Grade – Fourth

Standard: Number Operations and Concepts

Skill: Understand ways to represent numbers, relationships among numbers, and number systems

Context: Problem solving situations will include representing, comparing, and ordering whole numbers up to 999,999; recognition of common fractions (halves, thirds, and fourths) as part of a whole using area models; and using place value to read and write decimals to hundredths and whole numbers up to 999,999 in words, standard, and expanded forms.

Instructional suggestions: (Created to be user-friendly, teachers should be able to read these ideas and put them into practice in their classroom.)

- Remind students in all standards, reading for "math" understanding is a part of what they are expected to do.
- Dice Game- Students roll dice, write the results as a proper fraction and place the fraction in the correct position on a number line.
- Provide students with manipulatives to practice demonstrating place value. (One example, using units, strips and mats, would be 3-mats, 4-strips and 3-units = 343)
- Have students practice sequencing numbers from least to greatest and greatest to least. (Don't hesitate to use some common fractions in the list of numbers.)
- Have students practice doing activities with common fractions (a great time to use measuring cups).
- Provide games and activities (i.e. using number tiles) so students know the difference between expanded, standard, and word forms.

- Ensure knowledge of vocabulary such as: digit, value, expanded, greatest, least, etc.

Grade – Fourth

Standard: Number Operations and Concepts

Skill: Develop the connection between conceptual understanding and computational proficiency

Context: Problem solving situations will include mathematical reasoning by computational fluency with explanation of the strategies used in problem solving including multiplication by single digits; adding and subtracting to thousands, multiplying hundreds by a single digit; and solving problems in the context of money, making combinations up to $10 and making change up to $5.

Instructional suggestions: (Created to be user-friendly, teachers should be able to read these ideas and put them into practice in their classroom.)

- Have students use manipulatives to practice creating and solving number sentences from story problems.
- Have students use hands-on activities to practice making change and making different money combinations for the same amount up to $10.00. (You could also have the students practice counting up as they make change.)
- Students should be able to recognize and determine the smallest combination of coins and/or dollars needed to make change up to $5.00 or a given amount up to $10.00.
- Have students make an array of multiplication problems.
- Have students write their own multi-step problems using two different computation sets which their counterparts then solve and explain how they arrived at the solution. (Example: I bought 2-$.55 comic books and 3-$.75 candy bars and paid with a Five Dollar bill. Count my change back to me.)

- Students will develop multiple computational strategies for solving problems and will explain their reasoning to include multiplication by single digits.

- Use vocabulary such as: between, more, difference, etc

- Provide students the opportunity to write their own story problems and choose the appropriate operation for the problem.

- Have a “problem of the day” that has a ‘4-step’ problem solving guide that students use and apply to provide experience in choosing the correct concept to use.

- Provide a poster with key phrases on which operation to choose. Graphic organizers can be found in the NCTM (Illuminations resources) materials with arrays (to use in solving problems) with totals, amounts, etc..

- Have students write a story problem then create a play and act out. Let other students write the story to connect vocabulary with the action.

Grade – Fourth

Standard: Geometry

Skill: Specify locations and describe spatial relationships using coordinate geometry and other representational systems

Context: Problem solving situations will include demonstrating an understanding of relationships with lines by recognizing parallel, perpendicular or intersecting lines.

Instructional suggestions: (Created to be user-friendly, teachers should be able to read these ideas and put them into practice in their classroom.)

- Have students use yarn or their bodies to understand, demonstrate, and apply perpendicular lines. Students should know and be able to apply perpendicular lines to real world elements (i.e. maps, streets, etc).
- Have students compare and contrast what makes perpendicular, parallel, and intersecting lines. Use real life examples using line segments and intersection.
- Have students keep a math journal and record math vocabulary and definitions (i.e. flip a shape is to reflect it over a line).
- Students need to be able to define and explain key mathematical terms. Example: perpendicular, parallel and intersecting. Avoid using the word “even” to describe equal distance.
- Give examples or expose students to real-life parallelism, for example, railroad tracks; and a 4-way stop where it is perpendicular. Describe letters of the alphabet like “H” that include parallel and perpendicular lines and “X” that has intersecting lines etc…

Grade - Fourth

Standard: Geometry

Skill: Analyze characteristics and properties of two- and three-dimensional geometric shapes

Context: Problem solving situations will include geometrical attributes of 2- and 3- dimensional objects (sides, edges, vertices, or faces), allowing students to use spatial reasoning and geometric modeling to classify and describe.

Instructional suggestions: (Created to be user-friendly, teachers should be able to read these ideas and put them into practice in their classroom.)

- Have students define, record, and give examples of attributes of 2- and 3- dimensional objects in their math journals.
- Have students record and explain math vocabulary such as the following: sides, edges, vertices, faces, surfaces, etc.
- Have students sort and classify geometric shapes by attributes.
- Provide students with a variety of manipulatives to create 2- and 3- dimensional geometric shapes.
- Use a variety of 3-D pictures to teach geometric shapes and concepts.
- Have students identify real-life objects in the classroom and at home by their shapes and attributes.
- Having manipulatives for two- and three-dimensional shapes and figures is crucial. Drawing them in the math journal and writing the descriptions; having students use and refer to these regularly. Students could also construct 3-d objects or use technology such as the SmartBoard to visualize and manipulate the figures.

- Vocabulary Game: Student put the word behind their head (this student does not know what the vocabulary word is). Other students have to give them information to get the student to say the vocabulary word (without actually using the term).

- Make riddle clues to come up with correct polygon shapes. Give hardest clues first. Keep adding clues until they can figure it out. For example: Cube, I have 12 edges, I have 6 faces, etc..

Grade – Fourth

Standard: Geometry

Skill: Apply transformations and use symmetry to analyze mathematical situations

Context: Problem solving situations will include identifying and describing reflections of common polygons.

Instructional suggestions: (Created to be user-friendly, teachers should be able to read these ideas and put them into practice in their classroom.)

- Have students apply transformations & symmetry. Use mirrors to demonstrate an image that has been flipped. (Have them send each other messages using "mirror" writing.)
- Have students demonstrate and practice problem solving tasks using concepts such as flip, rotation, and symmetry. Incorporate art projects in which students fold and cut paper to demonstrate symmetry.
- Use transparencies as over-lays to demonstrate symmetry.
- Teach vocabulary such as: reflection vs. flip, slide vs. translation, rotational symmetry, etc.
- Provide flip or reflection problems that include vertical, diagonal and horizontal lines.

Grade – Fourth

Standard: Measurement

Skill: Understand measurable attributes of objects and the units, systems, and processes of measurement

Context: Problem solving situations will include the use of appropriate methods, tools, and units to solve problems involving estimation and measure of length, weight and capacity using customary units (yards, feet, inch, half-inch, quarter-inch, ounces, pounds, teaspoons, tablespoons, cups, pints, quarts, and gallons); and reasoning about the relationships within the U.S. customary system (seconds, minutes, hours) and elapsed time (nearest minute).

Instructional suggestions: (Created to be user-friendly, teachers should be able to read these ideas and put them into practice in their classroom.)

- Using real-life activities have students convert minutes to hours, feet to inches, etc. (Example: If I can read 10 pages in ½ hour, about how many minutes does it take me to read 1 page?)
- Provide opportunities for students to practice physical measurement (measure floor, desk, door, etc.).
- Use a number line with hours and minutes for students to calculate elapsed time.
- Have students figure out elapsed time using both analog and digital clocks.
- Gallon Guide or Measure Man Poster provides a nice visual for the kids. Can be purchased or hand-made.
- Constantly integrate lapsed time examples into the student's daily experiences.

- For example, “How much time until we go to lunch.” Or relate to their own life…”What time to you get up in the morning.” Expose them as much as possible! Another possibility is when they sign out they are required to tell you the time they are leaving. Promethean Boards have their own clocks that would allow hand-on practice.

- It might help to teach military time and teach them how to add and subtract using this and converting to regular time. This is a strategy that helps students be able to correctly determine the answers to this type of problem.

Grade – Fourth

Standard: Measurement

Skill: Apply appropriate techniques, tools, and formulas to determine perimeter, area, or volume

Context: Problem solving situations will include the use of sound reasoning to calculate perimeter or area of rectangles and squares using models.

Instructional suggestions: (Created to be user-friendly, teachers should be able to read these ideas and put them into practice in their classroom.)

- Have students find figures with the same area but with different shapes.
- Reinforce students' ability to apply formulas (LxW = area), (add all sides = perimeter).
- Have students record, illustrate, and give examples of perimeter, area, and volume in their math journals.
- Provide students with hands-on activities to calculate perimeter or area of rectangles and squares using models, as well as determining volume.
- Resource: Marilyn Burns' materials should be used to teach with arrays on multiplication and perimeter/areas. Another resource is from Greg Tang.
- Perimeter game: Use graph paper, cards with dimensions on them, one student is red/one is blue. Students draw a card and, they have to draw the object. Build upon the concept, "build it before you fill it" and RIM is in the word Perimeter.

Grade – Fourth

Standard: Algebra

Skill: Understand patterns, relations, and functions

Context: Problem solving situations will include the use of sound reasoning to identify, describe, extend growing patterns (up to four places) using manipulatives, numbers, or graphic representations and/or explain results, or determining and explaining the rule when given a pattern or sequence.

Instructional suggestions: (Created to be user-friendly, teachers should be able to read these ideas and put them into practice in their classroom.)

- Have students build "growing" arrangements out of blocks and challenge other students to build the arrangement that would come next.
- Have students explain and extend a table or chart.
- Give students information and have them organize data to solve a problem, or have students come up with a rule or pattern for the information given in a chart or table (Input-Output activities).
- Have students solve the problem looking at the problem backwards, practice looking at patterns throughout the problem.
- Define and use vocabulary such as: extended patterns, growing patterns, skip patterns, refer back to ABC patterns.
- Use 2-step computation to extend pattern problem solving (+2, -3, +2, -3…).
- Use manipulatives to have students create patterns and then transfer or identify the patterns into numbers, words, or symbols.

Grade – Fourth

Standard: Data Analysis and Probability

Skill: Collect, organize, and display relevant data to answer questions, and use appropriate statistical methods to analyze the data

Context: Problem solving situations will include collecting, organizing, and comparing data using a variety of data displays, including Venn diagrams.

Instructional suggestions: (Created to be user-friendly, teachers should be able to read these ideas and put them into practice in their classroom.)

- Have students collect, organize, and display information to answer specific questions and draw conclusions. Have students organize the data in a Venn diagram. (Example: Right-handed batters, left-handed batters and switch hitters.)
- Have students collect information and represent it in a variety of ways (tables, charts, graphs).
- Keep a data collection on something every month (i.e. real-life data-weather and plants) and represent the data in multiple ways.
- Have students use technology to organize and display relevant data.
- Graph and display student scores; show score data for fall, winter, and spring in order to make comparisons (e.g. DIBELS scores, writing scores, etc.).
- Encourage students to use correct vocabulary/terminology when asking questions about tables, charts, and graphs.
- There needs to emphasis on the use of keys with pictographs.

- Some of the ways you might do this include having students build their own graph with a key then taking the same graph changing the key for the same graph. Require students to make three different keys with the same graph and show how the data or answer to a problem changes.

Grade – Fourth

Standard: Data Analysis and Probability

Skill: Develop and evaluate inferences and predictions that are based on data

Context: Problem solving situations will include simple probability and recording the results of experiments or simulations limited to 9 or fewer outcomes using the language: certain, likely, unlikely, and impossible.

Instructional suggestions: (Created to be user-friendly, teachers should be able to read these ideas and put them into practice in their classroom.)

- Provide students with spinners, coins, cards, and/or dice to provide opportunities to predict and then record the "certain, likely, unlikely, and impossible" outcomes. Be firmer with teaching the vocabulary of "certain", "likely", "unlikely" possibilities. Directly instruct this vocabulary.
- Put items in a bag to teach probability (i.e. crayons).
- Have students interpret whether a graph or chart can be used to predict the possible outcome of an event.
- Allow students to practice with 2-step spinner problems. Make a tree diagram with possible outcomes from the first spinner.
- Give students multiple opportunities with games with spinners. Before they spin, let them guess what they may get.