognizes multiple representations of the same pattern.

**2.1A3** Uses concrete objects to model a whole number pattern.

**Benchmark - Variables, Equations and Inequalities**

**2.2K1** Explains and uses symbols to represent unknown whole number quantities from 0 through 100.

**2.2K2a** Finds the sum or difference in one-step equations with: a. whole numbers from 0 through 99.

**2.2K2b** Finds the sum or difference in one-step equations with: b. up to two different coins.

**2.2K3** Finds unknown addend or subtrahend using basic addition and subtraction facts (fact family).

**2.2K4** Describes and compares two whole numbers from 0 through 1,000 using the terms: is equal to, is less than, is greater than.

**2.2A1** Represents real-world problems using symbols and whole numbers from 0 through 30 with one operation (addition, subtraction) and one unknown.

**2.2A2a** Generates: a. addition or subtraction equations to match a given real-world problem with one operation and one unknown using whole numbers from 0 through 99.

**2.2A2b** Generates: b. a real-world problem to match a given addition or subtraction equation with one operation using the basic facts.

**Benchmark - Functions**

**2.3K1** States mathematical relationships between whole numbers from 0 through 100 using various methods including mental math, paper and pencil, and concrete objects.

**2.3K2** Finds the values and determines the rule that involve addition or subtraction of whole numbers from 0 through 100 using a horizontal or vertical function table (input/output machine, T-table).

**2.3K3** Generalizes numerical patterns using whole numbers from 0 through 100 with one operation (addition, subtraction) by stating the rule using words.

**2.3A1** Represents and describes mathematical relationships between whole numbers from 0 through 100 using concrete objects, pictures, oral descriptions, and symbols.

**2.3A2** Finds the rule, states the rule, and extends numerical patterns with whole numbers from 0 through 100.

**Benchmark - Models**

**2.4K1a** Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: a. process models (concrete objects, pictures, diagrams, number lines, unifix cubes, hundred charts, or measurement tools) to model computational procedures and mathematical relationships, to compare and order numerical quantities, and to represent fractional parts.

**2.4K1b** Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: b. place value models (place value mats, hundred charts, or base ten blocks) to compare, order, and represent numerical quantities and to model computational procedures.

**2.4K1c** Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: c. fraction models (fraction strips or pattern blocks) to compare, order, and represent numerical quantities.

**2.4K1d** Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: d. money models (base ten blocks or coins) to compare, order, and represent numerical quantities.

**2.4K1e** Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: e. function tables (input/output machines, T-tables) to model numerical relationships.

**2.4K1f** Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: f. two-dimensional geometric models (geoboards, dot paper, pattern blocks, tangrams, or attribute blocks) to model perimeter and properties of geometric shapes and three-dimensional geometric models (solids) and real-world objects to compare size and to model attributes of geometric shapes.

**2.4K1g** Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: g. two-dimensional geometric models (spinners), three-dimensional geometric models (number cubes), and process models (concrete objects) to model probability.

| | |
|---|---|
| **2.4K1h** | Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: h. graphs using concrete objects, representational objects, or abstract representations, pictographs, frequency tables, horizontal and vertical bar graphs, Venn diagrams or other pictorial displays, and line plots to organize and display data. |
| **2.4K1i** | Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: i. Venn diagrams to sort data. |
| **2.4K2** | Creates a mathematical model to show the relationship between two or more things. |
| **2.4A1a** | Recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: a. process models (concrete objects, pictures, diagrams, number lines, unifix cubes, hundred charts, or measurement tools) to model computational procedures and mathematical relationships, to compare and order numerical quantities, and to model problem situations. |
| **2.4A1b** | Recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: b. place value models (place value mats, hundred charts, or base ten blocks) to compare, order, and represent numerical quantities and to model computational procedures. |
| **2.4A1c** | Recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: c. money models (base ten blocks or coins) to compare, order, and represent numerical quantities. |
| **2.4A1d** | Recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: d. two-dimensional geometric models (geoboards, dot paper, pattern blocks, tangrams, or attribute blocks) to model perimeter and properties of geometric shapes and three-dimensional geometric models (solids) and real-world objects to compare size and to model attributes of geometric shapes. |
| **2.4A1e** | Recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: e. two-dimensional geometric models (spinners), three- dimensional geometric models (number cubes), and process models (concrete objects) to model probability. |
| **2.4A1f** | Recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: f. graphs using concrete objects, representational objects, or abstract representations, pictographs, horizontal and vertical bar graphs. |
| **2.4A2** | Selects a mathematical model that is more useful than other mathematical models in a given situation. |

**Standard - Geometry**

**Benchmark - Geometric figures and their Properties**

| | |
|---|---|
| **3.1K1** | Recognizes and investigates properties of circles, squares, rectangles, triangles, and ellipses (ovals) (plane figures/two-dimensional shapes) using concrete objects, drawings, and appropriate technology. |

**3.1K2** Recognizes, draws, and describes circles, squares, rectangles, triangles, ellipses (ovals) (plane figures).
**3.1K3** Recognizes cubes, rectangular prisms, cylinders, cones, and spheres (solids/three-dimensional figures).
**3.1K4** Recognizes the square, triangle, rhombus, hexagon, parallelogram, and trapezoid from a pattern block set.
**3.1K5** Compares geometric shapes (circles, squares, rectangles, triangles, ellipses) to one another.
**3.1K6** Recognizes whether a shape has a line of symmetry.

**3.1A1** Solves real-world problems by applying the properties of plane figures (circles, squares, rectangles, triangles, ellipses).
**3.1A2a** Demonstrates how: a. plane figures (circles, squares, rectangles, triangles, ellipses) can be combined or separated to make a new shape.
**3.1A2b** Demonstrates how: b. solids (cubes, rectangular solids, cylinders, cones, spheres) can be combined or separated to make a new shape.

**3.1A3** Identifies the plane figures (circles, squares, rectangles, triangles, ellipses) used to form a composite figure.

**Benchmark - Measurement and Estimation**

**3.2K1** Uses whole number approximations (estimations) for length, weight, and volume using standard and nonstandard units of measure.
**3.3K2** Reads and tells time by five-minute intervals using analog and digital clocks.
**3.2K3** elects and uses appropriate measurement tools and units of measure for length, weight, volume, and temperature for a given situation.
**3.2K4a** Measures: a. length to the nearest inch or foot and to the nearest whole unit of a nonstandard unit.
**3.2K4b** Measures: b. weight to the nearest nonstandard unit.
**3.2K4c** Measures: c. volume to the nearest cup, pint, quart, or gallon.
**3.2K4d** Measures: d. temperature to the nearest degree.
**3.2K5a** States: a. the number of minutes in an hour.
**3.2K5b** States: b. the number of days in each month.
**3.2A1** Compares the weights of more than two concrete objects using a balance.
**3.2A2a** Solves real-world problems by applying appropriate measurements: a. length to the nearest inch or foot.
**3.2A2b** Solves real-world problems by applying appropriate measurements: b. length to the nearest whole unit of a nonstandard unit.

**3.2A3** Estimates to check whether or not measurements or calculations for length in real-world problems are reasonable.
**3.2A4** Adjusts original measurement or estimation for length and weight in real-world problems based on additional information (a frame of reference).

**Benchmark - Transformational Geometry**

**3.3K1** Knows and uses the cardinal points (north, south, east, west).

**3.3K2** Recognizes that changing an object's position or orientation including whether the object is nearer or farther away does not change the name, size, or shape of the object.

**3.3K3** Recognizes when a shape has undergone one transformation (flip/reflection, turn/rotation, slide/translation).

**3.3A1** Shows two concrete objects or shapes are congruent by physically fitting one shape or object on top of the other.

**3.3A2** Follows directions to move objects from one location to another using appropriate vocabulary and the cardinal points (north, south, east, west).

**Benchmark - Geometry from an Algebraic Perspective**

**3.4K1** Locates and plots whole numbers from 0 through 1,000 on a segment of a number line (horizontal/vertical).

**3.4K2** Represents the distance between two whole numbers from 0 through 1,000 on a segment of a number line.

**3.4K3** Uses a segment of a number line to model addition and subtraction using whole numbers from 0 through 1,000.

**3.4A1** Solves real-world problems involving counting, adding, and subtracting whole numbers from 0 through 1,000 using a segment of a number line.

**Standard 4 - Data**

**Benchmark - Probability**

**4.1K1** Recognizes any outcome of a simple event in an experiment or simulation as impossible, possible, certain, likely, or unlikely.

**4.1K2** Lists some of the possible outcomes of a simple event in an experiment or simulation including the use of concrete objects.

**4.1A1** Makes a prediction about a simple event in an experiment or simulation; conducts the experiment or simulation including the use of concrete objects; records the results in a chart, table, or graph; and makes an accurate statement about the results.

**Benchmark - Statistics**

**4.2K1a** Organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: a. graphs using concrete objects.

**4.2K1b** Organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: b. pictographs with a whole symbol or picture representing one, two, or ten (no partial symbols or pictures).

**4.2K1c** Organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: c. frequency tables (tally marks).

**4.2K1d** Organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: d. horizontal and vertical bar graphs.

**4.2K1e** Organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: e. Venn diagrams or other pictorial displays.

**4.2K1f** Organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: f. line plots.

**4.2K2** Collects data using different techniques (observations, interviews, or surveys) and explains the results.

**4.2K3** Identifies the minimum (lowest) and maximum (highest) values in a whole number data set.

**4.2K4** Finds the range for a data set using two-digit whole numbers.

**4.2K5a** Finds the mode (most) for a data set using concrete objects that include: a. quantitative/numerical data (whole numbers through 100).

**4.2K5b** Finds the mode (most) for a data set using concrete objects that include: b. qualitative/non-numerical data (category that occurs most often).

**4.2A1a** Communicates the results of data collection and answers questions based on information from: a. graphs using concrete objects.

**4.2A1b** Communicates the results of data collection and answers questions based on information from: b. pictographs with a whole symbol or picture representing one (no partial symbols or pictures).

**4.2A1c** Communicates the results of data collection and answers questions based on information from: c. horizontal and vertical bar graphs.

**4.2A2** Determines categories from which data could be gathered.

**4.2A3** Recognizes that the same data set can be displayed in various formats including the use of concrete objects.

**4.2A4** Recognizes appropriate conclusions from data collected.

**Third Grade**

**Standard 1. Number and Computation**

**Benchmark - Number Sense**

**1.1K1a** knows, explains, and represents: a. whole numbers from 0 through 10,000.

**1.1K1b** knows, explains, and represents : b. fractions greater than or equal to zero (halves, fourths, thirds, eighths, tenths, sixteenths).

**1.1K1c** knows, explains, and represents : c. decimals greater than or equal to zero through tenths place.

**1.1K2a** compares and orders: a. whole numbers from 0 through 10,000 with and without the use of concrete objects.

**1.1K2b** compares and orders: b. fractions greater than or equal to zero with like denominators (halves, fourths, thirds, eighths, tenths, sixteenths) using concrete objects.

**1.1K2c** compares and orders: c. decimals greater than or equal to zero through tenths place using concrete objects.

**1.1K3a** knows, explains, and uses equivalent representations including the use of mathematical models for: a. addition and subtraction of whole numbers from 0 through 1,000.

**1.1K3b** knows, explains, and uses equivalent representations including the use of mathematical models for: b. multiplication using the basic facts through the 5s and the multiplication facts of the 10s .

**1.1K3c** knows, explains, and uses equivalent representations including the use of mathematical models for: c. addition and subtraction of money.

**1.1K4** determines the value of mixed coins and bills with a total value of $50 or less.

**1.1A1a** solves real-world problems using equivalent representations and concrete objects to: a. compare and order whole numbers from 0 through 5,000.

**1.1A1b** solves real-world problems using equivalent representations and concrete objects to: b. add and subtract whole numbers from 0 through 1,000 and when used as monetary amounts.

**1.1A2a** determines whether or not solutions to real-world problems that involve the following are reasonable: a. whole numbers from 0 through 1,000.

**1.1A2b** determines whether or not solutions to real-world problems that involve the following are reasonable: b. fractions greater than or equal to zero (halves, fourths, thirds, eighths, tenths, sixteenths).

**1.1A2c** determines whether or not solutions to real-world problems that involve the following are reasonable: c. decimals greater than or equal to zero when used as monetary amounts.

**1.1A3** determines the amount of change owed through $100.00.

**Benchmark - Number Systems and their Properties**

**1.2K1** identifies, reads, and writes numbers using numerals and words from tenths place through ten thousands place.

**1.2K2** identifies, models, reads, and writes numbers using expanded form from tenths place through ten thousands place.

**1.2K3** classifies various subsets of numbers as whole numbers, fractions (including mixed numbers), or decimals.

**1.2K4** identifies the place value of various digits from tenths to one hundred thousands place.

**1.2K5** identifies any whole number through 1,000 as even or odd.

**1.2K6a** uses the concepts of these properties with whole numbers from 0 through 100 and demonstrates their meaning including the use of concrete objects: a. commutative properties of addition and multiplication.

**1.2K6b** uses the concepts of these properties with whole numbers from 0 through 100 and demonstrates their meaning including the use of concrete objects: b. zero property of addition (additive identity).

**1.2K6c** uses the concepts of these properties with whole numbers from 0 through 100 and demonstrates their meaning including the use of concrete objects: c. property of one for multiplication (multiplicative identity).

**1.2K6d** uses the concepts of these properties with whole numbers from 0 through 100 and demonstrates their meaning including the use of concrete objects: d. associative property of addition.

**1.2K6e** uses the concepts of these properties with whole numbers from 0 through 100 and demonstrates their meaning including the use of concrete objects: e. symmetric property of equality applied to addition and multiplication.

**1.2K6f** uses the concepts of these properties with whole numbers from 0 through 100 and demonstrates their meaning including the use of concrete objects: f. zero property of multiplication.

**1.2K7** divides whole numbers from 0 through 99,999 into groups of 10,000s; 1,000s; 100s; 10s, and 1s using base ten models.

**1.2A1a** solves real-world problems with whole numbers from 0 through 100 using place value models, money, and the concepts of these properties to explain reasoning: a. commutative property of addition.

**1.2A1b** solves real-world problems with whole numbers from 0 through 100 using place value models, money, and the concepts of these properties to explain reasoning: b. zero property of addition.

**1.2A1c** solves real-world problems with whole numbers from 0 through 100 using place value models, money, and the concepts of these properties to explain reasoning: c. associative property of addition.

**1.2A2a** performs various computational procedures with whole numbers from 0 through 100 using the concepts of these properties and explains how they were used: a. commutative property of multiplication.

**1.2A2b** performs various computational procedures with whole numbers from 0 through 100 using the concepts of these properties and explains how they were used: b. zero property of multiplication without computing.

**1.2A2c** performs various computational procedures with whole numbers from 0 through 100 using the concepts of these properties and explains how they were used: c. associative property of addition.

**Benchmark - Estimation**

**1.3K1** estimates whole numbers quantities from 0 through 1,000; fractions (halves, fourths); and monetary amounts through $500 using various computational methods including mental math, paper and pencil, concrete objects, and appropriate technology.

**1.3K2** uses various estimation strategies to estimate using whole number quantities from 0 through 1,000 and explains the process used.

**1.3K3** recognizes and explains the difference between an exact and an approximate answer.

**1.3A1** adjusts original whole number estimate of a real-world problem using numbers from 0 through 1,000 based on additional information (a frame of reference).

**1.3A2** estimates to check whether or not the result of a real-world problem using whole numbers from 0 through 1,000 and monetary amounts through $500 is reasonable and makes predictions based on the information.

**1.3A3** selects a reasonable magnitude from three given quantities based on a familiar problem situation and explains the reasonableness of the results.

**1.3A4** determines if a real-world problem with whole numbers from 0 through 1,000 calls for an exact or approximate answer and performs the appropriate computation using various computational methods including mental math, paper and pencil, concrete objects, and appropriate technology.

**Benchmark - Computation**

**1.4K1** computes with efficiency and accuracy using various computational methods including mental math, paper and pencil, concrete objects, and appropriate technology.

**1.4K2** states and uses with efficiency and accuracy the multiplication facts through the 5s and the multiplication facts of the 10s and corresponding division facts.

**1.4K3** skip counts (multiples) by 2s, 3s, 4s, 5s, and 10s.

**1.4K4a** performs and explains these computational procedures: a. adds and subtracts whole numbers from 0 through 10,000.

**1.4K4b** performs and explains these computational procedures: b. multiplies whole numbers when one factor is 5 or less and the other factor is a multiple of 10 through 1,000 with or without the use of concrete objects.

**1.4K4c** performs and explains these computational procedures: c. adds and subtracts monetary amounts using dollar and cents notation through $500.00.

**1.4K5** fair shares/measures out (divides) a total amount through 100 concrete objects into equal groups.

**1.4K6** explains the relationship between addition and subtraction.

**1.4K7** identifies multiplication and division fact families through the 5s and the multiplication and division fact families of the 10s.

**1.4K8** reads and writes horizontally, vertically, and with different operational symbols the same addition, subtraction, multiplication, or division expression.

**1.4A1a** solves one-step real-world addition or subtraction problems with: a. whole numbers from 0 through 10,000.

**1.4A1b** solves one-step real-world addition or subtraction problems with: b. monetary amounts using dollar and cents notation through $500.00

**1.4A2** generates a family of multiplication and division facts through the 5s.

**Standard 2. Algebra**

**Benchmark - Patterns**

**2.1K1a** uses concrete objects, drawings, and other representations to work with types of patterns: a. repeating patterns.

**2.1K1b** uses concrete objects, drawings, and other representations to work with types of patterns: b. growing patterns.

**2.1K2a** uses these attributes to generate patterns: a. counting numbers related to number theory.

**2.1K2b** uses these attributes to generate patterns: b. whole numbers that increase or decrease.

**2.1K2c** uses these attributes to generate patterns: c. geometric shapes including one attribute change.

**2.1K2d** uses these attributes to generate patterns: d. measurements.

**2.1K2e** uses these attributes to generate patterns: e. money and time.

**2.1K2f** uses these attributes to generate patterns: f. things related to daily life.

**2.1K2g** uses these attributes to generate patterns: g. things related to size, shape, color, texture, or movement.

**2.1K3** identifies, states, and continues a pattern presented in various formats including numeric (list or table), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written.

**2.1K4a** generates: a. repeating patterns.

**2.1K4b** generates: b. growing (extending) patterns.

**2.1K4c** generates: c. patterns using function tables (input/output machines, T-tables).

**2.1A1a** generalizes the following patterns using a written description: a. counting numbers related to number theory.

**2.1A1b** generalizes the following patterns using a written description: b. whole number patterns.

**2.1A1c** generalizes the following patterns using a written description: c. patterns using geometric shapes.

**2.1A1d** generalizes the following patterns using a written description: d. measurement patterns.

**2.1A1e** generalizes the following patterns using a written description: e. money and time patterns.

**2.1A1f** generalizes the following patterns using a written description: f. patterns using size, shape, color, texture, or movement.

**2.1A2** recognizes multiple representations of the same pattern.

USD #447 Cherryvale-Thayer Schools
MATH

**Benchmark - Variables, Equations, and Inequalities**

**2.2K1** explains and uses symbols to represent unknown whole number quantities from 0 through 1,000.

**2.2K2a** finds the sum or difference in one-step equations with: a. whole numbers from 0 through 99.

**2.2K2b** finds the sum or difference in one-step equations with: b. monetary values through a dollar.

**2.2K3** finds the unknown in the multiplication and division fact families through the 5s and the 10s.

**2.2K4** compares two whole numbers from 0 through 1,000 using the equality and inequality symbols (=, <, >) and their corresponding meanings (is equal to, is less than, is greater than).

**2.2A1a** represents real-world problems using symbols with one operation and one unknown that: a. adds or subtracts using whole numbers from 0 through 99.

**2.2A1b** represents real-world problems using symbols with one operation and one unknown that: b. multiplies or divides using the basic facts through the 5s and the basic facts of the 10s.

**2.2A2a** generates one-step equations to solve real-world problems with one unknown and a whole number solution that: a. adds or subtracts using the basic fact families.

**2.2A2b** generates one-step equations to solve real-world problems with one unknown and a whole number solution that: b. multiplies or divides using the basic facts through the 5s and the basic facts of the 10s.

**2.2A3a** generates: a real-world problem with one operation that matches a given addition equation or subtraction equation using whole numbers from 0 through 99.

**2.2A3b** generates: b. a real-world problem with one operation that matches a given multiplication equation or division equation using basic facts through the 5s and the basic facts of the 10s.

**2.2A3c** generates: c. number comparison statements using equality and inequality symbols (=, <, >) for whole numbers from 0 through 100, measurement, and money.

**Benchmark - Functions**

**2.3K1** states mathematical relationships between whole numbers from 0 through 200 using various methods including mental math, paper and pencil, concrete objects, and appropriate technology.

**2.3K2** finds the values and determines the rule with one operation (addition, subtraction) of whole numbers from 0 through 200 using a horizontal or vertical function table (input/output machine, T-table).

**2.3K3** generalizes numerical patterns using whole numbers from 0 through 200 with one operation (addition, subtraction) by stating the rule using words.

**2.3K4** uses a function table (input/output machine, T-table) to identify and plot ordered pairs in the first quadrant of a coordinate plane.

**2.3A1** represents and describes mathematical relationships between whole numbers from 0 through 100 using concrete objects, pictures, written descriptions, symbols, equations, tables, and graphs.

**2.3A2** finds the rule, states the rule using words, and extends numerical patterns with whole numbers from 0 through 100.

**Benchmark - Models**

**2.4K1a** knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: a. process models (concrete objects, pictures, number lines, coordinate planes/grids, hundred charts, measurement tools, multiplication arrays, or division sets) to model computational procedures and mathematical relationships and to model problem situations.

**2.4K1b** knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: b. place value models (place value mats, hundred charts, base ten blocks or unifix cubes) to compare, order, and represent numerical quantities and to model computational procedures.

**2.4K1c** knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: c. fraction models (fraction strips or pattern blocks) and decimal models (base ten blocks or coins) to compare, order, and represent numerical quantities.

**2.4K1d** knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: d. money models (base ten blocks or coins) to compare, order, and represent numerical quantities.

**2.4K1e** knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: e. function tables (input/output machines, T-tables) to find numerical relationships.

**2.4K1f** knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: f. two-dimensional geometric models (geoboards, dot paper, pattern blocks, or tangrams) to model perimeter, area, and properties of geometric shapes and three-dimensional geometric models (solids) and real-world objects to compare size and to model attributes of geometric shapes.

**2.4K1g** knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: g. two-dimensional geometric models (spinners), three-dimensional models (number cubes), and process models (concrete objects) to model probability.

**2.4K1h** knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: h. graphs using concrete objects, representational objects, or abstract representations, pictographs, frequency tables, horizontal and vertical bar graphs, Venn diagrams or other pictorial displays, line plots, charts, and tables to organize and display data.

knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships.

**2.4K1i** Mathematical models include: i. Venn diagrams to sort data and show relationships.

**2.4K2** creates a mathematical model to show the relationship between two or more things.

**2.4A1a** recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: a. process models (concrete objects, pictures, number lines, coordinate planes/grids, hundred charts, measurement tools, multiplication arrays, or division sets) to model computational procedures and mathematical relationships and to model problem situations.

**2.4A1b** recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: b. place value models (place value mats, hundred charts, base ten blocks, or unifix cubes) to compare, order, and represent numerical quantities and to model computational procedures.

**2.4A1c** recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: c. fraction models (fraction strips or pattern blocks) and decimal models (base ten blocks or coins) to compare, order, and represent numerical quantities.

**2.4A1d** recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: d. money models (base ten blocks or coins) to compare, order, and represent numerical quantities.

**2.4A1e** recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: e. function tables (input/output machines, T-tables) to model numerical relationships.

**2.4A1f** recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: f. two-dimensional geometric models (geoboards, dot paper, pattern blocks, or tangrams) to model perimeter, area, and properties of geometric shapes and three-dimensional geometric models (solids) and real-world objects to compare size and to model attributes of geometric shapes.

**2.4A1g** recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: g. two-dimensional geometric models (spinners), three-dimensional models (number cubes), and process models (concrete objects) to model probability.

**2.4A1h** recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: h. graphs using concrete objects, representational objects, or abstract representations pictographs, frequency tables, horizontal and vertical bar graphs, Venn diagrams or other pictorial displays, line plots, charts and tables to organize and display data.

**2.4A1i** recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: i. Venn diagrams to sort data and show relationships.

**2.4A2** selects a mathematical model that is more useful than other mathematical models in a given situation.

**Standard 3. Geometry**

**Benchmark - Geometric Figures and their Properties**

**3.1K1** recognizes and investigates properties of plane figures (circles, squares, rectangles, triangles, ellipses, rhombi, octagons) using concrete objects, drawings, and appropriate technology.

**3.1K2** recognizes, draws, and describes plane figures (circles, squares, rectangles, triangles, ellipses, rhombi, octagons).

**3.1K3** recognizes the solids (cubes, rectangular prisms, cylinders, cones, spheres).

**3.1K4** recognizes and describes the square, triangle, rhombus, hexagon, parallelogram, and trapezoid from a pattern block set.

**3.1K5** recognizes and describes a quadrilateral as any four-sided figure.

**3.1K6** determines if geometric shapes and real-world objects contain line(s) of symmetry and draws the line(s) of symmetry if the line(s) exist(s).

**3.1A1** solves real-world problems by applying properties of plane figures (circles, squares, rectangles, triangles, ellipses.

**3.1A2a** demonstrates how: a. plane figures (circles, squares, rectangles, triangles, ellipses, rhombi, hexagons, trapezoids) can be combined to make a new shape.

**3.1A2b** demonstrates how: b. solids (cubes, rectangular prisms, cylinders, cones, spheres) can be combined to make a new shape.

**3.1A3** identifies the plane figures (circles, squares, rectangles, triangles, ellipses, rhombi, hexagons, trapezoids) used to form a composite figure.

**Benchmark - Measurement and Estimation**

**3.2K1** uses whole number approximations (estimations) for length, width, weight, volume, temperature, time, and perimeter using standard and nonstandard units of measure.

**3.2K2** reads and tells time to the minute using analog and digital clocks.

**3.2K3a** selects, explains the selection of, and uses measurement tools, units of measure, and degree of accuracy appropriate for a given situation to measure: a. length width, and height to the nearest half inch, inch, foot, and yard; and to the nearest whole unit of nonstandard unit.

**3.2K3b** selects, explains the selection of, and uses measurement tools, units of measure, and degree of accuracy appropriate for a given situation to measure: b. length, width, and height to the nearest centimeter and meter.

**3.2K3c** selects, explains the selection of, and uses measurement tools, units of measure, and degree of accuracy appropriate for a given situation to measure: c. weight to the nearest whole unit of a nonstandard unit.

**3.2K3d** selects, explains the selection of, and uses measurement tools, units of measure, and degree of accuracy appropriate for a given situation to measure: d. volume to the nearest cup, pint, quart, and gallon.

**3.2K3e** selects, explains the selection of, and uses measurement tools, units of measure, and degree of accuracy appropriate for a given situation to measure: e. volume to the nearest liter.

**3.2K3f** selects, explains the selection of, and uses measurement tools, units of measure, and degree of accuracy appropriate for a given situation to measure: f. temperature to the nearest degree.

**3.2K4a** states: a. the number of hours in a day and days in a year.

**3.2K4b** states: b. the number of inches in a foot, inches in a yard, and feet in a yard.

**3.2K4c** states: c. the number of centimeters in a meter.

**3.2K4d** states: d. the number of cups in a pint, pints in a quart, and quarts in a gallon.

**3.2K5** finds the perimeter of squares, rectangles, and triangles given the measures of all the sides

**3.2A1a** solves real-world problems by applying appropriate measurements: a. length to the nearest inch, foot, or yard.

**3.2A1b** solves real-world problems by applying appropriate measurements: b. length to the nearest centimeter or meter.

**3.2A1c** solves real-world problems by applying appropriate measurements: c. length to the nearest whole unit of a nonstandard unit.

**3.2A1e** solves real-world problems by applying appropriate measurements: e. number of days in a week.

**3.2A2** estimates to check whether or not measurements or calculations for length, temperature, and time in real-world problems are reasonable.

**3.2A3** adjusts original measurement or estimation for length, weight, temperature, and time in real-world problems based on additional information (a frame of reference).

**Benchmark - Transformational Geometry**

**3.3K1** knows and uses cardinal points (north, south, east, west) and intermediate points (northeast, southeast, northwest, southwest).

**3.3K2** recognizes and performs one transformation (reflection/flip, rotation/turn, and translation/slide) on a two-dimensional figure.

**3.3A1** recognizes real-world transformations (reflection/flip, rotation/turn, and translation/slide).

**3.3A2** gives and uses directions to move from one location to another on a map and follows directions including the use of cardinal and intermediate points.

**Benchmark - Geometry from an Algebraic Perspective**

**3.4K1** uses a number line (horizontal/vertical) to model the basic multiplication facts through the 5s and the multiplication facts of the 10s.

**3.4K2a** identifies points on a coordinate plane (coordinate grid) using: a. two positive whole numbers.

**3.4K2b** identifies points on a coordinate plane (coordinate grid) using: b. a letter and a positive whole number.

**3.4K3** identifies points as ordered pairs in the first quadrant of a coordinate plane (coordinate grid).

**3.4A1** solves real-world problems using coordinate planes (coordinate grids) and map grids that have positive whole number and letter coordinates.

**Standard 4. Data**

**Benchmark - Probability**

**4.1K1** recognizes any outcome of a simple event in an experiment or simulation as impossible, possible, certain, likely, unlikely, or equally likely .

**4.1K2** lists some of the possible outcomes of a simple event in an experiment or simulation including the use of concrete objects.

**4.1A1** makes predictions about a simple event in an experiment or simulation; conducts the experiment or simulation including the use of concrete objects; records the results in a chart, table, or graph; and uses the results to draw conclusions about the event.

**4.1A2** compares what should happen (theoretical probability/expected results) with what did happen (experimental probability/empirical results) in an experiment or simulation with a simple event.

**Benchmark - Statistics**

**4.2K1a** organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: a. graphs using concrete objects.

**4.2K1b** organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: b. pictographs with a whole symbol or picture representing one, two, five, ten, twenty-five, or one-hundred (no partial symbols or pictures).

**4.2K1c** organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: c. frequency tables (tally marks).

| | |
|---|---|
| **4.2K1d** | organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: d. horizontal and vertical bar graphs. |
| **4.2K1e** | organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: e. Venn diagrams or other pictorial displays. |
| **4.2K1f** | organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: f. line plots. |
| **4.2K1g** | organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: g. charts and tables. |
| **4.2K2** | collects data using different techniques (observations, polls, surveys, or interviews) and explains the results. |
| **4.2K3a** | finds these statistical measures of a data set with less than ten data points using whole numbers from 0 through 1,000: a. minimum and maximum data values. |
| **4.2K3b** | finds these statistical measures of a data set with less than ten data points using whole numbers from 0 through 1,000: b. range. |
| **4.2K3c** | finds these statistical measures of a data set with less than ten data points using whole numbers from 0 through 1,000: c. mode(uni-modal only). |
| **4.2K3d** | finds these statistical measures of a data set with less than ten data points using whole numbers from 0 through 1,000: d. median when data set has an odd number of data points. |
| **4.2A1a** | interprets and uses data to make reasonable inferences and predictions, answer questions, and make decisions from these data displays: a. graphs using concrete objects. |
| **4.2A1b** | interprets and uses data to make reasonable inferences and predictions, answer questions, and make decisions from these data displays: b. pictographs with a whole symbol or picture representing one, two, five, ten, twenty-five, or one-hundred (no partial symbols or pictures). |
| **4.2A1c** | interprets and uses data to make reasonable inferences and predictions, answer questions, and make decisions from these data displays: c. frequency tables (tally marks). |
| **4.2A1d** | interprets and uses data to make reasonable inferences and predictions, answer questions, and make decisions from these data displays: d. horizontal and vertical bar graphs. |
| **4.2A1e** | interprets and uses data to make reasonable inferences and predictions, answer questions, and make decisions from these data displays: e. Venn diagrams or other pictorial displays. |

| | |
|---|---|
| **4.2A1f** | interprets and uses data to make reasonable inferences and predictions, answer questions, and make decisions from these data displays: f. line plots. |
| **4.2A1g** | interprets and uses data to make reasonable inferences and predictions, answer questions, and make decisions from these data displays: g. charts and tables. |
| **4.2A2a** | uses these statistical measures with a data set of less than ten data points using whole numbers from 0 through 1,000 to make reasonable inferences and predictions, answer questions, and make decisions: a. minimum and maximum data values. |
| **4.2A2b** | uses these statistical measures with a data set of less than ten data points using whole numbers from 0 through 1,000 to make reasonable inferences and predictions, answer questions, and make decisions: b. range. |
| **4.2A2c** | uses these statistical measures with a data set of less than ten data points using whole numbers from 0 through 1,000 to make reasonable inferences and predictions, answer questions, and make decisions: c. mode. |
| **4.2A2d** | uses these statistical measures with a data set of less than ten data points using whole numbers from 0 through 1,000 to make reasonable inferences and predictions, answer questions, and make decisions: d. median when data set has an odd number of data points. |
| **4.2A3** | recognizes that the same data set can be displayed in various formats including the use of concrete objects. |

USD #447 Cherryvale-Thayer Schools
MATH

**Fourth**

**Standard 1. Number and Computation**

**Benchmark - Number Sense**

| | |
|---|---|
| **1.1K1a** | knows, explains, and uses equivalent representations for: a. whole numbers from 0 through 100,000. |
| **1.1K1b** | knows, explains, and uses equivalent representations for: b. fractions greater than or equal to zero (halves, fourths, thirds, eighths, tenths, twelfths, sixteenths, hundredths) including mixed numbers. |
| **1.1K1c** | knows, explains, and uses equivalent representations for: c. decimals greater than or equal to zero through hundredths place and when used as monetary amounts. |
| **1.1K2a** | compares and orders: a. whole numbers from 0 through 100,000. |
| **1.1K2b** | compares and orders: b. fractions greater than or equal to zero (halves, fourths, thirds, eighths, tenths, twelfths, sixteenths, hundredths) including mixed numbers with a special emphasis on concrete objects. |
| **1.1K2c** | compares and orders: c. decimals greater than or equal to zero through hundredths place and when used as monetary amounts. |
| **1.1A1a** | solves real-world problems using equivalent representations and concrete objects to: a. compare and order whole numbers from 0 through 100,000. |
| **1.1A1b** | solves real-world problems using equivalent representations and concrete objects to: b. add and subtract whole numbers from 0 through 10,000 and decimals when used as monetary amounts. |
| **1.1A1c** | solves real-world problems using equivalent representations and concrete objects to: c. multiply a one-digit whole number by a two-digit whole number. |
| **1.1A2a** | determines whether or not solutions to real-world problems that involve the following are reasonable: a. whole numbers from 0 through 10,000. |
| **1.1A2b** | determines whether or not solutions to real-world problems that involve the following are reasonable: b. fractions greater than or equal to zero (halves, fourths, thirds, eighths, tenths, sixteenths). |
| **1.1A2c** | determines whether or not solutions to real-world problems that involve the following are reasonable: c. decimals greater than or equal to zero when used as monetary amounts. |

**Benchmark - Number Systems and their Properties**

| | |
|---|---|
| **1.2K1** | identifies, models, reads, and writes numbers using numerals, words, and expanded notation from hundredths place through one-hundred thousands place. |
| **1.2K2** | classifies various subsets of numbers as whole numbers, fractions (including mixed numbers), or decimals. |
| **1.2K3** | identifies the place value of various digits from hundredths place through one hundred thousands place. |
| **1.2K4** | identifies any whole number as even or odd. |
| **1.2K5a** | uses the concepts of these properties with the whole number system and demonstrates their meaning including the use of concrete objects: a. commutative properties of addition and multiplication. |

| | |
|---|---|
| | uses the concepts of these properties with the whole number system and demonstrates their meaning including the use of concrete objects: b. zero property of addition (additive identity) and property of one for multiplication (multiplicative |
| **1.2K5b** | identity). |
| | uses the concepts of these properties with the whole number system and demonstrates their meaning including the use of |
| **1.2K5c** | concrete objects: c. associative properties of addition and multiplication. |
| | uses the concepts of these properties with the whole number system and demonstrates their meaning including the use of |
| **1.2K5d** | concrete objects: d. symmetric property of equality applied to addition and multiplication. |
| | uses the concepts of these properties with the whole number system and demonstrates their meaning including the use of |
| **1.2K5e** | concrete objects: e. zero property of multiplication. |
| | uses the concepts of these properties with the whole number system and demonstrates their meaning including the use of |
| **1.2K5f** | concrete objects: f. distributive property. |
| | solves real-world problems with whole numbers from 0 through 10,000 using place value models; money; and the |
| **1.2A1a** | concepts of these properties to explain reasoning: a. commutative properties of addition and multiplication. |
| | solves real-world problems with whole numbers from 0 through 10,000 using place value models; money; and the |
| **1.2A1b** | concepts of these properties to explain reasoning: b. zero property of addition. |
| | solves real-world problems with whole numbers from 0 through 10,000 using place value models; money; and the |
| **1.2A1c** | concepts of these properties to explain reasoning: c. property of one for multiplication. |
| | solves real-world problems with whole numbers from 0 through 10,000 using place value models; money; and the |
| **1.2A1d** | concepts of these properties to explain reasoning: d. associative properties of addition and multiplication. |
| | solves real-world problems with whole numbers from 0 through 10,000 using place value models; money; and the |
| **1.2A1e** | concepts of these properties to explain reasoning: e. zero property of multiplication. |
| | performs various computational procedures with whole numbers from 0 through 10,000 using the concepts of the following properties; extends the properties to fractions (halves, fourths, thirds, eighths, tenths, sixteenths) including mixed numbers, and decimals through hundredths place; and explains how the properties were used: a. commutative |
| **1.2A2a** | property of addition and multiplication. |
| | performs various computational procedures with whole numbers from 0 through 10,000 using the concepts of the following properties; extends the properties to fractions (halves, fourths, thirds, eighths, tenths, sixteenths) including mixed numbers, and decimals through hundredths place; and explains how the properties were used: b. zero property of |
| **1.2A2b** | multiplication without computing. |

performs various computational procedures with whole numbers from 0 through 10,000 using the concepts of the following properties; extends the properties to fractions (halves, fourths, thirds, eighths, tenths, sixteenths) including mixed numbers, and decimals through hundredths place; and explains how the properties were used: c. associative
**1.2A2c** property of addition.

states the reason for using whole numbers, fractions, mixed numbers, or decimals when solving a given real-world
**1.2A3** problem.

**Benchmark - Estimation**

estimates whole number quantities from 0 through 10,000; fractions (halves, fourths, thirds); and monetary amounts through $1,000 using various computational methods including mental math, paper and pencil, concrete materials, and
**1.3K1** appropriate technology.

uses various estimation strategies and explains how they are used when estimating whole numbers quantities from 0
**1.3K2** through 10,000; fractions [(halves, fourths, thirds) including mixed numbers)]; and monetary amounts through $1,000.

**1.3K3** recognizes and explains the difference between an exact and an approximate answer.

selects from an appropriate range of estimation strategies and determines if the estimate is an overestimate or
**1.3K4** underestimate.

adjusts original whole number estimates of a real-world problem using numbers from 0 through 10,000 based on
**1.3A1** additional information (a frame of reference).

estimates to check whether or not the result of a real-world problem using whole numbers from 0 through 10,000, fractions (including mixed numbers), and monetary amounts is reasonable and makes predictions based on the
**1.3A2** information.

selects a reasonable magnitude from three given quantities based on a familiar problem situation and explains the
**1.3A3** reasonableness of selection.

determines if a real-world problem calls for an exact or approximate answer and performs the appropriate computation using various computational methods including mental math, paper and pencil, concrete objects, and appropriate
**1.3A4** technology.

**Benchmark - Computation**

computes with efficiency and accuracy using various computational methods including mental math, paper and pencil,
**1.4K1** concrete materials, and appropriate technology.

states and uses with efficiency and accuracy multiplication facts from 1 x 1 through 12 x 12 and corresponding division
**1.4K2** facts.

| | |
|---|---|
| **1.4K3a** | performs and explains these computational procedures: a. adds and subtracts whole numbers from 0 through 100,000 and when used as monetary amounts. |
| **1.4K3b** | performs and explains these computational procedures: b. multiplies through a three-digit whole number by a two-digit whole number. |
| **1.4K3c** | performs and explains these computational procedures: c. multiplies whole dollar monetary amounts (through three-digits) by a one-digit or two-digit whole number. |
| **1.4K3d** | performs and explains these computational procedures: d. multiplies monetary amounts less than $100.00 by whole numbers less than ten. |
| **1.4K3e** | performs and explains these computational procedures: e. divides through a two-digit whole number by a one-digit whole number with a one-digit whole number quotient with or without a remainder |
| **1.4K3f** | performs and explains these computational procedures: f. adds and subtracts fractions greater than or equal to zero with like denominators. |
| **1.4K3g** | performs and explains these computational procedures: g. figures correct change through $20.00. |
| **1.4K4** | identifies multiplication and division fact families. |
| **1.4K5** | reads and writes horizontally, vertically, and with different operational symbols the same addition, subtraction, multiplication, or division expression. |
| **1.4K6a** | shows the relationship between these operations with the basic fact families (addition facts with sums from 0 through 20 and corresponding subtraction facts, multiplication facts from 1 x 1 through 12 x 12 and corresponding division facts) including the use of mathematical models: a. addition and subtraction |
| **1.4K6b** | shows the relationship between these operations with the basic fact families (addition facts with sums from 0 through 20 and corresponding subtraction facts, multiplication facts from 1 x 1 through 12 x 12 and corresponding division facts) including the use of mathematical models: b. addition and multiplication. |
| **1.4K6c** | shows the relationship between these operations with the basic fact families (addition facts with sums from 0 through 20 and corresponding subtraction facts, multiplication facts from 1 x 1 through 12 x 12 and corresponding division facts) including the use of mathematical models: c. multiplication and division. |
| **1.4K6d** | shows the relationship between these operations with the basic fact families (addition facts with sums from 0 through 20 and corresponding subtraction facts, multiplication facts from 1 x 1 through 12 x 12 and corresponding division facts) including the use of mathematical models: d. subtraction and division. |
| **1.4K7** | finds factors and multiples of whole numbers from 1 through 100. |
| | |
| **1.4A1a** | solves one- and two-step real-world problems with one or two operations using these computational procedures: a. adds and subtracts whole numbers from 0 through 10,000 and when used as monetary amounts. |
| **1.4A1b** | solves one- and two-step real-world problems with one or two operations using these computational procedures: b. multiplies through a two-digit whole number by a two-digit whole number. |

| | |
|---|---|
| | solves one- and two-step real-world problems with one or two operations using these computational procedures: c. |
| **1.4A1c** | multiplies whole dollar monetary amounts (up through three-digit) by a one-or two-digit whole number . |
| | solves one- and two-step real-world problems with one or two operations using these computational procedures: d. |
| **1.4A1d** | multiplies monetary amounts less than $100 by whole numbers less than ten. |
| | solves one- and two-step real-world problems with one or two operations using these computational procedures: e. |
| **1.4A1e** | figures correct change through $20.00. |
| **1.4A2** | generates a family of multiplication and division facts given one equation/fact. |

**Standard 2. Algebra**
**Benchmark - Patterns**

| | |
|---|---|
| **2.1K1a** | uses concrete objects, drawings, and other representations to work with types of patterns: a. repeating patterns. |
| **2.1K1b** | uses concrete objects, drawings, and other representations to work with types of patterns: b. growing patterns. |
| **2.1K2a** | uses these attributes to generate patterns: a. counting numbers related to number theory. |
| **2.1K2b** | uses these attributes to generate patterns: b. whole numbers that increase or decrease. |
| **2.1K2c** | uses these attributes to generate patterns: c. geometric shapes including one or two attributes changes. |
| **2.1K2d** | uses these attributes to generate patterns: d. measurements. |
| **2.1K2e** | uses these attributes to generate patterns: e. money and time. |
| **2.1K2f** | uses these attributes to generate patterns: f. things related to daily life. |
| **2.1K2g** | uses these attributes to generate patterns: g. things related to size, shape, color, texture, or movement. |
| **2.1K3** | identifies, states and continues a pattern presented in visual various formats including numeric (list or table), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written. |
| **2.1K4a** | generates: a. a pattern (repeating, growing) |
| **2.1K4b** | generates: b. a pattern using a function table (input/output machines, T-tables). |
| **2.1A1a** | generalizes these patterns using a written description: a. counting numbers related to number theory. |
| **2.1A1b** | generalizes these patterns using a written description: b. whole number patterns. |
| **2.1A1c** | generalizes these patterns using a written description: c. patterns using geometric shapes. |
| **2.1A1d** | generalizes these patterns using a written description: d. measurement patterns. |
| **2.1A1e** | generalizes these patterns using a written description: e. money and time patterns. |
| **2.1A1f** | generalizes these patterns using a written description: f. patterns using size, shape, color, texture, or movement. |
| **2.1A2** | recognizes multiple representations of the same pattern. |

**Benchmark - Variables, Equations, and Inequalities**

**2.2K1** explains and uses variables and symbols to represent unknown whole number quantities from 0 through 1,000.

**2.2K2a** solves one-step equations using whole numbers with one variable and a whole number solution that: a. find the unknown in a multiplication or division equation based on the multiplication facts from 1 x 1 through 12 x 12 and corresponding division facts.

**2.2K2b** solves one-step equations using whole numbers with one variable and a whole number solution that: b. find the unknown in a money equation using multiplication and division based upon the facts and addition and subtraction with values through $10.

**2.2K2c** solves one-step equations using whole numbers with one variable and a whole number solution that: c. find the unknown in a time equation involving whole minutes, hours, days, and weeks with values through 200.

**2.2K3** compares two whole numbers from 0 through 10,000 using the equality and inequality symbols (=, <, >) and their corresponding meanings (is equal to, is not equal to, is less than, is greater than).

**2.2K4** reads and writes whole number equations and inequalities using mathematical vocabulary and notation.

**2.2A1** represents real-world problems using variables and symbols with unknown whole number quantities from 0 through 1,000.

**2.2A2a** generates one-step equations to solve real-world problems with one unknown (represented by a variable or symbol) and a whole number solution that: a. add or subtract whole numbers from 0 through 1,000.

**2.2A2b** generates one-step equations to solve real-world problems with one unknown (represented by a variable or symbol) and a whole number solution that: b. multiply or divide using the basic facts.

**2.2A3a** generates: a. real-world problems with one operation to match a given addition, subtraction, multiplication, or division equation using whole numbers through 99.

**2.2A3b** generates: b. number comparison statements using equality and inequality symbols (=, <, >) with whole numbers, measurement, and money.

**Benchmark - Functions**

**2.3K1** states mathematical relationships between whole numbers from 0 through 1,000 using various methods including mental math, paper and pencil, concrete materials, and appropriate technology.

**2.3K2** finds the values, determines the rule, and states the rule using symbolic notation with one operation of whole numbers from 0 through 200 using a horizontal or vertical function table (input/output machine, T-table).

**2.3K3** generalizes numerical patterns using whole numbers from 0 through 200 with one operation by stating the rule using words.

| | |
|---|---|
| **2.3K4** | uses a function table (input/output machine, T-table) to identify, plot, and label the ordered pairs in the first quadrant of a coordinate plane. |
| **2.3A1** | represents and describes mathematical relationships between whole numbers from 0 through 1,000 using concrete objects, pictures, written descriptions, symbols, equations, tables, and graphs. |
| **2.3A2** | finds the rule, states the rule, and extends numerical patterns using real-world applications using whole numbers from 0 through 200. |

**Benchmark - Models**

| | |
|---|---|
| **2.4K1a** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: a. process models (concrete objects, pictures, diagrams, number lines, hundred charts, measurement tools, multiplication arrays, division sets, or coordinate planes/grids) to model computational procedures, mathematical relationships, and equations. |
| **2.4K1b** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: b. place value models (place value mats, hundred charts, base ten blocks, or unifix cubes) to compare, order, and represent numerical quantities and to model computational procedures. |
| **2.4K1c** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: c. fraction and mixed number models (fraction strips or pattern blocks) and decimal models (base ten blocks or coins) to compare, order, and represent numerical quantities. |
| **2.4K1d** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: d. money models (base ten blocks or coins) to compare, order, and represent numerical quantities. |
| **2.4K1e** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: e. function tables (input/output machines, T-tables) to model numerical and algebraic relationships. |
| **2.4K1f** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: f. two-dimensional geometric models (geoboards, dot paper, pattern blocks, or tangrams) to model perimeter, area, and properties of geometric shapes and three-dimensional geometric models (solids) and real-world objects to compare size and to model properties of geometric shapes. |
| **2.4K1g** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: g. two-dimensional geometric models (spinners), three-dimensional models (number cubes), and process models (concrete objects) to model probability. |

| | |
|---|---|
| | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: h. graphs using concrete objects, pictographs, frequency tables, horizontal and vertical bar |
| **2.4K1h** | graphs, line graphs, circle graphs, Venn diagrams, line plots, charts, and tables to organize and display data. |
| | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. |
| **2.4K1i** | Mathematical models include: i. Venn diagrams to sort data and show relationships. |
| **2.4K2** | creates a mathematical model to show the relationship between two or more things. |
| | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: a. process models (concrete objects, pictures, diagrams, number lines, coordinate planes/grids, hundred charts, measurement tools, multiplication arrays, or division sets) to model computational procedures, mathematical |
| **2.4A1a** | relationships, and problem situations. |
| | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: b. place value models (place value mats, hundred charts, base ten blocks, or unfix cubes) to model problem |
| **2.4A1b** | situations. |
| | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: c. fraction and mixed number models (fraction strips or pattern blocks) and decimal models (base ten blocks or |
| **2.4A1c** | coins) to compare, order, and represent numerical quantities. |
| | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models |
| **2.4A1d** | include: d. money models (base ten blocks or coins) to compare, order, and represent numerical quantities. |
| | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models |
| **2.4A1e** | include: e. function tables (input/output machines, T-tables) to model numerical and algebraic relationships. |
| | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: f. two-dimensional geometric models (geoboards, dot paper, pattern blocks, or tangrams) to model perimeter, area, and properties of geometric shapes and three-dimensional geometric models (solids) and real-world objects to |
| **2.4A1f** | compare size and to model properties of geometric shapes. |
| | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: g. two-dimensional geometric models (spinners), three-dimensional geometric models (number cubes), and |
| **2.4A1g** | process models (concrete objects) to model probability. |

| | |
|---|---|
| **2.4A1h** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: h. graphs using concrete objects, pictographs, frequency tables, horizontal and vertical bar graphs, line graphs, Venn diagrams, line plots, charts, and tables to organize, display, explain, and interpret data. |
| **2.4A1i** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: i. Venn diagrams to sort data and show relationships. |
| **2.4A2** | selects a mathematical model and explains why some mathematical models are more useful than other mathematical models in certain situations. |

**Standard 3. Geometry**

**Benchmark - Geometric Figures and their Properties**

| | |
|---|---|
| **3.1K1** | recognizes and investigates properties of plane figures (circles, squares, rectangles, triangles, ellipses, rhombi, octagons, hexagons, pentagons) using concrete objects, drawings, and appropriate technology. |
| **3.1K2** | recognizes, draws, and describes plane figures (circles, squares, rectangles, triangles, ellipses, rhombi, octagons, hexagons, pentagons). |
| **3.1K3** | describes the solids (cubes, rectangular prisms, cylinders, cones, spheres, triangular prisms) using the terms faces, edges, and vertices (corners). |
| **3.1K4** | recognizes and describes the square, triangle, rhombus, hexagon, parallelogram, and trapezoid from a pattern block set. |
| **3.1K5a** | recognizes: a. squares, rectangles, rhombi, parallelograms, trapezoids as special quadrilaterals. |
| **3.1K5b** | recognizes: b.similar and congruent figures. |
| **3.1K5c** | recognizes: c. points, lines (intersecting, parallel, perpendicular), line segments, and rays. |
| **3.1K6** | determines if geometric shapes and real-world objects contain line(s) of symmetry and draws the line(s) of symmetry if the line(s) exist(s). |
| **3.1A1a** | solves real-world problems by applying the properties of: a. plane figures (circles, squares, rectangles, triangles, ellipses, rhombi, parallelograms, hexagons) and lines of symmetry. |
| **3.1A1b** | solves real-world problems by applying the properties of: b. solids (cubes, rectangular prisms, cylinders, cones, spheres). |
| **3.1A2** | identifies the plane figures (circles, squares, rectangles, triangles, ellipses, rhombi, octagons, hexagons, pentagons, trapezoids) used to form a composite figure. |
| **3.2K1** | uses whole number approximations (estimations) for length, width, weight, volume, temperature, time, perimeter, and area using standard and nonstandard units of measure. |

| | |
|---|---|
| **3.2K2a** | selects, explains the selection of, and uses measurement tools, units of measure, and degree of accuracy appropriate for a given situation to measure: a. length, width, and height to the nearest fourth of an inch or to the nearest centimeter. |
| **3.2K2b** | selects, explains the selection of, and uses measurement tools, units of measure, and degree of accuracy appropriate for a given situation to measure: b. volume to the nearest cup, pint, quart, or gallon; to the nearest liter; or to the nearest whole unit of a nonstandard unit. |
| **3.2K2c** | selects, explains the selection of, and uses measurement tools, units of measure, and degree of accuracy appropriate for a given situation to measure: c. weight to the nearest ounce or pound or to the nearest whole unit of a nonstandard unit of measure. |
| **3.2K2d** | selects, explains the selection of, and uses measurement tools, units of measure, and degree of accuracy appropriate for a given situation to measure: d. temperature to the nearest degree. |
| **3.2K2e** | selects, explains the selection of, and uses measurement tools, units of measure, and degree of accuracy appropriate for a given situation to measure: e. time including elapsed time. |
| **3.2K3a** | states: a. the number of weeks in a year. |
| **3.2K3b** | states: b. the number of ounces in a pound. |
| **3.2K3c** | states: c. the number of milliliters in a liter, grams in a kilogram, and meters in a kilometer. |
| **3.2K3d** | states: d. the number of items in a dozen. |
| **3.2K4a** | converts: a. within the customary system: inches and feet, feet and yards, inches and yards, cups and pints, pints and quarts, quarts and gallons. |
| **3.2K4b** | converts: b. within the metric system: centimeters and meters. |
| **3.2K5a** | finds: a. the perimeter of two-dimensional figures given the measures of all the sides. |
| **3.2K5b** | finds: b. the area of squares and rectangles using concrete objects. |
| | |
| **3.2A1a** | solves real-world problems by applying appropriate measurements: a. length to the nearest fourth of an inch. |
| **3.2A1b** | solves real-world problems by applying appropriate measurements: b. length to the nearest centimeter. |
| **3.2A1c** | solves real-world problems by applying appropriate measurements: c. temperature to the nearest degree. |
| **3.2A1d** | solves real-world problems by applying appropriate measurements: d. weight to the nearest whole unit (pounds, grams, nonstandard unit). |
| **3.2A1e** | solves real-world problems by applying appropriate measurements: e. time including elapsed time. |
| **3.2A1f** | solves real-world problems by applying appropriate measurements: f. months in a year. |
| **3.2A1g** | solves real-world problems by applying appropriate measurements: g. minutes in an hour. |
| | |
| **3.2A1h** | solves real-world problems by applying appropriate measurements: h. perimeter of squares, rectangles, and triangles. |

| | |
|---|---|
| **3.2A2** | solves real-world problems that involve conversions within the same measurement system: inches and feet, feet and yards, inches and yards, cups and pints, pints and quarts, quarts and gallons, centimeters and meters. |
| **3.2A3** | estimates to check whether or not measurements and calculations for length, width, weight, volume, temperature, time, and perimeter in real-world problems are reasonable. |

**Benchmark - Transformational Geometry**

| | |
|---|---|
| **3.3K1** | describes a transformation using cardinal points or positional directions. |
| **3.3K2** | recognizes, performs, and describes one transformation (reflection/flip, rotation/turn, translation/slide) on a two-dimensional figure or concrete object. |
| **3.3K3** | recognizes three-dimensional figures (rectangular prisms, cylinders) and concrete objects from various perspectives (top, bottom, sides, corners). |
| **3.3A1** | recognizes real-world transformations (reflection/flip, rotation/turn, translation/slide). |
| **3.3A2** | gives and uses cardinal points or positional directions to move from one location to another on a map or grid . |
| **3.3A3** | describes the properties of geometric shapes or concrete objects that stay the same and the properties that change when a transformation is performed. |

**Benchmark - Geometry from an Algebraic Perspective**

| | |
|---|---|
| **3.4K1** | uses a number line (horizontal/vertical) to model whole number multiplication facts from 1 x 1 through 12 x 12 and corresponding division facts. |
| **3.4K2** | . uses points in the first quadrant of a coordinate plane (coordinate grid) to identify locations. |
| **3.4K3** | identifies and plots points as whole number ordered pairs in the first quadrant of a coordinate plane (coordinate grid). |
| **3.4K4** | organizes whole number data using a T-table and plots the ordered pairs in the first quadrant of a coordinate plane (coordinate grid). |
| **3.4A1** | solves real-world problems that involve distance and location using coordinate planes (coordinate grids) and map grids with positive whole number and letter coordinates. |
| **3.4A2** | solves real-world problems by plotting whole number ordered pairs in the first quadrant of a coordinate plane (coordinate grid). |

**Standard 4. Data**

**Benchmark - Probability**

**4.1K1** recognizes that the probability of an impossible event is zero and that the probability of a certain event is one.

**4.1K2** lists all possible outcomes of a simple event in an experiment or simulation including the use of concrete objects.

**4.1K3** recognizes and states the probability of a simple event in an experiment or simulation.

**4.1A1** makes predictions about a simple event in an experiment or simulation; conducts an experiment or simulation including the use of concrete objects; records the results in a chart, table, or graph; and uses the results to draw conclusions about the event.

**4.1A2** uses the results from a completed experiment or simulation of a simple event to make predictions in a variety of real-world problems.

**4.1A3** compares what should happen (theoretical probability/expected results) with what did happen (empirical probability/experimental results) in an experiment or simulation with a simple event.

**Benchmark - Statistics**

**4.2K1a** organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: a. graphs using concrete objects, (for testing, does not have to use concrete objects in items).

**4.2K1b** organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: b. pictographs with a symbol or picture representing one, two, five, ten, twenty-five, or one-hundred including partial symbols when the symbol represents an even amount.

**4.2K1c** organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: c. frequency tables (tally marks).

**4.2K1d** organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: d. horizontal and vertical bar graphs.

**4.2K1e** organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: e. Venn diagrams or other pictorial displays.

**4.2K1f** organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: f. line plots.

| | |
|---|---|
| **4.2K1g** | organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: g. charts and tables. |
| **4.2K1h** | organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: h. line graphs. |
| **4.2K1i** | organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number intervals using these data displays: i. circle graphs. |
| **4.2K2** | collects data using different techniques (observations, polls, surveys, interviews, or random sampling) and explains the results. |
| **4.2K3a** | identifies, explains, and calculates or finds these statistical measures of a data set with less than ten whole number data points using whole numbers from 0 through 1,000: a. minimum and maximum values. |
| **4.2K3b** | identifies, explains, and calculates or finds these statistical measures of a data set with less than ten whole number data points using whole numbers from 0 through 1,000: b. range. |
| **4.2K3c** | identifies, explains, and calculates or finds these statistical measures of a data set with less than ten whole number data points using whole numbers from 0 through 1,000: c. mode. |
| **4.2K3d** | identifies, explains, and calculates or finds these statistical measures of a data set with less than ten whole number data points using whole numbers from 0 through 1,000: d. median when data set has an odd number of data points. |
| **4.2K3e** | identifies, explains, and calculates or finds these statistical measures of a data set with less than ten whole number data points using whole numbers from 0 through 1,000: e. mean when data set has a whole number mean. |
| **4.2A1a** | interprets and uses data to make reasonable inferences and predictions, answer questions, and make decisions from these data displays: a. graphs using concrete objects. |
| **4.2A1b** | interprets and uses data to make reasonable inferences and predictions, answer questions, and make decisions from these data displays: b. pictographs with a symbol or picture representing one, two, five, ten, twenty-five, or one-hundred including partial symbols when the symbol represents an even amount. |
| **4.2A1c** | interprets and uses data to make reasonable inferences and predictions, answer questions, and make decisions from these data displays: c. frequency tables (tally marks). |
| **4.2A1d** | interprets and uses data to make reasonable inferences and predictions, answer questions, and make decisions from these data displays: d. horizontal and vertical bar graphs. |
| **4.2A1e** | interprets and uses data to make reasonable inferences and predictions, answer questions, and make decisions from these data displays: e. Venn diagrams or other pictorial displays. |

| | |
|---|---|
| **4.2A1f** | interprets and uses data to make reasonable inferences and predictions, answer questions, and make decisions from these data displays: f. line plots. |
| **4.2A1g** | interprets and uses data to make reasonable inferences and predictions, answer questions, and make decisions from these data displays: g. charts and tables. |
| **4.2A1h** | interprets and uses data to make reasonable inferences and predictions, answer questions, and make decisions from these data displays: h. line graphs. |
| **4.2A2a** | uses these statistical measures of a data set using whole numbers from 0 through 1,000 with less than ten whole number data points to make reasonable inferences and predictions, answer questions, and make decisions: a. minimum and maximum values. |
| **4.2A2b** | uses these statistical measures of a data set using whole numbers from 0 through 1,000 with less than ten whole number data points to make reasonable inferences and predictions, answer questions, and make decisions: b. range. |
| **4.2A2c** | uses these statistical measures of a data set using whole numbers from 0 through 1,000 with less than ten whole number data points to make reasonable inferences and predictions, answer questions, and make decisions: c. mode. |
| 4.2A2d | uses these statistical measures of a data set using whole numbers from 0 through 1,000 with less than ten whole number data points tc |
| 4.2A2e | uses these statistical measures of a data set using whole numbers from 0 through 1,000 with less than ten whole number data points tc |
| 4.2A3 | recognizes that the same data set can be displayed in various formats including the use of concrete objects. |
| 4.2A4 | recognizes and explains the effects of scale and interval changes on graphs of whole number data sets. |

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

› make reasonable inferences and predictions, answer questions, and make decisions: d. median when the data set has an odd number of data points.
› make reasonable inferences and predictions, answer questions, and make decisions: e. mean when the data set has a whole number mean.

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

USD #447 Cherryvale-Thayer Schools
MATH

**Fifth**

**Standard 1. Number and Computation**

**Benchmark - Number Sense**

| | |
|---|---|
| **1.1K1a** | knows, explains, and uses equivalent representations for: a. whole numbers from 0 through 1,000,000. |
| **1.1K1b** | knows, explains, and uses equivalent representations for: b. fractions greater than or equal to zero (including mixed numbers). |
| **1.1K1c** | knows, explains, and uses equivalent representations for: c. decimals greater than or equal to zero through hundredths place and when used as monetary amounts. |
| **1.1K2a** | compares and orders: a. integers. |
| **1.1K2b** | compares and orders: b. fractions greater than or equal to zero (including mixed numbers). |
| **1.1K2c** | compares and orders: c. decimals greater than or equal to zero through hundredths place. |
| **1.1K3** | explains the numerical relationships (relative magnitude) between whole numbers, fractions greater than or equal to zero (including mixed numbers), and decimals greater than or equal to zero through hundredths place. |
| **1.1K4** | knows equivalent percents and decimals for one whole, one-half, one-fourth, three-fourths, and one tenth through nine tenths. |
| **1.1K5** | identifies integers and gives real-world problems where integers are used. |
| **1.1A1a.i** | solves real-world problems using equivalent representations and concrete objects to: a. compare and order: i. whole numbers from 0 through 1,000,000. |
| **1.1A1a.ii** | solves real-world problems using equivalent representations and concrete objects to: a. compare and order: ii. fractions greater than or equal to zero (including mixed numbers). |
| **1.1A1a.iii** | solves real-world problems using equivalent representations and concrete objects to: a. compare and order: iii. decimals greater than or equal to zero to hundredths place. |
| **1.1A1a.iv** | solves real-world problems using equivalent representations and concrete objects to: a. compare and order: iv. integers. |
| **1.1A1b** | solves real-world problems using equivalent representations and concrete objects to: b. add and subtract whole numbers from 0 through 100,000 and decimals when used as monetary amounts. |
| **1.1A1c** | solves real-world problems using equivalent representations and concrete objects to: c. multiply through a two-digit whole number by a two-digit whole number. |
| **1.1A1d** | solves real-world problems using equivalent representations and concrete objects to: d. divide through a four-digit whole number by a two-digit whole number. |
| **1.1A2a** | determines whether or not solutions to real-world problems that involve the following are reasonable: a. whole numbers from 0 through 100,000. |

| | |
|---|---|
| **1.1A2b** | determines whether or not solutions to real-world problems that involve the following are reasonable: b. fractions greater than or equal to zero (including mixed numbers). |
| **1.1A3** | decimals greater than or equal to zero through hundredths place. |

**Benchmark - Number Systems and their Properties**

| | |
|---|---|
| **1.2K1** | classifies subsets of numbers as integers, whole number, fractions (including mixed numbers), or decimals. |
| **1.2K2** | identifies prime and composite numbers from 0 through 50. |
| **1.2K3a** | uses the concepts of these properties with whole numbers, integers, fractions greater than or equal to zero (including mixed numbers), and decimals greater than or equal to zero and demonstrates their meaning including the use of concrete objects: a. commutative properties of addition and multiplication. |
| **1.2K3b** | uses the concepts of these properties with whole numbers, integers, fractions greater than or equal to zero (including mixed numbers), and decimals greater than or equal to zero and demonstrates their meaning including the use of concrete objects: b. associative properties of addition and multiplication. |
| **1.2K3c** | uses the concepts of these properties with whole numbers, integers, fractions greater than or equal to zero (including mixed numbers), and decimals greater than or equal to zero and demonstrates their meaning including the use of concrete objects: c. zero property of addition (additive identity) and property of one for multiplication (multiplicative identity). |
| **1.2K3d** | uses the concepts of these properties with whole numbers, integers, fractions greater than or equal to zero (including mixed numbers), and decimals greater than or equal to zero and demonstrates their meaning including the use of concrete objects: d. symmetric property of equality. |
| **1.2K3e** | uses the concepts of these properties with whole numbers, integers, fractions greater than or equal to zero (including mixed numbers), and decimals greater than or equal to zero and demonstrates their meaning including the use of concrete objects: e. zero property of multiplication. |
| **1.2K3f** | uses the concepts of these properties with whole numbers, integers, fractions greater than or equal to zero (including mixed numbers), and decimals greater than or equal to zero and demonstrates their meaning including the use of concrete objects: f. distributive property. |
| **1.2K3g** | uses the concepts of these properties with whole numbers, integers, fractions greater than or equal to zero (including mixed numbers), and decimals greater than or equal to zero and demonstrates their meaning including the use of concrete objects: g. substitution property. |
| **1.2K4** | recognizes Roman Numerals that are used for dates, on clock faces, and in outlines. |
| **1.2K5** | recognizes the need for integers. |
| **1.2A1a** | solves real-world problems with whole numbers from 0 through 100,000 and decimals through hundredths using place value models; money; and the concepts of these properties to explain reasoning: a. commutative and associative properties of addition and multiplication. |

| | |
|---|---|
| **1.2A1b** | solves real-world problems with whole numbers from 0 through 100,000 and decimals through hundredths using place value models; money; and the concepts of these properties to explain reasoning: b. zero property of addition. |
| **1.2A1c** | solves real-world problems with whole numbers from 0 through 100,000 and decimals through hundredths using place value models; money; and the concepts of these properties to explain reasoning: c. property of one for multiplication. |
| **1.2A1d** | solves real-world problems with whole numbers from 0 through 100,000 and decimals through hundredths using place value models; money; and the concepts of these properties to explain reasoning: d. symmetric property of equality. |
| **1.2A1e** | solves real-world problems with whole numbers from 0 through 100,000 and decimals through hundredths using place value models; money; and the concepts of these properties to explain reasoning: e. zero property of multiplication. |
| **1.2A1f** | solves real-world problems with whole numbers from 0 through 100,000 and decimals through hundredths using place value models; money; and the concepts of these properties to explain reasoning: f. distributive property. |
| **1.2A2a** | performs various computational procedures with whole numbers from 0 through 100,000 using the concepts of these properties; extends these properties to fractions greater than or equal to zero (including mixed numbers) and decimals greater than or equal to zero through hundredths place; and explains how the properties were used: a. commutative and associative properties of addition and multiplication. |
| **1.2A2b** | performs various computational procedures with whole numbers from 0 through 100,000 using the concepts of these properties; extends these properties to fractions greater than or equal to zero (including mixed numbers) and decimals greater than or equal to zero through hundredths place; and explains how the properties were used: b. zero property of addition. |
| **1.2A2c** | performs various computational procedures with whole numbers from 0 through 100,000 using the concepts of these properties; extends these properties to fractions greater than or equal to zero (including mixed numbers) and decimals greater than or equal to zero through hundredths place; and explains how the properties were used: c. property of one for multiplication. |
| **1.2A2d** | performs various computational procedures with whole numbers from 0 through 100,000 using the concepts of these properties; extends these properties to fractions greater than or equal to zero (including mixed numbers) and decimals greater than or equal to zero through hundredths place; and explains how the properties were used: d. symmetric property of equality. |

| | |
|---|---|
| **1.2A2e** | performs various computational procedures with whole numbers from 0 through 100,000 using the concepts of these properties; extends these properties to fractions greater than or equal to zero (including mixed numbers) and decimals greater than or equal to zero through hundredths place; and explains how the properties were used: e. zero property of multiplication. |
| **1.2A2f** | performs various computational procedures with whole numbers from 0 through 100,000 using the concepts of these properties; extends these properties to fractions greater than or equal to zero (including mixed numbers) and decimals greater than or equal to zero through hundredths place; and explains how the properties were used: f. distributive property. |
| **1.2A3** | states the reason for using integers, whole numbers, fractions (including mixed numbers), or decimals when solving a given real-world problem. |

**Benchmark - Estimation**

| | |
|---|---|
| **1.3K1** | estimates whole numbers quantities from 0 through 100,000; fractions greater than or equal to zero (including mixed numbers); decimals greater than or equal to zero through hundredths place; and monetary amounts to $10,000 using various computational methods including mental math, paper and pencil, concrete materials, and appropriate technology. |
| **1.3K2** | uses various estimation strategies to estimate whole number quantities from 0 through 100,000; fractions greater than or equal to zero (including mixed numbers); decimals greater than or equal to zero through hundredths place; and monetary amounts to $10,000 and explains how various strategies are used. |
| **1.3K3** | recognizes and explains the difference between an exact and an approximate answer. |
| **1.3K4** | explains the appropriateness of an estimation strategy used and whether the estimate is greater than (overestimate) or less than (underestimate) the exact answer. |
| **1.3A1** | adjusts original estimate using whole numbers from 0 through 100,000 of a real-world problem based on additional information (a frame of reference). |
| **1.3A2** | estimates to check whether or not the result of a real-world problem using whole numbers from 0 through 100,000; fractions greater than or equal to zero (including mixed numbers); decimals greater than or equal to zero to tenths place; and monetary amounts to $10,000 is reasonable and makes predictions based on the information. |
| **1.3A3** | selects a reasonable magnitude from given quantities based on a real-world problem using whole numbers from 0 through 100,000 and explains the reasonableness of selection. |
| **1.3A4** | determines if a real-world problem calls for an exact or approximate answer using whole numbers from 0 through 100,000 and performs the appropriate computation using various computational methods including mental math, paper and pencil, concrete materials, and appropriate technology. |

**Benchmark - Computation**

| | |
|---|---|
| **1.4K1** | computes with efficiency and accuracy using various computational methods including mental math, paper and pencil, concrete materials, and appropriate technology. |
| **1.4K2a** | performs and explains these computational procedures: a. divides whole numbers through a 2-digit divisor and a 4-digit dividend with the remainder as a whole number or a fraction using paper and pencil. |
| **1.4K2b** | performs and explains these computational procedures: b. divides whole numbers beyond a 2-digit divisor and a 4-digit dividend using appropriate technology. |
| **1.4K2c** | performs and explains these computational procedures: c. adds and subtracts decimals from thousands place through hundredths place. |
| **1.4K2d** | performs and explains these computational procedures: d. multiplies decimals up to three digits by two digits from hundreds place through hundredths place. |
| **1.4K2e** | performs and explains these computational procedures: e. adds and subtracts fractions (like and unlike denominators) greater than or equal to zero (including mixed numbers) without regrouping and without expressing answers in simplest form with special emphasis on manipulatives, drawings, and models. |
| **1.4K2f** | performs and explains these computational procedures: f. multiplies and divides by 10; 100; 1,000; or single-digit multiples of each. |
| **1.4K3** | reads and writes horizontally, vertically, and with different operational symbols the same addition, subtraction, multiplication, or division expression. |
| **1.4K4** | identifies, explains, and finds the greatest common factor and least common multiple of two or more whole numbers through the basic multiplication facts from 1 x 1 through 12 x 12.<br>Units: multiplication |
| **1.4A1a** | solves one- and two-step real-world problems using these computational procedures: a. adds and subtracts whole numbers from 0 through 100,000. |
| **1.4A1b** | solves one- and two-step real-world problems using these computational procedures: b. multiplies through a four-digit whole number by a two-digit whole number.<br>Units: multiplication |
| **1.4A1c** | solves one- and two-step real-world problems using these computational procedures: c. multiplies monetary amounts up to $1,000 by a one- or two-digit whole number.<br>Units: multiplication |

| | |
|---|---|
| **1.4A1d** | solves one- and two-step real-world problems using these computational procedures: d. divides whole numbers through a 2-digit divisor and a 4-digit dividend with the remainder as a whole number or a fraction. |
| **1.4A1e** | solves one- and two-step real-world problems using these computational procedures: e. adds and subtracts decimals from thousands place through hundredths place when used as monetary amounts. |
| **1.4A1f** | solves one- and two-step real-world problems using these computational procedures: f. multiplies and divides by 10; 100; and 1,000 and single digit multiples of each. |

**Standard 2. Algebra**
**Benchmark - Patterns**

| | |
|---|---|
| **2.1K1a** | uses concrete objects, drawings, and other representations to work with these types of patterns: a. repeating patterns. |
| **2.1K1b** | uses concrete objects, drawings, and other representations to work with these types of patterns: b. growing patterns. |
| **2.1K2a** | uses these attributes to generate patterns: a. counting numbers related to number theory. |
| **2.1K2b** | uses these attributes to generate patterns: b. whole numbers. |
| **2.1K2c** | uses these attributes to generate patterns: c. geometric shapes through two attribute changes. |
| **2.1K2d** | uses these attributes to generate patterns: d. measurements. |
| **2.1K2e** | uses these attributes to generate patterns: e. things related to daily life. |
| **2.1K2f** | uses these attributes to generate patterns: f. things related to size, shape, color, texture, or movement. |
| **2.1K3** | identifies, states, and continues a pattern presented in various formats including numeric (list or table), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written. |
| **2.1K4a** | generates: a. a pattern (repeating, growing). |
| **2.1K4b** | generates: b. a pattern using a function table (input/output machines, T-tables). |
| **2.1A1a** | generalizes these patterns using a written description: a. numerical patterns. |
| **2.1A1b** | generalizes these patterns using a written description: b. patterns using geometric shapes through two attribute changes. |
| **2.1A1c** | generalizes these patterns using a written description: c. measurement patterns. |
| **2.1A1d** | generalizes these patterns using a written description: d. patterns related to daily life. |
| **2.1A2** | recognizes multiple representations of the same pattern. |

**Benchmark - Variables, Equations, and Inequalities**

| | |
|---|---|
| **2.2K1** | explains and uses variables and symbols to represent unknown whole number quantities from 0 through 1,000 and variable relationships. |

| | |
|---|---|
| **2.2K2** | solves one-step linear equations with one variable and a whole number solution using addition and subtraction with whole numbers from 0 through 100 and multiplication with the basic facts. |
| **2.2K3** | explains and uses equality and inequality symbols and corresponding meanings (is equal to, is not equal to, is less than, is less than or equal to, is greater than, is greater than or equal to) with whole numbers from 0 to 100,000. |
| **2.2K4** | recognizes ratio as a comparison of part-to-part and part-to-whole relationships. |
| **2.2A1** | represents real-world problems using variables, symbols, and one-step equations with unknown whole number quantities from 0 through 1,000. |
| **2.2A2** | generates one-step linear equations to solve real-world problems with whole numbers from 0 through 1,000 with one unknown and a whole number solution using addition, subtraction, multiplication, and division. |
| **2.2A3a** | generates: a. a real-world problem with one operation to match a given addition, subtraction, multiplication, or division equation using whole numbers from 0 through 1,000. |
| **2.2A3b** | generates: b. number comparison statements using equality and inequality symbols (=, <, >) with whole numbers, measurement, and money. |

**Benchmark - Functions**

| | |
|---|---|
| **2.3K1** | states mathematical relationships between whole numbers from 0 through 10,000 using various methods including mental math, paper and pencil, concrete objects, and appropriate technology. |
| **2.3K2** | finds the values, determines the rule, and states the rule using symbolic notation with one operation of whole numbers from 0 through 10,000 using a vertical or horizontal function table (input/output machine, T-table). |
| **2.3K3** | generalizes numerical patterns using whole numbers from 0 through 5,000 up to two operations by stating the rule using words. |
| **2.3K4** | uses a function table (input/output machine, T-table) to identify, plot, and label whole number ordered pairs in the first quadrant of a coordinate plane. |
| **2.3K5** | plots and locates points for integers (positive and negative whole numbers) on a horizontal number line and vertical number line. |
| **2.3K6** | describes whole number relationships using letters and symbols. |
| **2.3A1** | represents and describes mathematical relationships between whole numbers from 0 through 5,000 using written and oral descriptions, tables, graphs, and symbolic notation. |
| **2.3A2** | finds the rule, states the rule, and extends numerical patterns using real-world problems with whole numbers from 0 through 5,000. |

| | |
|---|---|
| **2.3A3** | translates between verbal, numerical, and graphical representations including the use of concrete objects to describe mathematical relationships. |

**Benchmark - Models**

| | |
|---|---|
| **2.4K1a** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: a. process models (concrete objects, pictures, diagrams, number lines, hundred charts, measurement tools, multiplication arrays, division sets, or coordinate planes/grids) to model computational procedures and mathematical relationships and to solve equations. |
| **2.4K1b** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: b. place value models (place value mats, hundred charts, base ten blocks, or unifix cubes) to compare, order, and represent numerical quantities and to model computational procedures. |
| **2.4K1c** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: c. fraction and mixed number models (fraction strips or pattern blocks) and decimal and money models (base ten blocks or coins) to compare, order, and represent numerical quantities. |
| **2.4K1d** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: d. factor trees to find least common multiple and greatest common factor. |
| **2.4K1e** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: e. equations and inequalities to model numerical relationships. |
| **2.4K1f** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: f. function tables (input/output machines, T-tables) to model numerical and algebraic relationships. |
| **2.4K1g** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: g. two-dimensional geometric models (geoboards or dot paper) to model perimeter, area, and properties of geometric shapes and three-dimensional models (nets or solids) and real-world objects to compare size and to model volume and properties of geometric shapes. |
| **2.4K1h** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: h. tree diagrams to organize attributes through three different sets and determine the number of possible combination. |

| | |
|---|---|
| **2.4K1i** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: i. two- and three-dimensional geometric models (spinners or number cubes) and process models (concrete objects, pictures, diagrams, or coins) to model probability. |
| **2.4K1j** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: j. graphs using concrete objects, pictographs, frequency tables, bar graphs, line graphs, circle graphs, Venn diagrams, line plots, charts, tables, and single stem-and-leaf plots to organize and display data. |
| **2.4K1k** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: k. Venn diagrams to sort data and show relationships. |
| **2.4K2** | creates mathematical models to show the relationship between two or more things. |
| **2.4A1a** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: a. process models (concrete objects, pictures, diagrams, number lines, hundred charts, measurement tools, multiplication arrays, division sets, or coordinate planes/grids) to model computational procedures, mathematical relationships, and problem situations and to solve equations. |
| **2.4A1b** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: b. place value models (place value mats, hundred charts, base ten blocks, or unifix cubes) to model problem situations. |
| **2.4A1c** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: c. fraction and mixed number models (fraction strips or pattern blocks) and decimal and money models (base ten blocks or coins) to compare, order, and represent numerical quantities. |
| **2.4A1d** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: d. factor trees to find least common multiple and greatest common factor. |
| **2.4A1e** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: e. equations and inequalities to model numerical relationships. |
| **2.4A1f** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: f. function tables (input/output machines, T-tables) to model numerical and algebraic relationships. |
| **2.4A1g** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: g. two-dimensional geometric models (geoboards or dot paper) to model perimeter, area, and properties of geometric shapes and three-dimensional models (nets or solids) and real-world objects to compare size and to model volume and properties of geometric shapes. |

| | |
|---|---|
| **2.4A1h** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: h. scale drawings to model large and small real-world objects. |
| **2.4A1i** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: i. tree diagrams to organize attributes through three different sets and determine the number of possible combinations. |
| **2.4A1j** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: j. two- and three-dimensional geometric models (spinners or number cubes) and process models (concrete objects, pictures, diagrams, or coins) to model probability. |
| **2.4A1k** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: k. graphs using concrete objects, pictographs, frequency tables, bar graphs, line graphs, circle graphs, Venn diagrams, line plots, charts, and tables to organize, display, explain, and interpret data. |
| **2.4A1l** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: l. Venn diagrams to sort data and show relationships. |
| **2.4A2** | selects a mathematical model and explains why some mathematical models are more useful than other mathematical models in certain situations. |

**Standard 3. Geometry**

**Benchmark - Geometric Figures and Their Properties**

| | |
|---|---|
| **3.1K1** | recognizes and investigates properties of plane figures and solids using concrete objects, drawings, and appropriate technology. |
| **3.1K2a** | recognizes and describes: a. regular polygons having up to and including ten sides. |
| **3.1K2b** | recognizes and describes: b. similar and congruent figures. |
| **3.1K3** | recognizes and describes the solids (cubes, rectangular prisms, cylinders, cones, spheres, triangular prisms, rectangular pyramids, triangular pyramids) using the terms faces, edges, and vertices (corners). |
| **3.1K4** | determines if geometric shapes and real-world objects contain line(s) of symmetry and draws the line(s) of symmetry if the line(s) exist(s). |
| **3.1K5a** | recognizes, draws, and describes: a. points, lines, line segments, and rays. |
| **3.1K5b** | recognizes, draws, and describes: b. angles as right, obtuse, or acute. |
| **3.1K6** | recognizes and describes the difference between intersecting, parallel, and perpendicular lines. |
| **3.1K7** | identifies circumference, radius, and diameter of a circle. |
| **3.1A1a** | solves real-world problems by applying the properties of: a. plane figures (circles, squares, rectangles, triangles, ellipses, rhombi, parallelograms, hexagons, pentagons) and the line(s) of symmetry. |

| | |
|---|---|
| **3.1A1b** | solves real-world problems by applying the properties of: b. solids (cubes, rectangular prisms, cylinders, cones, spheres, triangular prisms) emphasizing faces, edges, vertices, and bases. |
| **3.1A1c** | solves real-world problems by applying the properties of: c. intersecting, parallel, and perpendicular lines. |
| **3.1A2** | identifies the plane figures (circles, squares, rectangles, triangles, ellipses, rhombi, octagons, pentagons, hexagons, trapezoids, parallelograms) used to form a composite figure. |

**Benchmark - Measurement and Estimation**

| | |
|---|---|
| **3.2K1** | determines and uses whole number approximations (estimations) for length, width, weight, volume, temperature, time, perimeter, and area using standard and nonstandard units of measure. |
| **3.2K2a** | selects, explains the selection of, and uses measurement tools, units of measure, and degree of accuracy appropriate for a given situation to measure length, width, weight, volume, temperature, time, perimeter, and area using: a. customary units of measure to the nearest fourth and eighth inch. |
| **3.2K2b** | selects, explains the selection of, and uses measurement tools, units of measure, and degree of accuracy appropriate for a given situation to measure length, width, weight, volume, temperature, time, perimeter, and area using: b. metric units of measure to the nearest centimeter. |
| **3.2K2c** | selects, explains the selection of, and uses measurement tools, units of measure, and degree of accuracy appropriate for a given situation to measure length, width, weight, volume, temperature, time, perimeter, and area using: c. nonstandard units of measure to the nearest whole unit. |
| **3.2K2d** | selects, explains the selection of, and uses measurement tools, units of measure, and degree of accuracy appropriate for a given situation to measure length, width, weight, volume, temperature, time, perimeter, and area using: d. time including elapsed time. |
| **3.2K3** | states the number of feet and yards in a mile. |
| **3.2K4a** | converts: a. within the customary system: inches and feet, feet and yards, inches and yards, cups and pints, pints and quarts, quarts and gallons, pounds and ounces. |
| **3.2K4b** | converts: b. within the metric system: centimeters and meters, meters and kilometers, milliliters and liters, grams and kilograms. |
| **3.2K5** | knows and uses perimeter and area formulas for squares and rectangles. |
| **3.2A1a** | solves real-world problems by applying appropriate measurements and measurement formulas: a. length to the nearest eighth of an inch or to the nearest centimeter. |
| **3.2A1b** | solves real-world problems by applying appropriate measurements and measurement formulas: b. temperature to the nearest degree. |
| **3.2A1c** | solves real-world problems by applying appropriate measurements and measurement formulas: c. weight to the nearest whole unit (pounds, grams, nonstandard units). |

| | |
|---|---|
| **3.2A1d** | solves real-world problems by applying appropriate measurements and measurement formulas: d. time including elapsed time. |
| **3.2A1e** | solves real-world problems by applying appropriate measurements and measurement formulas: e. hours in a day, days in a week, and days and weeks in a year. |
| **3.2A1f** | solves real-world problems by applying appropriate measurements and measurement formulas: f. months in a year and minutes in an hour. |
| **3.2A1g** | solves real-world problems by applying appropriate measurements and measurement formulas: g. perimeter of squares, rectangles and triangles. |
| **3.2A1h** | solves real-world problems by applying appropriate measurements and measurement formulas: h. area of squares and rectangles. |
| **3.2A2** | solves real-world problems that involve conversions within the same measurement system: inches and feet, feet and yards, inches and yards, cups and pints, pints and quarts, quarts and gallons, centimeters and meters. |
| **3.2A3** | estimates to check whether or not measurements or calculations for length, weight, temperature, time, perimeter, and area in real-world problems are reasonable. |
| **3.2A4** | adjusts original measurement or estimation for length, width, weight, volume, temperature, time, and perimeter in real-world problems based on additional information (a frame of reference). |

**Benchmark - Transformational Geometry**

| | |
|---|---|
| **3.3K1** | recognizes and performs through two transformations (reflection, rotation, translation) on a two-dimensional figure. |
| **3.3K2** | recognizes when an object is reduced or enlarged. |
| **3.3K3** | recognizes three-dimensional figures (rectangular prisms, cylinders, cones, spheres, triangular prisms, rectangular pyramids) from various perspectives (top, bottom, side, corners). |
| **3.3A1** | describes and draws a two-dimensional figure after performing one transformation (reflection, rotation, translation). |
| **3.3A2** | makes scale drawings of two-dimensional figures using a simple scale and grid paper. |

**Benchmark - Geometry from an Algebraic Perspective**

| | |
|---|---|
| **3.4K1** | locates and plots points on a number line (vertical/horizontal) using integers (positive and negative whole numbers). |
| **3.4K2** | explains mathematical relationships between whole numbers, fractions, and decimals and where they appear on a number line. |
| **3.4K3** | identifies and plots points as ordered pairs in the first quadrant of a coordinate plane (coordinate grid). |

| | |
|---|---|
| **3.4K4** | organizes whole number data using a T-table and plots the ordered pairs in the first quadrant of a coordinate plane (coordinate grid). |
| **3.4A1** | solves real-world problems that involve distance and location using coordinate planes (coordinate grids) and map grids with positive whole number and letter coordinates. |
| **3.4A2** | solves real-world problems by plotting ordered pairs in the first quadrant of a coordinate plane (coordinate grid). |

**Standard 4. Data**

**Benchmark - Probability**

| | |
|---|---|
| **4.1K1** | recognizes that all probabilities range from zero (impossible) through one (certain). |
| **4.1K2** | lists all possible outcomes of a simple event in an experiment or simulation in an organized manner including the use of concrete objects. |
| **4.1K3** | recognizes a simple event in an experiment or simulation where the probabilities of all outcomes are equal. |
| **4.1K4** | represents the probability of a simple event in an experiment or simulation using fractions. |
| **4.1A1** | conducts an experiment or simulation with a simple event including the use of concrete materials; records the results in a chart, table, or graph; uses the results to draw conclusions about the event; and makes predictions about future events. |
| **4.1A2** | uses the results from a completed experiment or simulation of a simple event to make predictions in a variety of real-world situations. |
| **4.1A3** | compares what should happen (theoretical probability/expected results) with what did happen (empirical probability/experimental results) in an experiment or simulation with a simple event. |

**Benchmark - Statistics**

| | |
|---|---|
| **4.2K1a** | organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number and decimal intervals using these data displays: a. graphs using concrete objects. |
| **4.2K1b** | organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number and decimal intervals using these data displays: b. pictographs. |
| **4.2K1c** | organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number and decimal intervals using these data displays: c. frequency tables. |

| | |
|---|---|
| **4.2K1d** | organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number and decimal intervals using these data displays: d. bar and line graphs. |
| **4.2K1e** | organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number and decimal intervals using these data displays: e. Venn diagrams and other pictorial displays. |
| **4.2K1f** | organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number and decimal intervals using these data displays: f. line plots. |
| **4.2K1g** | organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number and decimal intervals using these data displays: g. charts and tables. |
| **4.2K1h** | organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number and decimal intervals using these data displays: h. circle graphs. |
| **4.2K1i** | organizes, displays, and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including a title, labels, categories, and whole number and decimal intervals using these data displays: i. single stem-and-leaf plots. |
| **4.2K2** | collects data using different techniques (observations, polls, tallying, interviews, surveys, or random sampling) and explains the results. |
| **4.2K3a** | identifies, explains, and calculates or finds these statistical measures of a whole number data set of up to twenty whole number data points from 0 through 1,000: a. minimum and maximum values. |
| **4.2K3b** | identifies, explains, and calculates or finds these statistical measures of a whole number data set of up to twenty whole number data points from 0 through 1,000: b. range. |
| **4.2K3c** | identifies, explains, and calculates or finds these statistical measures of a whole number data set of up to twenty whole number data points from 0 through 1,000: c. mode(no-, uni-, bi-). |
| **4.2K3d** | identifies, explains, and calculates or finds these statistical measures of a whole number data set of up to twenty whole number data points from 0 through 1,000: d. median (including answers expressed as a decimal or a fraction without reducing to simplest form). |
| **4.2K3e** | identifies, explains, and calculates or finds these statistical measures of a whole number data set of up to twenty whole number data points from 0 through 1,000: e. mean (including answers expressed as a decimal or a fraction without reducing to simplest form). |
| **4.2A1a** | interprets and uses data to make reasonable inferences, predictions, and decisions, and to develop convincing arguments from these data displays: a. graphs using concrete materials. |

| | |
|---|---|
| **4.2A1b** | interprets and uses data to make reasonable inferences, predictions, and decisions, and to develop convincing arguments from these data displays: b. pictographs. |
| **4.2A1c** | interprets and uses data to make reasonable inferences, predictions, and decisions, and to develop convincing arguments from these data displays: c. frequency tables. |
| **4.2A1d** | interprets and uses data to make reasonable inferences, predictions, and decisions, and to develop convincing arguments from these data displays: d. bar and line graphs. |
| **4.2A1e** | interprets and uses data to make reasonable inferences, predictions, and decisions, and to develop convincing arguments from these data displays: e. Venn diagrams and other pictorial displays. |
| **4.2A1f** | interprets and uses data to make reasonable inferences, predictions, and decisions, and to develop convincing arguments from these data displays: f. line plots. |
| **4.2A1g** | interprets and uses data to make reasonable inferences, predictions, and decisions, and to develop convincing arguments from these data displays: g. charts and tables. |
| **4.2A1h** | interprets and uses data to make reasonable inferences, predictions, and decisions, and to develop convincing arguments from these data displays: h. circle graphs. |
| **4.2A2a** | uses these statistical measures of a whole number data set to make reasonable inferences and predictions, answer questions, and make decisions: a. minimum and maximum values. |
| **4.2A2b** | uses these statistical measures of a whole number data set to make reasonable inferences and predictions, answer questions, and make decisions: b. range. |
| **4.2A2c** | uses these statistical measures of a whole number data set to make reasonable inferences and predictions, answer questions, and make decisions: c. mode. |
| **4.2A2d** | uses these statistical measures of a whole number data set to make reasonable inferences and predictions, answer questions, and make decisions: d. median. |
| **4.2A2e** | uses these statistical measures of a whole number data set to make reasonable inferences and predictions, answer questions, and make decisions: e. mean when the data set has a whole number mean. |
| **4.2A3** | recognizes that the same data set can be displayed in various formats and discusses why a particular format may be more appropriate than another. |
| **4.2A4** | recognizes and explains the effects of scale and interval changes on graphs of whole number data sets. |

**Sixth**

**Standard 1. Number Sense and Computation**

**Benchmark - Number Sense**

| | |
|---|---|
| **1.1K1** | knows, explains, and uses equivalent representations for rational numbers expressed as fractions, terminating decimals, and percents; positive rational number bases with whole number exponents; time; and money. |
| **1.1K2a** | compares and orders: a. integers. |
| **1.1K2b** | compares and orders: b. fractions greater than or equal to zero. |
| **1.1K2c** | compares and orders: c. decimals greater than or equal to zero through thousandths place. |
| **1.1K3** | explains the relative magnitude between whole numbers, fractions greater than or equal to zero, and decimals greater than or equal to zero. |
| **1.1K4** | knows and explains numerical relationships between percents, decimals, and fractions between 0 and 1. |
| **1.1K5** | uses equivalent representations for the same simple algebraic expression with understood coefficients of 1. |
| **1.1A1a** | generates and/or solves real-world problems using equivalent representations of: a. integers. |
| **1.1A1b** | generates and/or solves real-world problems using equivalent representations of: b. fractions greater than or equal to zero. |
| **1.1A1c** | generates and/or solves real-world problems using equivalent representations of: c. decimals greater than or equal to zero through thousandths place. |
| **1.1A2a** | determines whether or not solutions to real-world problems that involve the following are reasonable: a. integers |
| **1.1A2b** | determines whether or not solutions to real-world problems that involve the following are reasonable: b. fractions greater than or equal to zero. |
| **1.1A2c** | determines whether or not solutions to real-world problems that involve the following are reasonable: c. decimals greater than or equal to zero through thousandths place. |

**Benchmark - Number Systems and their Properties**

| | |
|---|---|
| **1.2K1** | classifies subsets of the rational number system as counting (natural) numbers, whole numbers, integers, fractions (including mixed numbers), or decimals. |
| **1.2K2** | identifies prime and composite numbers and explains their meaning. |
| **1.2K3a** | uses and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: a. commutative and associative properties of addition and multiplication. |

| | |
|---|---|
| **1.2K3b** | uses and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: b. identity properties for addition and multiplication. |
| **1.2K3c** | uses and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: c. symmetric property of equality. |
| **1.2K3d** | uses and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: d. zero property of multiplication. |
| **1.2K3e** | uses and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: e. distributive property. |
| **1.2K3f** | uses and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: f. substitution property. |
| **1.2K3g** | uses and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: g. addition property of equality. |
| **1.2K3h** | uses and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: h. multiplication property of equality. |
| **1.2K3i** | uses and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: i. additive inverse property. |
| **1.2K4** | recognizes and explains the need for integers. |
| **1.2K5** | recognizes that the irrational number pi can be represented by an approximate rational value. |
| **1.2A1a** | generates and/or solves real-world problems with rational numbers using the concepts of these properties to explain reasoning: a. commutative and associative properties for addition and multiplication. |
| **1.2A1b** | generates and/or solves real-world problems with rational numbers using the concepts of these properties to explain reasoning: b. additive and multiplicative identities. |
| **1.2A1c** | generates and/or solves real-world problems with rational numbers using the concepts of these properties to explain reasoning: c. symmetric property of equality. |
| **1.2A1d** | generates and/or solves real-world problems with rational numbers using the concepts of these properties to explain reasoning: d. distributive property. |
| **1.2A1e** | generates and/or solves real-world problems with rational numbers using the concepts of these properties to explain reasoning: e. substitution property. |
| **1.2A1f** | generates and/or solves real-world problems with rational numbers using the concepts of these properties to explain reasoning: f. addition property of equality. |
| **1.2A1g** | generates and/or solves real-world problems with rational numbers using the concepts of these properties to explain reasoning: g. multiplication property of equality. |
| **1.2A1h** | generates and/or solves real-world problems with rational numbers using the concepts of these properties to explain reasoning: h. additive inverse property. |

| | |
|---|---|
| **1.2A2** | analyzes and evaluates the advantages and disadvantages of using integers, whole numbers, fractions (including mixed numbers), decimals, or the irrational number pi and its rational approximations in solving a given real-world problem. |

**Benchmark - Estimation**

| | |
|---|---|
| **1.3K1** | estimates quantities with combinations of rational numbers and/or the irrational number pi using various computational methods including mental math, paper and pencil, concrete objects, and/or appropriate technology. |
| **1.3K2** | uses various estimation strategies and explains how they were used to estimate rational number quantities or the irrational number pi.<br>Units: Past Mastery |
| **1.3K3** | recognizes and explains the difference between an exact and an approximate answer. |
| **1.3K4** | determines the appropriateness of an estimation strategy used and whether the estimate is greater than (overestimate) or less than (underestimate) the exact answer and its potential impact on the result. |
| **1.3A1** | adjusts original rational number estimate of a real-world problem based on additional information (a frame of reference). |
| **1.3A2** | estimates to check whether or not the result of a real-world problem using rational numbers is reasonable and makes predictions based on the information.<br>Units: Past Mastery, Just the Basics |
| **1.3A3** | selects a reasonable magnitude from given quantities based on a real-world problem and explains the reasonableness of the selection. |
| **1.3A4** | determines if a real-world problem calls for an exact or approximate answer and performs the appropriate computation using various computational methods including mental math, paper and pencil, concrete objects, or appropriate technology. |

**Benchmark - Computation**

| | |
|---|---|
| **1.4K1** | computes with efficiency and accuracy using various computational methods including mental math, paper and pencil, concrete objects, and appropriate technology. |
| **1.4K2a** | performs and explains these computational procedures: a. divides whole numbers through a two-digit divisor and a four-digit dividend and expresses the remainder as a whole number, fraction, or decimal. |
| **1.4K2b** | performs and explains these computational procedures: b. adds and subtracts decimals from millions place through thousandths place. |
| **1.4K2c** | performs and explains these computational procedures: c. multiplies and divides a four-digit number by a two-digit number using numbers from thousands place through hundredths place. |

| | |
|---|---|
| **1.4K2d** | performs and explains these computational procedures: d. multiplies and divides using numbers from thousands place through thousandths place by 10; 100; 1,000; .1; .01; .001; or single-digit multiples of each. |
| **1.4K2e** | performs and explains these computational procedures: e. adds integers. |
| **1.4K2f** | performs and explains these computational procedures: f. adds, subtracts, and multiplies fractions (including mixed numbers) expressing answers in simplest form. |
| **1.4K2g** | performs and explains these computational procedures: g. finds the root of perfect whole number squares. |
| **1.4K2h** | performs and explains these computational procedures: h. uses basic order of operations (multiplication and division in order from left to right, then addition and subtraction in order from left to right) with whole numbers. |
| **1.4K2i** | performs and explains these computational procedures: i. adds, subtracts multiplies, and divides rational numbers using concrete objects. |
| **1.4K3** | recognizes, describes, and uses different representations to express the same computational procedures. |
| **1.4K4** | identifies, explains, and finds the prime factorization of whole numbers. |
| **1.4K5** | finds prime factors, greatest common factor, multiples, and the least common multiple. |
| **1.4K6** | finds a whole number percent (between 0 and 100) of a whole number. |
| **1.4A1a** | generates and/or solves one- and two-step real-world problems with rational numbers using these computational procedures: a. division with whole numbers. |
| **1.4A1b** | generates and/or solves one- and two-step real-world problems with rational numbers using these computational procedures: b.Â  addition, subtraction, multiplication, and division of decimals through hundredths place. |
| **1.4A1c** | generates and/or solves one- and two-step real-world problems with rational numbers using these computational procedures: c. addition, subtraction, and multiplication of fractions (including mixed numbers). |

**Standard 2. Algebra**

**Benchmark - Patterns**

| | |
|---|---|
| **2.1K1a** | identifies, states, and continues a pattern presented in various formats including numeric (list or table), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written using these attributes include: a. counting numbers including perfect squares, and factors and multiples. |

| | |
|---|---|
| **2.1K1b** | identifies, states, and continues a pattern presented in various formats including numeric (list or table), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written using these attributes include: b. positive rational numbers limited to two operations (addition, subtraction, multiplication, division) including arithmetic sequences (a sequence of numbers in which the difference of two consecutive numbers is the same). |
| **2.1K1c** | identifies, states, and continues a pattern presented in various formats including numeric (list or table), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written using these attributes include: c. geometric figures through two attribute changes. |
| **2.1K1d** | identifies, states, and continues a pattern presented in various formats including numeric (list or table), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written using these attributes include: d. measurements. |
| **2.1K1e** | identifies, states, and continues a pattern presented in various formats including numeric (list or table), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written using these attributes include: e. things related to daily life. |
| **2.1K2** | generates a pattern (repeating, growing). |
| **2.1K3** | extends a pattern when given a rule of one or two simultaneous operational changes (addition, subtraction, multiplication, division) between consecutive terms. |
| **2.1K4** | states the rule to find the next number of a pattern with one operational change (addition, subtraction, multiplication, division) to move between consecutive terms. |
| **2.1A1** | recognizes the same general pattern presented in different representations [numeric (list or table), visual (picture, table, or graph), and written]. |
| **2.1A2** | recognizes multiple representations of the same pattern. |

**Benchmark - Variables, Equations, and Inequalities**

| | |
|---|---|
| **2.2K1** | explains and uses variables and/or symbols to represent unknown quantities and variable relationships. |
| **2.2K2** | uses equivalent representations for the same simple algebraic expression with understood coefficients of 1. |
| **2.2K3a** | solves: a. one-step linear equations (addition, subtraction, multiplication, division) with one variable and whole number solutions. |
| **2.2K3b** | solves: b. one-step linear inequalities(addition, subtraction) in one variable with whole numbers. |
| **2.2K4** | explains and uses equality and inequality symbols and corresponding meanings (is equal to, is not equal to, is less than, is less than or equal to, is greater than, is greater than or equal to) to represent mathematical relationships with positive rational numbers. |

| | |
|---|---|
| **2.2K5** | knows and uses the relationship between ratios, proportions, and percents and finds the missing term in simple proportions where the missing term is a whole number. |
| **2.2K6** | finds the value of algebraic expressions using whole numbers. |
| **2.2A1a** | represents real-world problems using variables and symbols to: a. write algebraic or numerical expressions or one-step equations (addition, subtraction, multiplication, division) with whole number solutions. |
| **2.2A1b** | represents real-world problems using variables and symbols to: b. write and/or solve one-step equations (addition, subtraction, multiplication, and division). |
| **2.2A2** | generates real-world problems that represent simple expressions or one-step linear equations (addition, subtraction, multiplication, division) with whole number solutions. |
| **2.2A3** | explains the mathematical reasoning that was used to solve a real-world problem using a one-step equation (addition, subtraction, multiplication, division). |

**Benchmark - Functions**

| | |
|---|---|
| **2.3K1** | recognizes linear relationships using various methods including mental math, paper and pencil, concrete objects, and graphing utilities or appropriate technology. |
| **2.3K2** | finds the values and determines the rule with one operation using a function table (input/output machine, T-table). |
| **2.3K3** | generalizes numerical patterns up to two operations by stating the rule using words. |
| **2.3K4** | uses a given function table (input/output machine, T-table) to identify, plot, and label the ordered pairs using the four quadrants of a coordinate plane. |
| **2.3A1** | represents a variety of mathematical relationships using written and oral descriptions of the rule, tables, graphs, and when possible, symbolic notation. |
| **2.3A2** | interprets and describes the mathematical relationships of numerical, tabular, and graphical representations. |

**Benchmark - Models**

| | |
|---|---|
| **2.4K1a** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: a. process models (concrete objects, pictures, diagrams, number lines, hundred charts, measurement tools, multiplication arrays, division sets, or coordinate planes/grids) to model computational procedures and mathematical relationships and to solve equations. |
| **2.4K1b** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: b. place value models (place value mats, hundred charts, base ten blocks, or unifix cubes) to compare, order, and represent numerical quantities and to model computational procedures. |

| | |
|---|---|
| **2.4K1c** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: c. fraction and mixed number models (fraction strips or pattern blocks) and decimal and money models (base ten blocks or coins) to compare, order, and represent numerical quantities. |
| **2.4K1d** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: d. factor trees to find least common multiple and greatest common factor. |
| **2.4K1e** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: e. equations and inequalities to model numerical relationships. |
| **2.4K1f** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: f. function tables (input/output machines, T-tables) to model numerical and algebraic relationships. |
| **2.4K1g** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: g. two-dimensional geometric models (geoboards or dot paper) to model perimeter, area, and properties of geometric shapes and three-dimensional geometric models (nets or solids) and real-world objects to model volume and to identify attributes (faces, edges, vertices, bases) of geometric shapes. |
| **2.4K1h** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: h. tree diagrams to organize attributes and determine the number of possible combinations. |
| **2.4K1i** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: i. graphs using concrete objects, two- and three-dimensional geometric models (spinners or number cubes) and process models (concrete objects, pictures, diagrams, or coins) to model probability. |
| **2.4K1j** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: j. frequency tables, bar graphs, line graphs, circle graphs, Venn diagrams, line plots, charts, tables, single stem-and-leaf plots, and scatter plots to organize and display data. |
| **2.4K1k** | knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include: k. Venn diagrams to sort data and to show relationships. |
| **2.4K2** | uses one or more mathematical models to show the relationship between two or more things. |

| | |
|---|---|
| **2.4A1a** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: a. process models (concrete objects, pictures, diagrams, number lines, hundred charts, measurement tools, multiplication arrays, division sets, or coordinate planes/grids) to model computational procedures and mathematical relationships, to represent problem situations, and to solve equations. |
| **2.4A1b** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: b. place value models (place value mats, hundred charts, base ten blocks, or unifix cubes) to model problem situations. |
| **2.4A1c** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: c. fraction and mixed number models (fraction strips or pattern blocks) and decimal and money models (base ten blocks or coins) to compare, order, and represent numerical quantities. |
| **2.4A1d** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: d. factor trees to find least common multiple and greatest common factor. |
| **2.4A1e** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: e. equations and inequalities to model numerical relationships. |
| **2.4A1f** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: f. function tables (input/output machines, T-tables) to model numerical and algebraic relationships. |
| **2.4A1g** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: g. two-dimensional geometric models (geoboards or dot paper) to model perimeter, area, and properties of geometric shapes and three-dimensional geometric models (nets or solids) and real-world objects to model volume and to identify attributes (faces, edges, vertices, bases) of geometric shapes. |
| **2.4A1h** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: h. scale drawings to model large and small real-world objects. |
| **2.4A1i** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: i. tree diagrams to organize attributes and determine the number of possible combinations. |
| **2.4A1j** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: j. two- and three-dimensional geometric models (spinners or number cubes) and process models (concrete objects, pictures, diagrams, or coins) to model probability. |

| | |
|---|---|
| **2.4A1k** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: k. graphs using concrete objects, frequency tables, bar graphs, line graphs, circle graphs, Venn diagrams, line plots, charts, tables, and single stem-and-leaf plots to organize, display, explain, and interpret data. |
| **2.4A1l** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: l. Venn diagrams to sort data and to show relationships. |
| **2.4A2** | selects a mathematical model and justifies why some mathematical models are more accurate than other mathematical models in certain situations. |

**Benchmark - Geometric Figures and their Properties**

| | |
|---|---|
| **3.1K1** | recognizes and compares properties of plane figures and solids using concrete objects, constructions, drawings, and appropriate technology. |
| **3.1K2** | recognizes and names regular and irregular polygons through 10 sides including all special types of quadrilaterals: squares, rectangles, parallelograms, rhombi, trapezoids, kites. |
| **3.1K3** | names and describes the solids [prisms (rectangular and triangular), cylinders, cones, spheres, and pyramids (rectangular and triangular)] using the terms faces, edges, vertices, and bases.. |
| **3.1K4** | recognizes all existing lines of symmetry in two-dimensional figures. |
| **3.1K5** | recognizes and describes the attributes of similar and congruent figures. |
| **3.1K6** | recognizes and uses symbols for angle (find symbol for), line, line segment, ray, parallel, and perpendicular. |
| **3.1K7a** | classifies: a. angles as right, obtuse, acute, or straight. |
| **3.1K7b** | classifies: b. triangles as right, obtuse, acute, scalene, isosceles, or equilateral. |
| **3.1K8** | identifies and defines circumference, radius, and diameter of circles and semicircles. |
| **3.1K9** | recognize that the sum of the angles of a triangle equals 180Â°. |
| **3.1K10** | determines the radius or diameter of a circle given one or the other. |
| **3.1A1a** | solves real-world problems by applying the properties of: a. plane figures (regular polygons through 10 sides, circles, and semicircles) and the line(s) of symmetry. |
| **3.1A1b** | solves real-world problems by applying the properties of: b. solids (cubes, rectangular prisms, cylinders, cones, spheres, triangular prisms) emphasizing faces, edges, vertices, and bases. |
| **3.1A1c** | solves real-world problems by applying the properties of: c. intersecting, parallel, and perpendicular lines. |
| **3.1A2a** | decomposes geometric figures made from: a. regular and irregular polygons through 10 sides, circles, and semicircles. |
| **3.1A2b** | decomposes geometric figures made from: b. nets (two-dimensional shapes that can be folded into three-dimensional figures). |

**3.1A3a** composes geometric figures made from: a. regular and irregular polygons through 10 sides, circles, and semicircles.

**3.1A3b** composes geometric figures made from: b. nets (two-dimensional shapes that can be folded into three-dimensional figures).

**Benchmark - Measurement and Estimation**

**3.2K1** determines and uses whole number approximations (estimations) for length, width, weight, volume, temperature, time, perimeter, and area using standard and nonstandard units of measure.

**3.2K2** selects, explains the selection of, and uses measurement tools, units of measure, and level of precision appropriate for a given situation to find accurate rational number representations for length, weight, volume, temperature, time, perimeter, area, and angle measurements.

**3.2K3a** converts: a. within the customary system

**3.2K3b** converts: b. within the metric system using the prefixes: kilo, hecto, deka, deci, centi, and milli.

**3.2K4** uses customary units of measure to the nearest sixteenth of an inch and metric units of measure to the nearest millimeter.

**3.2K5a** recognizes and states perimeter and area formulas for squares, rectangles, and triangles: a. uses given measurement formulas to find perimeter and area of: squares and rectangles.

**3.2K5b** recognizes and states perimeter and area formulas for squares, rectangles, and triangles: b. figures derived from squares and/or rectangles.

**3.2K6a** describes the composition of the metric system: a. meter, liter, and gram (root measures).

**3.2K6b** describes the composition of the metric system: b. kilo, hecto, deka, deci, centi, and milli (prefixes).

**3.2K7** finds the volume of rectangular prisms using concrete objects.

**3.2K8** estimates an approximate value of the irrational number pi.

**3.2A1a** solves real-world problems by applying these measurement formulas: a. perimeter of polygons using the same unit of measurement.

**3.2A1b** solves real-world problems by applying these measurement formulas: b. area of squares, rectangles, and triangles using the same unit of measurement.

**3.2A1c** solves real-world problems by applying these measurement formulas: c. conversions within the metric system.

**3.2A2** estimates to check whether or not measurements and calculations for length, width, weight, volume, temperature, time, perimeter, and area in real-world problems are reasonable and adjusts original measurement or estimation based on additional information (a frame of reference).

**Benchmark - Transformational Geometry**

| | |
|---|---|
| **3.3K1** | identifies, describes, and performs one or two transformations (reflection, rotation, translation) on a two-dimensional figure. |
| **3.3K2** | reduces (contracts/shrinks) and enlarges (magnifies/grows) simple shapes with simple scale factors. |
| **3.3K3** | recognizes three-dimensional figures from various perspectives (top, bottom, sides, corners). |
| **3.3K4** | recognizes which figures will tessellate. |
| **3.3A1** | describes a transformation of a given two-dimensional figure that moves it from its initial placement (preimage) to its final placement. |
| **3.3A2** | makes a scale drawing of a two-dimensional figure using a simple scale. |

**Benchmark - Geometry from an Algebraic Perspective**

| | |
|---|---|
| 3.4K1 | uses a number line (horizontal/vertical) to order integers and positive rational numbers (in both fractional and decimal form). |
| **3.4K2** | organizes integer data using a T-table and plots the ordered pairs in all four quadrants of a coordinate plane (coordinate grid). |
| **3.4K3a** | uses all four quadrants of the coordinate plane to: a. identify the ordered pairs of integer values on a given graph. |
| **3.4K3b** | uses all four quadrants of the coordinate plane to: b. plot the ordered pairs of integer values. |
| **3.4A1** | represents, generates, and/or solves real-world problems using a number line with integer values. |
| **3.4A2a** | represents and/or generates real-world problems using a coordinate plane with integer values to find: a. the perimeter of squares and rectangles. |
| **3.4A2b** | represents and/or generates real-world problems using a coordinate plane with integer values to find: b. the area of triangles, squares, and rectangles. |

**Standard 4. Data**

**Benchmark - Probability**

| | |
|---|---|
| **4.1K1** | recognizes that all probabilities range from zero (impossible) through one (certain) and can be written as a fraction, decimal, or a percent |
| **4.1K2** | lists all possible outcomes of an experiment or simulation with a compound event composed of two independent events in a clear and organized way. |
| **4.1K3** | recognizes whether an outcome in a compound event in an experiment or simulation is impossible, certain, likely, unlikely, or equally likely. |
| **4.1K4** | represents the probability of a simple event in an experiment or simulation using fractions and decimals. |

| | |
|---|---|
| | conducts an experiment or simulation with a compound event composed of two independent events including the use of concrete objects; records the results in a chart, table, or graph; and uses the results to draw conclusions about the events |
| **4.1A1** | and make predictions about future events. |
| | analyzes the results of a given experiment or simulation of a compound event composed of two independent events to |
| **4.1A2** | draw conclusions and make predictions in a variety of real-world situations. |
| | compares what should happen (theoretical probability/expected results) with what did happen (empirical probability/experimental results) in an experiment or simulation with a compound event composed of two independent |
| **4.1A3** | events. |

**Benchmark - Statistics**

| | |
|---|---|
| | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: a. graphs |
| **4.2K1a** | using concrete objects. |
| | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: b. frequency |
| **4.2K1b** | tables and line plots. |
| | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: c. bar, line, |
| **4.2K1c** | and circle graphs. |
| | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: d. Venn |
| **4.2K1d** | diagrams or other pictorial displays. |
| | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: e. charts and |
| **4.2K1e** | tables. |
| | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: f. single stem- |
| **4.2K1f** | and-leaf plots. |
| | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: g. scatter |
| **4.2K1g** | plots. |
| | |
| | selects and justifies the choice of data collection techniques (observations, surveys, or interviews) and sampling techniques |
| **4.2K2** | (random sampling, samples of convenience, or purposeful sampling) in a given situation. |
| **4.2K3** | uses sampling to collect data and describe the results. |

**4.2K4a** determines mean, median, mode, and range for: a. a whole number data set.

**4.2K4b** determines mean, median, mode, and range for: b. a decimal data set with decimals greater than or equal to zero.

**4.2K1a** uses data analysis (mean, median, mode, range) of a whole number data set or a decimal data set with decimals greater than or equal to zero to make reasonable inferences, predictions, and decisions and to develop convincing arguments from these data displays: a. graphs using concrete objects.

**4.2A1b** uses data analysis (mean, median, mode, range) of a whole number data set or a decimal data set with decimals greater than or equal to zero to make reasonable inferences, predictions, and decisions and to develop convincing arguments from these data displays: b. frequency tables and line plots.

**4.2A1c** uses data analysis (mean, median, mode, range) of a whole number data set or a decimal data set with decimals greater than or equal to zero to make reasonable inferences, predictions, and decisions and to develop convincing arguments from these data displays: c. bar, line, and circle graphs.

**4.2A1d** uses data analysis (mean, median, mode, range) of a whole number data set or a decimal data set with decimals greater than or equal to zero to make reasonable inferences, predictions, and decisions and to develop convincing arguments from these data displays: d. Venn diagrams or other pictorial displays.

**4.2A1e** uses data analysis (mean, median, mode, range) of a whole number data set or a decimal data set with decimals greater than or equal to zero to make reasonable inferences, predictions, and decisions and to develop convincing arguments from these data displays: e. charts and tables.

**4.2A1f** uses data analysis (mean, median, mode, range) of a whole number data set or a decimal data set with decimals greater than or equal to zero to make reasonable inferences, predictions, and decisions and to develop convincing arguments from these data displays: f. single stem-and-leaf plots.

**4.2A2** explains advantages and disadvantages of various data displays for a given data set.

**4.2A3** recognizes and explains the effects of scale and/or interval changes on graphs of whole number data sets.

**Seventh**

**Standard 1. Number and Computation**

**Benchmark - Number Sense**

| | |
|---|---|
| **1.1K1** | knows, explains, and uses equivalent representations for rational numbers and simple algebraic expressions including integers, fractions, decimals, percents, and ratios; integer bases with whole number exponents; positive rational numbers written in scientific notation with positive integer exponents; time; and money. |
| **1.1K2** | compares and orders rational numbers and the irrational number pi. |
| **1.1K3** | explains the relative magnitude between rational numbers and between rational numbers and the irrational number pi. |
| **1.1K4a** | knows and explains what happens to the product or quotient when: a. a whole number is multiplied or divided by a rational number greater than zero and less than one. |
| **1.1K4b** | knows and explains what happens to the product or quotient when: b. a whole number is multiplied or divided by a rational number greater than one. |
| **1.1K4c** | knows and explains what happens to the product or quotient when: c. a rational number (excluding zero) is multiplied or divided by zero. |
| **1.1K5** | explains and determines the absolute value of rational numbers |
| **1.1A1a** | generates and/or solves real-world problems using: a. equivalent representations of rational numbers and simple algebraic expressions. |
| **1.1A1b** | generates and/or solves real-world problems using: b. fraction and decimal approximations of the irrational number pi. |
| **1.1A2** | determines whether or not solutions to real-world problems using rational numbers, the irrational number pi, and simple algebraic expressions are reasonable. |

**Benchmark - Number Systems and Their Properties**

| | |
|---|---|
| **1.2K1** | knows and explains the relationships between natural (counting) numbers, whole numbers, integers, and rational numbers using mathematical models. |
| **1.2K2** | classifies a given rational number as a member of various subsets of the rational number system. |
| **1.2K3a** | names, uses, and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: a. commutative properties of addition and multiplication (changing the order of the numbers does not change the solution). |
| **1.2K3b** | names, uses, and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: b. associative properties of addition and multiplication (changing the grouping of the numbers does not change the solution). |

| | |
|---|---|
| **1.2K3c** | names, uses, and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: c. distributive property [distributing multiplication or division over addition or subtraction. |
| **1.2K3d** | names, uses, and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: d. substitution property (one name of a number can be substituted for another name of the same number). |
| **1.2K4a** | uses and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: a. identity properties for addition and multiplication (additive identity - zero added to any number is equal to that number; multiplicative identity - one multiplied by any number is equal to that number). |
| **1.2K4b** | uses and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: b. symmetric property of equality (if 7 + 2x = 9 then 9 = 7 + 2x). |
| **1.2K4c** | uses and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: c. zero property of multiplication (any number multiplied by zero is zero). |
| **1.2K4d** | uses and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: d. addition and multiplication properties of equality (adding/multiplying the same number to each side of an equation results in an equivalent equation). |
| **1.2K4e** | uses and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: e. additive and multiplicative inverse properties. (Every number has a value known as its additive inverse and when the original number is added to that additive inverse, the answer is zero. |
| **1.2K5** | recognizes that the irrational number pi can be represented by approximate rational values. |
| **1.2A1a** | generates and/or solves real-world problems with rational numbers and the irrational number pi using the concepts of these properties to explain reasoning: a. commutative and associative properties of addition and multiplication. |
| **1.2A1b** | generates and/or solves real-world problems with rational numbers and the irrational number pi using the concepts of these properties to explain reasoning: b. distributive property. |
| **1.2A1c** | generates and/or solves real-world problems with rational numbers and the irrational number pi using the concepts of these properties to explain reasoning: c. substitution property. |
| **1.2A1d** | generates and/or solves real-world problems with rational numbers and the irrational number pi using the concepts of these properties to explain reasoning: d. symmetric property of equality. |
| **1.2A1e** | generates and/or solves real-world problems with rational numbers and the irrational number pi using the concepts of these properties to explain reasoning: e. additive and multiplicative identities. |

| | |
|---|---|
| **1.2A1f** | generates and/or solves real-world problems with rational numbers and the irrational number pi using the concepts of these properties to explain reasoning: f. zero property of multiplication. |
| **1.2A1g** | generates and/or solves real-world problems with rational numbers and the irrational number pi using the concepts of these properties to explain reasoning: g. addition and multiplication properties of equality. |
| **1.2A1h** | generates and/or solves real-world problems with rational numbers and the irrational number pi using the concepts of these properties to explain reasoning: h. additive and multiplicative inverse properties. |
| **1.2A2** | analyzes and evaluates the advantages and disadvantages of using integers, whole numbers, fractions (including mixed numbers), decimals, or the irrational number pi and its rational approximations in solving a given real-world problem. |

**Benchmark - Estimation**

| | |
|---|---|
| **1.3K1** | estimates quantities with combinations of rational numbers and/or the irrational number pi using various computational methods including mental math, paper and pencil, concrete objects, and/or appropriate technology. |
| **1.3K2** | uses various estimation strategies and explains how they were used to estimate rational number quantities and the irrational number pi. |
| **1.3K3** | recognizes and explains the difference between an exact and approximate answer. |
| **1.3K4** | determines the appropriateness of an estimation strategy used and whether the estimate is greater than (overestimate) or less than (underestimate) the exact answer and its potential impact on the result. |
| **1.3K5** | knows and explains why the fraction (22/7) or decimal (3.14) representation of the irrational number pi is an approximate value. |
| **1.3A1** | adjusts original rational number estimate of a real-world problem based on additional information (a frame of reference). |
| **1.3A2** | estimates to check whether or not the result of a real-world problem using rational numbers, the irrational number pi, and/or simple algebraic expressions is reasonable and makes predictions based on the information. |
| **1.3A3** | determines a reasonable range for the estimation of a quantity given a real-world problem and explains the reasonableness of the range. |
| **1.3A4** | determines if a real-world problem calls for an exact or approximate answer and performs the appropriate computation using various computational methods including mental math, paper and pencil, concrete objects, and/or appropriate technology. |

**Benchmark - Computation**

| | |
|---|---|
| **1.4K1** | computes with efficiency and accuracy using various computational methods including mental math, paper and pencil, concrete objects, and appropriate technology. |
| **1.4K2a** | performs and explains these computational procedures: a. adds and subtracts decimals from ten millions place through hundred thousandths place. |
| **1.4K2b** | performs and explains these computational procedures: b. multiplies and divides a four-digit number by a two-digit number using numbers from thousands place through thousandths place. |
| **1.4K2c** | performs and explains these computational procedures: c.multiplies and divides using numbers from thousands place through thousandths place by 10; 100; 1,000; .1; .01; .001; or single-digit multiples of each. |
| **1.4K2d** | performs and explains these computational procedures: d. adds, subtracts, multiplies, and divides fractions and expresses answers in simplest form. |
| **1.4K2e** | performs and explains these computational procedures: e. adds, subtracts, multiplies, and divides integers. |
| **1.4K2f** | performs and explains these computational procedures: f. uses order of operations (evaluates within grouping symbols, evaluates powers to the second or third power, multiplies or divides in order from left to right, then adds or subtracts in order from left to right) using whole numbers. |
| **1.4K2g** | performs and explains these computational procedures: g. simplifies positive rational numbers raised to positive whole number powers. |
| **1.4K2h** | performs and explains these computational procedures: h. combines like terms of a first degree algebraic expression. |
| **1.4K3** | recognizes, describes, and uses different ways to express computational procedures. |
| **1.4K4** | finds prime factors, greatest common factor, multiples, and the least common multiple. |
| **1.4K5** | finds percentages of rational numbers. |
| **1.4A1a** | generates and/or solves one- and two-step real-world problems using these computational procedures and mathematical concepts: a. addition, subtraction, multiplication, and division of rational numbers with a special emphasis on fractions and expressing answers in simplest form. |
| **1.4A1b** | generates and/or solves one- and two-step real-world problems using these computational procedures and mathematical concepts: b. addition, subtraction, multiplication, and division of rational numbers with a special emphasis on integers. |
| **1.4A1c** | generates and/or solves one- and two-step real-world problems using these computational procedures and mathematical concepts: c. first degree algebraic expressions in one variable. |
| **1.4A1d** | generates and/or solves one- and two-step real-world problems using these computational procedures and mathematical concepts: d. percentages of rational numbers. |
| **1.4A1e** | generates and/or solves one- and two-step real-world problems using these computational procedures and mathematical concepts: e. approximation of the irrational number pi. |

**Standard 2. Algebra**
**Benchmark - Patterns**

| | |
|---|---|
| **2.1K1a** | identifies, states, and continues a pattern presented in various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written using these attributes: a. counting numbers including perfect squares, cubes, and factors and multiples (number theory). |
| **2.1K1b** | identifies, states, and continues a pattern presented in various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written using these attributes: b. positive rational numbers including arithmetic and geometric sequences (arithmetic: sequence of numbers in which the difference of two consecutive numbers is the same, geometric: a sequence of numbers in which each succeeding term is obtained by multiplying the preceding term by the same number. |
| **2.1K1c** | identifies, states, and continues a pattern presented in various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written using these attributes: c. geometric figures. |
| **2.1K1d** | identifies, states, and continues a pattern presented in various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written using these attributes: d. measurements. |
| **2.1K1e** | identifies, states, and continues a pattern presented in various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written using these attributes: e. things related to daily life. |
| **2.1K2** | generates a pattern. |
| **2.1K3** | extends a pattern when given a rule of one or two simultaneous changes (addition, subtraction, multiplication, division) between consecutive terms. |
| **2.1K4** | states the rule to find the nth term of a pattern with one operational change (addition or subtraction) between consecutive terms. |
| **2.1A1** | generalizes a pattern by giving the nth term using symbolic notation. |
| **2.1A2** | recognizes the same general pattern presented in different representations [numeric (list or table), visual (picture, table, or graph), and written]. |

**Benchmark - Variable, Equations, and Inequalities**

| | |
|---|---|
| **2.2K1** | knows and explains that a variable can represent a single quantity that changes. |
| **2.2K2** | knows, explains, and uses equivalent representations for the same simple algebraic expressions. |

**2.2K3** shows and explains how changes in one variable affects other variables.

**2.2K4** explains the difference between an equation and an expression.

**2.2K5a** solves: a. one-step linear equations in one variable with positive rational coefficients and solutions.

**2.2K5b** solves: b. two-step linear equations in one variable with counting number coefficients and constants and positive rational solutions.

**2.2K5c** solves: c. one-step linear inequalities with counting numbers and one variable.

**2.2K6** explains and uses the equality and inequality symbols and corresponding meanings (is equal to, is not equal to, is less than, is less than or equal to, is greater than, is greater than or equal to) to represent mathematical relationships with rational numbers.

**2.2K7** knows the mathematical relationship between ratios, proportions, and percents and how to solve for a missing term in a proportion with positive rational number solutions and monomials.

**2.2K8** evaluates simple algebraic expressions using positive rational numbers.

**2.2A1** represents real-world problems using variables and symbols to write linear expressions, one- or two-step equations.

**2.2A2** solves real-world problems with one- or two-step linear equations in one variable with whole number coefficients and constants and positive rational solutions intuitively and analytically.

**2.2A3** generates real-world problems that represent one- or two-step linear equations.

**2.2A4** explains the mathematical reasoning that was used to solve a real-world problem using a one- or two-step linear equation.

**Benchmark - Functions**

**2.3K1** recognizes constant and linear relationships using various methods including mental math, paper and pencil, concrete objects, and graphing utilities or appropriate technology.

**2.3K2** finds the values and determines the rule through two operations using a function table (input/output machine, T-table).

**2.3K3** demonstrates mathematical relationships using ordered pairs in all four quadrants of a coordinate plane.

**2.3K4** describes and/or gives examples of mathematical relationships that remain constant.

**2.3A1** represents a variety of constant and linear relationships using written or oral descriptions of the rule, tables, graphs, and when possible, symbolic notation.

**2.3A2** interprets, describes, and analyzes the mathematical relationships of numerical, tabular, and graphical representations, including translations between the representations.

**Benchmark - Models**

| | |
|---|---|
| **2.4K1a** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: a. process models (concrete objects, pictures, diagrams, number lines, hundred charts, measurement tools, multiplication arrays, division sets, or coordinate grids) to model computational procedures, algebraic relationships, and mathematical relationships and to solve equations. |
| **2.4K1b** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: b. place value models (place value mats, hundred charts, base ten blocks, or unifix cubes) to compare, order, and represent numerical quantities and to model computational procedures. |
| **2.4K1c** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: c. fraction and mixed number models (fraction strips or pattern blocks) and decimal and money models (base ten blocks or coins) to compare, order, and represent numerical quantities. |
| **2.4K1d** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: d. factor trees to find least common multiple and greatest common factor and to model prime factorization. |
| **2.4K1e** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: e. equations and inequalities to model numerical relationships. |
| **2.4K1f** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: f. function tables to model numerical and algebraic relationships. |
| **2.4K1g** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: g. coordinate planes to model relationships between ordered pairs and linear equations. |
| **2.4K1h** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: h. two- and three-dimensional geometric models (geoboards, dot paper, nets or solids) to model perimeter, area, volume, and surface area, and properties of two- and three-dimensional. |
| **2.4K1i** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: i. geometric models (spinners, targets, or number cubes), process models (coins, pictures, or diagrams), and tree diagrams to model probability. |

| | |
|---|---|
| **2.4K1j** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: j. frequency tables, bar graphs, line graphs, circle graphs, Venn diagrams, charts, tables, single stem-and-leaf plots, scatter plots, and box-and-whisker plots to organize and display data. |
| **2.4K1k** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: k. Venn diagrams to sort data and show relationships. |
| **2.4A1a** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: a. process models (concrete objects, pictures, diagrams, flowcharts, number lines, hundred charts, measurement tools, multiplication arrays, division sets, or coordinate grids) to model computational procedures, algebraic relationships, mathematical relationships, and problem situations and to solve equations. |
| **2.4A1b** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: b. place value models (place value mats, hundred charts, base ten blocks, or unifix cubes) to model problem situations. |
| **2.4A1c** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: c. fraction and mixed number models (fraction strips or pattern blocks) and decimal and money models (base ten blocks or coins) to compare, order, and represent numerical quantities. |
| **2.4A1d** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: d. factor trees to find least common multiple and greatest common factor and to model prime factorization. |
| **2.4A1e** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: e. equations and inequalities to model numerical relationships. |
| **2.4A1f** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: f. function tables to model numerical and algebraic relationships. |
| **2.4A1g** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: g. coordinate planes to model relationships between ordered pairs and linear equations. |
| **2.4A1h** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: h. two- and three-dimensional geometric models (geoboards, dot paper, nets or solids) to model perimeter, area, volume, and surface area, and properties of two- and three-dimensional models. |

| | |
|---|---|
| **2.4A1i** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: i. scale drawings to model large and small real-world objects. |
| **2.4A1j** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: j. geometric models (spinners, targets, or number cubes), process models (coins, pictures, or diagrams), and tree diagrams to model probability. |
| **2.4A1k** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: k. frequency tables, bar graphs, line graphs, circle graphs, Venn diagrams, charts, tables, single stem-and-leaf plots, scatter plots, and box-and-whisker plots to describe, interpret, and analyze data. |
| **2.4A1l** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: l. Venn diagrams to sort data and show relationships. |
| **2.4A2** | selects a mathematical model and justifies why some mathematical models are more accurate than other mathematical models in certain situations |
| **2.4A3** | uses the mathematical modeling process to make inferences about real-world situations when the mathematical model used to represent the situation is given. |

**Standard 3. Geometry**

**Benchmark - Geometric Figures and Their Properties**

| | |
|---|---|
| **3.1K1** | recognizes and compares properties of two- and three-dimensional figures using concrete objects, constructions, drawings, appropriate terminology, and appropriate technology. |
| **3.1K2** | classifies regular and irregular polygons having through ten sides as convex or concave. |
| **3.1K3a** | identifies angle and side properties of triangles and quadrilaterals: a. sum of the interior angles of any triangle is 180Â°. |
| **3.1K3b** | identifies angle and side properties of triangles and quadrilaterals: b. sum of the interior angles of any quadrilateral is 360Â°. |
| **3.1K3c** | identifies angle and side properties of triangles and quadrilaterals: c. parallelograms have opposite sides that are parallel and congruent. |
| **3.1K3d** | identifies angle and side properties of triangles and quadrilaterals: d. rectangles have angles of 90Â°, opposite sides are congruent. |
| **3.1K3e** | identifies angle and side properties of triangles and quadrilaterals: e. rhombi have all sides the same length, opposite angles are congruent. |
| **3.1K3f** | identifies angle and side properties of triangles and quadrilaterals: f. squares have angles of 90Â°, all sides congruent. |

| | |
|---|---|
| **3.1K3g** | identifies angle and side properties of triangles and quadrilaterals: g. trapezoids have one pair of opposite sides parallel and the other pair of opposite sides are not parallel. |
| **3.1K4a** | identifies and describes: a. the altitude and base of a rectangular prism and triangular prism. |
| **3.1K4b** | identifies and describes: b. the radius and diameter of a cylinder. |
| **3.1K5** | identifies corresponding parts of similar and congruent triangles and quadrilaterals. |
| **3.1K6** | uses symbols for right angle within a figure, parallel, perpendicular, and triangle to describe geometric figures. |
| **3.1K7a** | classifies triangles as: a. scalene, isosceles, or equilateral. |
| **3.1K7b** | classifies triangles as: b. right, acute, obtuse, or equiangular. |
| **3.1K8** | determines if a triangle can be constructed given sides of three different lengths. |
| **3.1K9** | generates a pattern for the sum of angles for 3-, 4-, 5-, n-sides polygons. |
| **3.1K10** | describes the relationship between the diameter and the circumference of a circle. |
| **3.1A1a** | solves real-world problems by applying the properties of: a. plane figures (regular and irregular polygons through 10 sides, circles, and semicircles) and the line(s) of symmetry. |
| **3.1A1b** | solves real-world problems by applying the properties of: b. solids (cubes, rectangular prisms, cylinders, cones, spheres, triangular prisms) emphasizing faces, edges, vertices, and bases. |
| **3.1A2a** | decomposes geometric figures made from: a. regular and irregular polygons through 10 sides, circles, and semicircles. |
| **3.1A2b** | decomposes geometric figures made from: b. nets (two-dimensional shapes that can be folded into three-dimensional figures). |
| **3.1A2c** | decomposes geometric figures made from: c. prisms, pyramids, cylinders, cones, spheres, and hemispheres. |
| **3.1A3a** | composes geometric figures made from: a. regular and irregular polygons through 10 sides, circles, and semicircles. |
| **3.1A3b** | composes geometric figures made from: b. nets (two-dimensional shapes that can be folded into three-dimensional figures). |
| **3.1A3c** | composes geometric figures made from: c. prisms, pyramids, cylinders, cones, spheres, and hemispheres. |

**Benchmark - Measurement and Estimation**

| | |
|---|---|
| **3.2K1** | determines and uses rational number approximations (estimations) for length, width, weight, volume, temperature, time, perimeter, and area using standard and nonstandard units of measure. |
| **3.2K2** | determines and uses rational number approximations (estimations) for length, width, weight, volume, temperature, time, perimeter, and area using standard and nonstandard units of measure. |
| **3.2K3** | converts within the customary system and within the metric system. |
| **3.2K4** | knows and uses perimeter and area formulas for circles, squares, rectangles, triangles, and parallelograms. |

**3.2K5** finds perimeter and area of two-dimensional composite figures of circles, squares, rectangles, and triangles.
**3.2K6a** uses given measurement formulas to find: a. surface area of cubes.
**3.2K6b** uses given measurement formulas to find: b. volume of rectangular prisms.
**3.2K7** finds surface area of rectangular prisms using concrete objects.
**3.2K8** uses appropriate units to describe rate as a unit of measure.
**3.2K9** finds missing angle measurements in triangles and quadrilaterals.
**3.2A1a** solves real-world problems by: a. converting within the customary and metric systems.

**3.2A1b** solves real-world problems by: b. finding perimeter and area of circles, squares, rectangles, triangles, and parallelograms.
**3.2A1c** solves real-world problems by: c. finding perimeter and area of two-dimensional composite figures of squares, rectangles, and triangles.
**3.2A1d** solves real-world problems by: d. using appropriate units to describe rate as a unit of measure.
**3.2A1e** solves real-world problems by: e. finding missing angle measurements in triangles and quadrilaterals.

**3.2A1f** solves real-world problems by: f. applying various measurement techniques (selecting and using measurement tools, units of measure, and level of precision) to find accurate rational number representations for length, weight, volume, temperature, time, perimeter, and area appropriate to a given situation.
**3.2A2** estimates to check whether or not measurements or calculations for length, width, weight, volume, temperature, time, perimeter, and area in real-world problems are reasonable and adjusts original measurement or estimation based on additional information (a frame of reference).

**Benchmark - Transformational Geometry**

**3.3K1** identifies, describes, and performs single and multiple transformations [reflection, rotation, translation, reduction (contraction/shrinking), enlargement (magnification/growing)] on a two-dimensional figure.
**3.3K2** identifies three-dimensional figures from various perspectives (top, bottom, sides, corners).
**3.3K3** draws three-dimensional figures from various perspectives (top, bottom, sides, corners).
**3.3K4** generates a tessellation.
**3.3A1** describes the impact of transformations [reflection, rotation, translation, reduction (contraction/shrinking), enlargement (magnification/growing)] on the perimeter and area of squares and rectangles.
**3.3A2** investigates congruency and similarity of geometric figures using transformations.

**3.3A3** determines the actual dimensions and/or measurements of a two-dimensional figure represented in a scale drawing.

**Benchmark - Geometry from an Algebraic Perspective**

**3.4K1** finds the distance between the points on a number line by computing the absolute value of their difference.

**3.4K2a** uses all four quadrants of a coordinate plane to: a. identify in which quadrant or on which axis a point lies when given the coordinates of a point.

**3.4K2b** uses all four quadrants of a coordinate plane to: b. plot points.

**3.4K2c** uses all four quadrants of a coordinate plane to: c. identify points.

**3.4K2d** uses all four quadrants of a coordinate plane to: d. list through five ordered pairs of a given line.

**3.4K3** uses a given linear equation with whole number coefficients and constants and a whole number solution to find the ordered pairs, organize the ordered pairs using a T-table, and plot the ordered pairs on the coordinate plane.

**3.4K4** examines characteristics of two-dimensional figures on a coordinate plane using various methods including mental math, paper and pencil, concrete objects, and graphing utilities or other appropriate technology.

**3.4A1a** represents and/or generates real-world problems using a coordinate plane to find: a. perimeter of squares and rectangles.

**3.4A1b** represents and/or generates real-world problems using a coordinate plane to find: b. circumference (perimeter) of circles.

**3.4A1c** represents and/or generates real-world problems using a coordinate plane to find: c. area of circles, parallelograms, triangles, squares, and rectangles.

**Standard 4. Data**
**Benchmark - Probability**

**4.1K1** finds the probability of a compound event composed of two independent events in an experiment or simulation.

**4.1K2** explains and gives examples of simple or compound events in an experiment or simulation having probability of zero or one.

**4.1K3a** uses a fraction, decimal, and percent to represent the probability of: a. a simple event in an experiment or simulation.

**4.1K3b** uses a fraction, decimal, and percent to represent the probability of: b. a compound event composed of two independent events in an experiment or simulation.

**4.1K4** finds the probability of a simple event in an experiment or simulation using geometric models.

**4.1A1** conducts an experiment or simulation with a compound event composed of two independent events including the use of concrete objects; records the results in a chart, table, or graph; and uses the results to draw conclusions and make predictions about future events.

| | |
|---|---|
| **4.1A2** | analyzes the results of an experiment or simulation of a compound event composed of two independent events to draw conclusions, generate convincing arguments, and make predictions and decisions in a variety of real-world situations. |
| **4.1A3** | compares results of theoretical (expected) probability with empirical (experimental) probability in an experiment or situation with a compound event composed of two simple independent events and understands that the larger the sample size, the greater the likelihood that the experimental results will equal the theoretical probability. |
| **4.1A4** | makes predictions based on the theoretical probability of a simple event in an experiment or simulation. |

**Benchmark - Statistics**

| | |
|---|---|
| **4.2K1a** | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: a. frequency tables. |
| **4.2K1b** | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: b. bar, line, and circle graphs. |
| **4.2K1c** | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: c. Venn diagrams or other pictorial displays. |
| **4.2K1d** | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: d. charts and tables. |
| **4.2K1e** | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: e. stem-and-leaf plots (single). |
| **4.2K1f** | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: f. scatter plots. |
| **4.2K1g** | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: g. box-and-whiskers plots. |
| **4.2K2** | selects and justifies the choice of data collection techniques (observations, surveys, or interviews) and sampling techniques (random sampling, samples of convenience, or purposeful sampling) in a given situation. |

**4.2K3** conducts experiments with sampling and describes the results.

**4.2K4** determines the measures of central tendency (mode, median, mean) for a rational number data set.

**4.2K5** identifies and determines the range and the quartiles of a rational number data set.

**4.2K6** identifies potential outliers within a set of data by inspection rather than formal calculation.

**4.2A1a** uses data analysis (mean, median, mode, range) of a rational number data set to make reasonable inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: a. frequency tables.

**4.2A1b** uses data analysis (mean, median, mode, range) of a rational number data set to make reasonable inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: b. bar, line, and circle graphs.

**4.2A1c** uses data analysis (mean, median, mode, range) of a rational number data set to make reasonable inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: c. Venn diagrams or other pictorial displays.

**4.2A1d** uses data analysis (mean, median, mode, range) of a rational number data set to make reasonable inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: d. charts and tables.

**4.2A1e** uses data analysis (mean, median, mode, range) of a rational number data set to make reasonable inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: e. stem-and-leaf plots (single).

**4.2A1f** uses data analysis (mean, median, mode, range) of a rational number data set to make reasonable inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: f. scatter plots.

**4.2A1g** uses data analysis (mean, median, mode, range) of a rational number data set to make reasonable inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: g. box-and-whiskers plots.

**4.2A2** explains advantages and disadvantages of various data displays for a given data set.

**4.2A3a** recognizes and explains: a. misleading representations of data.

**4.2A3b** recognizes and explains: b. the effects of scale or interval changes on graphs of data sets.

**4.2A4** determines and explains the advantages and disadvantages of using each measure of central tendency and the range to describe a data set.

**Eighth**

**Standard 1. Number and Computation**

**Benchmark - Number Sense**

| | |
|---|---|
| **1.1K1** | knows, explains, and uses equivalent representations for rational numbers and simple algebraic expressions including integers, fractions, decimals, percents, and ratios; rational number bases with integer exponents; rational numbers written in scientific notation with integer exponents; time; and money. |
| **1.1K2** | compares and orders rational numbers, the irrational number pi, and algebraic expressions. |
| **1.1K3** | explains the relative magnitude between rational numbers, the irrational number pi, and algebraic expressions. |
| **1.1K4** | recognizes and describes irrational numbers. |
| **1.1K5a** | knows and explains what happens to the product or quotient when: a. a positive number is multiplied or divided by a rational number greater than zero and less than one. |
| **1.1K5b** | knows and explains what happens to the product or quotient when: b. a positive number is multiplied or divided by a rational number greater than one. |
| **1.1K5c** | knows and explains what happens to the product or quotient when: c. a nonzero real number is multiplied or divided by zero. |
| **1.1K6** | explains and determines the absolute value of real numbers. |
| **1.1A1** | generates and/or solves real-world problems using equivalent representations of rational numbers and simple algebraic expressions. |
| **1.1A2** | determines whether or not solutions to real-world problems using rational numbers, the irrational number pi, and simple algebraic expressions are reasonable. |

**Benchmark - Number Systems and Their Properties**

| | |
|---|---|
| **1.2K1** | explains and illustrates the relationship between the subsets of the real number system [natural (counting) numbers, whole numbers, integers, rational numbers, irrational numbers] using mathematical models. |
| **1.2K2** | identifies all the subsets of the real number system [natural (counting) numbers, whole numbers, integers, rational numbers, irrational numbers] to which a given number belongs. |
| **1.2K3a** | names, uses, and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: a. commutative, associative, distributive, and substitution properties. |
| **1.2K3b** | names, uses, and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: b. identity properties for addition and multiplication and inverse properties of addition and multiplication. |

| | |
|---|---|
| **1.2K3c** | names, uses, and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: c. symmetric property of equality. |
| **1.2K3d** | names, uses, and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: d. addition and multiplication properties of equalities. |
| **1.2K3e** | names, uses, and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: e. addition property of inequalities. |
| **1.2K3f** | names, uses, and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects: f. zero product property. |
| **1.2A1a** | generates and/or solves real-world problems with rational numbers using the concepts of these properties to explain reasoning: a. commutative, associative, distributive, and substitution properties. |
| **1.2A1b** | generates and/or solves real-world problems with rational numbers using the concepts of these properties to explain reasoning: b. identity and inverse properties of addition and multiplication. |
| **1.2A1c** | generates and/or solves real-world problems with rational numbers using the concepts of these properties to explain reasoning: c. symmetric property of equality. |
| **1.2A1d** | generates and/or solves real-world problems with rational numbers using the concepts of these properties to explain reasoning: d. addition and multiplication properties of equality. |
| **1.2A1e** | generates and/or solves real-world problems with rational numbers using the concepts of these properties to explain reasoning: e. zero product property. |
| **1.2A2** | analyzes and evaluates the advantages and disadvantages of using integers, whole numbers, fractions (including mixed numbers), or decimals in solving a given real-world problem. |

**Benchmark - Estimation**

| | |
|---|---|
| **1.3K1** | estimates real number quantities using various computational methods including mental math, paper and pencil, concrete objects, and/or appropriate technology. |
| **1.3K2** | uses various estimation strategies and explains how they were used to estimate real number quantities and simple algebraic expressions. |
| **1.3K3** | knows and explains why a decimal representation of the irrational number pi is an approximate value. |
| **1.3K4** | knows and explains between which two consecutive integers an irrational number lies. |
| **1.3A1** | adjusts original rational number estimate of a real-world problem based on additional information (a frame of reference). |
| **1.3A2** | estimates to check whether or not the result of a real-world problem using rational numbers and/or simple algebraic expressions is reasonable and makes predictions based on the information. |
| **1.3A3** | determines a reasonable range for the estimation of a quantity given a real-world problem and explains the reasonableness of the range. |

| | |
|---|---|
| **1.3A4** | determines if a real-world problem calls for an exact or approximate answer and performs the appropriate computation using various computational methods including mental mathematics, paper and pencil, concrete objects, and/or appropriate technology. |
| **1.3A5** | explains the impact of estimation on the result of a real-world problem (underestimate, overestimate, range of estimates). |

**Benchmark - Computation**

| | |
|---|---|
| **1.4K1** | computes with efficiency and accuracy using various computational methods including mental math, paper and pencil, concrete objects, and appropriate technology. |
| **1.4K2a** | performs and explains these computational procedures with rational numbers: a. addition, subtraction, multiplication, and division of integers. |
| **1.4K2b** | performs and explains these computational procedures with rational numbers: b. order of operations. |
| **1.4K2c** | performs and explains these computational procedures with rational numbers: c. approximation of roots of numbers using calculators. |
| **1.4K2d.i** | performs and explains these computational procedures with rational numbers: d. multiplication or division to find: i. a percent of a number. |
| **1.4K2d.ii** | performs and explains these computational procedures with rational numbers: d. multiplication or division to find: ii. percent of increase and decrease. |
| **1.4K2d.iii** | performs and explains these computational procedures with rational numbers: d. multiplication or division to find: iii. percent one number is of another number. |
| **1.4K2d.iv** | performs and explains these computational procedures with rational numbers: d. multiplication or division to find: iv. a number when a percent of the number is given. |
| **1.4K2e** | performs and explains these computational procedures with rational numbers: e. addition of polynomials. |
| **1.4K2f** | performs and explains these computational procedures with rational numbers: f. simplifies algebraic expressions in one variable by combining like terms or using the distributive property. |
| **1.4K3** | finds factors and common factors of simple monomial expressions. |
| **1.4A1a** | generates and/or solves one- and two-step real-world problems using computational procedures and mathematical concepts: a. rational numbers. |
| **1.4A1b** | generates and/or solves one- and two-step real-world problems using computational procedures and mathematical concepts: b. the irrational number pi as an approximation. |
| **1.4A1c** | generates and/or solves one- and two-step real-world problems using computational procedures and mathematical concepts: c. applications of percents. |

**Standard 2. Algebra**

**Benchmark - Patterns**

| | |
|---|---|
| **2.1K1a** | identifies, states, and continues a pattern presented in various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written using these attributes: a. counting numbers including perfect squares, cubes, and factors and multiples with positive rational numbers (number theory). |
| **2.1K1b** | identifies, states, and continues a pattern presented in various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written using these attributes: b. rational numbers including arithmetic and geometric sequences (arithmetic: sequence of numbers in which the difference of two consecutive numbers is the same, geometric: a sequence of numbers in which each succeeding term is obtained by multiplying the preceding term by the same number). |
| **2.1K1c** | identifies, states, and continues a pattern presented in various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written using these attributes: c. geometric figures. |
| **2.1K1d** | identifies, states, and continues a pattern presented in various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written using these attributes: d. measurements. |
| **2.1K1e** | identifies, states, and continues a pattern presented in various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written using these attributes: e. things related to daily life. |
| **2.1K1f** | identifies, states, and continues a pattern presented in various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written using these attributes: f. variables and simple expressions. |
| **2.1K2** | generates and explains a pattern. |
| **2.1K3** | generates a pattern limited to two operations (addition, subtraction, multiplication, division, exponents) when given the rule for the nth term. |
| **2.1K4** | states the rule to find the nth term of a pattern using explicit symbolic notation. |
| **2.1K5** | describes the pattern when given a table of linear values and plots the ordered pairs on a coordinate plane. |
| **2.1A1** | generalizes numerical patterns using algebra and then translates between the equation, graph, and table of values resulting from the generalization. |
| **2.1A2** | recognizes the same general pattern presented in different representations [numeric (list or table), visual (picture, table, or graph), and written]. |

**Benchmark - Variables, Equations, and Inequalities**

**2.2K1** identifies independent and dependent variables within a given situation.

**2.2K2** simplifies algebraic expressions in one variable by combining like terms or using the distributive property.

**2.2K3a** solves: a. one- and two-step linear equations in one variable with rational number coefficients and constants intuitively and/or analytically.

**2.2K3b** solves: b. one-step linear inequalities in one variable with rational number coefficients and constants intuitively, analytically, and graphically;

**2.2K3c** solves: c. systems of given linear equations with whole number coefficients and constants graphically.

**2.2K4** knows and describes the mathematical relationship between ratios, proportions, and percents and how to solve for a missing monomial or binomial term in a proportion.

**2.2K5a** represents and solves algebraically: a. the number when a percent and a number are given.

**2.2K5b** represents and solves algebraically: b. what percent one number is of another number.

**2.2K5c** represents and solves algebraically: c. percent of increase or decrease.

**2.2K6** evaluates formulas using substitution.

**2.2A1a** represents real-world problems using: a.variables, symbols, expressions, one- or two-step equations with rational number coefficients and constants.

**2.2A1b** represents real-world problems using: b. one-step inequalities with rational number coefficients and constants.

**2.2A1c** represents real-world problems using: c. systems of linear equations with whole number coefficients and constants.

**2.2A2** solves real-world problems with two-step linear equations in one variable with rational number coefficients and constants and rational solutions intuitively, analytically, and graphically.

**2.2A3a** generates real-world problems that represent: a. one- or two-step linear equations.

**2.2A3b** generates real-world problems that represent: b. one-step linear inequalities.

**2.2A4** explains the mathematical reasoning that was used to solve a real-world problem using one- or two-step linear equations and inequalities and discusses the advantages and disadvantages to various strategies that may have been used to solve the problem.

**Benchmark - Functions**

**2.3K1** recognizes and examines constant, linear, and nonlinear relationships using various methods including mental math, paper and pencil, concrete objects, and graphing utilities or appropriate technology.

**2.3K2** knows and describes the difference between constant, linear, and nonlinear relationships.

**2.3K3** explains the concepts of slope and x- and y-intercepts of a line.

**2.3K4** recognizes and identifies the graphs of constant and linear functions.

**2.3K5** identifies ordered pairs from a graph, and/or plots ordered pairs using a variety of scales for the x- and y-axis.

**2.3A1** represents a variety of constant and linear relationships using written or oral descriptions of the rule, tables, graphs, and symbolic notation.

**2.3A2** interprets, describes, and analyzes the mathematical relationships of numerical, tabular, and graphical representations.

**2.3A3** translates between the numerical, tabular, graphical, and symbolic representations of linear relationships with integer coefficients and constants.

**Benchmark - Models**

**2.4K1a** knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: a. process models (concrete objects, pictures, diagrams, number lines, hundred charts, measurement tools, multiplication arrays, division sets, or coordinate grids) to model computational procedures, algebraic relationships, and mathematical relationships and to solve equations.

**2.4K1b** knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: b. place value models (place value mats, hundred charts, base ten blocks, or unifix cubes) to compare, order, and represent numerical quantities and to model computational procedures.

**2.4K1c** knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: c. fraction and mixed number models (fraction strips or pattern blocks) and decimal and money models (base ten blocks or coins) to compare, order, and represent numerical quantities.

**2.4K1d** knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: d. factor trees to model least common multiple, greatest common factor, and prime factorization.

**2.4K1e** knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: e. equations and inequalities to model numerical relationships.

**2.4K1f** knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: f. function tables to model numerical and algebraic relationships.

| | |
|---|---|
| **2.4K1g** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: g. coordinate planes to model relationships between ordered pairs and linear equations and inequalities. |
| **2.4K1h** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: h. two- and three-dimensional geometric models (geoboards, dot paper, nets, or solids) and real-world objects to model perimeter, area, volume, surface area, and properties of two-and three-dimensional figures. |
| **2.4K1i** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: i. scale drawings to model large and small real-world objects. |
| **2.4K1j** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: j. geometric models (spinners, targets, or number cubes), process models (coins, pictures, or diagrams), and tree diagrams to model probability. |
| **2.4K1k** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: k. frequency tables, bar graphs, line graphs, circle graphs, Venn diagrams, charts, tables, single and double stem-and-leaf plots, scatter plots, box-and-whisker plots, and histograms to organize and display data. |
| **2.4K1l** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: l. Venn diagrams to sort data and to show relationships. |
| **2.4A1a** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: a. process models (concrete objects, pictures, diagrams, flowcharts, number lines, hundred charts, measurement tools, multiplication arrays, division sets, or coordinate grids) to model computational procedures, algebraic relationships, mathematical relationships, and problem situations and to solve equations. |
| **2.4A1b** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: b. place value models (place value mats, hundred charts, base ten blocks, or unifix cubes) to model problem situations. |
| **2.4A1c** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: c. fraction and mixed number models (fraction strips or pattern blocks) and decimal and money models (base ten blocks or coins) to compare, order, and represent numerical quantities. |
| **2.4A1d** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: d. equations and inequalities to model numerical relationships. |

| | |
|---|---|
| **2.4A1e** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: e. function tables to model numerical and algebraic relationships. |
| **2.4A1f** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: f. coordinate planes to model relationships between ordered pairs and linear equations and inequalities. |
| **2.4A1g** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: g. two- and three-dimensional geometric models (geoboards, dot paper, nets, or solids) and real-world objects to model perimeter, area, volume, surface area and properties of two- and three-dimensional figures. |
| **2.4A1h** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: h. scale drawings to model large and small real-world objects. |
| **2.4A1i** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: i. geometric models (spinners, targets, or number cubes), process models (coins, pictures, or diagrams), and tree diagrams to model probability. |
| **2.4A1j** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: j. frequency tables, bar graphs, line graphs, circle graphs, Venn diagrams, charts, tables, single and double stem-and-leaf plots, scatter plots, box-and-whisker plots, and histograms to describe, interpret, and analyze data. |
| **2.4A1k** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: k. Venn diagrams to sort data and to show relationships. |
| **2.4A2** | determines if a given graphical, algebraic, or geometric model is an accurate representation of a given real-world situation. |
| **2.4A3** | uses the mathematical modeling process to analyze and make inferences about real-world situations. |

**Standard 3. Geometry**

**Benchmark - Geometric Figures and Their Properties**

| | |
|---|---|
| **3.1K1** | recognizes and compares properties of two- and three-dimensional figures using concrete objects, constructions, drawings, appropriate terminology, and appropriate technology. |
| **3.1K2a** | discusses properties of triangles and quadrilaterals related to: a. sum of the interior angles of any triangle is 180Â°. |
| **3.1K2b** | discusses properties of triangles and quadrilaterals related to: b. sum of the interior angles of any quadrilateral is 360Â°. |
| **3.1K2c** | discusses properties of triangles and quadrilaterals related to: c. parallelograms have opposite sides that are parallel and congruent, opposite angles are congruent. |

| | |
|---|---|
| **3.1K2d** | discusses properties of triangles and quadrilaterals related to: d. rectangles have angles of 90Â°, sides may or may not be equal. |
| **3.1K2e** | discusses properties of triangles and quadrilaterals related to: e. rhombi have all sides equal in length, angles may or may not be equal. |
| **3.1K2f** | discusses properties of triangles and quadrilaterals related to: f. squares have angles of 90Â°, all sides congruent. |
| **3.1K2g** | discusses properties of triangles and quadrilaterals related to: g. trapezoids have one pair of opposite sides parallel and the other pair of opposite sides are not parallel. |
| **3.1K2h** | discusses properties of triangles and quadrilaterals related to: h. kites have two distinct pairs of adjacent congruent sides. |
| **3.1K3** | recognizes and describes the rotational symmetries and line symmetries that exist in two-dimensional figures. |
| **3.1K4** | recognizes and uses properties of corresponding parts of similar and congruent triangles and quadrilaterals to find side or angle measures using standard notation for similarity (~) and congruence. |
| **3.1K5** | knows and describes Triangle Inequality Theorem to determine if a triangle exists. |
| **3.1K6a** | uses the Pythagorean theorem to: a. determine if a triangle is a right triangle. |
| **3.1K6b** | uses the Pythagorean theorem to: b. find a missing side of a right triangle where the lengths of all three sides are whole numbers. |
| **3.1K7** | recognizes and compares the concepts of a point, line, and plane. |
| **3.1K8** | describes the intersection of plane figures. |
| **3.1K9a** | describes and explains angle relationships: a. when two lines intersect including vertical and supplementary angles. |
| **3.1K9b** | describes and explains angle relationships: b. when formed by parallel lines cut by a transversal including corresponding, alternate interior, and alternate exterior angles. |
| **3.1K10** | recognizes and describes arcs and semicircles as parts of a circle and uses the standard notation for arc and circle. |
| **3.1A1a** | solves real-world problems by: a.using the properties of corresponding parts of similar and congruent figures. |
| **3.1A1b** | solves real-world problems by: b. applying the Pythagorean Theorem. |

**Benchmark - Measurement and Estimation**

| | |
|---|---|
| **3.2K1** | determines and uses rational number approximations (estimations) for length, width, weight, volume, temperature, time, perimeter, area, and surface area using standard and nonstandard units of measure. |

| | |
|---|---|
| | selects and uses measurement tools, units of measure, and level of precision appropriate for a given situation to find accurate real number representations for length, weight, volume, temperature, time, perimeter, area, surface area, and |
| **3.2K2** | angle measurements. |
| **3.2K3** | converts within the customary system and within the metric system. |
| | estimates the measure of a concrete object in one system given the measure of that object in another system and the |
| **3.2K4** | approximate conversion factor. |
| **3.2K5a** | uses given measurement formulas to find: a. area of parallelograms and trapezoids. |
| **3.2K5b** | uses given measurement formulas to find: b. surface area of rectangular prisms, triangular prisms, and cylinders. |
| **3.2K5c** | uses given measurement formulas to find: c. volume of rectangular prisms, triangular prisms, and cylinders. |
| **3.2K6** | recognizes how ratios and proportions can be used to measure inaccessible objects. |
| **3.2K7** | calculates rates of change. |
| **3.2A1a** | solves real-world problems: a. converting within the customary and the metric systems. |
| | solves real-world problems: b. finding perimeter and area of circles, squares, rectangles, triangles, parallelograms, and |
| **3.2A1b** | trapezoids. |
| **3.2A1c** | solves real-world problems: c. finding the volume and surface area of rectangular prisms. |
| | estimates to check whether or not measurements or calculations for length, weight, volume, temperature, time, perimeter, area, and surface area in real world problems are reasonable and adjusts original measurement or estimation |
| **3.2A2** | based on additional information (a frame of reference). |
| **3.2A3** | uses ratio and proportion to measure inaccessible objects. |

**Benchmark - Transformational Geometry**

| | |
|---|---|
| | identifies, describes, and performs single and multiple transformations [reflection, rotation, translation, reduction |
| **3.3K1** | (contraction/shrinking), enlargement (magnification/growing)] on a two-dimensional figure. |
| | describes a reflection of a given two-dimensional figure that moves it from its initial placement (preimage) to its final |
| **3.3K2** | placement (image) in the coordinate plane over the x- and y-axis. |
| **3.3K3a** | draws: a. three-dimensional figures from a variety of perspectives (top, bottom, sides, corners). |
| **3.3K3b** | draws: b. a scale drawing of a two-dimensional figure. |
| **3.3K3c** | draws: c. a two-dimensional drawing of a three-dimensional figure. |
| **3.3K4** | determines where and how an object or a shape can be tessellated using single or multiple transformations. |
| **3.3A1** | generalizes the impact of transformations on the area and perimeter of any two-dimensional geometric figure. |

| | |
|---|---|
| **3.3A2** | describes and draws a two-dimensional figure after undergoing two specified transformations without using a concrete object. |
| **3.3A3** | investigates congruency, similarity, and symmetry of geometric figures using transformations. |
| **3.3A4** | uses a scale drawing to determine the actual dimensions and/or measurements of a two-dimensional figure represented in a scale drawing. |

**Benchmark - Geometry from an Algebraic Perspective**

| | |
|---|---|
| **3.4K1a** | uses the coordinate plane to: a. list several ordered pairs on the graph of a line and find the slope of the line. |
| **3.4K1b** | uses the coordinate plane to: b. recognize that ordered pairs that lie on the graph of an equation are solutions to that equation. |
| **3.4K1c** | uses the coordinate plane to: c. recognize that points that do not lie on the graph of an equation are not solutions to that equation. |
| **3.4K1d** | uses the coordinate plane to: d. determine the length of a side of a figure drawn on a coordinate plane with vertices having the same x- or y-coordinates. |
| **3.4K1e** | uses the coordinate plane to: e. solve simple systems of linear equations. |
| **3.4K2** | uses a given linear equation with integer coefficients and constants and an integer solution to find the ordered pairs, organizes the ordered pairs using a T-table, and plots the ordered pairs on a coordinate plane. |
| **3.4K3** | examines characteristics of two-dimensional figures on a coordinate plane using various methods including mental math, paper and pencil, concrete objects, and graphing utilities or other appropriate technology. |
| **3.4A1** | represents, generates, and/or solves distance problems (including the use of the Pythagorean theorem, but not necessarily the distance formula). |
| **3.4A2** | translates between the written, numeric, algebraic, and geometric representations of a real-world problem. |

**Standard 4. Data**
**Benchmark - Probability**

| | |
|---|---|
| **4.1K1** | knows and explains the difference between independent and dependent events in an experiment, simulation, or situation. |
| **4.1K2** | identifies situations with independent or dependent events in an experiment, simulation, or situation. |
| **4.1K3** | finds the probability of a compound event composed of two independent events in an experiment, simulation, or situation. |
| **4.1K4** | finds the probability of simple and/or compound events using geometric models (spinners or dartboards). |

| | |
|---|---|
| **4.1K5** | finds the odds of a desired outcome in an experiment or simulation and expresses the answer as a ratio (2/3 or 2:3 or 2 to 3). |
| **4.1K6** | describes the difference between probability and odds. |
| **4.1A1** | conducts an experiment or simulation with independent or dependent events including the use of concrete objects; records the results in a chart, table, or graph; and uses the results to draw conclusions and make predictions about future events. |
| **4.1A2** | analyzes the results of an experiment or simulation of two independent events to generate convincing arguments, draw conclusions, and make predictions and decisions in a variety of real-world situations. |
| **4.1A3** | compares theoretical probability (expected results) with empirical probability (experimental results) in an experiment or simulation with a compound event composed of two independent events and understands that the larger the sample size, the greater the likelihood that the experimental results will equal the theoretical probability. |
| **4.1A4a** | makes predictions based on the theoretical probability of: a. a simple event in an experiment or simulation. |
| **4.1A4b** | makes predictions based on the theoretical probability of: b. compound events composed of two independent events in an experiment or simulation. |

**Benchmark - Statistics**

| | |
|---|---|
| **4.2K1a** | organizes, displays and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: a. frequency tables. |
| **4.2K1b** | organizes, displays and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: b. bar, line, and circle graphs. |
| **4.2K1c** | organizes, displays and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: c. Venn diagrams or other pictorial displays. |
| **4.2K1d** | organizes, displays and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: d. charts and tables. |
| **4.2K1e** | organizes, displays and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: e. stem-and-leaf plots (single and double). |

| | |
|---|---|
| **4.2K1f** | organizes, displays and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: f. scatter plots. |
| **4.2K1g** | organizes, displays and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: g. box-and-whiskers plots. |
| **4.2K1h** | organizes, displays and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: h. histograms. |
| **4.2K2** | recognizes valid and invalid data collection and sampling techniques. |
| **4.2K3** | determines and explains the measures of central tendency (mode, median, mean) for a rational number data set. |
| **4.2K4** | determines and explains the range, quartiles, and interquartile range for a rational number data set. |
| **4.2K5** | explains the effects of outliers on the median, mean, and range of a rational number data set. |
| **4.2K6** | makes a scatter plot and draws a line that approximately represents the data, determines whether a correlation exists, and if that correlation is positive, negative, or that no correlation exists. |
| **4.2A1a** | uses data analysis (mean, median, mode, range) in real-world problems with rational number data sets to compare and contrast two sets of data, to make accurate inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: a. frequency tables. |
| **4.2A1b** | uses data analysis (mean, median, mode, range) in real-world problems with rational number data sets to compare and contrast two sets of data, to make accurate inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: b. bar, line, and circle graphs. |
| **4.2A1c** | uses data analysis (mean, median, mode, range) in real-world problems with rational number data sets to compare and contrast two sets of data, to make accurate inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: c. Venn diagrams or other pictorial displays. |
| **4.2A1d** | uses data analysis (mean, median, mode, range) in real-world problems with rational number data sets to compare and contrast two sets of data, to make accurate inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: d. charts and tables. |
| **4.2A1e** | uses data analysis (mean, median, mode, range) in real-world problems with rational number data sets to compare and contrast two sets of data, to make accurate inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: e. stem-and-leaf plots (single and double). |
| **4.2A1f** | uses data analysis (mean, median, mode, range) in real-world problems with rational number data sets to compare and contrast two sets of data, to make accurate inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: f. scatter plots. |

| | |
|---|---|
| **4.2A1g** | uses data analysis (mean, median, mode, range) in real-world problems with rational number data sets to compare and contrast two sets of data, to make accurate inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: g. box-and-whiskers plots. |
| **4.2A1h** | uses data analysis (mean, median, mode, range) in real-world problems with rational number data sets to compare and contrast two sets of data, to make accurate inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: h. histograms. |
| **4.2A2** | explains advantages and disadvantages of various data collection techniques (observations, surveys, or interviews), and sampling techniques (random sampling, samples of convenience, biased sampling, or purposeful sampling) in a given situation. |
| **4.2A3a** | recognizes and explains: a. misleading representations of data. |
| **4.2A3b** | recognizes and explains: b. the effects of scale or interval changes on graphs of data sets. |
| **4.2A4** | recognizes faulty arguments and common errors in data analysis. |

Algebra 1

**Standard 1. Numbers and Computation**

**Benchmark - Number Sense**

**1.1K1** knows, explains, and uses equivalent representations for real numbers and algebraic expressions including integers, fractions, decimals, percents, ratios; rational number bases with integer exponents; rational numbers written in scientific notation; absolute value; time; and money.

**1.1K2** compares and orders real numbers and/or algebraic expressions and explains the relative magnitude between them.

**1.1K3a** knows and explains what happens to the product or quotient when a real number is multiplied or divided by: a. a rational number greater than zero and less than one.

**1.1K3b** knows and explains what happens to the product or quotient when a real number is multiplied or divided by: b. a rational number greater than one.

**1.1K3c** knows and explains what happens to the product or quotient when a real number is multiplied or divided by: c. a rational number less than zero.

**1.1A1** generates and/or solves real-world problems using equivalent representations of real numbers and algebraic expressions.

**1.1A2** determines whether or not solutions to real-world problems using real numbers and algebraic expressions are reasonable.

**Benchmark - Number Systems and Their Properties**

**1.2K1** explains and illustrates the relationship between the subsets of the real number system [natural (counting) numbers, whole numbers, integers, rational numbers, irrational numbers] using mathematical models.

**1.2K2** identifies all the subsets of the real number system [natural (counting) numbers, whole numbers, integers, rational numbers, irrational numbers] to which a given number belongs.

**1.2K3a** names, uses, and describes these properties with the real number system and demonstrates their meaning including the use of concrete objects: a. commutative (a + b = b + a and ab = ba), associative [a + (b + c) = (a + b) + c and a(bc) = (ab)c], distributive [a (b + c) = ab + ac], and substitution properties (if a = 2, then 3a = 3 x 2 = 6).

**1.2K3b** names, uses, and describes these properties with the real number system and demonstrates their meaning including the use of concrete objects: b. identity properties for addition and multiplication and inverse properties of addition and multiplication (additive identity, multiplicative identity, additive inverse, multiplicative inverse.

**1.2K3c** names, uses, and describes these properties with the real number system and demonstrates their meaning including the use of concrete objects: c. symmetric property of equality (if a = b, then b = a).

| | |
|---|---|
| **1.2K3d** | names, uses, and describes these properties with the real number system and demonstrates their meaning including the use of concrete objects: d. addition and multiplication properties of equality (if a = b, then a + c = b + c and if a = b, then ac = bc) and inequalities (if a > b, then a + c > b + c and if a > b, and c > 0 then ac > bc). |
| **1.2K3e** | names, uses, and describes these properties with the real number system and demonstrates their meaning including the use of concrete objects: e. zero product property (if ab = 0, then a = 0 and/or b = 0). |
| **1.2K4a** | uses and describes these properties with the real number system: a. transitive property (if a = b and b = c, then a = c). |
| **1.2K4b** | uses and describes these properties with the real number system: b. reflexive property (a = a). |
| **1.2A1a** | generates and/or solves real-world problems with real numbers using the concepts of these properties to explain reasoning: a. commutative, associative, distributive, and substitution properties. |
| **1.2A1b** | generates and/or solves real-world problems with real numbers using the concepts of these properties to explain reasoning: b. identity and inverse properties of addition and multiplication. |
| **1.2A1c** | generates and/or solves real-world problems with real numbers using the concepts of these properties to explain reasoning: c. symmetric property of equality. |
| **1.2A1d** | generates and/or solves real-world problems with real numbers using the concepts of these properties to explain reasoning: d. addition and multiplication properties of equality. |
| **1.2A1e** | generates and/or solves real-world problems with real numbers using the concepts of these properties to explain reasoning: e. zero product property. |
| **1.2A2** | analyzes and evaluates the advantages and disadvantages of using integers, whole numbers, fractions (including mixed numbers), decimals or irrational numbers and their rational approximations in solving a given real-world problem. |

**Benchmark - Estimation**

| | |
|---|---|
| **1.3K1** | estimates real number quantities using various computational methods including mental math, paper and pencil, concrete objects, and/or appropriate technology. |
| **1.3K2** | uses various estimation strategies and explains how they were used to estimate real number quantities and algebraic expressions. |
| **1.3K3** | knows and explains why a decimal representation of an irrational number is an approximate value. |
| **1.3K4** | knows and explains between which two consecutive integers an irrational number lies. |
| **1.3A1** | adjusts original rational number estimate of a real-world problem based on additional information (a frame of reference). |
| **1.3A2** | estimates to check whether or not the result of a real-world problem using real numbers and/or algebraic expressions is reasonable and makes predictions based on the information. |

| | |
|---|---|
| **1.3A3** | determines if a real-world problem calls for an exact or approximate answer and performs the appropriate computation using various computational strategies including mental math, paper and pencil, concrete objects, and/or appropriate technology. |
| **1.3A4** | explains the impact of estimation on the result of a real-world problem (underestimate, overestimate, range of estimates). |

**Benchmark - Computation**

| | |
|---|---|
| **1.4K1** | computes with efficiency and accuracy using various computational methods including mental math, paper and pencil, concrete objects, and appropriate technology. |
| **1.4K2a** | performs and explains these computational procedures: a. addition, subtraction, multiplication, and division using the order of operations. |
| **1.4K2b.i** | performs and explains these computational procedures: b. multiplication or division to find: i. a percent of a number. |
| **1.4K2b.ii** | performs and explains these computational procedures: b. multiplication or division to find: ii. percent of increase and decrease. |
| **1.4K2b.iii** | performs and explains these computational procedures: b. multiplication or division to find: iii. percent one number is of another number. |
| **1.4K2b.iv** | performs and explains these computational procedures: b. multiplication or division to find: iv. a number when a percent of the number is given. |
| **1.4K2c** | performs and explains these computational procedures: c. manipulation of variable quantities within an equation or inequality. |
| **1.4K2e** | performs and explains these computational procedures: e. simplification or evaluation of real numbers and algebraic monomial expressions raised to a whole number power and algebraic binomial expressions squared or cubed. |
| **1.4K2f** | performs and explains these computational procedures: f. simplification of products and quotients of real number and algebraic monomial expressions using the properties of exponents. |
| **1.4K3** | finds prime factors, greatest common factor, multiples, and the least common multiple of algebraic expressions. |
| **1.4A1a** | generates and/or solves multi-step real-world problems with real numbers and algebraic expressions using computational procedures (addition, subtraction, multiplication, division, roots, and powers excluding logarithms), and mathematical concepts with: a. applications from business, chemistry, and physics that involve addition, subtraction, multiplication, division, squares, and square roots when the formulae are given as part of the problem and variables are defined. |

| | |
|---|---|
| **1.4A2c** | generates and/or solves multi-step real-world problems with real numbers and algebraic expressions using computational procedures (addition, subtraction, multiplication, division, roots, and powers excluding logarithms), and mathematical concepts with: c. probabilities. |
| **1.4A2d** | generates and/or solves multi-step real-world problems with real numbers and algebraic expressions using computational procedures (addition, subtraction, multiplication, division, roots, and powers excluding logarithms), and mathematical concepts with: d. application of percents. |
| **1.4A2e** | generates and/or solves multi-step real-world problems with real numbers and algebraic expressions using computational procedures (addition, subtraction, multiplication, division, roots, and powers excluding logarithms), and mathematical concepts with: e. simple exponential growth and decay (excluding logarithms) and economics. |

**Standard 2. Algebra**

**Benchmark - Patterns**

| | |
|---|---|
| **2.1K1a** | identifies, states, and continues the following patterns using various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written: a. arithmetic and geometric sequences using real numbers and/or exponents. |
| **2.1K1b** | identifies, states, and continues the following patterns using various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written: b. patterns using geometric figures. |
| **2.1K1c** | identifies, states, and continues the following patterns using various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written: c. algebraic patterns including consecutive number patterns or equations of functions. |
| **2.1K1d** | identifies, states, and continues the following patterns using various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written: d. special patterns. |
| **2.1K2** | generates and explains a pattern. |
| **2.1K3** | classify sequences as arithmetic, geometric, or neither. |
| **2.1K4a** | defines: a. a recursive or explicit formula for arithmetic sequences and finds any particular term. |
| **2.1K4b** | defines: b. a recursive or explicit formula for geometric sequences and finds any particular term. |
| **2.1A1** | recognizes the same general pattern presented in different representations [numeric (list or table), visual (picture, table, or graph), and written]. |
| **2.1A2** | solves real-world problems with arithmetic or geometric sequences by using the explicit equation of the sequence. |

**Benchmark - Variables, Equations, and Inequalities**

**2.2K1** knows and explains the use of variables as parameters for a specific variable situation.

**2.2K2** manipulates variable quantities within an equation or inequality.

**2.2K3a** solves: a. linear equations and inequalities both analytically and graphically.

**2.2K3b** solves: b. quadratic equations with integer solutions (may be solved by trial and error, graphing, quadratic formula, or factoring).

**2.2K3c** solves: c. systems of linear equations with two unknowns using integer coefficients and constants.

**2.2K3f** solves: f. equations and inequalities with absolute value quantities containing one variable with a special emphasis on using a number line and the concept of absolute value.

**2.2K3g** solves: g. exponential equations with the same base without the aid of a calculator or computer.

**2.2A1** represents real-world problems using variables, symbols, expressions, equations, inequalities, and simple systems of linear equations.

**2.2A2a** represents and/or solves real-world problems with: a.linear equations and inequalities both analytically and graphically.

**2.2A2b** represents and/or solves real-world problems with: b. quadratic equations with integer solutions (may be solved by trial and error, graphing, quadratic formula, or factoring).

**2.2A2c** represents and/or solves real-world problems with: c. systems of linear equations with two unknowns.

**2.2A3** explains the mathematical reasoning that was used to solve a real-world problem using equations and inequalities and analyzes the advantages and disadvantages of various strategies that may have been used to solve the problem.

**Benchmark - Functions**

**2.3K1** evaluates and analyzes functions using various methods including mental math, paper and pencil, concrete objects, and graphing utilities or other appropriate technology.

**2.3K2** matches equations and graphs of constant and linear functions and quadratic functions limited to $y = ax2 + c$.

**2.3K3** determines whether a graph, list of ordered pairs, table of values, or rule represents a function.

**2.3K4** determines x- and y-intercepts and maximum and minimum values of the portion of the graph that is shown on a coordinate plane.

**2.3K5a** identifies domain and range of: a. relationships given the graph or table.

**2.3K5b** identifies domain and range of: b. constant and quadratic functions given the equation

**2.3K6** recognizes how changes in the constant and/or slope within a linear function changes the appearance of a graph.

**2.3K7** uses function notation.

**2.3K8** evaluates function(s) given a specific domain.

**2.3K9** describes the difference between independent and dependent variables and identifies independent and dependent variables.

**2.3A1** translates between the numerical, graphical, and symbolic representations of functions.

**2.3A2** interprets the meaning of the x- and y- intercepts, slope, and/or points on and off the line on a graph in the context of a real-world situation.

**2.3A3a** analyzes: a. the effects of parameter changes (scale changes or restricted domains) on the appearance of a function's graph.

**2.3A3b** analyzes: b. how changes in the constants and/or slope within a linear function affects the appearance of a graph.

**Benchmark - Models**

**2.4K1a** knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: a. process models (concrete objects, pictures, diagrams, number lines, hundred charts, measurement tools, multiplication arrays, division sets, or coordinate grids) to model computational procedures, algebraic relationships, and mathematical relationships and to solve equations.

**2.4K1b** knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: b. factor trees to model least common multiple, greatest common factor, and prime factorization.

**2.4K1c** knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: c. algebraic expressions to model relationships between two successive numbers in a sequence or other numerical patterns.

**2.4K1d** knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: d. equations and inequalities to model numerical and geometric relationships.

**2.4K1e** knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: e. function tables to model numerical and algebraic relationships.

**2.4K1f** knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: f. coordinate planes to model relationships between ordered pairs and equations and inequalities and linear and quadratic functions.

| | |
|---|---|
| **2.4K1i** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: i. scale drawings to model large and small real-world objects. |
| **2.4K1k** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: k. geometric models (spinners, targets, or number cubes), process models (concrete objects, pictures, diagrams, or coins), and tree diagrams to model probability. |
| **2.4K1l** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: l. frequency tables, bar graphs, line graphs, circle graphs, Venn diagrams, charts, tables, single and double stem-and-leaf plots, scatter plots, box-and-whisker plots, histograms, and matrices to organize and display data. |
| **2.4K1m** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: m. Venn diagrams to sort data and show relationships. |
| **2.4A1a** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: a. process models (concrete objects, pictures, diagrams, flowcharts, number lines, hundred charts, measurement tools, multiplication arrays, division sets, or coordinate grids) to model computational procedures, algebraic relationships, mathematical relationships, and problem situations and to solve equations. |
| **2.4A1b** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: b. algebraic expressions to model relationships between two successive numbers in a sequence or other numerical patterns. |
| **2.4A1c** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: c. equations and inequalities to model numerical and geometric relationships. |
| **2.4A1d** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: d. function tables to model numerical and algebraic relationships. |
| **2.4A1e** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: e. coordinate planes to model relationships between ordered pairs and equations and inequalities and linear and quadratic functions. |
| **2.4A1h** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: h. geometric models (spinners, targets, or number cubes), process models (coins, pictures, or diagrams), and tree diagrams to model probability. |

| | |
|---|---|
| **2.4A1i** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: i. frequency tables, bar graphs, line graphs, circle graphs, Venn diagrams, charts, tables, single and double stem-and-leaf plots, scatter plots, box-and-whisker plots, histograms, and matrices to describe, interpret, and analyze data. |
| **2.4A1j** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: j. Venn diagrams to sort data and show relationships. |
| **2.4A2** | uses the mathematical modeling process to analyze and make inferences about real-world situations. |

**Standard 3. Geometry**

**Benchmark - Geometric Figures and Their Properties**

| | |
|---|---|
| **3.1A1c** | solves real-world problems by: c. using properties of parallel lines. |

**Benchmark - Measurement and Estimation**

| | |
|---|---|
| **3.2K1** | determines and uses real number approximations (estimations) for length, width, weight, volume, temperature, time, distance, perimeter, area, surface area, and angle measurement using standard and nonstandard units of measure. |
| **3.2K3** | approximates conversions between customary and metric systems given the conversion unit or formula. |
| **3.2K4a** | states, recognizes, and applies formulas for: a. perimeter and area of squares, rectangle, and triangles. |
| **3.2K4b** | states, recognizes, and applies formulas for: b. circumference and area of circles; volume of rectangular solids. |
| **3.2K5** | uses given measurement formulas to find perimeter, area, volume, and surface area of two- and three-dimensional figures (regular and irregular). |
| **3.2K7** | knows, explains, and uses ratios and proportions to describe rates of change. |
| **3.2A1b** | solves real-world problems by: b. finding the perimeter and the area of circles, squares, rectangles, triangles, parallelograms, and trapezoids. |
| **3.2A1d** | solves real-world problems by: d. using the Pythagorean theorem. |
| **3.2A1e** | solves real-world problems by: e. using rates of change. |
| **3.2A2** | estimates to check whether or not measurements or calculations for length, weight, volume, temperature, time, distance, perimeter, area, surface area, and angle measurement in real-world problems are reasonable and adjusts original measurement or estimation based on additional information (a frame of reference). |

**Benchmark - Geometry from an Algebraic Perspective**

| | |
|---|---|
| **3.4K3** | calculates the slope of a line from a list of ordered pairs on the line and explains how the graph of the line is related to its slope. |
| **3.4K4** | finds and explains the relationship between the slopes of parallel and perpendicular line. |
| **3.4K6** | recognizes the equation of a line and transforms the equation into slope-intercept form in order to identify the slope and y-intercept and uses this information to graph the line. |
| **3.4K7** | recognizes the equation y = ax2 + c as a parabola; represents and identifies characteristics of the parabola including opens upward or opens downward, steepness (wide/narrow), the vertex, maximum and minimum values, and line of symmetry; and sketches the graph of the parabola. |
| **3.4K8** | explains the relationship between the solution(s) to systems of equations and systems of inequalities in two unknowns and their corresponding graphs. |

**Standard 4. Data**

**Benchmark - Probability**

| | |
|---|---|
| **4.1K1** | finds the probability of two independent events in an experiment, simulation, or situation. |
| **4.1K2** | finds the conditional probability of two dependent events in an experiment, simulation, or situation. |
| **4.1K3** | explains the relationship between probability and odds and computes one given the other. |
| **4.1A1** | conducts an experiment or simulation with two dependent events; records the results in charts, tables, or graphs; and uses the results to generate convincing arguments, draw conclusions and make predictions. |
| **4.1A2a** | uses theoretical or empirical probability of a simple or compound event composed of two or more simple, independent events to make predictions and analyze decisions about real-world situations including: a. work in economics, quality control, genetics, meteorology, and other areas of science. |
| **4.1A2b** | uses theoretical or empirical probability of a simple or compound event composed of two or more simple, independent events to make predictions and analyze decisions about real-world situations including: b. games |
| **4.1A2c** | uses theoretical or empirical probability of a simple or compound event composed of two or more simple, independent events to make predictions and analyze decisions about real-world situations including: c. situations involving geometric models. |
| **4.1A3** | compares theoretical probability (expected results) with empirical probability (experimental results) of two independent and/or dependent events and understands that the larger the sample size, the greater the likelihood that experimental results will match theoretical probability. |
| **4.1A4** | uses conditional probabilities of two dependent events in an experiment, simulation, or situation to make predictions and analyze decisions. |

**Benchmark - Statistics**

| | |
|---|---|
| **4.2K1a** | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: a. frequency tables and line plots. |
| **4.2K1b** | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: b. bar, line, and circle graphs. |
| **4.2K1c** | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: c. Venn diagrams or other pictorial displays. |
| **4.2K1d** | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: d. charts and tables. |
| **4.2K1e** | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: e. stem-and-leaf plots (single and double). |
| **4.2K1f** | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: f. scatter plots. |
| **4.2K1g** | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: g. box-and-whiskers plots. |
| **4.2K1h** | organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: h. histograms. |
| **4.2K3** | calculates and explains the meaning of range, quartiles and interquartile range for a real number data set. |
| **4.2K4** | explains the effects of outliers on the measures of central tendency (mean, median, mode) and range and interquartile range of a real number data set. |
| **4.2K5** | approximates a line of best fit given a scatter plot and makes predictions using the graph or the equation of that line. |
| **4.2K6c** | compares and contrasts the dispersion of two given sets of data in terms of range and the shape of the distribution including: c. bimodal. |

| | |
|---|---|
| **4.2A1a** | uses data analysis (mean, median, mode, range, quartile, interquartile range) in real-world problems with rational number data sets to compare and contrast two sets of data, to make accurate inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: a. frequency tables and line plots. |
| **4.2A1b** | uses data analysis (mean, median, mode, range, quartile, interquartile range) in real-world problems with rational number data sets to compare and contrast two sets of data, to make accurate inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: b. bar, line, and circle graphs. |
| **4.2A1c** | uses data analysis (mean, median, mode, range, quartile, interquartile range) in real-world problems with rational number data sets to compare and contrast two sets of data, to make accurate inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: c. Venn diagrams or other pictorial displays. |
| **4.2A1d** | uses data analysis (mean, median, mode, range, quartile, interquartile range) in real-world problems with rational number data sets to compare and contrast two sets of data, to make accurate inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: d. charts and tables. |
| **4.2A1e** | uses data analysis (mean, median, mode, range, quartile, interquartile range) in real-world problems with rational number data sets to compare and contrast two sets of data, to make accurate inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: e. stem-and-leaf plots (single and double). |
| **4.2A1f** | uses data analysis (mean, median, mode, range, quartile, interquartile range) in real-world problems with rational number data sets to compare and contrast two sets of data, to make accurate inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: f. scatter plots. |
| **4.2A1g** | uses data analysis (mean, median, mode, range, quartile, interquartile range) in real-world problems with rational number data sets to compare and contrast two sets of data, to make accurate inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: g. box-and-whiskers plots. |
| **4.2A1h** | uses data analysis (mean, median, mode, range, quartile, interquartile range) in real-world problems with rational number data sets to compare and contrast two sets of data, to make accurate inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays: h. histograms. |

| | |
|---|---|
| **4.2A2** | determines and describes appropriate data collection techniques (observations, surveys, or interviews) and sampling techniques (random sampling, samples of convenience, biased sampling, census of total population, or purposeful sampling) in a given situation. |
| **4.2A3** | uses changes in scales, intervals, and categories to help support a particular interpretation of the data. |
| **4.2A4** | determines and explains the advantages and disadvantages of using each measure of central tendency and the range to describe a data set. |
| **4.2A5a** | analyzes the effects of: a. outliers on the mean, median, and range of a real number data set. |
| **4.2A5b** | analyzes the effects of: b. changes within a real number data set on mean, median, mode, range, quartiles, and interquartile range. |
| **4.2A6** | approximates a line of best fit given a scatter plot, makes predictions, and analyzes decisions using the equation of that line. |

**Algebra 2**

**Standard 1. Numbers and Computation**

**Benchmark - Number Systems and Their Properties**

| | |
|---|---|
| **1.2K1** | explains and illustrates the relationship between the subsets of the real number system [natural (counting) numbers, whole numbers, integers, rational numbers, irrational numbers] using mathematical models. |
| **1.2K2** | identifies all the subsets of the real number system [natural (counting) numbers, whole numbers, integers, rational numbers, irrational numbers] to which a given number belongs. |
| **1.2K3a** | names, uses, and describes these properties with the real number system and demonstrates their meaning including the use of concrete objects: a. commutative (a + b = b + a and ab = ba), associative [a + (b + c) = (a + b) + c and a(bc) = (ab)c], distributive [a (b + c) = ab + ac], and substitution properties (if a = 2, then 3a = 3 x 2 = 6). |
| **1.2K3b** | names, uses, and describes these properties with the real number system and demonstrates their meaning including the use of concrete objects: b. identity properties for addition and multiplication and inverse properties of addition and multiplication (additive identity, multiplicative identity, additive inverse, multiplicative inverse. |

**Benchmark - Estimation**

| | |
|---|---|
| **1.3K1** | estimates real number quantities using various computational methods including mental math, paper and pencil, concrete objects, and/or appropriate technology. |

**Standard 2. Algebra**

**Benchmark - Patterns**

| | |
|---|---|
| **2.1K1a** | identifies, states, and continues the following patterns using various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written: a. arithmetic and geometric sequences using real numbers and/or exponents. |
| **2.1K1b** | identifies, states, and continues the following patterns using various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written: b. patterns using geometric figures. |
| **2.1K1c** | identifies, states, and continues the following patterns using various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written: c. algebraic patterns including consecutive number patterns or equations of functions. |
| **2.1K1d** | identifies, states, and continues the following patterns using various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written: d. special patterns. |

| | |
|---|---|
| **2.1A1** | recognizes the same general pattern presented in different representations [numeric (list or table), visual (picture, table, or graph), and written]. |

**Benchmark - Variables, Equations, and Inequalities**

| | |
|---|---|
| **2.2K3a** | solves: a. linear equations and inequalities both analytically and graphically. |
| **2.2K3b** | solves: b. quadratic equations with integer solutions (may be solved by trial and error, graphing, quadratic formula, or factoring). |
| **2.2K3c** | solves: c. systems of linear equations with two unknowns using integer coefficients and constants. |
| **2.2K3d** | solves: d. radical equations with no more than one inverse operation around the radical expression. |
| **2.2K3e** | solves: e. equations where the solution to a rational equation can be simplified as a linear equation with a nonzero denominator. |
| **2.2K3f** | solves: f. equations and inequalities with absolute value quantities containing one variable with a special emphasis on using a number line and the concept of absolute value. |
| **2.2K3g** | solves: g. exponential equations with the same base without the aid of a calculator or computer. |
| **2.2A1** | represents real-world problems using variables, symbols, expressions, equations, inequalities, and simple systems of linear equations. |
| **2.2A2a** | represents and/or solves real-world problems with: a.linear equations and inequalities both analytically and graphically. |
| **2.2A2b** | represents and/or solves real-world problems with: b. quadratic equations with integer solutions (may be solved by trial and error, graphing, quadratic formula, or factoring). |
| **2.2A2c** | represents and/or solves real-world problems with: c. systems of linear equations with two unknowns. |
| **2.2A2d** | represents and/or solves real-world problems with: d. radical equations with no more than one inverse operation around the radical expression. |
| **2.2A2e** | represents and/or solves real-world problems with: e. a rational equation where the solution can be simplified as a linear equation with a nonzero denominator. |
| **2.2A3** | explains the mathematical reasoning that was used to solve a real-world problem using equations and inequalities and analyzes the advantages and disadvantages of various strategies that may have been used to solve the problem. |

**Benchmark - Functions**

| | |
|---|---|
| **2.3K1** | evaluates and analyzes functions using various methods including mental math, paper and pencil, concrete objects, and graphing utilities or other appropriate technology. |
| **2.3K2** | matches equations and graphs of constant and linear functions and quadratic functions limited to y = ax2 + c. |
| **2.3K3** | determines whether a graph, list of ordered pairs, table of values, or rule represents a function. |

| | |
|---|---|
| **2.3K4** | determines x- and y-intercepts and maximum and minimum values of the portion of the graph that is shown on a coordinate plane. |
| **2.3K5a** | identifies domain and range of: a. relationships given the graph or table. |
| **2.3K5b** | identifies domain and range of: b. constant and quadratic functions given the equation |
| **2.3K6** | recognizes how changes in the constant and/or slope within a linear function changes the appearance of a graph. |
| **2.3K7** | uses function notation. |
| **2.3K8** | evaluates function(s) given a specific domain. |
| **2.3K9** | describes the difference between independent and dependent variables and identifies independent and dependent variables. |
| **2.3A1** | translates between the numerical, graphical, and symbolic representations of functions. |
| **2.3A2** | interprets the meaning of the x- and y- intercepts, slope, and/or points on and off the line on a graph in the context of a real-world situation. |
| **2.3A3b** | analyzes: b. how changes in the constants and/or slope within a linear function affects the appearance of a graph. |
| **2.3A3c** | analyzes: c. how changes in the constants and/or coefficients within a quadratic function in the form of y = ax2 + c affects the appearance of a graph. |

**Benchmark - Models**

| | |
|---|---|
| **2.4K1d** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: d. equations and inequalities to model numerical and geometric relationships. |
| **2.4K1e** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: e. function tables to model numerical and algebraic relationships. |
| **2.4K1f** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: f. coordinate planes to model relationships between ordered pairs and equations and inequalities and linear and quadratic functions. |
| **2.4A1a** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: a. process models (concrete objects, pictures, diagrams, flowcharts, number lines, hundred charts, measurement tools, multiplication arrays, division sets, or coordinate grids) to model computational procedures, algebraic relationships, mathematical relationships, and problem situations and to solve equations. |

**2.4A1c** recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: c. equations and inequalities to model numerical and geometric relationships.

**2.4A1d** recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: d. function tables to model numerical and algebraic relationships.

**2.4A1e** recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: e. coordinate planes to model relationships between ordered pairs and equations and inequalities and linear and quadratic functions.

**Standard 3. Geometry**

**Benchmark - Geometric Figures and Their Properties**

**3.1A1b** solves real-world problems by: b. applying the Pythagorean Theorem.

**3.1A1c** solves real-world problems by: c. using properties of parallel lines.

**Benchmark - Measurement and Estimation**

**3.2K1** determines and uses real number approximations (estimations) for length, width, weight, volume, temperature, time, distance, perimeter, area, surface area, and angle measurement using standard and nonstandard units of measure.

**3.2K2** selects and uses measurement tools, units of measure, and level of precision appropriate for a given situation to find accurate real number representations for length, weight, volume, temperature, time, distance, area, surface area, mass, midpoint, and angle measurements.

**3.2A1d** solves real-world problems by: d. using the Pythagorean theorem.

**Benchmark - Geometry from an Algebraic Perspective**

**3.4K1** recognizes and examines two- and three-dimensional figures and their attributes including the graphs of functions on a coordinate plane using various methods including mental math, paper and pencil, concrete objects, and graphing utilities or other appropriate technology.

**3.4K2** determines if a given point lies on the graph of a given line or parabola without graphing and justifies the answer.

**3.4K3** calculates the slope of a line from a list of ordered pairs on the line and explains how the graph of the line is related to its slope.

**3.4K4** finds and explains the relationship between the slopes of parallel and perpendicular line.

**3.4K6** recognizes the equation of a line and transforms the equation into slope-intercept form in order to identify the slope and y-intercept and uses this information to graph the line.

| | |
|---|---|
| | recognizes the equation y = ax2 + c as a parabola; represents and identifies characteristics of the parabola including opens upward or opens downward, steepness (wide/narrow), the vertex, maximum and minimum values, and line of symmetry; |
| **3.4K7** | and sketches the graph of the parabola. |
| | explains the relationship between the solution(s) to systems of equations and systems of inequalities in two unknowns and |
| **3.4K8** | their corresponding graphs. |
| | analyzes how changes in the constants and/or leading coefficients within the equation of a line or parabola affects the |
| **3.4A4** | appearance of the graph of the equation. |

**Standard 4. Data**

**Benchmark - Probability**

| | |
|---|---|
| **4.1K2** | finds the conditional probability of two dependent events in an experiment, simulation, or situation. |
| **4.1K3** | explains the relationship between probability and odds and computes one given the other. |
| | conducts an experiment or simulation with two dependent events; records the results in charts, tables, or graphs; and uses |
| **4.1A1** | the results to generate convincing arguments, draw conclusions and make predictions. |
| | uses theoretical or empirical probability of a simple or compound event composed of two or more simple, independent events to make predictions and analyze decisions about real-world situations including: a. work in economics, quality |
| **4.1A2a** | control, genetics, meteorology, and other areas of science. |
| | uses theoretical or empirical probability of a simple or compound event composed of two or more simple, independent |
| **4.1A2b** | events to make predictions and analyze decisions about real-world situations including: b. games |
| | uses theoretical or empirical probability of a simple or compound event composed of two or more simple, independent events to make predictions and analyze decisions about real-world situations including: c. situations involving geometric |
| **4.1A2c** | models. |
| | compares theoretical probability (expected results) with empirical probability (experimental results) of two independent and/or dependent events and understands that the larger the sample size, the greater the likelihood that experimental |
| **4.1A3** | results will match theoretical probability. |
| | uses conditional probabilities of two dependent events in an experiment, simulation, or situation to make predictions and |
| **4.1A4** | analyze decisions. |

**Geometry**

**Standard 1. Numbers and Computation**

**Benchmark - Number Sense**

| | |
|---|---|
| **1.1K1** | knows, explains, and uses equivalent representations for real numbers and algebraic expressions including integers, fractions, decimals, percents, ratios; rational number bases with integer exponents; rational numbers written in scientific notation; absolute value; time; and money. |
| **1.1K3a** | knows and explains what happens to the product or quotient when a real number is multiplied or divided by: a. a rational number greater than zero and less than one. |
| **1.1K3b** | knows and explains what happens to the product or quotient when a real number is multiplied or divided by: b. a rational number greater than one. |
| **1.1K3c** | knows and explains what happens to the product or quotient when a real number is multiplied or divided by: c. a rational number less than zero. |
| **1.1A1** | generates and/or solves real-world problems using equivalent representations of real numbers and algebraic expressions. |
| **1.1A2** | determines whether or not solutions to real-world problems using real numbers and algebraic expressions are reasonable. |

**Benchmark - Estimation**

| | |
|---|---|
| **1.3K1** | estimates real number quantities using various computational methods including mental math, paper and pencil, concrete objects, and/or appropriate technology. |
| **1.3K2** | uses various estimation strategies and explains how they were used to estimate real number quantities and algebraic expressions. |
| **1.3K3** | knows and explains why a decimal representation of an irrational number is an approximate value. |
| **1.3A1** | adjusts original rational number estimate of a real-world problem based on additional information (a frame of reference). |
| **1.3A2** | estimates to check whether or not the result of a real-world problem using real numbers and/or algebraic expressions is reasonable and makes predictions based on the information. |
| **1.3A3** | determines if a real-world problem calls for an exact or approximate answer and performs the appropriate computation using various computational strategies including mental math, paper and pencil, concrete objects, and/or appropriate technology. |
| **1.3A4** | explains the impact of estimation on the result of a real-world problem (underestimate, overestimate, range of estimates). |

**Benchmark - Computation**

| | |
|---|---|
| **1.4K1** | computes with efficiency and accuracy using various computational methods including mental math, paper and pencil, concrete objects, and appropriate technology. |
| **1.4K2a** | performs and explains these computational procedures: a. addition, subtraction, multiplication, and division using the order of operations. |
| **1.4K2b.i** | performs and explains these computational procedures: b. multiplication or division to find: i. a percent of a number. |
| **1.4K2d** | performs and explains these computational procedures: d. simplification of radical expressions (without rationalizing denominators) including square roots of perfect square monomials and cube roots of perfect cubic monomials. |
| **1.4K2e** | performs and explains these computational procedures: e. simplification or evaluation of real numbers and algebraic monomial expressions raised to a whole number power and algebraic binomial expressions squared or cubed. |
| **1.4K2f** | performs and explains these computational procedures: f. simplification of products and quotients of real number and algebraic monomial expressions using the properties of exponents. |
| **1.4A1a** | generates and/or solves multi-step real-world problems with real numbers and algebraic expressions using computational procedures (addition, subtraction, multiplication, division, roots, and powers excluding logarithms), and mathematical concepts with: a. applications from business, chemistry, and physics that involve addition, subtraction, multiplication, division, squares, and square roots when the formulae are given as part of the problem and variables are defined. |
| **1.4A1b** | generates and/or solves multi-step real-world problems with real numbers and algebraic expressions using computational procedures (addition, subtraction, multiplication, division, roots, and powers excluding logarithms), and mathematical concepts with: b. volume and surface area given the measurement formulas of rectangular solids and cylinders. |
| **1.4A2d** | generates and/or solves multi-step real-world problems with real numbers and algebraic expressions using computational procedures (addition, subtraction, multiplication, division, roots, and powers excluding logarithms), and mathematical concepts with: d. application of percents. |

**Standard 2. Algebra**

**Benchmark - Patterns**

| | |
|---|---|
| **2.1K1b** | identifies, states, and continues the following patterns using various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written: b. patterns using geometric figures. |

| | |
|---|---|
| | identifies, states, and continues the following patterns using various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written: c. algebraic |
| **2.1K1c** | patterns including consecutive number patterns or equations of functions. |
| **2.1K2** | generates and explains a pattern. |
| **2.1K3** | classify sequences as arithmetic, geometric, or neither. |
| **2.1K4b** | defines: b. a recursive or explicit formula for geometric sequences and finds any particular term. |
| **2.1A1** | recognizes the same general pattern presented in different representations [numeric (list or table), visual (picture, table, or graph), and written]. |
| **2.1A2** | solves real-world problems with arithmetic or geometric sequences by using the explicit equation of the sequence. |

**Benchmark - Variables, Equations, and Inequalities**

| | |
|---|---|
| **2.2K3a** | solves: a. linear equations and inequalities both analytically and graphically. |
| **2.2K3b** | solves: b. quadratic equations with integer solutions (may be solved by trial and error, graphing, quadratic formula, or factoring). |
| **2.2K3e** | solves: e. equations where the solution to a rational equation can be simplified as a linear equation with a nonzero denominator. |
| **2.2A1** | represents real-world problems using variables, symbols, expressions, equations, inequalities, and simple systems of linear equations. |
| **2.2A2a** | represents and/or solves real-world problems with: a.linear equations and inequalities both analytically and graphically. |
| **2.2A2b** | represents and/or solves real-world problems with: b. quadratic equations with integer solutions (may be solved by trial and error, graphing, quadratic formula, or factoring). |
| **2.2A2c** | represents and/or solves real-world problems with: c. systems of linear equations with two unknowns. |

**Benchmark - Functions**

| | |
|---|---|
| | evaluates and analyzes functions using various methods including mental math, paper and pencil, concrete objects, and |
| **2.3K1** | graphing utilities or other appropriate technology. |
| **2.3K5a** | identifies domain and range of: a. relationships given the graph or table. |
| **2.3K5b** | identifies domain and range of: b. constant and quadratic functions given the equation |
| **2.3K7** | uses function notation. |
| **2.3K8** | evaluates function(s) given a specific domain. |
| **2.3K9** | describes the difference between independent and dependent variables and identifies independent and dependent variables. |

| | |
|---|---|
| **2.3A2** | interprets the meaning of the x- and y- intercepts, slope, and/or points on and off the line on a graph in the context of a real-world situation. |
| **2.3A3a** | analyzes: a. the effects of parameter changes (scale changes or restricted domains) on the appearance of a function's graph. |

**Benchmark - Models**

| | |
|---|---|
| **2.4K1a** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: a. process models (concrete objects, pictures, diagrams, number lines, hundred charts, measurement tools, multiplication arrays, division sets, or coordinate grids) to model computational procedures, algebraic relationships, and mathematical relationships and to solve equations. |
| **2.4K1b** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: b. factor trees to model least common multiple, greatest common factor, and prime factorization. |
| **2.4K1c** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: c. algebraic expressions to model relationships between two successive numbers in a sequence or other numerical patterns. |
| **2.4K1d** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: d. equations and inequalities to model numerical and geometric relationships. |
| **2.4K1h** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: h. two- and three-dimensional geometric models (geoboards, dot paper, coordinate plane, nets, or solids) and real-world objects to model perimeter, area, volume, and surface area, properties of two- and three-dimensional figures, and isometric views of three-dimensional figures. |
| **2.4K1i** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: i. scale drawings to model large and small real-world objects. |
| **2.4K1k** | knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include: k. geometric models (spinners, targets, or number cubes), process models (concrete objects, pictures, diagrams, or coins), and tree diagrams to model probability. |
| **2.4A1b** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: b. algebraic expressions to model relationships between two successive numbers in a sequence or other numerical patterns. |

| | |
|---|---|
| **2.4A1c** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: c. equations and inequalities to model numerical and geometric relationships. |
| **2.4A1e** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: e. coordinate planes to model relationships between ordered pairs and equations and inequalities and linear and quadratic functions. |
| **2.4A1f** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: f. two- and three-dimensional geometric models (geoboards, dot paper, coordinate plane, nets, or solids) and real-world objects to model perimeter, area, volume, and surface area, properties of two- and three-dimensional figures and isometric views of three-dimensional figures. |
| **2.4A1g** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: g. scale drawings to model large and small real-world objects. |
| **2.4A1j** | recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include: j. Venn diagrams to sort data and show relationships. |
| **2.4A2** | uses the mathematical modeling process to analyze and make inferences about real-world situations. |

**Standard 3. Geometry**

**Benchmark - Geometric Figures and Their Properties**

| | |
|---|---|
| **3.1K1** | recognizes and compares properties of two-and three-dimensional figures using concrete objects, constructions, drawings, appropriate terminology, and appropriate technology. |
| **3.1K2a** | discusses properties of regular polygons related to: a. angle measures. |
| **3.1K2b** | discusses properties of regular polygons related to: b. diagonals. |
| **3.1K3** | recognizes and describes the symmetries (point, line, plane) that exist in three-dimensional figures. |
| **3.1K4** | recognizes that similar figures have congruent angles, and their corresponding sides are proportional. |
| **3.1K5a** | uses the Pythagorean Theorem to: a. determine if a triangle is a right triangle. |
| **3.1K5b** | uses the Pythagorean Theorem to: b. find a missing side of a right triangle. |
| **3.1K6a** | recognizes and describes: a. congruence of triangles using: Side-Side-Side (SSS), Angle-Side-Angle (ASA), Side-Angle-Side (SAS), and Angle-Angle-Side (AAS). |
| **3.1K6b** | recognizes and describes: b. the ratios of the sides in special right triangles: 30Â°-60Â°-90Â° and 45Â°-45Â°-90Â°. |
| **3.1K7** | recognizes, describes, and compares the relationships of the angles formed when parallel lines are cut by a transversal. |
| **3.1K8** | recognizes and identifies parts of a circle: arcs, chords, sectors of circles, secant and tangent lines, central and inscribed angles. |
| **3.1A1a** | solves real-world problems by: a. using the properties of corresponding parts of similar and congruent figures. |
| **3.1A1b** | solves real-world problems by: b. applying the Pythagorean Theorem. |

**3.1A1c** solves real-world problems by: c. using properties of parallel lines.

**3.1A2** uses deductive reasoning to justify the relationships between the sides of 30Â°-60Â°-90Â° and 45Â°-45Â°-90Â° triangles using the ratios of sides of similar triangles.

**3.1A3** understands the concepts of and develops a formal or informal proof through understanding of the difference between a statement verified by proof (theorem) and a statement supported by examples.

**Benchmark - Measurement and Estimation**

**3.2K1** determines and uses real number approximations (estimations) for length, width, weight, volume, temperature, time, distance, perimeter, area, surface area, and angle measurement using standard and nonstandard units of measure.

**3.2K2** selects and uses measurement tools, units of measure, and level of precision appropriate for a given situation to find accurate real number representations for length, weight, volume, temperature, time, distance, area, surface area, mass, midpoint, and angle measurements.

**3.2K3** approximates conversions between customary and metric systems given the conversion unit or formula.

**3.2K4a** states, recognizes, and applies formulas for: a. perimeter and area of squares, rectangle, and triangles.

**3.2K4b** states, recognizes, and applies formulas for: b. circumference and area of circles; volume of rectangular solids.

**3.2K5** uses given measurement formulas to find perimeter, area, volume, and surface area of two- and three-dimensional figures (regular and irregular).

**3.2K6** recognizes and applies properties of corresponding parts of similar and congruent figures to find measurements of missing sides.

**3.2K7** knows, explains, and uses ratios and proportions to describe rates of change.

**3.2A1a** solves real-world problems by: a. converting within the customary and the metric systems.

**3.2A1b** solves real-world problems by: b. finding the perimeter and the area of circles, squares, rectangles, triangles, parallelograms, and trapezoids.

**3.2A1c** solves real-world problems by: c. finding the volume and the surface area of rectangular solids and cylinders.

**3.2A1d** solves real-world problems by: d. using the Pythagorean theorem.

**3.2A1e** solves real-world problems by: e. using rates of change.

**3.2A2** estimates to check whether or not measurements or calculations for length, weight, volume, temperature, time, distance, perimeter, area, surface area, and angle measurement in real-world problems are reasonable and adjusts original measurement or estimation based on additional information (a frame of reference).

**3.2A3** uses indirect measurements to measure inaccessible objects.

**Benchmark - Transformational Geometry**

| | |
|---|---|
| **3.3K1** | describes and performs single and multiple transformations [refection, rotation, translation, reduction (contraction/shrinking), enlargement (magnification/growing)] on two- and three-dimensional figures. |
| **3.3K2** | recognizes a three-dimensional figure created by rotating a simple two-dimensional figure around a fixed line. |
| **3.3K3** | generates a two-dimensional representation of a three-dimensional figure. |
| **3.3K4** | determines where and how an object or a shape can be tessellated using single or multiple transformations and creates a tessellation. |
| **3.3A1** | analyzes the impact of transformations on the perimeter and area of circles, rectangles, and triangles and volume of rectangular prisms and cylinders. |
| **3.3A2** | describes and draws a simple three-dimensional shape after undergoing one specified transformation without using concrete objects to perform the transformation. |
| **3.3A3** | uses a variety of scales to view and analyze two- and three-dimensional figures. |
| **3.3A4** | analyzes and explains transformations using such things as sketches and coordinate systems. |

**Benchmark - Geometry from an Algebraic Perspective**

| | |
|---|---|
| **3.4K1** | recognizes and examines two- and three-dimensional figures and their attributes including the graphs of functions on a coordinate plane using various methods including mental math, paper and pencil, concrete objects, and graphing utilities or other appropriate technology. |
| **3.4K2** | determines if a given point lies on the graph of a given line or parabola without graphing and justifies the answer. |
| **3.4K3** | calculates the slope of a line from a list of ordered pairs on the line and explains how the graph of the line is related to its slope. |
| **3.4K4** | finds and explains the relationship between the slopes of parallel and perpendicular line. |
| **3.4K5** | uses the Pythagorean Theorem to find distance (may use the distance formula). |
| **3.4K6** | recognizes the equation of a line and transforms the equation into slope-intercept form in order to identify the slope and y-intercept and uses this information to graph the line. |
| **3.4K7** | recognizes the equation y = ax2 + c as a parabola; represents and identifies characteristics of the parabola including opens upward or opens downward, steepness (wide/narrow), the vertex, maximum and minimum values, and line of symmetry; and sketches the graph of the parabola. |
| **3.4K8** | explains the relationship between the solution(s) to systems of equations and systems of inequalities in two unknowns and their corresponding graphs. |
| **3.4A1** | represents, generates, and/or solves real-world problems that involve distance and two-dimensional geometric figures including parabolas in the form ax2 + c. |
| **3.4A2** | translates between the written, numeric, algebraic, and geometric representations of a real-world problem. |

**3.4A3** recognizes and explains the effects of scale changes on the appearance of the graph of an equation involving a line or parabola.

**3.4A4** analyzes how changes in the constants and/or leading coefficients within the equation of a line or parabola affects the appearance of the graph of the equation.

**Standard 4. Data**

**Benchmark - Probability**

**4.1A2a** uses theoretical or empirical probability of a simple or compound event composed of two or more simple, independent events to make predictions and analyze decisions about real-world situations including: a. work in economics, quality control, genetics, meteorology, and other areas of science.

**4.1A2c** uses theoretical or empirical probability of a simple or compound event composed of two or more simple, independent events to make predictions and analyze decisions about real-world situations including: c. situations involving geometric models.

**Benchmark - Statistics**

**4.2K1a** organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: a. frequency tables and line plots.

**4.2K1b** organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: b. bar, line, and circle graphs.

**4.2K1d** organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays: d. charts and tables.