

Elementary
Mathematics
Curriculum
Guide
Grade 4

Fall 2002

Loudoun County Public Schools
Department of Mathematics

Elementary Curriculum Guide Overview

This curriculum guide was designed to facilitate and enhance your mathematics instruction. Each grade level contains six parts –

- 1) A grade level syllabi,
- 2) A curriculum framework,
- 3) An SOL summary page with before and after SOL links and related resources,
- 4) An enrichment section for each strand,
- 5) Six assessments - one per strand, and
- 6) A checklist of SOLs to use as needed.

Teachers are encouraged to make a copy of their grade level guide for more personalized use. By copying the appropriate pages and putting them in a binder, teachers can further customize this guide, adding their own worksheets, tests, or other resources. Additionally, if information on a particular SOL is updated or changed in the future, an individual page can be inserted versus having to get acquainted with an entirely new guide.

This guide was developed in part by the contributions of you, the teacher, as a result of your survey responses. We hope that it will be a useful and well-used document that will serve you for years to come.

**Elementary Curriculum Guide Committee
Summer 2002**

Mathematics Internet Safety Procedures

1. Teachers should review all Internet sites and links prior to using it in the classroom. During this review, teachers need to ensure the appropriateness of the content on the site, checking for broken links, and paying attention to any inappropriate pop-ups or solicitation of information.
2. Teachers should circulate throughout the classroom while students are on the internet checking to make sure the students are on the appropriate site and are not minimizing other inappropriate sites.
3. Teachers should periodically check and update any web addresses that they have on their LCPS web pages.
4. Teachers should assure that the use of websites correlate with the objectives of the lesson and provide students with the appropriate challenge.

Kindergarten

Number and Number Sense

- K.1 The student, given two sets containing 10 or fewer concrete items, will identify and describe one set as having more, fewer, or the same number of members as the other set, using the concept of one-to-one correspondence.
- K.2 The student, given a set containing 10 or fewer concrete items, will
 - a) tell how many are in the set by counting the number of items orally;
 - b) select the corresponding numeral from a given set; and
 - c) write the numeral to tell how many are in the set.
- K.3 The student, given an ordered set of three objects and/or pictures, will indicate the ordinal position of each item, first through third, and the ordered position of each item from left-to-right, right-to-left, top-to-bottom, and/or bottom-to-top.
- K.4 The student will investigate and recognize patterns from counting by fives and tens to 30, using concrete objects and a calculator.
- K.5 The student will count forward to 30 and backward from 10.

Computation and Estimation

- K.6 The student will add and subtract whole numbers, using up to 10 concrete items.

Measurement

- K.7 The student will recognize a penny, nickel, dime, and quarter and will determine the value of a collection of pennies and/or nickels whose total value is 10 cents or less.
- K.8 The student will identify the instruments used to measure length (ruler), weight (scale), time (clock: digital and analog; calendar: date, month, and season), and temperature (thermometer).
- K.9 The student will tell time to the hour, using an analog or digital clock.
- K.10 The student will compare two objects or events, using direct comparisons or nonstandard units of measure, according to one or more of the following attributes: length (shorter, longer), height (taller, shorter), weight (heavier, lighter), temperature (hotter, colder). Examples of nonstandard units include foot length, hand span, new pencil, paper clip, block.

Geometry

- K.11 The student will identify, describe, and draw two-dimensional (plane) geometric figures (circle, triangle, square, and rectangle).
- K.12 The student will describe the location of one object relative to another (above, below, next to) and identify representations of plane geometric figures (circle, triangle, square, and rectangle) regardless of their position and orientation in space.
- K.13 The student will compare the size (larger, smaller) and shape of plane geometric figures (circle, triangle, square, and rectangle).

Probability and Statistics

- K.14 The student will gather data relating to familiar experiences by counting and tallying.
- K.15 The student will display objects and information, using objects, graphs, pictorial graphs, and tables.
- K.16 The student will investigate and describe the results of dropping a two-colored counter or using a multicolored spinner.

Patterns, Functions, and Algebra

- K.17 The student will sort and classify objects according to similar attributes (size, shape, and color).
- K.18 The student will identify, describe, and extend a repeating relationship (pattern) found in common objects, sounds, and movements.

First Grade

Number and Number Sense

- 1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.
- 1.2 The student will group a collection of up to 100 objects into tens and ones and write the corresponding numeral to develop an understanding of place value.
- 1.3 The student will count forward by ones, fives, and tens to 100, by twos to 20, and backward by ones from 20.
- 1.4 The student will recognize and write numerals 0 through 100.
- 1.5 The student will identify the ordinal positions first through tenth, using an ordered set of objects.
- 1.6 The student will identify and represent the concepts of one-half and one-fourth, using appropriate materials or a drawing.

Computation and Estimation

- . 1.7 The student, given a familiar problem situation involving magnitude, will
 - a) select a reasonable magnitude from three given quantities: a one-digit numeral, a two-digit numeral, and a three-digit numeral (e.g. 5, 50, and 500); and
 - b) explain the reasonableness of his/her choice.
- . 1.8 The student will recall basic addition facts, sums to 10 or less, and the corresponding subtraction facts.
- . 1.9 The student will create and solve story and picture problems involving one-step solutions, using basic addition and subtractions facts.

Measurement

- . 1.10 The student will
 - a) identify the number of pennies equivalent to a nickel, a dime, and a quarter;
 - b) determine the value of a collection of pennies, nickels, and dimes whose total value is 100 cents or less.
- . 1.11 The student will tell time to the half-hour, using an analog or digital clock.
- . 1.12 The student will use nonstandard units to measure length and weight.
- . 1.13 The student will compare the volumes of two given containers by using concrete materials (e.g., jelly beans, sand, water, rice).
- . 1.14 The student will compare the weights of two objects, using a balance scale.

Geometry

- . 1.15 The student will describe the proximity of objects in space (*near, far, close by, below, above, up, down, beside, and next to*).
- . 1.16 The student will draw, describe, and sort plane geometric figures (triangle, rectangle, square, and circle).
- . 1.17 The student will identify and describe objects in his/her environment that depict plane geometric figures (triangle, rectangle, square, and circle).

Probability and Statistics

- . 1.18 The student will investigate, identify, and describe various forms of data collection in his/her world (e.g., recording daily temperature, lunch count, attendance, and favorite ice cream), using tables, picture graphs, and object graphs.
- . 1.19 The student will interpret information displayed in a picture or object graph, using the vocabulary *more, less, fewer, greater than, less than, and equal to*.

Patterns, Functions, and Algebra

- . 1.20 The student will sort and classify concrete objects according to one or more attributes, including color, size, shape, and thickness.
- . 1.21 The student will recognize, describe, extend, and create a wide variety of patterns, including rhythmic, color, shape, and numerical. Patterns will include both growing and repeating patterns. Concrete materials and calculators will be used.

Second Grade

Number and Number Sense

- . 2.1 The student will
 - a) read, write, and identify the place value of each digit in a three-digit numeral, using numeration models; and
 - b) round two-digit numbers to the nearest ten.
- . 2.2 The student will compare two whole numbers between 0 and 999, using symbols ($>$, $<$, or $=$) and words (*greater than, less than, or equal to*).
- . 2.3 The student will identify the ordinal positions first through twentieth, using an ordered set of objects.
- . 2.4 The student will identify the part of a set and/or region that represents fractions for one-half, one-third, one-fourth, one-eighth, and one-tenth and write the corresponding fraction.
- . 2.5 The student will
 - a) count forward by twos, fives, and tens to 100 starting at various multiples of 2, 5, or 10, using mental mathematics, paper and pencil, hundred chart, calculation, and/or concrete objects, as appropriate;
 - b) count backward by tens from 100;
 - c) group objects by threes and fours; and
 - d) recognize even and odd numbers, using objects.

Computation and Estimation

- . 2.6 The student will recall basic addition facts - i.e., sums to 18 or less - and the corresponding subtraction facts.
- . 2.7 The student, given two whole numbers, whose sum is 99 or less, will

- a) estimate the sum; and
- b) find the sum, using various methods of calculation (mental computation, concrete materials, and paper and pencil).
- . 2.8 The student, given two whole numbers, each of which is 99 or less, will
 - a) estimate the difference; and
 - b) find the difference, using various methods of calculation (mental computation, concrete materials, and paper and pencil).
- . 2.9 The student will create and solve one-step addition and subtraction problems using data from simple tables, picture graphs, bar graphs, and practical situations.
- . 2.10 The student, given a simple addition or subtraction fact, will recognize and describe the related facts which represent and describe the inverse relationship between addition and subtraction (e.g., $3 + \underline{\quad} = 7$, $\underline{\quad} + 3 = 7$; $7 - 3 = \underline{\quad}$, and $7 - \underline{\quad} = 3$).

Measurement

- . 2.11 The student will
 - a) count and compare a collection of pennies, nickels, dimes, and quarters whose total value is \$2.00 or less; and
 - b) identify the correct usage of the cent symbol (c), dollar symbol (\$), and decimal point (.)
- . 2.12 The student will estimate and then use a ruler to make linear measurements to the nearest centimeter and inch, including measuring the distance around a polygon in order to determine perimeter.
- . 2.13 The student, given grid paper, will estimate and then count the number of square units needed to cover a given surface in order to determine area.
- . 2.14 The student will estimate and then count the number of cubes in a rectangular box in order to determine volume.
- . 2.15 The student will estimate and then determine weight/mass of familiar objects in pounds and/or kilograms, using a scale.
- . 2.16 The student will tell time and write time to the quarter hour, using analog and digital clocks.
- . 2.17 The student will use actual measuring devices to compare metric and U.S. Customary units (cups, pints, quarts, gallons, and liters) for measuring liquid volume, using the concepts of *more*, *less*, and *equivalent*).
- . 2.18 The student will
 - a) use calendar language appropriately (e.g. months, *today*, *yesterday*, *next week*, *last week*);
 - b) determine past and future days of the week; and
 - c) identify specific dates on a given calendar.
- . 2.19 The student will read the temperature on a Celsius and/or Fahrenheit thermometer to the nearest 10 degrees.

Geometry

- . 2.20 The student will identify, describe, and sort three-dimensional solid) concrete figures, including a cube, rectangular solid (prism), square pyramid, sphere, cylinder, and cone, according to the number and shape of the solid's faces, edges, and corners.
- . 2.21 The student will identify and create figures, symmetric along a line, using various concrete materials.
- . 2.22 The student will compare and contrast plane and solid geometric shapes (circle/sphere, square/cube, and rectangle/rectangular solid).

Probability and Statistics

- . 2.23 The student will read, construct, and interpret a simple picture and bar graph.
- . 2.24 The student will record data from experiments, using spinners and colored tiles/cubes, and use the data to predict which of two events is more likely to occur if the experiment is repeated.

Patterns, Functions, and Algebra

- . 2.25 The student will identify, create, and extend a wide variety of patterns, using numbers, concrete objects, and pictures.
- . 2.26 The student will solve problems by completing a numerical sentence involving the basic facts for addition and subtraction. Examples include $3 + \underline{\quad} = 7$, or $9 - \underline{\quad} = 2$. Students will create story problems, using the numerical sentences.

Third Grade

Number and Number Sense

- . 3.1 The student will read and write six-digit numerals and identify the place value for each digit.
- . 3.2 The student will round a whole number, 9,999 or less, to the nearest ten, hundred, and thousand.
- . 3.3 The student will compare two whole numbers between 0 and 9,999, using symbols ($>$, $<$, or $=$) and words (*greater than*, *less than*, or *equal to*).

- . 3.4 The student will recognize and use the inverse relationships between addition/subtraction and multiplication/division to complete basic fact sentences. Students will use these relationships to solve problems such as $5 + 3 = 8$ and $8 - 3 = \underline{\quad}$.
- . 3.5 The student will
 - a) divide regions and sets to represent a fraction; and
 - b) name and write the fractions represented by a given model (area/region, length/measurement, and set). Fractions (including mixed numbers) will include halves, thirds, fourths, eighths, and tenths).
- . 3.6 The student will compare the numerical value of two fractions having like and unlike denominators, using concrete or pictorial models involving areas/regions, lengths/measurements, and sets.
- . 3.7 The student will read and write decimals expressed as tenths and hundredths, using concrete materials and models.

Computation and Estimation

- . 3.8 The student will solve problems involving the sum or difference of two whole numbers, each 9,999 or less, with or without regrouping, using various computational methods, including calculators, paper and pencil, mental computation, and estimation.
- . 3.9 The student will recall the multiplication and division facts through the nines tables.
- . 3.10 The student will represent multiplication and division, using area and set models, and create and solve problems that involve multiplication of two whole numbers, one factor 99 or less and the second factor 5 or less.
- . 3.11 The student will add and subtract with proper fractions having like denominators of 10 or less, using concrete materials and lengths/measurements.
- . 3.12 The student will add and subtract with decimals expressed as tenths, using concrete materials, pictorial representations, and paper and pencil.

Measurement

- . 3.13 The student will determine by counting the value of a collection of bills and coins whose total value is \$5.00 or less, compare the value of the coins or bills, and make change.
- . 3.14 The student will estimate and then use actual measuring devices with metric and U.S. Customary units to measure
 - a) length - inches, feet, yards, centimeters, and meters;
 - b) liquid - volume, cups, pints, quarts, gallons, and liters; and
 - c) weight/mass - ounce, pounds, grams, and kilograms.
- . 3.15 The student will tell time to the nearest five-minute interval and to the nearest minute, using analog and digital clocks.
- . 3.16 The student will identify equivalent periods of time, including relationships among days, months, and years, as well as minutes and hours.
- . 3.17 The student will read temperature to the nearest degree from a Celsius thermometer and a Fahrenheit thermometer. Real thermometers and physical models of thermometers will be used.
- . 3.18 The student will analyze two-dimensional (plane) and three-dimensional (solid) geometric figures (circle, square, rectangle, triangle, cube, rectangular solid [prism], square pyramid, sphere, cone, and cylinder) and identify relevant properties, including the number of corners, square corners, edges, and the number and shape of faces, using concrete models.

Geometry

- . 3.19 The students will identify and draw representations of line segments and angles, using a ruler or straightedge.
- . 3.20 The student, given appropriate drawings or models, will identify and describe congruent and symmetrical, two-dimensional (plane) figures, using tracing procedures.

Probability and Statistics

- . 3.21 The student, given grid paper, will
 - a) collect and organize data on a given topic of his/her choice, using observations, measurements, surveys, or experiments; and
 - b) construct a line plot, a picture graph, or a bar graph to represent the results. Each graph will include an appropriate title and key.
- . 3.22 The student will read and interpret data represented in line plots, bar graphs, and picture graphs and write a sentence analyzing the data.
- . 3.23 The student will investigate and describe the concept of probability as chance and list possible results of a given situation.

Patterns, Functions, and Algebra

- . 3.24 The student will recognize and describe a variety of patterns formed using concrete objects, numbers, tables, and picture, and extend the pattern, using the same or different forms (concrete objects, numbers, tables, and pictures).
- . 3.25 The student will
 - a) investigate and create patterns involving numbers, operations (addition and multiplication), and relations that model the identity and commutative properties for addition and multiplication; and
 - b) demonstrate an understanding of equality by recognizing that the equal sign (=) links equivalent quantities, such as $4 \times 3 = 2 \times 6$.

Fourth Grade

Number and Number Sense

- . 4.1 The student will
 - a) identify (orally and in writing) the place value for each digit in a whole number expressed through millions;
 - b) compare two whole numbers expressed through millions, using symbols ($>$, $<$, or $=$); and
 - c) round whole numbers expressed through millions to the nearest thousand, ten thousand, and hundred thousand.
- . 4.2 The student will
 - a) identify, model, and compare rational numbers (fractions and mixed numbers), using concrete objects and pictures;
 - b) represent equivalent fractions; and
 - c) relate fractions to decimals, using concrete objects.
- . 4.3 The student will compare the numerical value of fractions (with like and unlike denominators) having denominators of 12 or less, using concrete materials.
- . 4.4 The student will
 - a) read, write, represent, and identify decimals expressed through thousands;
 - b) round to the nearest whole number, tenth, and hundredth; and
 - c) compare the value of two decimals, using symbols ($>$, $<$, or $=$), concrete materials, drawings, and calculators.

Computation and Estimation

- . 4.5 The student will estimate whole number sums and differences and describe the method of estimation. Students will refine estimates, using terms such as closer to, between, and a little more than.
- . 4.6 The student will add and subtract whole numbers written in vertical and horizontal form, choosing appropriately between paper and pencil methods and calculators.
- . 4.7 The student will find the product of two whole numbers when one factor has two digits or fewer and the other factor has three digits or fewer, using estimation and paper and pencil. For larger products (a two-digit numeral times a three-digit numeral), estimation and calculators will be used.
- . 4.8 The student will estimate and find the quotient of two whole numbers, given a one-digit divisor.
- . 4.9 The student will
 - a) add and subtract with fractions having like and unlike denominators of 12 or less, using concrete materials, pictorial representations, and paper and pencil;
 - b) add and subtract with decimals through thousandths, using concrete materials, pictorial representations, and paper and pencil; and
 - c) solve problems involving addition and subtraction with fractions having like and unlike denominators of 12 or less and with decimals expressed through thousandths, using various computational methods, including calculators, paper and pencil, mental computation, and estimation.

Measurement

- . 4.10 The student will
 - a) estimate and measure weight/mass, using actual measuring devices, and describe the results in U.S. Customary/metric units as appropriate, including ounces, pounds, grams, and kilograms;
 - b) identify equivalent measurements between units within the U.S. Customary system (ounces and pounds) and between units within the metric system (grams and kilograms);
 - c) and estimate the conversion of ounces and grams and pounds and kilograms, using approximate comparisons. (1 ounce is about 28 grams, or 1 gram is about the weight of a paper clip; 1 kilogram is a little more than 2 pounds)*

**The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.*

- . 4.11 The student will

- a) estimate and measure length, using actual measuring devices, and describe the results in both metric and U.S. Customary units, including part of an inch ($\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$), inches, feet, yards, millimeters, centimeters, and meters;
- b) identify equivalent measurements between units within the U.S. Customary system (inches and feet; feet and yards; inches and yards) and between units within the metric system (millimeters and centimeters; centimeters and meters; and millimeters and meters);
- c) and estimate the conversion of inches and centimeter, yards and meters, and miles and kilometers, using approximate comparisons (1 inch is about 2.5 centimeters, 1 meter is a little longer than 1 yard, 1 mile is slightly farther than 1.5 kilometers, or 1 kilometer is slightly farther than half a mile). *

**The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.*

□. 4.12 The student will

- a) estimate and measure liquid volume, using actual measuring devices and using metric and U.S. Customary units, including cups, pints, quarts, gallons, milliliters, and liters;
- b) identify equivalent measurements between units within the U.S. Customary system (cups, pints, quarts, and gallons) and between units within the metric system (milliliters and liters);
- c) estimate the conversion of quarts and liters, using approximate comparisons (1 quart is a little less than 1 liter, 1 liter is a little more than 1 quart). *

**The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.*

□. 4.13 The student will

- a) identify and describe situations representing the use of perimeter and area; and
- b) use measuring devices to find perimeter in both standard and nonstandard units of measure.

Geometry

□. 4.14 The student will investigate and describe the relationships between and among points, lines, line segments, and rays.

□. 4.15 The student will

- a) identify and draw representations of points, lines, line segments, rays, and angles, using a straightedge or ruler; and
- b) describe the path of shortest distance between two points on a flat surface.

□. 4.16 The student will identify and draw representations of lines that illustrate intersection, parallelism, and perpendicularity.

□. 4.17 The student will

- a) analyze and compare the properties of two-dimensional (plane) geometric figures (circle, square, rectangle, triangle, parallelogram, and rhombus) and three-dimensional (solid) geometric figures (sphere, cube, and rectangular solid [prism]);
- b) identify congruent and non-congruent shapes; and
- c) investigate congruence of plane figures after geometric transformations such as reflection (flip), translation (slide) and rotation (turn), using mirrors, paper folding, and tracing.

□. 4.18 The student will identify the ordered pair for a point and locate the point for an ordered pair in the first quadrant of a coordinate plane.

Probability and Statistics

□. 4.19 The student will

- a) predict the likelihood of outcomes of a simple event, using the terms *certain*, *likely*, *unlikely*, *impossible*; and
- b) determine the probability of a given simple event, using concrete materials.

□. 4.20 The student will collect, organize, and display data in line and bar graphs with scale increments of one or greater than one and use the display to interpret the results, draw conclusions, and make predictions.

Patterns, Functions, and Algebra

□. 4.21 The student will recognize, create, and extend numerical and geometric patterns, using concrete materials, number lines, symbols, tables, and words.

□. 4.22 The student will recognize and demonstrate the meaning of equality, using symbols representing numbers, operations and relations [e.g., $3 + 5 = 5 + 3$ and $15 + (35 + 16) = (15 + 35) + 16$].

Fifth Grade

Number and Number Sense

- . 5.1 The student will
 - a) read, write, and identify the place values of decimals through thousandths;
 - b) round decimal numbers to the nearest tenth or hundredth; and
 - c) compare the values of two decimals through thousandths, using the symbols $>$, $<$, or $=$.
- . 5.2 The student will
 - a) recognize and name commonly used fractions (halves, fourths, fifths, eighths, and tenths) in their equivalent decimal form and vice versa; and
 - b) order a given set of fractions and decimals from least to greatest. Fractions will include like and unlike denominators limited to 12 or less, and mixed numbers.

Computation and Estimation

- . 5.3 The student will create and solve problems involving addition, subtraction, multiplication, and division of whole numbers, using paper and pencil, estimation, mental computation, and calculators.
- . 5.4 The student will find the sum, difference, and product of two numbers expressed as decimals through thousandths, using an appropriate method of calculation, including paper and pencil, estimation, mental computation, and calculators.
- . 5.5 The student, given a dividend of four digits or fewer and a divisor of two digits or fewer, will find the quotient and remainder.
- . 5.6 The student, given a dividend expressed as a decimal through thousandths and a single-digit divisor, will find the quotient.
- . 5.7 The student will add and subtract with fractions and mixed numbers, with and without regrouping, and express answers in simplest form. Problems will include like and unlike denominators limited to 12 or less.

Measurement

- . 5.8 The student will describe the perimeter of a polygon and the area of a square, rectangle, and right triangle, given the appropriate measures.
- . 5.9 The student will identify and describe the diameter, radius, chord, and circumference of a circle.
- . 5.10 The student will differentiate between perimeter, area, and volume and identify whether the application of the concept of perimeter, area, or volume is appropriate for a given situation.
- . 5.11 The student will choose an appropriate measuring device and unit of measure to solve problems involving measurements of
 - a) length - part of an inch ($\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$) inches, feet, yards, miles, millimeters, centimeter, meters, and kilometers;
 - b) weight/mass - ounces, pounds, tons, grams, and kilograms;
 - c) liquid volume - cups, pints, quarts, gallons, milliliters, and liters;
 - d) area - square units; and
 - e) temperature - Celsius and Fahrenheit units.Problems also will include estimating the conversion of Celsius and Fahrenheit units relative to familiar situation (water freezes at 0 C and 32 F, water boils at 100 C and 212 F, normal body temperature is 37 C and 98.6 F).

Geometry

- . 5.12 The student will determine an amount of elapsed time in hours and minutes within a 24-hour period.
- . 5.13 The student will measure and draw right, acute, and obtuse angles and triangles, using appropriate tools.
- . 5.14 The student will classify angles and triangles as right, acute, or obtuse.
- . 5.15 The student, using two-dimensional (plane) figures (square, rectangle, triangle, parallelogram, rhombus, kite, and trapezoid) will
 - a) recognize, identify, describe, and analyze their properties in order to develop definitions of these figures;
 - b) identify and explore congruent, noncongruent, and similar figures;
 - c) investigate and describe the results of combining and subdividing shapes;
 - d) identify and describe a line of symmetry; and
 - e) recognize the images of figures resulting from geometric transformations such as translation (slide), reflection (flip) or rotation (turn).
- . 5.16 The student will identify, compare, and analyze properties of three-dimensional (solid) geometric shapes (cylinder, cone, cube, square pyramid, and rectangular prism).

Probability and Statistics

- . 5.17 The student will
 - a) solve problems involving the probability of a single event by using tree diagrams or by constructing a sample space representing all possible results;
 - b) predict the probability of outcomes of simple experiments, representing it with fractions or decimals from 0 to 1, and test the prediction; and
 - c) create a problem statement involving probability and based on information from a given problem situation. Students will not be required to solve the created problem statement.
- . 5.18 The student will, given a problem situation, collect, organize, and display a set of numerical data in a variety of forms, using bar graphs, stem-and-leaf plots, and line graphs, to draw conclusions and make predictions.
- . 5.19 The student will find the mean, median, mode, and range of a set of data.

Patterns, Functions, and Algebra

- . 5.20 The student will analyze the structure of numerical and geometric patterns (how they change or grow) and express the relationship, using words, tables, graphs, or a mathematical sentence. Concrete materials and calculators will be used.
- . 5.21 The student will
 - a) investigate and describe the concept of a variable;
 - b) use a variable expression to represent a given verbal quantitative expression involving one operation; and
 - c) write an open sentence to represent a given mathematical relationship, using a variable.
- . 5.22 The student will create a problem situation based on a given situation based on a given open sentence using a single variable.

Sixth Grade

Number and Number Sense

- 6.1 The student will identify representations of a given percent and describe orally and in writing the equivalence relationships among fractions, decimals, and percents.
- The student will describe and compare two sets of data, using ratios, and will use appropriate notations, such as a/b , a to b , and $a:b$.
- 6.3 The student will
 - a) find common multiples and factors, including least common multiple and greatest common factor;
 - b) identify and describe prime and composite numbers; and
 - c) identify and describe the characteristics of even and odd integers.
- 6.4 The student will compare and order whole numbers, fractions, and decimals, using concrete materials, drawings or pictures, and mathematical symbols.
- 6.5 The student will identify, represent, order, and compare integers.

Computation and Estimation

- 6.6 The student will
 - a) solve problems that involve addition, subtraction, multiplication, and/or division with fractions and mixed numbers, with and without regrouping, that include like and unlike denominators of 12 or less, and express their answers in simplest form; and
 - b) find the quotient, given a dividend expressed as a decimal through thousandths and a divisor expressed as a decimal to thousandths with exactly one non-zero digit.
- 6.7 The student will use estimation strategies to solve multi-step practical problems involving whole numbers, decimals, and fractions (rational numbers).
- 6.8 The student will solve multi-step consumer-application problems involving fractions and decimals and present data and conclusions in paragraphs, tables, or graphs. Planning a budget will be included.

Measurement

- 6.9 The student will compare and convert units of measure for length, area, weight/mass, and volume within the U.S. Customary system and the metric system and estimate conversions between units in each system:
 - a) length - part of an inch ($1/2$, $1/4$, and $1/8$), inches, feet, yards, miles, millimeters, centimeters, meters, and kilometers;
 - b) weight/mass - ounces, pounds, tons, grams, and kilograms;
 - c) liquid volume - cups, pints, quarts, gallons, milliliters, and liters; and
 - d) area - square units. *

**The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.*

- ❑ 6.10 The student will estimate and then determine length, weight/mass, area, and liquid volume/capacity, using standard and nonstandard units of measure.
- ❑ 6.11 The student will determine if a problem situation involving polygons of four or fewer sides represents the application of perimeter or area and apply the appropriate formula.
- ❑ 6.12 The student will
 - a) solve problems involving the circumference and/or area of a circle when given the diameter or radius; and
 - b) derive approximations for pi (π) from measurements for circumference and diameter, using concrete materials or computer models.
- ❑ 6.13 The student will
 - a) estimate angle measures, using 45° , 90° , and 180° , as referents, and use the appropriate tools to measure the given angles; and
 - b) measure and draw right, acute, and obtuse angles and triangles.

Geometry

- ❑ 6.14 The student will identify, classify, and describe the characteristics of plane figures, describing their similarities, differences, and defining properties.
- ❑ 6.15 The student will determine congruence of segments, angles, and polygons by direct comparison, given their attributes. Examples of non-congruent and congruent figures will be included.
- ❑ 6.16 The student will construct the perpendicular bisector of a line segment and an angle bisector.
- ❑ 6.17 The student will sketch, construct models of, and classify solid figures (rectangular prism cone, cylinder, and pyramid).

Probability and Statistics

- ❑ 6.18 The student, given a problem situation, will collect, analyze, display, and interpret data in a variety of graphical methods, including
 - a) line, bar, and circle graphs;
 - b) stem-and-leaf plots; and
 - c) box-and-whisker plots.Circle graphs will be limited to halves, fourths, and eighths.
- ❑ 6.19 The student will describe the mean, median, and mode as measures of central tendency, describe the range, and determine their meaning for a set of data.
- ❑ 6.20 The student will
 - a) make a sample space for selected experiments and represent it in the form of a list, chart, picture, or tree diagram; and
 - b) determine and interpret the probability of an event occurring from a given sample space and represent the probability as a ratio, decimal, or percent, as appropriate for the given situation.

Patterns, Functions, and Algebra

- ❑ 6.21 The student will investigate and describe, and extend numerical and geometric patterns, including triangular numbers, patterns formed by powers of 10, and arithmetic sequences.
- ❑ 6.22 The student will investigate and describe concepts of positive exponents, perfect squares, square roots, and, for numbers greater than 10, scientific notation. Calculators will be used to develop exponential patterns.
- ❑ 6.23 The student will
 - a) model and solve algebraic equations, using concrete materials.
 - b) solve one-step linear equations in one variable, involving whole number coefficients and positive rational solutions; and
 - c) use the following algebraic terms appropriately: variable, *coefficient*, *term*, and *equation*.

Booklists by Strand

Number and Number Sense

Adler, David. (1996). Fraction Fun. Defines the term fraction and applies it to real-life situations. Provides examples and hands on activities with pizza, weight and money. ISBN: 0-8234-1259-8.(1.6).

Axelrod, Amy. (1992). Pigs Will Be Pigs. An interesting way to think about money in order to eat. ISBN: 002765415X. (K.9, 1.10, 2.11, 3.13).

Band, Molly. (1998). Ten Nine Eight. Turn bedtime into playtime with a rhyming game as you learn to count backwards. ISBN: 0-688-00906-9. (K.5).

Carle, Eric. (1972). Rooster's Off To See the World. A rooster sets off to see the world, encountering fourteen animals along the way. ISBN: 0-88708-042-1. (K.1, K.2, K.3, K.5, K.7, 1.2, 1.5, 2.3).

Carle, Eric. (1968). 1,2,3, To the Zoo. Each car on the train has one more animal than the one before. ISBN: 0-399-61172-8. (K.2, 1.5).

Carle, Eric. (1969). The Very Hungry Caterpillar. ALA suggested reading list. Follow the process of a caterpillar as he eats his way through a large quantity of food and changes into a butterfly. ISBN: 0-399-20853-4. (K.2, K.10).

Dunbar, Joyce & Majewska. (1990). Ten Little Mice. This book provides counting practice backwards from 10, shows animal habitats, and contains rhyming patterns. ISBN: 0-15-284614-x. (K.5, 1.5, 2.3).

Ernst, Lisa. (1986). Up To Ten and Down Again. Practice counting up to ten and then counting backwards. ISBN: 0-688-04541-3. (K.5).

Fallwell, Catherine. (1993). Feast For 10. A family counts from 1-10 using items in a feast. ISBN: 0-395-62037-6. (K.2).

Fallwell, Catherine. (1998). Christmas for 10. A family counts from 1-10 using Christmas items. ISBN: 0-395-85581-0. (K.2).

Gag, Wanda. (1996). Millions of Cats. Millions of cats follow a man home. One is adopted and loved by the man and his wife. ISBN: 0-698-20091-8. (3.1).

Grossman, Bill. (1996). My Little Sister Ate One Hare. Little sister has no problem eating one hare, two snakes, and three ants, but when she gets to ten peas, she throws up quite a mess. ISBN: 0517596008. (K.5).

Jackson, Woody. (1999). Counting Cows 1-10. A bold bovine twist on counting is sure to amuse little ones just learning their numbers. ISBN: 0152021744. (K.5).

Leedy, Loreen. (1994). Fraction Action. A variety of fractions visualized through basic shapes, as well as everyday objects. ISBN: 0-8234-1109-5. (2.4, 3.5, 4.2, 4.3). (1.7, 2.1, 3.7).

Leedy, Loreen. (1992). Monster Money Book. A little girl and a monster learn about money. Why it is needed. ISBN: 0-8234-0922-8

McGrath, Barbara. (1994). The M&M Counting Book. Uses M&M's to count, make sets, add, subtract, and create shapes. ISBN: 0-88106-854-3. (K.1, K.2).

McGrath, Barbara, Bolster, Rob, & Massola, Frank. (1998). Cherrio's Counting Book. Book emphasizing counting 1 - 100. ISBN: 0-590- 68357-8. (K.1, K.2, 1.1, 1.2).

McMillan, Bruce. (1996). Jelly Beans for Sale. Shows how different combinations of pennies, nickels, dimes and quarters can buy varying amounts of jellybeans. ISBN: 0590865846. (K.9, 1.9).

Monclure, Jane Belk & Hohag, Linda. (1985). My Five Book. "Little five" introduces the concept of "five" by interacting with five of a variety of things. ISBN: 8953168. (K.4). 3.5, 4.3).

Murphy, Stuart. (1998). A Fair Bear Share. Concentrates on fractions through story form. ISBN: 0-6446714-7. (1.6, 2.4, 3.5, 4.3).

Nagda, Ann Whitehead & Bickel, Cindy. (2000). Tiger Math: Learning to Graph from a Baby Tiger. An orphan baby tiger's life and development is graphed. ISBN: 0-8050-6248-3. (1.5, 1.18, 2.4, 2.9, 3.22,).

Pallotta, Jerry & Bolster, Rob (I). (2001). Twizzlers. Twizzlers are used to explain place value, decimals, and percentages. ISBN: 439154308. (2.1, 3.5).

Pallotta, Jerry & Bolster, Rob (I). (2000). Reese's Pieces Counting by 5's. Hands on lesson for counting by 5's. ISBN: 0-439-13520-6. (1.3, 1.4).

Rathman, Peggy. (1998). 10 Minutes Till Bedtime. Father announces the minutes left till bedtime as hamsters converge for a madcap tour of the house. ISBN: 039923103X. (K.1). math journey. ISBN: 0385322178. (3.1, 4.1, 5.1).

Scieszka, Jon. (1995). The Math Curse. An amazing book dealing with numbers in everyday life. ISBN: 0670861944. (2.3, 3.5, 4.1, 5.1).

Number and Number Sense Schwartz, David & Moss, Marissa. (1998). G is for Googol. A math alphabet book to provide an overview of numbers and number sense. ISBN: 1-883672-58-9. (5.1).

Schwartz, David. (1999). On Beyond A Million. By the power of ten professor X and his dog Y lead a group of children on an amazing math journey. ISBN: 0385322178.(3.1, 4.1, 5.1)

Sheppard, Jeff. (1992). The Right Amount of Elephants. A joyous twist on the counting book concept. ISBN: 0064432998. (K.5).

Strickland, Paul. (2000). Ten Terrible Dinosaurs. A rhyming text that is the perfect way to introduce counting down to very young children. ISBN: 0140567704. (K.5).

Swinburne, Stephanie R.. (2000). What's A Pair-What's A Dozen. A number sense book. ISBN: 1-56397-871-7. (K.2, 1.2, 2.2).

Wadsworth, Ginger. (1999). One Tiger Grows. Various sounds made by animals as numbers are counted 1-20. Shows the animal in its habitat. ISBN: 0881062731. (K.5).

Wells, Rosemary. (2000). Emily's First 100 Days of School. The concept of counting is shown in Emily's first 100 days of school and gives a description of what each number means. ISBN: 0-7868-0507-2. (1.1, 1.4).

Williams, Rozanne L. (2001). The Coin Counting Book. Useful for learning to count, and name the dominations of all the U.S. coins. ISBN: 0-88106-325-8. (K.6, K.9, 1.7, 1.10).

Yeatts, Karol. (2000). Cereal Math. Used best as a teacher resource for using cereal to teach sorting and classifying. ISBN: 0-590-51208-0. (1.3, 1.4).

Computation and Estimation

Anno, Masaichiro. (1983). Anno's Mysterious Multiplying Jar. Demonstrates the concept of factorials. ISBN: 0-399-20951-4. (4.21, 4.22, 5.19, 5.20).

Demi. (1997). One Grain Of Rice. A clever girl asks the raja to give her one piece of rice doubling it everyday for 30 days. ISBN: 059093998X. (4.1).

Gill, Shelly. (2000). The Big Buck Adventure. The true power of spending lies in many possibilities. Come join in the adventure and solve math problems. ISBN: 0881062944. (1.10, 2.11, 3.13).

Goldstone, Bruce & Cahoon, Heather. (2001). Ten Friends. Rhymes and pictures give an introduction to the many combinations that add up to 10. ISBN: 0-8050-6249-1. (1.8, 2.6).

Leedy, Loreen. (1994). Fraction Action. A variety of fractions visualized through basic shapes, as well as everyday objects. ISBN: 0-8234-1109-5. (2.11, 3.13).

Leedy, Loreen. (1997). Mission Addition. Animals explore addition using items in the world around them. ISBN: 082341307. (1.8, 2.6).

Leedy, Loreen. (1992). Monster Money Book. A little girl and a monster learn about money and why it is needed. ISBN: 0-8234-0922-8. (3.13).

Leedy, Loreen. (1995). 2x2= BOO! Spooky Multiplication. Exciting Halloween stories to illustrate the basic multiplication facts 1-5. ISBN: 0-8234-1190-7. (3.9).

McGrath, Barbara. (1994). The M&M Counting Book. Uses M&M's to count, make sets, add, subtract, and create shapes. ISBN: 0-88106-854-3. (1.8).

Miranda, Anne & Powell, Polly (I). (1999). Monster Math. Counting monsters add up to a great big birthday celebration. ISBN: 015-201835- 2. (K.7).

Murphy, Stuart. (1997). Divide and Ride. Teaches division as a group of friends entertain themselves on different carnival rides. ISBN: 0-06-026776-3. (3.9, 4.9, 5.5).

Murphy, Stuart. (1998). A Fair Bear Share. Concentrates on fractions through story form. ISBN: 0-6446714-7. (5.7).

Napoli, Donna Jo, Tchen, Richard, & Walrod, Amy (I). (2001). How Hungry Are You?. An introduction to simple division concepts when two friends go on a picnic and gradually add 10 more. How will they divide their treats? ISBN: 0-689-83389-x. (3.8, 3.9, 3.11).

Wells, Rosemary. (1977). Bunny Money. Max and Ruby spend so much money on emergencies that they have to be very creative to find a suitable present to buy for their grandmother. ISBN: 0-8037-2146-3. (2.9, 2.11).

Williams, Rozanne L.. (2001). The Coin Counting Book. Useful for learning to count, and name the dominations of all the U.S. coins. ISBN: 0-88106-325-8. (K.6, K.9, 1.7, 1.10).

Murphy, Stuart. (1999). Jump Kangaroo, Jump. Presents real-world applications of fractions and division. ISBN: 006446721X. (5.7).

Murphy, Stuart. (1998). Penny Pot. Story teaches children the use of money for buying items. ISBN: 0-06-027606-1. (1.10, 2.11, 3.13).

Schwartz, David. (1989). If You Made A Million. Takes a look at the different ways we use money. ISBN: 0688070175. (2.11,3.13).

Measurement

Adler, David & Tobin, Anne. (1999). How Tall, How Short, How Faraway?. Helps to learn how ancient Egyptians and Romans used fingers, hands, and arms as measuring tools. Shows the differences between customary and metric systems. ISBN: 0-8234-1375-6. (1.12, 3.14).

Axlerod, Amy & McGinley-Nally, Sharon. (1997). Pigs in the Pantry. Mrs. Pig cooks using customary measurement - teaching sequencing in a fun way. ISBN: 68980665. (2.17).

Branley, Franklin & Weber, Jill. (1993). Keeping Time. Fascinating information about time, day, month, and the sundial - science and folklore, things to make and why. ISBN: 0-395-47777-8. (2.16, 3.15, 5.12).

Connelly, Luella & Dunne, Kathleen. (1995). Let's Measure It. Very simple book on beginning measurement. ISBN: 1-57471-006-0. (1.10, 2.12, 3.14).

Grifalconi, Ann. (1986). The Village of Round and Square Houses. Geometric shapes are used to separate an African village by men and women in rounds and squares. ISBN: 0-316-32862-6. (K.13, 1.16, 2.20, 5.8).

Harper, Dan, Moser, Barry, & Moser, Cara. (1998). Telling Time with Big Mama Cat. This book teaches time through a beautiful story of the day in the life of a family through the eyes of their Big Mama Cat. It has a fold-out clock with hands that move. ISBN: 0-15-201738-0. (K.11, 1.11, 2.16).

Lionni, Leo. (1960). Inch by Inch. To keep from being eaten, an inchworm measures a robin's tail, a flamingo's neck, a toucan's beak, a heron's legs, and a nightingale's song. ISBN: 0-688-13283-9. (1.12, 2.12, 3.14, 4.11, 5.11).

Leedy, Loreen. (1995). Fraction Action. A variety of fractions visualized through basic shapes, as well as everyday objects. ISBN: 0-8234-1109-5. (1.10).

Leedy, Loreen. (1998). Measuring Penny. A girl measures her dog using non-standard measures. ISBN: 0805053603. (K.12, 1.12).

McMillan, Bruce. (1996). Jelly Beans for Sale. An introduction to basic units of money. ISBN: 0-590-86584-6. (K.9, 1.10).

Mitchell, Adrian & Pudles, Daniel. (1999). Twice My Size. Rhythmic text shows real-life comparison of objects, animals, and things twice their size. ISBN: 0-7613-1423-7. (K.12, 1.12, 3.14).

Murphy, Stuart J. & Gorton, Julia. (1999). Super Sand Castle Saturday. Children building sand castles and measure them with many nonstandard tools. ISBN: 0329-08558-1. (K.12, 1.12).

Myller,Rolf. (1962). How Big Is a Foot? Thrown in jail because the bed he made for the queen is too small, an apprentice comes up with a more accurate way of measuring size. ISBN: 0833568531. (K.10, 1.12, 2.12, 3.14).

Schwartz, David M. & Marhola, James. (1999). If You Hopped Like a Frog. Descriptions of ratio comparing what humans would be able to do if they were animals. ISBN: 590098578. (1.12).

Stevens, Janet. (1999). Cook-a-doodle-doo. The grandchild of the little Red Hen enlists friends to make a strawberry short cake and learns how to measure correctly. ISBN: 152019243. (2.17, 3.14).

Sweeney, Joah & Cable, Annette. (2001). Me and the Measure of Things. Description of all kinds of measurement illustrated by bright bold pictures. ISBN: 037581101x. (2.17, 3.14).

Wells, Robert E.. (1993). Is a Blue Whale the Biggest Thing There Is?. Big, bigger, biggest illustrated from whale to the universe. ISBN: 807536555. (1.12).

Geometry

Dotlich, Rebecca Kai & Ferrari, Maria (I). (1999). What is Round?. Photographs of all kinds of circles for students to identify in order to reinforce the shapes. ISBN: 694012084. (K.13, K.14, K.15).

Dotlich, Rebecca Kai & Ferrari, Maria (I). (1999). What is Square?. Photographs of all kinds of squares for students to identify in order to reinforce the shapes. ISBN: 694012076. (K.13, K.14, K.15).

Grifalconi, Ann. (1986). The Village of Round and Square Houses. Geometric shapes are used to separate an African village by men and women in rounds and squares. ISBN: 0-316-32862-6. (K.13, 1.16, 2.20, 5.8).

Hewitt, Sally. (1996). Take Off With Shapes. An interactive approach to defining shapes, squares, circles, rectangles, prisms, and more. ISBN: 0817241140. (K.14, 1.16, 2.18, 3.18).

Hoban, Tana. (1985). Is It Larger? Is It Smaller?. This picture book (no words) may serve as a good book that the teacher can use to reinforce the concepts of larger/smaller. The pictures are real life photographs that are bright, colorful, and vivid. ISBN: 0-688-04027-6. (K.15, 4.15, 4.16, 5.15).

Kirkby, David. (1996). Pattern. Explores such concepts as mathematical shape and symmetry. ISBN: 1-57572-043-4. (2.21, 2.25, 3.24, 3.25, 4.21).

Kirby, David. (1996). Measures & Spaces. Presents elementary geometric concepts along with simple activities and calculations. ISBN: 1-57572-045-0. (3.18, 3.19, 3.20, 4.15, 4.16, 4.17, 5.13, 5.14, 5.15).

Lasky, Kathryn & Hawkes, Kevin. (1994). The Librarian Who Measured the Earth. A read-aloud to introduce the concept of circumference. A short biography of the Greek astronomer Eratosthenes is included. ISBN: 0-316-51526-4. (5.9).

McGrath, Barbara. (1994). The M&M Counting Book. Uses M&M's to count, make sets, add, subtract, and create shapes. ISBN: 0-88106-854-3. (K.13).

Murphy, Stuart & Floca, Brian. (2000). Let's Fly a Kite. Two siblings argue as they build a kite and learn symmetry along the way. ISBN: 6028344. (2.19).

Rogers, Paul. (1989). The Shapes Game. A look at finding shapes in different pictures. ISBN: 0-8050-1280-X. (K.13, 1.16).

Weiss, Malcolm. (1976). Jellybeans! All That? Introduction to Algebra, terms and process. Easy to read and comprehend. ISBN: 0690009143. (4.20, 4.21, 4.22).

Probability and Statistics

Kirkby, David. (1996). Handling Data. Introduces elementary statistical concepts along with simple activities and calculations. ISBN: 1-57572-046-9. (3.21, 3.22, 3.23, 4.18, 4.19, 5.16, 5.17).

Markle, Sendra. (1997). Discovering Graph Secrets. Shares activities through charts and graphs. ISBN: 0689319428. (4.19, 5.17).

Murphy, Stuart. (1998). Lemonade for Sale. Shares with children how to read various types of graphs. ISBN: 0060274409. (1.19, 2.21, 3.22).

Nagda, Ann Whitehead & Bickel, Cindy. (2000). Tiger Math: Learning to Graph from a Baby Tiger. An orphan baby tiger's life and development is graphed. ISBN: 0-8050-6248-3. (1.5, 1.18, 2.4, 2.9, 3.22, 5.2).

Patterns, Functions, and Algebra

Jenkins, Emily & Bogacki, Tomek (I). (2001). Five Creatures. Each page groups the five members of the household into different groups. The author's concept came from doing Venn diagrams of her family. There are two cats, mother, father, and daughter that are presented. ISBN: 374323419. (K.19).

King, Andrew. (1998). Discovering Patterns. Patterns in nature and in numbers are explored in games and activities. ISBN: 0-7613-0724-9. (1.20, 1.21, 2.25, 3.24).

Kirby, David. (1996). Pattern. Explores such concepts as mathematical shape and symmetry. ISBN: 1-57572-043-4. (2.19, 2.25, 3.24, 3.25, 4.21).

Patilla, Peter. (1999). Sorting. A book teaching young children to sort and to identify patterns. ISBN: 1-57572-969-5. (K.19, 1.20).

Tuxworth, Nicola. (1999). Mixing and Matching. This book is a simplistic introduction to viewing differences based on attributes such as color, pattern, size and shape. ISBN: 0-8368-2371-0. (K.19, 1.20).

This is the math strand. This is a useful way to sort the math curriculum or align the SOL across grade levels.

→ Probability and Statistics

Previous Grade SOL Link:

2.23 The student will read, construct, and interpret a simple picture and bar graph.

Current Grade Level SOL:

3.21 The student, given grid paper, will
a) collect and organize data on a given topic of his/her choice, using observations, measurements, surveys, or experiments; and
b) c
grap
inclu

Next Grade SOL Link:

4.20 The student will collect, organize, and display data in line and bar graphs with scale increments of one or greater than one and use the display to interpret the results, draw conclusions, and make predictions.

Look here to see the related SOL from the previous grade level. In some cases this box will be empty as the SOL will skip a year as part of the spiraling process.

This is the SOL to be taught this year. This SOL is the 2001 version. Any old guides will reflect the 1995 standards.

Look here to see the related SOL for the next grade level. This will help you differentiate instruction for those students who need to work on acceleration.

Textbook:

The LCPS has adopted a textbook series to teach the Virginia SOL. Write the textbook chapters and pages that correlate to this SOL here.

Workbook:

Along with the adopted textbook series, there are multiple workbooks for your use when planning for

Worksheets:

You may have worksheets that pertain to the grade level SOL. Write the names of those

Materials:

Materials vary from school to school and classroom to classroom. There are materials that come with the math series, that individual schools have purchased, and ones that you have bought, inherited, or found! Write down the materials you know you have at your disposal for teaching the SOL. For future planning, write down the materials you need to better teach this SOL.

Assessment:

The assessment varies widely in the elementary classroom. Write down what you plan to use to

Technology Links:

The technologies listed are software programs that LCPS has purchased. Write in additional programs that are useful when teaching the SOL. Check with your Technology Resource Teacher for additional resources.

Media Resources:

There is a host of media from the Instructional Media Center – list it here. In addition to the IMC videos and filmstrips, your librarian may have videotapes of various series. Check with your librarian for more complete information.

Literature Connections:

Kirkby, David. (1996). Handlin concepts along with simple ac 046-9. (3.21, 3.22, 3.23, 4.18

This list was compiled from Project STARS, a state sponsored initiative to correlate children's literature with the SOL. This is only a starting point of available literature. Write in additional books you find that enhance your teaching of the SOL.

Previous Grade SOL Link:	Current Grade Level SOL:	Next Grade SOL Link:
Textbook: Workbook: Worksheets: Materials:	Assessment: Technology Links: Media Resources: Literature Connections:	

Number and Number Sense

Previous Grade SOL Link:

3.1 The student will read and write six-digit numerals and identify the place value for each digit.

3.2 The student will round a whole number, 9,999 or less, to the nearest ten, hundred, and thousand.

3.3 The student will compare two whole numbers between 0 and 9,999, using symbols ($>$, $<$, or $=$) and words (*greater than*, *less than*, or *equal to*).

Current Grade Level SOL:

4.1 The student will

- identify (orally and in writing) the place value for each digit in a whole number expressed through millions;
- compare two whole numbers expressed through millions, using symbols ($>$, $<$, or $=$); and
- round whole numbers expressed through millions to the nearest thousand, ten thousand, and hundred thousand.

Next Grade SOL Link:

Textbook:

Workbook:

Worksheets:

Materials:

Assessment:

Technology Links:

Math Textbook, Math Processor

Media Resources:

Literature Connections:

Demi. (1997). One Grain Of Rice. A clever girl asks the raja to give her one piece of rice doubling it everyday for 30 days. ISBN: 059093998X. (4.1).

Schwartz, David. (1999). On Beyond A Million. By the power of ten professor X and his dog Y lead a group of children on an amazing math journey. ISBN: 0385322178.(3.1, 4.1, 5.1)

Number and Number Sense

Previous Grade SOL Link:

3.5 The student will

- a) divide regions and sets to represent a fraction; and
- b) name and write the fractions represented by a given model (area/region, length/measurement, and set).

Fractions (including mixed numbers) will include halves, thirds, fourths, eighths, and tenths).

Current Grade Level SOL:

4.2 The student will

- a) identify, model, and compare rational numbers (fractions and mixed numbers), using concrete objects and pictures;
- b) represent equivalent fractions; and
- c) relate fractions to decimals, using concrete objects.

Next Grade SOL Link:

5.2 The student will

- a) recognize and name commonly used fractions (halves, fourths, fifths, eighths, and tenths) in their equivalent decimal form and vice versa; and
- b) order a given set of fractions and decimals from least to greatest.

Fractions will include like and unlike denominators limited to 12 or less, and mixed numbers.

Textbook:

Workbook:

Worksheets:

Materials:

Assessment:

Technology Links:

Math Textbook, Math Processor
Number Munchers
Fraction Munchers

Media Resources:

Literature Connections:

Leedy, Loreen. (1994). **Fraction Action**. A variety of fractions visualized through basic shapes, as well as everyday objects.
ISBN: 0-8234-1109-5. (2.4, 3.5, 4.2, 4.3).

Number and Number Sense

Previous Grade SOL Link:

3.5 The student will

a) divide regions and sets to represent a fraction; and

b) name and write the fractions represented by a given model (area/region, length/measurement, and set).

Fractions (including mixed numbers) will include halves, thirds, fourths, eighths, and tenths).

3.6 The student will compare the numerical value of two fractions having like and unlike denominators, using concrete or pictorial models involving areas/regions, lengths/measurements, and sets.

Current Grade Level SOL:

4.3 The student will compare the numerical value of fractions (with like and unlike denominators) having denominators of 12 or less, using concrete materials.

Next Grade SOL Link:

5.2 The student will

a) recognize and name commonly used fractions (halves, fourths, fifths, eighths, and tenths) in their equivalent decimal form and vice versa; and
b) order a given set of fractions and decimals from least to greatest.

Fractions will include like and unlike denominators limited to 12 or less, and mixed numbers.

Textbook:

Workbook:

Worksheets:

Materials:

Assessment:

Technology Links:

Math Textbook, Math Processor
Number Munchers
Fraction Munchers

Media Resources:

Literature Connections:

Leedy, Loreen. (1994). **Fraction Action**. A variety of fractions visualized through basic shapes, as well as everyday objects. ISBN: 0-8234-1109-5. (2.4, 3.5, 4.2, 4.3).
Monclure, Jane Belk & Hohag, Linda. (1985). **My Five Book**. "Little five" introduces the concept of "five" by interacting with five of a variety of things. ISBN: 8953168. (K.4, 3.5, 4.3).
Murphy, Stuart. (1998). **A Fair Bear Share**. Concentrates on fractions through story form. ISBN: 0-6446714-7. (1.6, 2.4, 3.5, 4.3).

Number and Number Sense

Previous Grade SOL Link:

3.7 The student will read and write decimals expressed as tenths and hundredths, using concrete materials and models.

3.12 The student will add and subtract with decimals expressed as tenths, using concrete materials, pictorial representations, and paper and pencil.

Current Grade Level SOL:

4.4 The student will

a) read, write, represent, and identify decimals expressed through thousands;

b) round to the nearest whole number, tenth, and hundredth; and

c) compare the value of two decimals, using symbols ($>$, $<$, or $=$), concrete materials, drawings, and calculators.

Next Grade SOL Link:

5.1 The student will

a) read, write, and identify the place values of decimals through thousandths;

b) round decimal numbers to the nearest tenth or hundredth; and

c) compare the values of two decimals through thousandths, using the symbols $>$, $<$, or $=$.

Textbook:

Workbook:

Worksheets:

Materials:

Assessment:

Technology Links:

Math Textbook, Math Processor

Media Resources:

Literature Connections:

Computation and Estimation

Previous Grade SOL Link:

Current Grade Level SOL:

4.5 The student will estimate whole number sums and differences and describe the method of estimation. Students will refine estimates, using terms such as closer to, between, and a little more than.

Next Grade SOL Link:

5.3 The student will create and solve problems involving addition, subtraction, multiplication, and division of whole numbers, using paper and pencil, estimation, mental computation, and calculators.

Textbook:

Workbook:

Worksheets:

Materials:

Assessment:

Technology Links:

Math Textbook, Math Processor

Media Resources:

Literature Connections:

Computation and Estimation

Previous Grade SOL Link:

3.8 The student will solve problems involving the sum or difference of two whole numbers, each 9,999 or less, with or without regrouping, using various computational methods, including calculators, paper and pencil, mental computation, and estimation.

Current Grade Level SOL:

4.6 The student will add and subtract whole numbers written in vertical and horizontal form, choosing appropriately between paper and pencil methods and calculators.

Next Grade SOL Link:

5.3 The student will create and solve problems involving addition, subtraction, multiplication, and division of whole numbers, using paper and pencil, estimation, mental computation, and calculators.

Textbook:

Workbook:

Worksheets:

Materials:

Assessment:

Technology Links:

Math Textbook, Math Processor
Number Munchers
Troggle Trouble

Media Resources:

Literature Connections:

Computation and Estimation

Previous Grade SOL Link:

3.10 The student will represent multiplication and division, using area and set models, and create and solve problems that involve multiplication of two whole numbers, one factor 99 or less and the second factor 5 or less.

Current Grade Level SOL:

4.7 The student will find the product of two whole numbers when one factor has two digits or fewer and the other factor has three digits or fewer, using estimation and paper and pencil. For larger products (a two-digit numeral times a three-digit numeral), estimation and calculators will be used.

Next Grade SOL Link:

5.3 The student will create and solve problems involving addition, subtraction, multiplication, and division of whole numbers, using paper and pencil, estimation, mental computation, and calculators.

Textbook:

Workbook:

Worksheets:

Materials:

Assessment:

Technology Links:

Math Textbook, Math Processor
Neighborhood Map Machine
Troggle Trouble

Media Resources:

Literature Connections:

Computation and Estimation

Previous Grade SOL Link:

Current Grade Level SOL:

4.8 The student will estimate and find the quotient of two whole numbers, given a one-digit divisor.

Next Grade SOL Link:

5.5 The student, given a dividend of four digits or fewer and a divisor of two digits or fewer, will find the quotient and remainder.

5.6 The student, given a dividend expressed as a decimal through thousandths and a single-digit divisor, will find the quotient.

Textbook:

Workbook:

Worksheets:

Materials:

Assessment:

Technology Links:

Math Textbook, Math Processor

Media Resources:

Literature Connections:

Computation and Estimation

Previous Grade SOL Link:

3.11 The student will add and subtract with proper fractions having like denominators of 10 or less, using concrete materials and lengths/measurements.

3.12 The student will add and subtract with decimals expressed as tenths, using concrete materials, pictorial representations, and paper and pencil.

Current Grade Level SOL:

4.9 The student will

a) add and subtract with fractions having like and unlike denominators of 12 or less, using concrete materials, pictorial representations, and paper and pencil;

b) add and subtract with decimals through thousandths, using concrete materials, pictorial representations, and paper and pencil; and

c) solve problems involving addition and subtraction with fractions having like and unlike denominators of 12 or less and with decimals expressed through thousandths, using various computational methods, including calculators, paper and pencil, mental computation, and estimation.

Next Grade SOL Link:

5.7 The student will add and subtract with fractions and mixed numbers, with and without regrouping, and express answers in simplest form. Problems will include like and unlike denominators limited to 12 or less.

Textbook:

Workbook:

Worksheets:

Materials:

Assessment:

Technology Links:

Math Textbook, Math Processor
Number Munchers
Fraction Munchers

Media Resources:

Literature Connections:

Murphy, Stuart. (1997). Divide and Ride. Teaches division as a group of friends entertain themselves on different carnival rides. ISBN: 0-06-026776-3. (3.9, 4.9, 5.5).

Measurement

Previous Grade SOL Link:

3.14 The student will estimate and then use actual measuring devices with metric and U.S. Customary units to measure

- a) length - inches, feet, yards, centimeters, and meters;
- b) liquid - volume, cups, pints, quarts, gallons, and liters; and
- c) weight/mass - ounce, pounds, grams, and kilograms.

Current Grade Level SOL:

4.10 The student will estimate and measure weight/mass, using actual measuring devices, and describe the results in U.S. Customary/metric units as appropriate, including ounces, pounds, grams, and kilograms;

- b) identify equivalent measurements between units within the U.S. Customary system (ounces and pounds) and between units within the metric system (grams and kilograms);
- c) and estimate the conversion of ounces and grams and pounds and kilograms, using approximate comparisons (1 ounce is about 28 grams, or 1 gram is about the weight of a paper clip; 1 kilogram is a little more than 2 pounds)*

**The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.*

Next Grade SOL Link:

5.11 The student will choose an appropriate measuring device and unit of measure to solve problems involving measurements of

- a) length - part of an inch (1/2, 1/4, and 1/8) inches, feet, yards, miles, millimeters, centimeter, meters, and kilometers;
- b) weight/mass - ounces, pounds, tons, grams, and kilograms;
- c) liquid volume - cups, pints, quarts, gallons, milliliters, and liters;
- d) area - square units; and
- e) temperature - Celsius and Fahrenheit units.

Textbook:

Workbook:

Worksheets:

Materials:

Assessment:

Technology Links:

Math Textbook, Math Processor

Media Resources:

Literature Connections:

Measurement

Previous Grade SOL Link:	Current Grade Level SOL:	Next Grade SOL Link:
<p>3.14 The student will estimate and then use actual measuring devices with metric and U.S. Customary units to measure</p> <p>a) length - inches, feet, yards, centimeters, and meters;</p> <p>b) liquid - volume, cups, pints, quarts, gallons, and liters; and</p> <p>c) weight/mass - ounce, pounds, grams, and kilograms.</p>	<p>4.11 The student will</p> <p>a) estimate and measure length, using actual measuring devices, and describe the results in both metric and U.S. Customary units, including part of an inch (1/2, 1/4, and 1/8), inches, feet, yards, millimeters, centimeters, and meters;</p> <p>b) identify equivalent measurements between units within the U.S. Customary system (inches and feet; feet and yards; inches and yards) and between units within the metric system (millimeters and centimeters; centimeters and meters; and millimeters and meters);</p> <p>c) and estimate the conversion of inches and centimeter, yards and meters, and miles and kilometers, using approximate comparisons (1 inch is about 2.5 centimeters, yards and meters, and miles and kilometers, using approximate comparisons (1 inch is about 2.5 centimeters, 1 meter is a little longer than a yard, 1 mile is slightly farther than 1.5 kilometers, or 1 kilometer is slightly farther than half a mile). *</p> <p><i>*The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.</i></p>	<p>5.11 The student will choose an appropriate measuring device and unit of measure to solve problems involving measurements of</p> <p>a) length - part of an inch (1/2, 1/4, and 1/8) inches, feet, yards, miles, millimeters, centimeter, meters, and kilometers;</p> <p>b) weight/mass - ounces, pounds, tons, grams, and kilograms;</p> <p>c) liquid volume - cups, pints, quarts, gallons, milliliters, and liters;</p> <p>d) area - square units; and</p> <p>e) temperature - Celsius and Fahrenheit units.</p>

Textbook:	Assessment:
Workbook:	Technology Links: Math Textbook, Math Processor
Worksheets:	Media Resources:
Materials:	Literature Connections: Lionni, Leo. (1960). <u>Inch by Inch</u> . To keep from being eaten, an inchworm measures a robin's tail, a flamingo's neck, a toucan's beak, a heron's legs, and a nightingale's song. ISBN: 0-688-13283-9. (1.12, 2.12, 3.14, 4.11, 5.11).

Measurement

Previous Grade SOL Link:

3.14 The student will estimate and then use actual measuring devices with metric and U.S. Customary units to measure

- a) length - inches, feet, yards, centimeters, and meters;
- b) liquid - volume, cups, pints, quarts, gallons, and liters; and
- c) weight/mass - ounce, pounds, grams, and kilograms.

Current Grade Level SOL:

4.12 The student will

- a) estimate and measure liquid volume, using actual measuring devices and using metric and U.S. Customary units, including cups, pints, quarts, gallons, milliliters, and liters;
- b) identify equivalent measurements between units within the U.S. Customary system (cups, pints, quarts, and gallons) and between units within the metric system (milliliters and liters);
- c) estimate the conversion of quarts and liters, using approximate comparisons (1 quart is a little less than 1 liter, 1 liter is a little more than 1 quart). *

**The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.*

Next Grade SOL Link:

5.11 The student will choose an appropriate measuring device and unit of measure to solve problems involving measurements of

- a) length - part of an inch (1/2, 1/4, and 1/8) inches, feet, yards, miles, millimeters, centimeter, meters, and kilometers;
- b) weight/mass - ounces, pounds, tons, grams, and kilograms;
- c) liquid volume - cups, pints, quarts, gallons, milliliters, and liters;
- d) area - square units; and
- e) temperature - Celsius and Fahrenheit units.

Textbook:

Workbook:

Worksheets:

Materials:

Assessment:

Technology Links:

Math Textbook, Math Processor

Media Resources:

Literature Connections:

Measurement

Previous Grade SOL Link:

Current Grade Level SOL:

4.13 The student will
a) identify and describe situations representing the use of perimeter and area; and
b) use measuring devices to find perimeter in both standard and nonstandard units of measure.

Next Grade SOL Link:

5.8 The student will describe the perimeter of a polygon and the area of a square, rectangle, and right triangle, given the appropriate measures.
5.10 The student will differentiate between perimeter, area, and volume and identify whether the application of the concept of perimeter, area, or volume is appropriate for a given situation.

Textbook:

Workbook:

Worksheets:

Materials:

Assessment:

Technology Links:
Math Textbook, Math Processor

Media Resources:

Literature Connections:

Geometry

Previous Grade SOL Link:

3.19 The students will identify and draw representations of line segments and angles, using a ruler or straightedge.

Current Grade Level SOL:

4.14 The student will investigate and describe the relationships between and among points, lines, line segments, and rays.

Next Grade SOL Link:

Textbook:

Workbook:

Worksheets:

Materials:

Assessment:

Technology Links:

Math Textbook, Math Processor

Media Resources:

Literature Connections:

Geometry

Previous Grade SOL Link:

3.19 The students will identify and draw representations of line segments and angles, using a ruler or straightedge.

Current Grade Level SOL:

4.15 The student will
 a) identify and draw representations of points, lines, line segments, rays, and angles, using a straightedge or ruler; and
 b) describe the path of shortest distance between two points on a flat surface.

Next Grade SOL Link:

5.15 The student, using two-dimensional (plane) figures (square, rectangle, triangle, parallelogram, rhombus, kite, and trapezoid) will
 a) recognize, identify, describe, and analyze properties in order to develop definitions of these figures;
 b) identify and explore congruent, noncongruent, and similar figures;
 c) investigate and describe the results of combining and subdividing shapes;
 d) identify and describe a line of symmetry; and
 e) recognize the images of figures resulting from geometric transformations such as translation (slide), reflection (flip) or rotation (turn).
 5.16 The student will identify, compare, and analyze properties of three-dimensional (solid) geometric shapes (cylinder, cone, cube, square pyramid, and rect. prism).

Textbook:

Workbook:

Worksheets:

Materials:

Assessment:

Technology Links:

Math Textbook, Math Processor

Media Resources:

Literature Connections:

Hoban, Tana. (1985). Is It Larger? Is It Smaller?. This picture book (no words) may serve as a good book that the teacher can use to reinforce the concepts of larger/smaller. The pictures are real life photographs that are bright, colorful, and vivid. ISBN: 0-688-04027-6. (K.15). 4.15, 4.16, 5.15).
 Kirby, David. (1996). Measures & Spaces. Presents elementary geometric concepts along with simple activities and calculations. ISBN:1-57572-045-0. (3.18, 3.19, 3.20, 4.15, 4.16, 4.17, 5.13, 5.14, 5.15).

Geometry

Previous Grade SOL Link:

3.19 The students will identify and draw representations of line segments and angles, using a ruler or straightedge.

Current Grade Level SOL:

4.16 The student will identify and draw representations of lines that illustrate intersection, parallelism, and perpendicularity.

Next Grade SOL Link:

Textbook:

Workbook:

Worksheets:

Materials:

Assessment:

Technology Links:

Math Textbook, Math Processor

Media Resources:

Literature Connections:

Hoban, Tana. (1985). Is It Larger? Is It Smaller?. This picture book (no words) may serve as a good book that the teacher can use to reinforce the concepts of larger/smaller. The pictures are real life photographs that are bright, colorful, and vivid. ISBN: 0-688-04027-6. (K.15, 4.15, 4.16, 5.15).
Kirby, David. (1996). Measures & Spaces. Presents elementary geometric concepts along with simple activities and calculations. ISBN: 1-57572-045-0. (3.18, 3.19, 3.20, 4.15, 4.16, 4.17, 5.13, 5.14, 5.15).

Geometry

Previous Grade SOL Link:

3.18 The student will analyze two-dimensional (plane) and three-dimensional (solid) geometric figures (circle, square, rectangle, triangle, cube, rectangular solid [prism], square pyramid, sphere, cone, and cylinder) and identify relevant properties, including the number of corners, square corners, edges, and the number and shape of faces, using concrete models.

3.20 The student, given appropriate drawings or models, will identify and describe congruent and symmetrical, two-dimensional (plane) figures, using tracing procedures.

Current Grade Level SOL:

4.17 The student will

- a) analyze and compare the properties of two-dimensional (plane) geometric figures (circle, square, rectangle, triangle, parallelogram, and rhombus) and three-dimensional (solid) geometric figures (sphere, cube, and rectangular solid [prism]);
- b) identify congruent and noncongruent shapes; and
- c) investigate congruence of plane figures after geometric transformations such as reflection (flip), translation (slide) and rotation (turn), using mirrors, paper folding, and tracing.

Next Grade SOL Link:

5.15 The student, using two-dimensional (plane) figures (square, rectangle, triangle, parallelogram, rhombus, kite, and trapezoid) will

- a) recognize, identify, describe, and analyze their properties in order to develop definitions of these figures;
- b) identify and explore congruent, noncongruent, and similar figures;
- c) investigate and describe the results of combining and subdividing shapes;
- d) identify and describe a line of symmetry; and
- e) recognize the images of figures resulting from geometric transformations such as translation (slide), reflection (flip) or rotation (turn).

5.16 The student will identify, compare, and analyze properties of three-dimensional (solid) geometric shapes (cylinder, cone, cube, square pyramid, and rect. prism).

Textbook:

Workbook:

Worksheets:

Materials:

Assessment:

Technology Links:

Math Textbook, Math Processor
Tesselmania

Media Resources:

Literature Connections:

Kirby, David. (1996). Measures & Spaces. Presents elementary geometric concepts along with simple activities and calculations. ISBN:1-57572-045-0. (3.18, 3.19, 3.20, 4.15, 4.16, 4.17, 5.13, 5.14, 5.15).

Geometry

Previous Grade SOL Link:

Current Grade Level SOL:

4.18 The student will identify the ordered pair for a point and locate the point for an ordered pair in the first quadrant of a coordinate plane.

Next Grade SOL Link:

Textbook:

Workbook:

Worksheets:

Materials:

Assessment:

Technology Links:

Math Textbook, Math Processor
Neighborhood Map Machine

Media Resources:

Literature Connections:

Kirkby, David. (1996). Handling Data. Introduces elementary statistical concepts along with simple activities and calculations. ISBN: 1-57572-046-9. (3.21, 3.22, 3.23, 4.18, 4.19, 5.16, 5.17).

Probability and Statistics

Previous Grade SOL Link:

3.23 The student will investigate and describe the concept of probability as chance and list possible results of a given situation.

Current Grade Level SOL:

4.19 The student will
a) predict the likelihood of outcomes of a simple event, using the terms *certain*, *likely*, *unlikely*, *impossible*; and
b) determine the probability of a given simple event, using concrete materials.

Next Grade SOL Link:

5.17 The student will
a) solve problems involving the probability of a single event by using tree diagrams or by constructing a sample space representing all possible results;
b) predict the probability of outcomes of simple experiments, representing it with fractions or decimals from 0 to 1, and test the prediction; and
c) create a problem statement involving probability and based on information from a given problem situation. Students will not be required to solve the created problem statement.

Textbook:

Workbook:

Worksheets:

Materials:

Assessment:

Technology Links:

Math Textbook, Math Processor
Number Munchers

Media Resources:

Literature Connections:

Kirkby, David. (1996). **Handling Data**. Introduces elementary statistical concepts along with simple activities and calculations. ISBN: 1-57572- 046-9. (3.21, 3.22, 3.23, 4.18, 4.19, 5.16, 5.17).

Probability and Statistics

Previous Grade SOL Link:

3.21 The student, given grid paper, will
a) collect and organize data on a given topic of his/her choice, using observations, measurements, surveys, or experiments; and
b) construct a line plot, a picture graph, or a bar graph to represent the results. Each graph will include an appropriate title and key.

3.22 The student will read and interpret data represented in line plots, bar graphs, and picture graphs and write a sentence analyzing the data.

3.23 The student will investigate and describe the concept of probability as chance and list possible results of a given situation.

Current Grade Level SOL:

4.20 The student will collect, organize, and display data in line and bar graphs with scale increments of one or greater than one and use the display to interpret the results, draw conclusions, and make predictions.

Next Grade SOL Link:

5.17 The student will
a) solve problems involving the probability of a single event by using tree diagrams or by constructing a sample space representing all possible results;
b) predict the probability of outcomes of simple experiments, representing it with fractions or decimals from 0 to 1, and test the prediction; and
c) create a problem statement involving probability and based on information from a given problem situation. Students will not be required to solve the created problem statement.

5.18 The student will, given a problem situation, collect, organize, and display a set of numerical data in a variety of forms, using bar graphs, stem-and-leaf plots, and line graphs, to draw conclusions and make predictions.

Textbook:

Workbook:

Worksheets:

Materials:

Assessment:

Technology Links:

Math Textbook, Math Processor

Media Resources:

Literature Connections:

Weiss, Malcolm. (1976). Jellybeans! All That? Introduction to Algebra, terms and process. Easy to read and comprehend.
ISBN: 0690009143. (4.20, 4.21, 4.22).

Patterns, Functions, and Algebra

Previous Grade SOL Link:

3.24 The student will recognize and describe a variety of patterns formed using concrete objects, numbers, tables, and picture, and extend the pattern, using the same or different forms (concrete objects, numbers, tables, and pictures).

Current Grade Level SOL:

4.21 The student will recognize, create, and extend numerical and geometric patterns, using concrete materials, number lines, symbols, tables, and words.

Next Grade SOL Link:

5.20 The student will analyze the structure of numerical and geometric patterns (how they change or grow) and express the relationship, using words, tables, graphs, or a mathematical sentence. Concrete materials and calculators will be used.

Textbook:

Workbook:

Worksheets:

Materials:

Assessment:

Technology Links:

Math Textbook, Math Processor

Media Resources:

Literature Connections:

Anno, Masaichiro. (1983). Anno's Mysterious Multiplying Jar. Demonstrates the concept of factorials. ISBN: 0-399-20951-4. (4.21, 4.22, 5.19, 5.20).

Kirkby, David. (1996). Pattern. Explores such concepts as mathematical shape and symmetry. ISBN: 1-57572-043-4. (2.21, 2.25, 3.24, 3.25, 4.21).

Weiss, Malcolm. (1976). Jellybeans! All That? Introduction to Algebra, terms and process. Easy to read and comprehend. ISBN: 0690009143. (4.20, 4.21, 4.22).

Patterns, Functions, and Algebra

Previous Grade SOL Link:

3.25 The student will

- a) investigate and create patterns involving numbers, operations (addition and multiplication), and relations that model the identity and commutative properties for addition and multiplication; and
- b) demonstrate an understanding of equality by recognizing that the equal sign (=) links equivalent quantities, such as $4 \times 3 = 2 \times 6$.

Current Grade Level SOL:

4.22 The student will recognize and demonstrate the meaning of equality, using symbols representing numbers, operations and relations [e.g., $3 + 5 = 5 + 3$ and $15 + (35 + 16) = (15 + 35) + 16$].

Next Grade SOL Link:

Textbook:

Workbook:

Worksheets:

Materials:

Assessment:

Technology Links:

Math Textbook, Math Processor

Media Resources:

Literature Connections:

Anno, Masaichiro. (1983). **Anno's Mysterious Multiplying Jar**. Demonstrates the concept of factorials. ISBN: 0-399-20951-4. (4.21, 4.22, 5.19, 5.20).

Weiss, Malcolm. (1976). **Jellybeans! All That?** Introduction to Algebra, terms and process. Easy to read and comprehend. ISBN: 0690009143. (4.20, 4.21, 4.22).

Grade 4

Strand

Assessment

- Number and Number Sense
- Computation and Estimation
- Measurement
- Geometry
- Measurement
- Measurement

Name _____

Date _____

Number and Number Sense

1. What is the place value of the underlined digit in the number 3,683,735?
 - a) millions
 - b) hundred thousands
 - c) ten thousands
 - d) thousands

2. What is the place value of the underlined digit in the number 9,471,642 ?
 - a) millions
 - b) hundred thousands
 - c) ten thousands
 - d) thousands

3. What is 6,453,877 rounded to the nearest ten thousand?
 - a) 6,453,000
 - b) 6,450,000
 - c) 6,400,000
 - d) 6,000,000

4. What is 2,091,078 rounded to the nearest thousand?
 - a) 2,100,000
 - b) 2,091,100
 - c) 2,091,000
 - d) 2,000,000

5. \$.50 is what part of \$1.00?
 - a) $\frac{1}{2}$
 - b) $\frac{1}{4}$
 - c) $\frac{1}{3}$
 - d) $\frac{1}{5}$

6. What is the equivalent decimal for the fraction $\frac{1}{4}$?
 - a) .50
 - b) .20
 - c) .25
 - d) .33

7. $\frac{3}{5} + \frac{2}{3} = ?$
 - a) $\frac{5}{8}$
 - b) $\frac{5}{15}$
 - c) $1 \frac{9}{15}$
 - d) $1 \frac{4}{15}$

8. $\frac{2}{7} + \frac{2}{5} = ?$
 - a) $\frac{4}{12}$
 - b) $\frac{4}{35}$
 - c) $\frac{24}{35}$
 - d) $\frac{3}{8}$

9. What is 6.3425 rounded to the nearest hundredth?

- a) 6.34
- b) 6.3
- c) 6.0
- d) 6.342

10. What is 453.8843 rounded to the nearest tenth?

- a) 453.884
- b) 453.9
- c) 453.8
- d) 453.88

Answer Key:

- | | |
|------|-------|
| 1) c | 6) c |
| 2) b | 7) d |
| 3) b | 8) c |
| 4) c | 9) a |
| 5) a | 10) b |

Name _____

Date _____

Computation and Estimation

1. If Jon goes to the store and gives the cashier a \$50.00 bill for \$28.48 worth of purchases, how much change will he receive?

- a) \$31.52
- b) \$31.42
- c) \$21.52
- d) \$21.42

2. Ginger and Frank went to the grocery store with five coupons. One was for \$0.15, one was for \$0.35, and three were for \$0.75. If they used all of their coupons, about how much money would they save?

- a) \$1.00
- b) \$2.00
- c) \$3.00
- d) \$4.00

3. $130 + 260 + 921 + 369 =$

- a) 1670
- b) 1680
- c) 1570
- d) 1580

4. 213

312

621

+ 789

- a) 1935
- b) 1825
- c) 2035
- d) 1925

5. 671

x 3

- a) 1823
- b) 1223
- c) 2213
- d) 2013

6. $483 \times 4 =$

- a) 1932
- b) 1532
- c) 1922
- d) 1522

7. $\overline{9)162}$

- a) 15
- b) 17
- c) 18
- d) 19

8. $\overline{3)843}$

- a) 281
- b) 271
- c) 381
- d) 371

9. $\frac{2}{9} + \frac{1}{4} =$

- a) $\frac{3}{13}$
- b) $\frac{17}{36}$
- c) $\frac{2}{36}$
- d) $\frac{3}{36}$

10. $4.786 + 30.55 =$

- a) 78.41
- b) 35.336
- c) 70.356
- d) 43.366

Answer Key:

- | | | |
|------|------|-------|
| 1) c | 5) d | 9) b |
| 2) c | 6) a | 10) b |
| 3) b | 7) c | |
| 4) a | 8) c | |

Name _____

Date _____

Measurement

1. A paperclip weighs about...

- a) 1 kilogram
- b) 1 pound
- c) 1 ounce
- d) 1 gram

2. A kilogram is about the same as...

- a) 2 pounds
- b) 2 ounces
- c) 20 pounds
- d) 20 ounces

3. This line is how long?



- a) 2 1/2 inches
- b) 2 inches
- c) 3 1/2 inches
- d) 3 inches

4. 1 inch is about...

- a) 10 centimeters
- b) 1 centimeter
- c) 2.5 centimeters
- d) 25 centimeters

5. Which of the following sentences is **NOT** true?

- a) 1 meter is a little longer than a yard
- b) 1 mile is a little shorter than a kilometer
- c) 1 kilometer is slightly farther than a half a mile
- d) 1 meter is a little longer than a yard

6. How many pints are in 1 quart?

- a) 2
- b) 3
- c) 4
- d) 6

7. How many quarts are in a gallon?

- a) 2
- b) 3
- c) 4
- d) 6

8. Cheryl is making a recipe for punch that calls for 4 quarts of ginger ale. The bottles at the store only come in 1-liter amounts. How many liter bottles will she have to buy to approximate the correct amount for the punch recipe?
- a) 2
 - b) 4
 - c) 6
 - d) 8
9. Farmer Henry is putting up a fence around his pasture. His pasture is square with each side measuring 300 feet. How many feet of fence will he need?
- a) 1500 feet
 - b) 600 feet
 - c) 900 feet
 - d) 1200 feet
10. Shannon is trying to figure out how many yards of ribbon to get to sew a border around her tablecloth. The tablecloth is four feet wide and eight feet long. How much ribbon does she need?
- a) 12 feet
 - b) 36 feet
 - c) 32 feet
 - d) 24 feet

Answer Key:

- | | |
|------|-------|
| 1) d | 6) a |
| 2) a | 7) c |
| 3) a | 8) b |
| 4) c | 9) d |
| 5) b | 10) d |

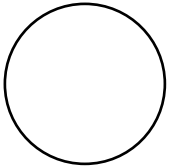
Name _____

Date _____

Geometry

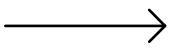
1. The corner of your math textbook could be compared to a...

- a) circle
- b) right angle
- c) parallelogram
- d) ray



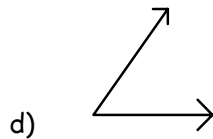
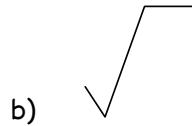
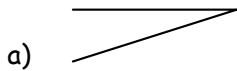
2. This plane shape is called a...

- a) sphere
- b) oval
- c) circle
- d) ellipse

3.  This is called a...

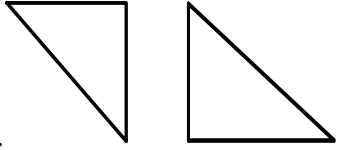
- a) line segment
- b) point
- c) ray
- d) line

4. Which of the following is the correct drawing of angle?



5. A cereal box could be described as which three-dimensional geometric figure?

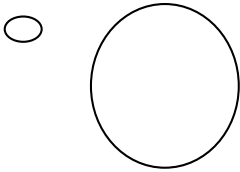
- a) rectangular prism
- b) cube
- c) sphere
- d) rectangle



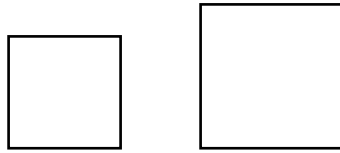
6. How has this shape been transformed?

- a) flip - flip
- b) flip - turn - turn
- c) flip - slide
- d) flip - turn - slide

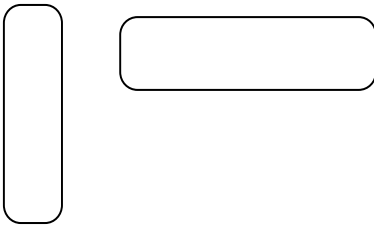
7. Which two shapes are congruent?



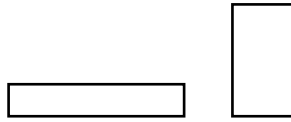
a)



b)

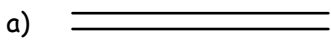


c)



d)

8. Which lines are parallel?



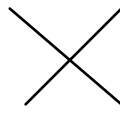
a)



b)

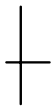


c)

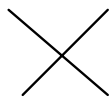


d)

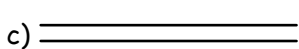
9. Which lines intersect, but are NOT perpendicular?



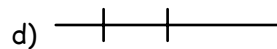
a)



b)

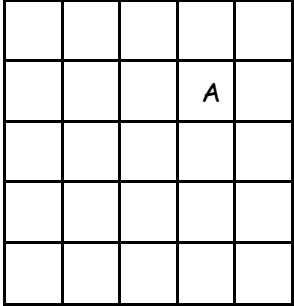


c)



d)

10.



What is the ordered pair for point A?

- a) (2,3)
- b) (0,1)
- c) (3,4)
- d) (4,3)

Answer Key:

- 1) b
- 2) c
- 3) c
- 4) d
- 5) a
- 6) b
- 7) c
- 8) a
- 9) b
- 10) c

Name _____

Date _____

Measurement

1. What is the probability of Angela rolling the number 4 from one roll on a standard die?
 - a) $\frac{1}{4}$
 - b) $\frac{1}{12}$
 - c) $\frac{2}{6}$
 - d) $\frac{1}{6}$

2. Li-Sue has a bag of 15 marbles. 3 are green, 4 are yellow, and 8 are blue. What is the probability that she will pull out a green marble on the first try?
 - a) $\frac{1}{15}$
 - b) $\frac{12}{15}$
 - c) $\frac{3}{15}$
 - d) $\frac{7}{15}$

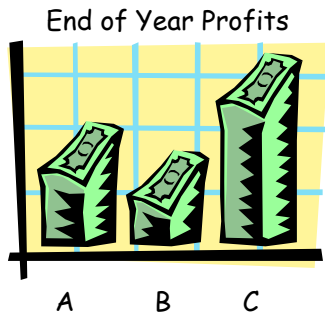
3. Which of the following statements is true?
 - a) It is unlikely to snow in Virginia during the month of May.
 - b) It is likely to snow in Virginia during the month of May.
 - c) It is certain to snow in Virginia during the month of May.
 - d) It is impossible to snow in Virginia during the month of May.

4. Which of the following statements is true?
 - a) It is unlikely that the sun will set tonight.
 - b) It is likely that the sun will set tonight.
 - c) It is certain that the sun will set tonight.
 - d) It is impossible that the sun will set tonight.

5. Bobby has a game that uses a spinner divided into four equal sections. One section is red, one blue, one green, and one yellow. What is the probability that, when playing the game, he will land on an orange space?
 - a) $\frac{1}{4}$
 - b) $\frac{0}{4}$
 - c) $\frac{4}{4}$
 - d) $\frac{2}{4}$

6. Which of the following statements is true?
 - a) It is unlikely that flowers are walking.
 - b) It is likely that flowers are walking.
 - c) It is certain that flowers are walking.
 - d) It is impossible that flowers are walking.

7.



Which company had the greatest end of the year profits?

- a) It is impossible to tell.
- b) Company A
- c) Company B
- d) Company C

8.

Make a line graph for the following information.

Title - Plant Height for the Week of May 1 - May 7

- Day 1 - 0 cm Day 5 - 3 cm
- Day 2 - 1 cm Day 6 - 3 cm
- Day 3 - 1 cm Day 7 - 5 cm
- Day 4 - 2 cm

9.

Make a bar graph for the following information.

Title - Snowfall Totals

- Seattle - 30 feet Atlanta - 5 feet
- Philadelphia - 15 feet Denver - 40 feet

10. How much more snow did Denver have than Philadelphia?

- a) 25 feet
- b) 35 feet
- c) 55 feet
- d) 15 feet

Answer Key:

- | | |
|------|---------------------------|
| 1) d | 6) d |
| 2) c | 7) c |
| 3) a | 8) Teacher Interpretation |
| 4) c | 9) Teacher Interpretation |
| 5) b | 10) a |

Name _____

Date _____

Measurement

1. What comes next in this pattern? **a z b y c x d w** ____

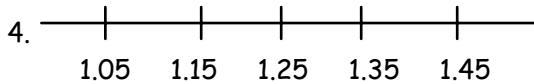
- a) **V**
- b) **E**
- c) **M**
- d) **L**

2. What number is missing? 5, 15, 25, 35, ____, 55, 65, 75...

- a) 40
- b) 50
- c) 45
- d) 55

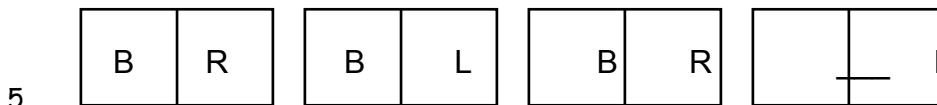
3. Lisa's company posted a \$1,000.00 profit the first year, \$2,000.00 the second year, and \$3,000.00 the third year. What could she reasonably predict would be her profit in the fourth year?

- a) \$1,000.00
- b) \$2,000.00
- c) \$3,000.00
- d) \$4,000.00



This number line increases in increments of...

- a) 0.10
- b) 0.01
- c) 10.0
- d) 1.00



What is missing in this pattern?

- a) B
- b) R
- c) L
- d) D

6. $4 + 8 = \underline{\quad} + 4$

- a) 4
- b) 7
- c) 3
- d) 8

7. $12 + (3 + 6) = (12 + \underline{\quad}) + 6$

- a) 12
- b) 3
- c) 8
- d) 6

8. $\underline{\quad} \times 5 \times 4 \times 3 = 4 \times 6 \times \underline{\quad} \times 5$

- a) 3
- b) 4
- c) 5
- d) 6

9. $(342 \times \underline{\quad}) \times 651 \times 9 = (651 \times 342) \times \underline{\quad} \times 24$

- a) 9
- b) 24
- c) 342
- d) 651

10. $89 + 34 + \underline{\quad} = 34 + 53 + 89$

- a) 89
- b) 43
- c) 53
- d) 34

Answer Key:

- | | |
|------|-------|
| 1) b | 6) d |
| 2) c | 7) b |
| 3) d | 8) a |
| 4) a | 9) b |
| 5) a | 10) c |