Soaring Heights Charter School　　　　　　　　　　　**Adopted July 2023**
3rd Grade Math - Big Ideas　　　　　　　　　　　　　**Revised August 2024**

Chapter 1 - Understand Multiplication and Division

STANDARDS:

3.OA.A.1:Interpret products of whole numbers, e.g., interpret as the total number of objects in 5 groups of 7 objects each. For example, describe and/or represent a context in which a total number of objects can be expressed as .

3.OA.A.2: Interpret whole-number quotients of whole numbers, e.g., interpret as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe and/or represent a context in which a number of shares or a number of groups can be expressed as .

3.OA.A.3: Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

3.OA.B.5: Apply properties of operations as strategies to multiply and divide. Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. 1.(Distributive property.) {Clarification: Students need not use formal terms for these properties).

MP.1: Make sense of problems and persevere in solving them
MP.2: Reason abstractly and quantitatively
MP.3: Construct viable arguments and critique the reasoning of others
MP.4: Model with mathematics
MP.5: Use appropriate tools strategically
MP.6: Attend to precision

MP.7: Look for and make use of structure
MP.8: Look for and express regularity in repeated reasoning

Objectives:

- Use equal groups to multiply.
- Use a number line to multiply.
- Use an array to multiply.
- Multiply factors in any order.
- Use division to find the size of equal groups.
- Use division to find the number of equal groups.
- Use a number line to divide.

Extended Activities:

Explore and Grow

1. Students use 24 counters to create equal groups in two different ways and then compare their two models. Distribute counters. Say, "Put your counters into equal size groups. Your groups may be any size as long as all counters are used, and each group is an equal size." "Draw the picture of your model." Suggest that students draw a ring around each group. "Now change the size of the groups and record the new picture." Look for and Make Use of Structure: "What is the same in both of your models? What is different? Why? Tell your partner."

2. Students model repeated addition on a floor number line given the size and number of jumps. Place several number lines from 0 to 16 on the floor or create them with masking tape. Assign small groups of students to each number line. "In your group, choose one person to be the traveler who will jump along the number line according to the instructions I give. The other group members will help direct the traveler. Each member of the group will get a turn as the traveler." "Start on 0. Jump forward 2. Stop. Jump forward 2 again. Stop. Jump forward 2 again. Stop." "Where did you end up? How many jumps of 2 did you take to get there?"

3. Students will try to form lines, with an equal number of students in each line, to see if they can form an array.

4. Provide students with a multiplication equation with a product that is less than 50. Have students cut out an outline of a skyscraper and represent their multiplication equation in square window arrays. Students should write the repeated addition equation that corresponds to their multiplication equation.

5. Students match multiplication expression cards to product cards.

6. Students view an array, from two different views, and compare what they see.

7. Students share 12 objects equally among one of the following numbers of groups: 2, 3, 4, or 6. Students work in small groups. Distribute 12 counters to each group. "You will receive 2, 3, 4, or 6 paper plates. Your task is to place the counters so that there are an equal number of counters on each plate." Distribute plates to groups. Some groups will have the same task. When all groups are complete, instruct students to walk around and observe the number of objects on each plate in the different situations.

Gifted and Talented Activities:

1. Provide students with buttons, paper clips, or other manipulatives. Give students equations to solve, either on a handout or written on the board. Students will put their items into equal groups based on the equations, and use the items to find the products.
2. Roll two dice. Use the numbers to create a multiplication equation. Have your partner solve it and explain the steps using their vocabulary cards. Switch and repeat.
3. Have students write a multiplication word problem. Encourage them to create a problem with a product of no more than 25. If time permits, allow them to draw illustrations to accompany their problem. Provide students with blank number lines or have them draw a number line. Have students represent their problem on the number line, showing the start and end points and the hops.
4. Display a large number line on the wall with only the number 1 showing. Provide and shuffle a deck of number cards with composite numbers up to 50. Have students pick the top card, represent the number in an array on grid paper, and glue it in the corresponding number placement on the number line. Note that there may be several ways to represent the same number in arrays and encourage students to represent all ways on the number line. For an extension, have students partner up to illustrate arrays of numbers larger than 50.
5. Explain that a palindrome is a word that is the same written backwards and forwards. Write a few simple palindromes on the board such as "mom," "noon," and "wow." Ask for volunteers who can explain how the concept of a palindrome is connected to the Commutative Property of Multiplication. Provide dictionaries to students and have them look for or think of examples of palindromes. Create a list of words that students fi nd

Chapter 2 - Multiplication Facts and Strategies

STANDARDS:

3.OA.A.3: Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem

3.OA.A.4: Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$, $5 = ? \div 3$, $6 \times 6 = ?$.

3.OA.C.7: With accuracy and efficiency, multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8x5=40, one knows 40 / 5=8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

3.OA.D.9: Identify arithmetic patterns (including patterns in the addition table or multiplication table) and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.

3.OA.B.5: Apply properties of operations as strategies to multiply and divide. Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. 1.(Distributive property.) {Clarification: Students need not use formal terms for these properties).

MP.1: Make sense of problems and persevere in solving them
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MP.3: Construct viable arguments and critique the reasoning of others
MP.4: Model with mathematics
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MP.7: Look for and make use of structure
MP.8: Look for and express regularity in repeated reasoning

Objectives:
- Multiply by 2.
- Multiply by 5.
- Multiply by 10.
- Use properties to multiply by 0 or 1.
- Use the Distributive Property to multiply.
- Use the problem solving plan to solve word problems.

Extended Activities:
1. **Vocabulary Bingo:** Students write the vocabulary words in 3 × 3 array pattern in their notebooks. Include review vocabulary words as needed to fill the array. Students can work in groups and take turns being the caller, or reader, of the defi nitions. Mark off the words as they are identified.
2. **Bodily-Kinesthetic Activity**: Place students in groups of 2. Hand each group a small, light-weight ball. Write a multiplication problem on the board. Students determine the product and then toss their ball back and forth with their partner the correct number of times.
3. **Logical-Mathematical:** Show students an analog clock. Show a time on the hour and ask students how many minutes it takes for the minute hand to move to the 7. Have students model the problem and write an equation. Repeat with different numbers.
4. **Interpersonal:** Give each student a new "name" for the day by handing them a label with a 2, 5, or 10 multiplication fact on it (without the product). They wear their labels on their shirts for the rest of the day. Each time a student talks to a classmate, they address that classmate by the product of their multiplication fact.
5. Give each student a pile of counters or other manipulatives. Write a multiplication expression on the board that the students are not able to solve mentally yet, such as 9 × 3. Have the students model how to use the Distributive Property to find the product. Have them write the equations associated with their models and compare with a partner.

6. The Best of Times by Greg Tang; Read the pages about multiplying by 0, 1, 2, 5, and 10, including the multiplication problems on the pages. Have students answer those problems by writing the product on a whiteboard and holding up their answer.

Gifted and Talented Activities:
1. The Olympics happen every two years, switching between summer and winter games. Tell students when the last Olympics occurred. Have them figure out how many years it will be until 4 (or other number) Olympics have occurred, and write a multiplication equation for the product.
2. Present students with the riddle, "I am thinking of two numbers. One number is 3 more than the other number. The sum of these two numbers is 9. What is the product?" Have students figure out the numbers and find the product using the Distributive Property. Have students create their own riddle. They can follow the same format as the first riddle, if they are confused about where to start. Have students present their riddles to the class and have the other students solve them.

Chapter 3 - More Multiplication Facts and Strategies

STANDARDS:

3.OA.A.3: Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
3.OA.A.4: Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 × ? = 48$, $5 = ? ÷ 3$, $6 × 6 = ?$.
3.OA.C.7: With accuracy and efficiency, multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8x5=40, one knows 40 / 5=8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.
3.OA.B.5: Apply properties of operations as strategies to multiply and divide. Examples: If $6 × 4 = 24$ is known, then $4 × 6 = 24$ is also known. $3 × 5 × 2$ can be found by $3 × 5 = 15$, then $15 × 2 = 30$, or by $5 × 2 = 10$, then $3 × 10 = 30$. Knowing that $8 × 5 = 40$ and $8 × 2 = 16$, one can find $8 × 7$ as $8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56$. 1.(Distributive property.) {Clarification: Students need not use formal terms for these properties).

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Objectives:
- Multiply by 3.
- Multiply by 4.
- Multiply by 6.
- Multiply by 7.
- Multiply by 8.
- Multiply by 9.
- Use a strategy to multiply two factors.
- Use the Associative Property of Multiplication.
- Use the problem solving plan to solve word problems.

Extended Activities:
1. Illustrator: Students create different types of artwork to illustrate the definitions of one or more vocabulary words. The artwork posters can be hung on the wall for students to use as a reference throughout the chapter.
2. Students stand in three columns to practice counting by multiples of 3. They look at ways to partition 3 columns to create two smaller arrays.
3. Bodily-Kinesthetic: Make outlines of large rectangles on the floor to represent buildings. Have students write an equation 3 × ____ = ____ on a whiteboard. Then, students will roll a die for the second number. Students solve by using index cards or sticky notes to make arrays within the outline of the rectangle. The index cards or sticky notes represent the windows in the buildings. Have students complete this activity multiple times. Extension: Have students explain what kind of building they make for each equation they solve. Some examples might include an apartment, office, or store.
4. Write 6s facts on different sheets of colored paper. Tape each sheet of paper to the fl oor in a line arrangement. Have students play by tossing a counter onto the fi rst sheet of paper. If the counter lands on the correct sheet of paper, students will hop to where the marker lands and solve that multiplication expression. If the counter does not land on the correct sheet of paper, it is the partners turn. Continue by tossing the counter to the next sheet of paper, hopping, and solving the equations. Have students play until they reach the last sheet of paper and solve the equation correctly. Be sure to include expressions that show the factors in different orders.
5. Interpersonal: Create multiple tic-tac-toe boards with 7s facts written in each space. Hand out boards to pairs of students. Students will take turns solving the equation, checking their answer with their partner, and if correct, drawing an X or an O over top of the equation. If a student is incorrect, then they do nothing, and it becomes the partner's turn. The first person to get three in a row wins!

Gifted and Talented Activities:
1. Play an adapted version of War. Use playing cards ace through 10. Shuffle and split equally. Each player turns over one card, multiplies it by 3, and states the product. If your own product is even, keep it and if odd give the cards to your opponent. The player with the most cards at the end of the round wins.

2. Discuss the four stages of a butterfly's life cycle: egg, larva, pupa, and adult butterfly. Tell students that a teacher wants groups of students to work together to make books about a butterfly's life cycle. Each book will have 4 pages – one for each stage. How many pieces of paper are needed if there are 4 groups? 5 groups? Have students solve these problems and write their corresponding equations down on paper.

3. **"Crack the Code!"**
Choose a short word or phrase and assign each letter to a different product. Write the code and blanks on the board. Students will solve the multiplication equations to crack the code. Then have students create their own code, exchange with a partner, and solve. 42 18 36 30 54 24 6 6 × 9 = U 6 × 1 = T = 6 × 6 = O 6 × 5 = D 6 × 4 = C6 × 7 = P 6 × 3 = R

4. Have students work in pairs or small group to design their own board game involving multiplication equations where 9 is a factor. Provide students with materials such as poster board, notecards, counters, crayons, or dice. Allow time for students to practice playing their games. Then they can switch and play a different group's game.

Chapter 4 - Division Facts and Strategies

STANDARDS:

3.OA.A.2: Interpret whole-number quotients of whole numbers, e.g., interpret as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe and/or represent a context in which a number of shares or a number of groups can be expressed as 56/8 .

3.OA.A.3: Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

3.OA.A.4: Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = ? ÷ 3, 6 × 6 = ?.

3.OA.B.6: Understand division as an unknown-factor problem. For example, find 32/8 by finding the number that makes 32 when multiplied by 8.

3.OA.C.7: With accuracy and efficiency, multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8x5=40, one knows 40 / 5=8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

3.OA.B.5: Apply properties of operations as strategies to multiply and divide. Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. 1.(Distributive property.) {Clarification: Students need not use formal terms for these properties).

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Objectives:
- Use an array to divide.
- Use fact families to relate multiplication and division.
- Divide a number by 2, 5, or 10.
- Divide a number by 3 or 4.
- Divide a number by 6 or 7.
- Divide a number by 8 or 9.
- Divide with 0 or 1.
- Use a strategy to divide.
- Use the problem solving plan to solve word problems.

Extended Activities:
1. **Eraser Man**
   Player A chooses a vocabulary word, draws a blank space for each letter in the word, and draws a stick figure. Player B tries to guess a letter in the word. Player A fi lls in the blanks with that letter or erases one part of Eraser Man if the word does not contain the letter. Play continues. Player B may guess the word at any time. If the word is incorrect, Player A erases another part. When only one part of Eraser Man remains, Player A reads the definition as a clue. The game is over when the correct word is guessed or all of Eraser Man's parts are erased. Rotate turns.
2. **Art Arrays**
   Students will draw their own arrays. Before students begin to draw, pass out slips of paper with division equations written on them, without the quotient. Students will use the given dividend and divisor to draw an array. Encourage students to be creative and use shapes and colors of their choice for the counters. After students draw their arrays, instruct them to complete the equation by filling in the quotient.

3. **Bodily-Kinesthetic**
   Have students form life-size arrays to solve division equations. Write a division problem on the board, where the dividend is less than the number of students in your class. Ask volunteers to come to the front of the room and line them up in an array to model the problem. Students outside of the array use their classmates as a visual to determine the quotient.
4. **Art**

Have students draw a shape with four sections, such as a flower with four petals or a tree with four branches. Provide students with four equations of a fact family with various pieces missing. Use the same equations for the whole class or give different students different fact families. Students put one equation on each of the four sections of their shape, and write the three numbers that form the fact family in the middle of the shape.

5. **Bodily-Kinesthetic**
   Write × and ÷ on two pieces of paper each, and write = and three numbers that form a fact family (for example, 5, 9, 45) on four pieces of paper each. Hand out pieces to twenty students. Set a timer and have students line up to form the equations in a fact family. If you have less than twenty students, write parts of the equations on the board, with space for students to fill in the values (for example, write ___ ÷ ___ = ___).

6. **Station Facts**
   Set up stations around the room with varying numbers of counters and other objects (rubber bands, paper clips, etc.). The number of objects should all be divisible by 10. Have students rotate to the different stations in small groups, and divide the objects by 2, 5, and 10. Students should write the related multiplication facts and find the quotients. After students have visited all of the stations, go over the answers as a class.

Gifted and Talented Activities:
1. **Marketplace**
   Bring in groups of objects in numbers that are divisible by 3 or 4 (or both). These can be objects that students will actually get to keep, like stickers or pencils. Set up a "marketplace" at the front of the room, and go through each object and state the quantity that you have. Ask students to solve division equations based on the number of customers. For example, if you have 16 stickers, ask students how many each customer can have if there are 4 customers.

2. Draw three long circles on the board with a division sign between the first two circles and an equal sign between the last two circles. Write numbers that are divisible by 6 or 7 in the first circle and factors of these numbers in the last two circles. Have students choose one number from each circle to form a division equation. Cross out numbers as they are used. Continue until no more equations can be formed (some numbers may not be used). Alternatively, pairs or groups of students can work on a copy, taking turns to form equations and using different colors to cross out numbers.

3. **Visual-Spatial**
   Provide each table or small group of students with 90 counters. Call out various division equations (all divisible by 9), and ask the groups to solve using the counters. Try not to go in order to make the activity more challenging (i.e., start with 27 divided by 9, then move to 81 divided by 9, etc.). After each exercise, ask a volunteer to write the division equation on a whiteboard.

Chapter 5 - Patterns and Fluency

STANDARDS:

3.OA.C.7: With accuracy and efficiency, multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8x5=40, one knows 40 / 5=8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

3.OA.D.9: 8. Identify arithmetic patterns (including patterns in the addition table or multiplication table) and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.

3.OA.A.4: Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$, $5 = ? \div 3$, $6 \times 6 = ?$.

3.OA.D.8: Solve two-step word problems, including problems involving money, using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (Clarification: This standard is limited to problems posed with whole numbers and having whole number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order) (Order of Operations)

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Objectives:

- Identify, explain, and use patterns related to the multiplication table.
- Use the multiplication table to write related multiplication and division facts.
- Complete a multiplication table.
- Solve multiplication and division word problems.

Extended Activities:

1. Each Orange Had 8 Slices by Paul Giganti, Jr.; Read the book aloud to students. Then, go through the book again with students and have them answer the questions. Ask the class to respond chorally, but if the answers do not come quickly have individual students come up and count. Discuss the patterns, both within the page and between pages.

2. **Human Division**
   Have students act out a division problem. Call a number of students to the front of the room. Have the class use their multiplication tables to direct the group at the front to organize themselves into a representation of a division problem. For example, call 6 students to the front. The class can tell the group to represent 6 divided by 2. The group of 6 then forms 2 groups of 3. Consider projecting a multiplication table to refer to. Call

different numbers of students to the front, and have the class divide the groups in different ways.
3. Have student pairs work together to create a multiplication table with missing factors and products. Have pairs exchange their tables with another pair. Students will then work together to complete the tables they receive. The two pairs of students can also work together as a group of four to discuss their tables.

Gifted and Talented Activities:
1. Sea Squares by Joy N. Hulme; Read the book aloud to students. Ask students how the book relates to the multiplication table. Then have students make their own books with a different theme but the same mathematical concept. Remind them to use the multiplication table as they make their books. Students can use construction paper to make a front and back cover for their books.
2. Many nature facts lend themselves to multiplication and division problems. For example, a clover usually has 3 leaves, bees have 4 wings, starfish have 5 arms, etc. Have students use books or the Internet to find a few interesting nature facts. They should then write a word problem using their favorite fact. For example: How many leaves do 6 clovers have? Students can trade problems with a partner and solve the problem.
3. Have students work in pairs to write and illustrate one multiplication word problem and one division word problem. Help students as needed to create mathematically correct problems. Then, have students produce a final version on a large sheet of construction paper, including appropriate illustrations. Hang the illustrated problems in the classroom, and give each problem a number. Have students circulate to solve the problems, and write down their answers for each problem. Then, check answers as a class.

Chapter 6 - Relate Area to Multiplication

STANDARDS:

3.M.B.3: Recognize area as an attribute of plane figures and understand concepts of area measurement.
3.M.B.3a: A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.
3.M.B.3b: A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.
3.M.B.4: Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).
3.M.B.5: Relate area to the operations of multiplication and addition.
3.M.B.5a: Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.
3.M.B.5b: Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.

3.M.B.5c: Use tiling to show in a concrete case that the area of a rectangle with whole number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning.

3.M.B.5d: Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.

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<u>Objectives</u>:

- Count to find the area of a shape.
- Count to find the area of a shape using standard units.
- Use multiplication to find the area of a rectangle.
- Use the Distributive Property to find the area of a rectangle.
- Find the area of a shape made up of rectangles.

<u>Extended Activities</u>:

1. If You Were a Kid Building a Pyramid by Lawrence Schimel; Read this book to students. Discuss with students how the Ancient Pyramids were built. Using centimeter cubes, have students build their own pyramid and find the area of the base.
2. Cut out copies of the Number Cards 1–10 Instructional Resource and put them into a hat or container. Tell students they are going to be drawing bases of buildings on grid paper. Have students choose two cards. Their first card will be the building's length and the second will be its width. Have students draw their base and find its area on grid paper. They can use crayons or colored pencils to decorate. Have students choose more cards to repeat this process multiple times.
3. <u>Perimeter, Area, and Volume: A Monster Book of Dimensions</u> by David A. Adler; Read this book to students. Focus on how to find the area of objects mentioned in the book. Then, have students create and draw a model television or movie screen on grid paper and calculate the areas of each. Be sure students add a key to show the standard units for their objects area.
4. Discuss the importance of maps and how they are used. Have students practice their spatial thinking skills by creating a map of the classroom on grid paper. Be sure students include a key with the standard unit they choose, as well as various objects that are also around the room. Have students find the area of their classroom and show their work.

<u>Gifted and Talented Activities</u>:

1. Write the following standard units, to measure area, on the board: square inch, square foot, square centimeter, and square meter. List flat rectangular objects found around the classroom, such as a sheet of paper, notecard, color tiles, the top of a student's desk, posters, bulletin board, whiteboard, or door. Have students choose three objects from the list and decide which standard unit is appropriate if they were to find the area of each object. Have students explain, and document, their reasoning. Compare answers with the rest of the class to ensure students understand the size of standard units.
2. Display a large multiplication chart on a wall, with only the factors 1 through 10 labeled. Place two sets of number cards 1 through 10 in a container. Have students take turns choosing two cards from the container. Students then draw a rectangle on grid paper with those side lengths, find the area, and return the cards to the container. Have students write the equation and areas in their rectangle, cut it out, and glue it on the multiplication chart. Be sure the rectangle corresponds to its factors. This activity can be repeated until there is at least one rectangle in each spot on the multiplication chart. Note: Avoid duplicate rectangles by having students switch the order of their factors or choose two new number cards if they have already been used.
3. Have each student draw an outline of a rectangle and decompose it using two different colors to model the Distributive Property. Once all students have completed drawing their rectangle, place them all in a bag to choose from. Each student chooses a new rectangle and will write an equation that uses the Distributive Property to find the area of the rectangle.

Chapter 7 - Round and Estimate Numbers

STANDARDS:

3.NBT.A.1: Use place value understanding to round whole numbers to the nearest 10 or 100.
3.NBT.A.2: With accuracy and efficiency add and subtract within 1,000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
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Objectives:
- Identify the values of digits in three-digit numbers.
- Use a number line to round numbers to the nearest ten or nearest hundred.
- Use place value to round numbers to the nearest ten or nearest hundred.

- Use rounding or compatible numbers to estimate sums.
- Use rounding or compatible numbers to estimate differences.

Extended Activities:
1. Create place value headbands for the entire class ahead of time by writing three-digit numbers on notecards and attaching them to paper headbands. Have all students close their eyes while you put the headbands on their heads. Have students open their eyes, write down one question about each digit, and trade questions with a partner. Questions might include, "What is the hundreds digit in my number?" or "Can you draw a model for the tens place?" Students use the answers to guess the number on their headband. Once the guesses are written down, students take the headbands off to see if the numbers match.
2. Use masking tape to create a number line with 21 tick marks along the floor. Label the first and last number with two hundreds, such as 300 and 500. Write numbers within the range on note cards. Give note cards to 5 students. Then have them line themselves up in order on the number line. Call on different students and ask the class to round their number to the nearest ten or hundred. Repeat with different students and/or numbers.
3. Choose an easy shape to draw and cut out, such as hearts. Provide students with two pieces of paper. Have them draw a large shape on one piece of paper and two small shapes on the other piece of paper. Have students write any three-digit number on the large shape. On the small shapes, students write "Nearest Ten" and "Nearest Hundred" and round their number accordingly. They will then cut out all of the shapes and glue the small shapes onto the large shape. Use a hole punch to punch a hole at the top, attach a string, and hang as a rounding pennant.
4. Have students create a comic about how to estimate sums. Provide students with an equation or have them come up with their own. Be sure students include steps they learned to estimate sums somewhere in their strip. Encourage students to add humor and to be creative.
5. Set up a basket or empty trash can in the middle of the room. Provide students with two sheets of paper. Have them write their name and a subtraction equation with three-digit numbers on each sheet. Once completed, students crumple up each paper and take turns throwing their paper balls into the basket or trash can. Students who make two baskets choose two paper balls to pick up first, and then the rest of the class pick up two balls and return to their seats. Students estimate to solve the problems on their paper. Then they return each sheet of paper to the original author to check their work.

Gifted and Talented Activities:
1. Assign students a three-digit number. Have students create a story or saying that explains how to round that number to the nearest ten or nearest hundred using a number line. Students can write their idea on a poster with a number line model and include any illustrations. Some ideas to inspire students' creativity are ninjas on a

number line, a road with signs as the ticks on a number line, or a ladder number line. Students can share their posters with the class.

2. Play "Rounding Ball." Have students stand in a circle or arrangement where they are able to pass a ball to one another. Students are to stay quiet until the ball is passed to them. The passer calls out a three digit number and the receiver says the number rounded to the nearest ten. The receiver also says a new three-digit number and passes the ball to someone different. Students are out if they say the wrong number, are not quiet until it's their turn, or drop the ball. Play several rounds, alternating rounding to the nearest ten and rounding to the nearest hundred.

3. Have students plan a trip to a place that is 500 miles away or closer. Students will discuss who will go with them, how they will get there, what they will do there, and what they need to bring. Then have students estimate how many miles it would take to travel there and back. Offer scenarios such as, "You reach your destination, then travel an additional 103 miles to visit a relative. About how many miles did you travel? Explain."

4. Write one of the numbers 90, 100, 230, 200, 370, 400, 690, and 700 on several note cards. There should be one note card per student. Print out pictures of the Sun, Mercury, Venus, Earth, and Mars and post them on the board. Talk about what it means to orbit around the sun. Write the amount of days it takes each planet to orbit the Sun. Pass out the note cards and have students say which planet their card corresponds to and why. Students can switch cards with a partner and repeat. Ask students questions to compare the numbers on the board, such as, "About how many more days does Earth take to orbit the sun than Venus?"

Chapter 8 - Add and Subtract Multi-Digit Numbers

STANDARDS:

3.NBT.A.2: With accuracy and efficiency add and subtract within 1,000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

3.OA.D.8: Solve two-step word problems, including problems involving money, using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (Clarification: This standard is limited to problems posed with whole numbers and having whole number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order) (Order of Operations)

MP.1: Make sense of problems and persevere in solving them

MP.2: Reason abstractly and quantitatively

MP.3: Construct viable arguments and critique the reasoning of others

MP.4: Model with mathematics

MP.5: Use appropriate tools strategically

MP.6: Attend to precision

MP.7: Look for and make use of structure

MP.8: Look for and express regularity in repeated reasoning

Objectives:
- Identify and use addition properties.
- Use a number line to find a sum.
- Use mental math to find a sum.
- Use partial sums to find a sum.
- Add three-digit numbers.
- Add up to four numbers.
- Use a number line to find a difference.
- Use mental math to find a difference.
- Subtract three-digit numbers.
- Use inverse operations to check answers.
- Use the problem-solving plan to solve two-step addition and subtraction word problems.

Extended Activities:
1. Display a worked out addition problem that uses one of the properties the students have learned. Have students stand if it models the Commutative Property, sit if it models the Associative Property, and jump if it models the Addition Property of Zero.
2. Have students roll two dice three times to create 3 two-digit numbers. Have them write an addition equation on colored paper. Then provide them with small macaroni noodles to demonstrate the Associative Property of Addition by gluing them on the paper as parenthesis around the numbers.
3. Students write a problem on the board such as 246 + 321 = ? Then they explain how to use one of the strategies such as make a ten and count on to add.
4. Have students work with a partner. Give each student a bag with some base ten blocks. Each student counts the base ten blocks in their bag and writes the number. Partners use their numbers as addends in an addition equation. One partner solves the problem showing compensation using base ten blocks while the other one writes it on a whiteboard using compensation to solve.
5. Write three-digit numbers on index cards and give one card to each student. Have them walk around the room until you say stop. Have them create an addition equation with the person closest to them using their two numbers. Encourage them to use partial sums.
6. Write an addition equation that adds 2 three-digit numbers on the board. Have students write the equation on paper and round each addend to the nearest ten or hundred. Then have students find the sum and check it. Provide sentence strip paper for students to explain whether the number of their estimate was reasonable.
7. Write an addition equation that adds 2 three-digit numbers on the board. Have students write the equation on paper and round each addend to the nearest ten or hundred. Then have students find the sum and check it. Provide sentence strip paper for students to explain whether the number of their estimate was reasonable.

Gifted and Talented Activities:

1. Assign students a three-digit number and a two-digit number to use in an addition equation. Students will solve this equation by creating a number line on the wall using tape. They can write their answers on paper and explain how they solved.
2. Discuss and play different genres of music. Focus on a famous artist and a small concert venue or theatre. Provide a word problem based on section seat numbers. For example, "The theater has three different sections of seats. There are 511 seats on the orchestra floor, 159 seats on the second level, and 265 seats on the Balcony level. 907 people show up for the show. Are there enough seats for all of the people?"
3. Explain how there are different species of animals. Have students identify how many more species there are of one type of animal than another. For example, there are at least 260 species of monkeys found in the world today. There are 38 species of wild cats. Have students find how many more monkeys there are than wild cats.
4. Discuss economics and how prices of items change when a lot of people want something and when few people want something. List 3 three-digit numbers on the board. Have students brainstorm different items that cost about that much. Then ask which items they could buy with $800 and how much they would have left. Later, ask how the costs of the items are affected if the demand goes down and if that would change anything about what they could buy.
5. Research the lengths of different lakes and list them on the board. You can use the lengths of the Great Lakes: Lake Erie: 241 miles, Lake Michigan: 307 miles, Lake Ontario: 193 miles, Lake Huron: 206 miles, and Lake Superior: 350 miles. Have students choose two lakes' lengths, estimate and find the difference between them.

Chapter 9 Multiples and Problem Solving

STANDARDS:

3.NBT.A.3: Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.

3.OA.B.5: Apply properties of operations as strategies to multiply and divide. Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known (Commutative Property of Multiplication). 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30 (Associative Property of Multiplication). Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56 (Distributive Property).

3.OA.D.8: Solve two-step word problems, including problems involving money, using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (Clarification: This standard is limited to problems posed with whole numbers and having whole number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order) (Order of Operations)

MP.1: Make sense of problems and persevere in solving them

MP.2: Reason abstractly and quantitatively

MP.3: Construct viable arguments and critique the reasoning of others

MP.4: Model with mathematics

MP.5: Use appropriate tools strategically
MP.6: Attend to precision
MP.7: Look for and make use of structure
MP.8: Look for and express regularity in repeated reasoning

Objectives:

- Use number lines to multiply by multiples of 10.
- Use place value to multiply by multiples of 10.
- Use properties to multiply by multiples of 10.
- Use the problem solving plan to solve two-step multiplication and division word problems.
- Use the problem solving plan to solve two-step word problems involving different operations.

Extended Activities:

1. Create a 0–900 number line on the floor or outside, with multiples of 10 labeled. Have two students each choose a number card from 2 to 9 to complete the product __ × __0 . Another student hops along the number line to find the product. Repeat with different students and numbers, or switch the cards in the product and have students compare the results.
2. Cut out the I have, Who has? – Multiples of 10 Multiplication Instructional Resource. Distribute all cards to students (some students may need to have 2 cards). Choose a student to go first and have them read the card aloud, "I have ___. Who has ___?" The student with the corresponding product raises their hand and reads their card. Have students turn over the cards after reading them to easily spot how many cards are left. Play continues in this fashion until all of the cards have been turned over. You can also time how long it takes to read all cards, keep a record, and attempt to beat that record each time you play. Note: To play with less than 30 cards, fill out and use the blank card(s) to return to the starting card sooner.
3. Have students decide which property they prefer to use when multiplying by multiples of 10, the Associative Property of Multiplication or the Distributive Property. Have them write down specific steps on how to find a product using their preferred property.
4. Split students into small groups. Give each group a number. Have each student create a two-step word problem that has the given number as the answer. Students should not use the number in their word problem, they need to work backward to create a word problem with the answer in mind. Students can switch problems within a group to check each other's work or trade with another group to solve.

Gifted and Talented Activities:

1. Discuss how maps use a scale to help determine the actual distance between two places. Have students create a map of an island that represents their hobbies and likes. Provide students with a scale, such as 1 inch = 30 miles, or have them choose their own. Students will then measure the distance between places in inches and use their scale to find how far away one place is from the others.

2. Show an image of a compound light microscope to students, and point out the eyepiece and objective lenses. Explain that the total magnification of an object is the product of the eyepiece magnification and the objective lens magnification. Have students find the total magnification of an eyepiece that is magnified at 20, 30, or 40 and an objective lens that is magnified at 4. If you have a microscope available, have students look at objects under different magnifications.
3. Write down a number of silly themes for students to choose from, such as purchasing work-out equipment for their pet fish or creating dream catchers for aliens on Pluto. Students will write a two-step multiplication and division word problem using the theme of their choice. Then have students switch with a partner to solve.
4. Discuss the first sentence in Abraham Lincoln's speech, the Gettysburg Address. Explain that a score is equal to 20, so "Four score and seven years ago" refers to 4 × 20 + 7 = 87 years ago. Have students write about where they see themselves in 2 score, 3 score, or 4 score years. Students should start with their future age, for example, "Threescore in the future, I will be 68 years old."

Chapter 10 - Understand Fractions

STANDARDS:

3.NF.A.1: Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a part of size 1/b. For example, if a rectangle is partitioned into 3 equal parts, each part is ⅓. Two of those parts would be ⅔.

3.G.A.2: Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as of the area of the shape.

3.NF.A.2: Understand a fraction as a number on the number line; represent fractions on a number line diagram.

3.NF.A.2.a: Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line. For example, partition the number line from 0 to 1 into 3 equal parts, represent ⅓ on the number line and show each part has a size ⅓.

3.NF.A.2.b: Represent a fraction a/b on a number line diagram by marking off a length 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.

MP.1: Make sense of problems and persevere in solving them

MP.2: Reason abstractly and quantitatively

MP.3: Construct viable arguments and critique the reasoning of others

MP.4: Model with mathematics

MP.5: Use appropriate tools strategically

MP.6: Attend to precision

MP.7: Look for and make use of structure

MP.8: Look for and express regularity in repeated reasoning

Objectives:
- Identify equal parts of a whole and name them.
- Identify and write a unit fraction.
- Identify and write a fraction.
- Plot fractions less than 1 on a number line.
- Plot fractions greater than 1 on a number line.

Extended Activities:
1. Sketch It!: Students work in groups to preview and discuss the words and their definitions. Then they put one set of vocabulary cards in a paper bag or in a pile where no one in the group can see the cards. One person at a time picks a card, making sure no one else sees the word. The student draws on the board or a piece of paper as the rest of the group attempts to guess what word the student is drawing. If you do not want students to be too competitive, assign them each a turn.
2. Discuss with students healthy foods. Print out or draw some fruits or veggies. Cut the pictures so that they show equal or unequal parts. Keep the parts within quantities they have learned. Show the pictures to students and have them determine if the parts are equal and then name them. Allow time for students to create their own pictures.
3. Provide students with modeling clay and have them create flat circles. They will partition the circles into equal shares and unequal shares. Then they can ask a partner to tell whether each circle shows equal shares and name them.
4. Have students work with color tiles. Give students only one green tile and one yellow tile, and several red and blue tiles. They can create a design or a picture with them. Then have them call out the green and yellow tiles as fractions. Provide a sentence stem such as "There are _____ equal parts in the whole. _____ of the equal parts is green." Then students can write the fraction.
5. Have students divide a paper plate into sixths. Then they can roll a die to determine how much of the plate they will color to create a flower. They can even attach a stem. Have students name the fraction that is colored and compare with a partner.
6. Have students create fractions on a number line by using paper, a ruler, a chenille stem, and a bead. Students can draw a number line on the paper by using a ruler. They will divide the line based on the fractions they want to show and label them. Then students will attach the bead to the chenille stem and lay it on the line. They can move the bead to plot different fractions.
7. Draw a number line on the board or on the floor. Then write different fractions the students have learned on a beach ball. Have students toss the ball to one another and wherever their right hand lands will be the fraction they get to plot on a number line. Have students decide how to label the number line and where the fraction should be plotted.

Gifted and Talented Activities:

1. Full House: An Invitation to Fractions by Dayle Ann Dodds; Read the book aloud. Then, have students create their own Inns and decide how many rooms they would offer, 2, 3, 4, 6, or 8. Students can write their own story about how many guests come to stay and what happens. Be sure they provide pictures and fractions about how many people stay, eat, or leave.
2. Have students make a stained glass window with 2, 4, 6, or 8 equal parts. Have them color and decorate the parts. Have them write fractions that represent how much of the window is each color.
3. Discuss with students some landmarks or buildings that are less than or greater than one mile away from their school. Have students create their own map of buildings they may see in a city or town. Then have students create a number line to show the distance between the buildings in miles. Students should stay within four miles and label at least four buildings.

Chapter 11 - Understanding Fraction Equivalence and Comparison

STANDARDS:

3.NF.A.3: Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.
3.NF.A.3 a: Understand two fractions as equivalent (equal) if they are the same size. Understand two fractions as equivalent if they are located at the same point on a number line.
3.NF.A.3b: Recognize and generate simple equivalent fractions, e.g., ½ = 2/4,, 4/6 = ⅔. Explain why the fractions are equivalent with support of a visual fraction model
3.NF.A.3c: Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Example - Express 3 in the form 3 + 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point on a number line diagram.
3.NF.A.3d: Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, with the support of a visual fraction model.
MP.1: Make sense of problems and persevere in solving them
MP.2: Reason abstractly and quantitatively
MP.3: Construct viable arguments and critique the reasoning of others
MP.4: Model with mathematics
MP.5: Use appropriate tools strategically
MP.6: Attend to precision
MP.7: Look for and make use of structure
MP.8: Look for and express regularity in repeated reasoning

Objectives:
- Model and write equivalent fractions.
- Use a number line to find equivalent fractions.
- Relate fractions and whole numbers.

- Compare fractions that have the same denominator.
- Compare fractions that have the same numerator.
- Use a number line to compare fractions.
- Compare fractions.
- Compare and order fractions.

Extended Activities:

1. Illustrator: Students create different types of artwork to illustrate the definitions of one or more vocabulary words. The artwork posters can be hung on the wall for students to use as a reference throughout the chapter.
2. Hand out a copy of Equivalent Fractions Cards Instructional Resource to each student. Students will first color the cards according to their fraction and then cut them out. They will match each card to its equivalent fraction. The one third and one half cards each have two matches.
3. Have students work with a partner. Partner A will set up Fraction Strips. Partner B will choose a fraction and write it on a whiteboard. Partner A will find one fraction that is equivalent to the fraction on the board by looking at the strips. Partner A will write it on the board. Students will then switch roles and play again.
4. Have students create large block numbers 1 to 4 on paper. Then have them write equivalent fractions on the corresponding block number. They can cut out the block numbers and post them on construction paper.
5. Have students use a spinner and a copy of the Fraction Spinners Instructional Resource to spin for two fractions that have the same denominator. They will write the fractions on a sheet of paper and compare them. Have them do this once for each denominator making a total of five problems.
6. Provide students with a copy of Lesser Fractions Instructional Resource. Students will color the fractions that are less than the fraction in the first box. Be sure students leave other fractions blank.
7. Provide students with different types of paint swatches. Have students use scissors and markers to create fractions on a number line. Students can select two fractions to compare on their number line and write which fraction is greater.
8. Students pick three fractions to order from least to greatest. Students can draw models for each fraction using fraction strips or copies of the same fi gure, coloring each one a different color.

Gifted and Talented Activities:

1. Discuss with students how to plant seeds and what seeds need to grow and survive. Show a picture of a certain kind of plant. Create a word problem describing two of the same kind of plants. An example can be Plant A is 2 — 4 of an inch tall and Plant B is 4 — 8 of an inch tall. "Are the plants the same height? How do you know?"
2. Have students create a word problem about finding animal tracks on a trail or use the one below. There is a _____(a) track at the 3 — 4 mark of a trail. There is a _____(b) track at _____(c) mark of a trail. Are these at the same locations on the trail? Explain. Provide students with guidelines on what to put in the blanks. For example, ask students

for (a) an animal, (b) a different animal, and (c) a fraction. Students can exchange their word problems with a partner and solve.

3. Divide students into pairs. Provide each pair with number cards 1–4, 6, and 8 and a die. One student rolls the die for a whole number and the other chooses a number card for a denominator. Students work together to write the whole number as a fraction with the chosen denominator. For example, if students roll a 4 and choose a 6, they would write 4 = 24 — 6 .

Chapter 12-Understand Time, Liquid Volume, and Mass

STANDARDS:

3.M.A.1: Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.

3.NBT.A.2: WIth accuracy and efficiency add and subtract within 1,000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

3.M.A.2: Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (Clarification: "Measure and estimate liquid volumes and masses" excludes compound units such as cm^3 and finding the geometric volume of a container. "Multiplying to solve one-step word problems" excludes multiplicative comparison problems (problems involving "times as much")

MP.1: Make sense of problems and persevere in solving them

MP.2: Reason abstractly and quantitatively

MP.3: Construct viable arguments and critique the reasoning of others

MP.4: Model with mathematics

MP.5: Use appropriate tools strategically

MP.6: Attend to precision

MP.7: Look for and make use of structure

MP.8: Look for and express regularity in repeated reasoning

<u>Objectives</u>:
- Tell time to the nearest minute.
- Measure elapsed time, in minutes, within the same hour.
- Measure elapsed time, in minutes, from one hour to the next.
- Use the problem solving plan to solve time interval problems.
- Understand and estimate liquid volumes in metric units.
- Measure liquid volumes in liters and milliliters.
- Understand and estimate masses of objects.
- Measure masses in grams and kilograms.

Extended Activities:

1. Provide students with a sheet of paper and a clock manipulative. Have students create a time on the clock then leave it at their desk. Play music and have students move around the room. Stop the music and have the students record the time of the nearest clock on their paper along with the clock owner's name. Once students have recorded fi ve clock times, have them check with the clock owners to see if they are correct.

2. Hand out a copy of the Wrist Watch Instructional Resource and a sheet of paper to students. Have students draw a time on the face of their wrist watch. Allow students to walk around the room with their wrist watches on and ask each other for the time. Students should show each other their watch for the time instead of telling them. Students will keep track of each time by writing the time on a sheet of paper.

3. Have students write about at least two different activities they complete at home that happen across the hour. Students will write the start time and end time of each activity, find the elapsed time, and provide an illustration.

4. Hand out a notecard to each student. Divide the class into two groups. Have one group focus on a hobby, activity, daily habit, or any task that takes less than 20 minutes to complete. The other group will focus on a hobby, activity, daily habit, or any task that takes up to 35 minutes to complete. Each student writes down the task and the time it takes to complete it. Have students find a partner in the other group, and write and illustrate a word problem about completing both tasks. Allow time for students to share their word problems with the class.

5. Have students draw a picture of a container. Make sure they identify whether they would measure the liquid volume of their container with milliliters or liters without labeling the units on the picture. Have students exchange their pictures with a partner and identify which metric unit they would use to measure the liquid volume of their partner's container.

Gifted and Talented Activities:

1. Have students create a schedule of three movie start times at a movie theatre. Have students make the movies less than one hour long. Students will list the start time and end times of each movie and tell how many minutes pass. Each movie length should be within the same hour of its start time. Have students decorate the schedule by making a movie advertisement for one of the movies they have listed.

2. Have students play, "The Detective Sees…" Write digital times on the board in a scattered arrangement. Make sure each time is labeled either starting or ending time. For each start time there should be a matching end time within the same hour. Ask students questions like, "The detective sees a start time and an end time that show 23 minutes have passed. What times does the detective see?" Note: Offer more of a challenge by having multiple time matches within the same hour.

3. Have students learn about the seven continents. They can research the different countries on each continent and their flags, meaningful symbols, money, and main attractions. Create word problems to solve that discuss the time spent on a trip to one of the continents. You can use the one below as an example. Australia You catch a taxi to

go to the Opera House at 5:35 P.M. and arrive there at 6:10 P.M. How long was your taxi ride?

4. Create a story problem with missing numbers and words, or use the one below. You spend (a)_____ more minutes playing (b)_____ than you do playing (c) _____. You spend (d) _____ minutes playing (c)_____. How much time do you spend playing (a)_____? Have students decide what to write in the blanks. For example, ask students for (a) a number within 20, (b) a sport or activity that can be played, (c) a different sport or activity that can be played, and (d) a number of minutes within 35. The complete problem may be, "You spend 15 more minutes playing soccer than you do playing piano. You spend 30 minutes playing piano. How much time do you spend playing soccer?" Have students solve the problem, and then start over with new responses.

5. Have students use an eyedropper to see how many drops of water they can fit on a penny. Have students estimate about how many milliliters of water they have on the penny. Have students record their answers on a sheet of paper. They can also list their results as being less than 1 milliliter or greater than 1 milliliter. Then offer other coins for students to use in the experiment.

Chapter 13 - Classify Two-Dimensional Shapes

STANDARDS:

3.G.A.1:Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.
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Objectives:
- Identify parallel sides and right angles of quadrilaterals.
- Describe quadrilaterals using sides and angles.
- Classify quadrilaterals based on their attributes.
- Draw quadrilaterals.

Extended Activities:

1. Divide students into groups of 3 or 4 and call out a quadrilateral. Groups will then need to arrange their bodies into the called out shape. Students can hold hands or use the wall and floor to ensure straight sides and right angles. Note: This activity can be played as a competition where one team sits out each round to be the "judges." The "judges" will ensure that each group's shape has exactly the correct attributes and receives a point for being the "best shape." The team that reaches five points wins!
2. Have a discussion about the road signs used in the Modeling Real Life of this section. Show images of the road signs and have students guess what the signs mean and how they promote safety. Mention that different shapes and colors of signs have different meanings and are used to ensure they are easily recognizable to drivers. Make a list of all the different signs students recognize and have them classify the signs into their shape. Then have students write a short story about "A World without Signs" and how it would affect our world. Shapes Rectangles: regulatory signs, guide signs, warning signs Diamonds (squares): warning signs Trapezoids: national forest route signs, cultural interest signs Colors Yellow: warning signs, school zones Orange: construction traffic control Green: guides Blue: services Brown: national forest route, recreational and cultural interest.
3. Write the names of various quadrilaterals on notecards and have students choose a card to illustrate. Students will need to draw the shape, and write what the shape would say. Their shape could say how many angles, sides, right angles, vertices, and/or pairs of parallel sides it has. Encourage students to be creative and illustrate a fun or silly face on their shape to make it more realistic. Extension: Give students the choice to make their own quadrilateral. They should still write how many angles, sides, right angles, vertices, and pairs of parallel sides their shape has.
4. Provide students with two short craft sticks and two long craft sticks (in each pair, the pieces are the same length.) Have students model all the quadrilaterals that can be made using the craft sticks as sides and draw the shape on a sheet of paper. Students will then name the quadrilateral and write all of the attributes of the shape they created with the four craft sticks. Extension: Challenge students by providing four craft sticks, each with a different length, and having them create, name, and write the attributes of a quadrilateral they made.

Gifted and Talented Activities:
1. Provide each student with a copy of Jump on the Quadrilateral Instructional Resource. Have each student cut the four quadrilaterals out and position them on the floor close enough to jump from one to another. The teacher will call out a description, such as, "I have four right angles." Students will then need to hop on the square. Repeat by calling out descriptive attributes of the shapes. Extension: Create and print off more quadrilateral shapes to give students more of a challenge when determining which shape is being described.
2. Provide pairs of students with pattern blocks and have them sit back to back. Partner A will create a pattern and then describe the shapes' attributes (without telling the name of the shapes) that he/she is using to create the pattern. Partner B will then need to gather the same shapes that Partner A described, and create their own pattern. Once both

partners' patterns are complete, they will stand up and compare patterns, ensuring they used the same shapes. Repeat by alternating roles and having Partner B create a pattern and describe the shapes he or she is using.

3. Students will be creating quadrilateral robots by either tracing the pattern blocks (square, trapezoid, and rhombus) or cutting out quadrilateral shapes on colored construction paper. Once students' robots are complete, they will create a list of the different shapes they used to create their robot and compare them with a partner.

Chapter 14 - Represent and Interpret Data

STANDARDS:
3.DL.A.1: Develop data-based questions and decide what data will answer the question. (e.g. "What size shoe does a 3rd grader wear?", "How many books does a 3rd grader read?")
3.DL.A.2: Collect student-centered data (e.g. collect data on students' favorite ice cream flavor) or use existing data to answer data-based questions.

3.DL.B.3: Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.
3.NF.A.2: Understand a fraction as a number on the number line; represent fractions on a number line diagram.
3.DL.B.4: Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.
MP.1: Make sense of problems and persevere in solving them
MP.2: Reason abstractly and quantitatively
MP.3: Construct viable arguments and critique the reasoning of others
MP.4: Model with mathematics
MP.5: Use appropriate tools strategically
MP.6: Attend to precision
MP.7: Look for and make use of structure
MP.8: Look for and express regularity in repeated reasoning

Objectives:
- Understand the data shown by a picture graph.
- Use data to make picture graphs.
- Understand the data shown by a bar graph.
- Use data to make bar graphs.
- Use data to make line plots.
- Measure objects to the nearest half inch and make line plots.
- Measure objects to the nearest quarter inch and make line plots.

Extended Activities:

1. Give students one minute to stack as many centimeter cubes as they can. Once their tower falls, have students record on the board the number of cubes they stacked. Make a tally chart on the board and record the different heights, by number of cubes, of the towers that were built. Then use tally marks to show how many of that height were built. Prepare a frequency table of the results. Give grid paper to each of pair of students. Have them make a picture graph of the results. Remind them to make a title and a key before starting the graph. Have students compare their graphs. Pay special attention to the keys used for the graphs.
2. Provide students with one copy of the Incomplete Bar Graph Instructional Resource. Have students study the bar graph and the title. Students then need to supply reasonable categories for each bar, taking the amount for each bar into consideration. Have students share their graphs and categories with the class. Have students discuss the reasonableness of their work. Extension: Provide students with the Incomplete Bar Graph (without a title), and have students study and supply a title and categories that follow the bars provided.
3. Provide students with large grid paper and have students write their fi rst and last name, one letter in each box without spaces. Have each student count the letters in their name. Make a class frequency table of the number of letters in students' names. Make a class bar graph showing how many students have a certain number of letters in their names. This class bar graph should have a scale of one. Extension: Have students create a bar graph of students' name lengths where the scale is more than 1. Note: This activity can also be completed by using vocabulary words.

Gifted and Talented Activities:
1. Research and discuss different animals that have more than two eyes. Print pictures of each animal for students to study. Create a picture graph on the board by printing out a symmetric eye and using it as the symbol for the graphs data. Make a key for the graph. One eye should stand for more than one eye. Ask students to hypothesize why these creatures have so many eyes. Humans only have two eyes, other than our appearance, how might we change if we had more than two eyes? Extension: Try to make sure the graph uses half a symbol. Note: Below are some suggested animals. Depending on the ability of your students, you may want to use only some of the animals. Animal Number of Eyes Praying Mantis 5 eyes Starfish 5 eyes or more (number of eyes = number of arms) Spider 8 eyes Box Jellyfish 24 eyes Scallops Up to 100 eyes
2. Conduct a survey of students' favorite lunch choices. Have students create a tally chart, or frequency table, on the board. Then, provide a large poster board for each pair or group of students. Students now make a picture graph of the results. Students will use their handprint as a symbol. Have them make a key showing how many lunches each handprint stands for. Have students use the results to fill in a picture graph by painting their hand and placing it on each lunch choice. Make sure to use a washable and safe paint for students to use to make their handprint. Another option is to have students trace their hands. Have students compare their graphs. Ask questions about the graphs focusing on the keys.

3. Research the amount of time it took to build some major structures or use the information from the chart below. Post the information in a bar graph. Ask a number of questions regarding the bar graph. Include addition and subtraction questions such as, "How much longer did it take to build the Pyramids than the Colosseum?" or "How many more years did it take to build the Pyramids, than the Eiffel Tower?"
4. Extension: Show where each structure is on a map and talk about when they were built. Structure: Amount of Years to Build Roman Colosseum, Italy about 8 years Statue of Liberty, U.S.A about 9 years Eiffel Tower, France about 2 years Pyramids, Egypt about 20 years.
5. Discuss the different fingerprint types with the class and have students study their own fingerprints. It may help to have students work with partners or in small groups to identify their types of fingerprints. Take a survey and have students create a bar graph that represents their data. Encourage students to use a scale other than by ones. Note: The arch, loop, and whorl are the most common types of fingerprints. There are less common fingerprints which students may possess. You could add a "Less Common" category to still allow those students to participate.

Chapter 15- Find Perimeter and Area

STANDARDS:

3.M.C.6: Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.
3.M.B.3: Recognize area as an attribute of plane figures and understand concepts of area measurement.
3.M.B.3a:A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.
3.M.B.3b:A plane figure which can be covered without gaps or overlaps by unit squares is said to have an area of square units.
3.MB.4: Measure areas by counting unit squares (square cm, square m, square in, square ft, and non-standard units).
MP.1: Make sense of problems and persevere in solving them
MP.2: Reason abstractly and quantitatively
MP.3: Construct viable arguments and critique the reasoning of others
MP.4: Model with mathematics
MP.5: Use appropriate tools strategically
MP.6: Attend to precision
MP.7: Look for and make use of structure
MP.8: Look for and express regularity in repeated reasoning

<u>Objectives</u>:
● Find perimeters of figures.
● Find perimeters of polygons.
● Use perimeter to find the unknown side lengths of a polygon.

- Use area to compare rectangles with the same perimeter.
- Use perimeter to compare rectangles with the same area.

Extended Activities:
1. Find the perimeter of your classroom using an inch ruler or yardstick. Then find the perimeter of the gym. Compare the perimeters. Model by using grid paper and drawing out both perimeters. Extension: Find the perimeter of the entire school building by measuring the outside of the building.
2. Have students locate and find the perimeter of at least ten classroom items such as desks, bulletin boards, posters, and whiteboards. Record the perimeters on a line plot by choosing a scale and making a mark for each measurement. This can be completed independently or as a class. If completing as a class, have each student find the perimeter of one classroom item and record the measurement on the class line plot.
3. Cut out the Unknown Side Length Cards Instructional Resource and hide them around the classroom. Students will need to walk around the room, find the various cards, and solve for the missing side length using the perimeter and other side lengths of the shape. Be sure students record their answers to review once time is over.
4. Provide students with large grid paper and have them create three rectangular shapes out of different colored construction paper. The shapes should all have the same perimeter measurement, but may have different areas. Arrange the three rectangular shapes on a black background to create an art piece like shown.

Gifted and Talented Activities:
1. Prepare for this activity by using tape to map out irregular polygons on the classroom or hallway floor tiles. Label each shape with a letter and a unit (inch, foot, yard, or meter). Students will rotate around to each shape and calculate the perimeter, not forgetting the required unit.
2. Students will work together and use their bodies to create polygons. Call out a perimeter and one side length. Students will need to arrange themselves into a polygon that matches the required measurement. Extension: Challenge students by simply calling out a perimeter measurement and having students think about what all the side length measurements would be. For example, if a perimeter of 25 units is called out, students can arrange themselves into a pentagon, mentioning that each side length would be 5 units.
3. Provide pairs of students with two dice and Grid Paper to draw their perimeters. Partner A will roll the dice to create the perimeter of a rectangle. Partner A will then draw the rectangle on the paper. Partner B is challenged to create a different rectangle with the same perimeter. If Partner B successfully creates a rectangle with the same perimeter as Partner A's rectangle, they receive a point. Continue to play by alternating roles of who rolls and draws their rectangle first. The student to reach 10 points, or have the most points when time is over, wins! For example, if a student rolls a 2 and a 6, the student must draw a rectangle with a perimeter of 26 units. The partner will then need to draw a different rectangle with the same perimeter of 26 units.
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