



ESL
SCIENCE
BUSINESS
BILINGUAL
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MATHEMATICS
LIBRARY MEDIA
SOCIAL STUDIES
WORLD LANGUAGES
GIFTED & TALENTED
TECHNOLOGY EDUCATION
ENGLISH LANGUAGE ARTS
FINE & PERFORMING ARTS
FAMILY & CONSUMER SCIENCE
HEALTH & PHYSICAL EDUCATION

RAHWAY PUBLIC SCHOOLS

CURRICULUM & INSTRUCTION

Course: Mathematics

Grade Level: 3

This curriculum is part of the Educational Program of Studies of the Rahway Public Schools.

ACKNOWLEDGMENTS

Anjanette Highsmith, Program Supervisor of K-6 Math, Science and Instructional Technology

The Board acknowledges the following who contributed to the preparation of this curriculum.

Siobhan Cassio

Dr. Tiffany A. Beer, Director of Curriculum and Instruction

Subject/Course Title:
Mathematics
Grade: **3**

Date of Board Adoption:
August 27, 2024

RAHWAY PUBLIC SCHOOLS CURRICULUM

Mathematics: Third Grade

PACING GUIDE

Unit	Title	Pacing
1	<u>Introducing Multiplication</u>	5 weeks
2	<u>Area & Multiplication</u>	4 weeks
3	<u>Wrapping Up Addition and Subtraction within 1,000</u>	5 weeks
4	<u>Relating Multiplication to Division</u>	6 weeks
5	<u>Fractions as Numbers</u>	5 weeks
6	<u>Measuring Length, Time, Liquid Volume and Weight</u>	4 weeks
7	<u>Two-dimensional Shapes and Perimeter</u>	4 weeks
8	<u>Putting it All Together</u>	4 weeks

ACCOMMODATIONS

<p>504 Accommodations:</p> <ul style="list-style-type: none"> ● Provide scaffolded vocabulary and vocabulary lists. ● Provide extra visual and verbal cues and prompts. ● Provide adapted/alternate/excerpted versions of the text and/or modified supplementary materials. ● Provide links to audio files and utilize video clips. ● Provide graphic organizers and/or checklists. ● Provide modified rubrics. ● Provide a copy of teaching notes, especially any key terms, in advance. ● Allow additional time to complete assignments and/or assessments. ● Provide shorter writing assignments. ● Provide sentence starters. ● Utilize small group instruction. ● Utilize Think-Pair-Share structure. ● Check for understanding frequently. ● Have student restate information. ● Support auditory presentations with visuals. ● Weekly home-school communication tools (notebook, daily log, phone calls or email messages). ● Provide study sheets and teacher outlines prior to assessments. ● Quiet corner or room to calm down and relax when anxious. ● Reduction of distractions. ● Permit answers to be dictated. ● Hands-on activities. ● Use of manipulatives. ● Assign preferential seating. ● No penalty for spelling errors or sloppy handwriting. ● Follow a routine/schedule. ● Provide student with rest breaks. ● Use verbal and visual cues regarding directions and staying on task. ● Assist in maintaining agenda book. 	<p>IEP Accommodations:</p> <ul style="list-style-type: none"> ● Provide scaffolded vocabulary and vocabulary lists. ● Differentiate reading levels of texts (e.g., Newsela). ● Provide adapted/alternate/excerpted versions of the text and/or modified supplementary materials. ● Provide extra visual and verbal cues and prompts. ● Provide links to audio files and utilize video clips. ● Provide graphic organizers and/or checklists. ● Provide modified rubrics. ● Provide a copy of teaching notes, especially any key terms, in advance. ● Provide students with additional information to supplement notes. ● Modify questioning techniques and provide a reduced number of questions or items on tests. ● Allow additional time to complete assignments and/or assessments. ● Provide shorter writing assignments. ● Provide sentence starters. ● Utilize small group instruction. ● Utilize Think-Pair-Share structure. ● Check for understanding frequently. ● Have student restate information. ● Support auditory presentations with visuals. ● Provide study sheets and teacher outlines prior to assessments. ● Use of manipulatives. ● Have students work with partners or in groups for reading, presentations, assignments, and analyses. ● Assign appropriate roles in collaborative work. ● Assign preferential seating. ● Follow a routine/schedule.
<p>Gifted and Talented Accommodations:</p> <ul style="list-style-type: none"> ● Differentiate reading levels of texts (e.g., Newsela). ● Offer students additional texts with higher lexile levels. ● Provide more challenging and/or more supplemental readings and/or activities to deepen understanding. ● Allow for independent reading, research, and projects. ● Accelerate or compact the curriculum. ● Offer higher-level thinking questions for deeper analysis. ● Offer more rigorous materials/tasks/prompts. ● Increase number and complexity of sources. ● Assign group research and presentations to teach the class. ● Assign/allow for leadership roles during collaborative work and in other learning activities. 	<p>ELL Accommodations:</p> <ul style="list-style-type: none"> ● Provide extended time. ● Assign preferential seating. ● Assign peer buddy who the student can work with. ● Check for understanding frequently. ● Provide language feedback often (such as grammar errors, tenses, subject-verb agreements, etc...). ● Have student repeat directions. ● Make vocabulary words available during classwork and exams. ● Use study guides/checklists to organize information. ● Repeat directions. ● Increase one-on-one conferencing. ● Allow student to listen to an audio version of the text. ● Give directions in small, distinct steps. ● Allow copying from paper/book. ● Give student a copy of the class notes.

- Provide written and oral instructions.
- Differentiate reading levels of texts (e.g., Newsela).
- Shorten assignments.
- Read directions aloud to student.
- Give oral clues or prompts.
- Record or type assignments.
- Adapt worksheets/packets.
- Create alternate assignments.
- Have student enter written assignments in criterion, where they can use the planning maps to help get them started and receive feedback after it is submitted.
- Allow student to resubmit assignments.
- Use small group instruction.
- Simplify language.
- Provide scaffolded vocabulary and vocabulary lists.
- Demonstrate concepts possibly through the use of visuals.
- Use manipulatives.
- Emphasize critical information by highlighting it for the student.
- Use graphic organizers.
- Pre-teach or pre-view vocabulary.
- Provide student with a list of prompts or sentence starters that they can use when completing a written assignment.
- Provide audio versions of the textbooks.
- Highlight textbooks/study guides.
- Use supplementary materials.
- Give assistance in note taking
- Use adapted/modified textbooks.
- Allow use of computer/word processor.
- Allow student to answer orally, give extended time (time-and-a-half).
- Allow tests to be given in a separate location (with the ESL teacher).
- Allow additional time to complete assignments and/or assessments.
- Read question to student to clarify.
- Provide a definition or synonym for words on a test that do not impact the validity of the exam.
- Modify the format of assessments.
- Shorten test length or require only selected test items.
- Create alternative assessments.
- On an exam other than a spelling test, don't take points off for spelling errors.

UNIT OVERVIEW

Content Area: Mathematics

Unit Title: Introduction Multiplication

Target Course/Grade Level: Math/ Grade 3

Unit Summary: In this unit, students interpret and represent data on scaled picture graphs and scaled bar graphs. Then, they learn the concept of multiplication. This is the first of four units that focus on multiplication. In this unit, students explore scaled picture graphs and bar graphs as an entry point for learning about equal-size groups and multiplication. Students learn that multiplication can mean finding the total number of objects in a groups of b objects each, and can be represented by $a \times b$. They then relate the idea of equal groups and the expression $a \times b$ to the rows and columns of an array. In working with arrays, students begin to notice the commutative property of multiplication. In all cases, students make sense of the meaning of multiplication expressions before finding their value, and before writing equations that relate two factors and a product. Later in the unit, students see situations in which the total number of objects is known but either the number of groups or the size of each group is not known. Problems with a missing factor offer students a preview to division.

Approximate Length of Unit: 5 Weeks

LEARNING TARGETS

NJ Student Learning Standards:

Mathematics:

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.OA.A.1 Interpret products of whole numbers, e.g., interpret 5×7 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 5×7 .

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.B.5 Apply properties of operations as strategies to multiply and divide.

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 $8 \times 5 = 40$, one knows $40 \div 5 = 8$) 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.

Interdisciplinary Connections and Standards:

English Language Arts:

SL.PE.3.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

SL.II.3.2. Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

SL.AS.3.6. Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.

Science & Engineering Practices:

Asking questions and defining problems

Developing and using models

Constructing explanations and designing solutions

Using mathematics and computational thinking

Obtaining, evaluating, and communicating information

Technology:

8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.

8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data.

8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim.

8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.

Career Readiness, Life Literacies, and Key Skills:

9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).

9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.

9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).

9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity.

Unit Understandings:

Students will understand ...

- How to represent and solve multiplication problems through the context of picture and bar graphs that represent categorical data.

Unit Essential Questions:

- How are multiplication and division related to each other and addition or subtraction?
- How are multiplication and division related?
- How can understanding multiplication and division help you in real life?
- What patterns can be used to find certain multiplication facts?
- How does understanding division help you in other parts of your life?
- What is a picture graph?
- What is a bar graph?
- What patterns do you see?
- In what ways can you communicate your mathematical reasoning to others?

Knowledge and Skills:

Students will know...

- How to represent and solve problems involving multiplication and division.
- How to understand properties of multiplication and the relationship between multiplication and division.
- How to multiply and divide within 100.
- How to solve problems involving the four operations and identify and explain patterns in arithmetic

Students will be able to...

- Interpret scaled picture and bar graphs.
- Represent data using scaled picture and bar graphs.
- Solve one- and two-step story problems using addition and subtraction.
- Represent and solve multiplication problems involving equal groups.
- Understand multiplication in terms of equal groups.
- Represent and solve multiplication problems involving arrays.

EVIDENCE OF LEARNING

Assessment:

What evidence will be collected and deemed acceptable to show that students truly “understand”?

- Cool Downs
- Section Checkpoints
- Common Assessment: Illustrative Math Unit 1 Assessment
- Daily Exit Slips
- Standards Mastery Assessment (i-Ready)

Learning Activities:

What differentiated learning experiences and instruction will enable all students to achieve the desired results?

- Online math games/activities
- Centers
- Math Dialogue
- Illustrative Mathematics (IM) 3.1 Lessons 1-21

3.DL.B.3 Scaled Graphs Activity:

- Provide students with a set of data related to something they can relate to, such as favorite colors, types of pets, or favorite ice cream flavors.
- In groups or individually, have them create a scaled picture graph and a scaled bar graph to represent the data set.
- Each square in the bar graph can represent a certain number of items (e.g., 5 pets per square).
- Once the graphs are created, have students interpret the data by answering questions such as "How many more people prefer chocolate ice cream than vanilla?" or "How many fewer cats are there than dogs?"

3.OA.A.1 Multiplication Contextualization:

- Present students with various real-world scenarios involving equal groups or arrays. For example, there are 4 rows of desks in a classroom, and each row has 7 desks.
- Have students interpret the multiplication in context, understanding that 4 groups of 7 desks each gives the total number of desks in the classroom.
- Encourage students to represent the situation using drawings or equations.

3.OA.A.3 Word Problems with Multiplication and Division:

- Provide word problems involving equal groups, arrays, or measurement quantities. For instance, "Sara has 3 baskets, and each basket contains 10 apples. How many apples does she have in total?"
- Guide students to identify whether multiplication or division is needed to solve the problem and encourage them to use drawings or equations with a symbol for the unknown number.

3.OA.A.4 Determining Unknown Whole Numbers:

- Present students with equations relating three whole numbers, where one number is unknown. For example, $3 \times ? = 15$ or $20 \div ? = 5$.
- Encourage students to use their understanding of multiplication and division to determine the unknown whole number. They can use strategies like making arrays or repeated addition/subtraction to find the missing value.

3.DL.B.3 Integrated Activity:

- Create an integrated activity where students collect data (e.g., favorite sports, number of siblings) and represent it using scaled graphs.
- Then, formulate word problems based on the data represented in the graphs, incorporating multiplication and division to solve "how many more" or "how many less" questions.

3.OA.D.9 Commutative and Associative Properties Exploration:

- Provide students with sets of multiplication equations involving small numbers (e.g., 3×4 , 4×3 , 2×5 , 5×2).
- Ask students to observe patterns and relationships between the numbers and their products.
- Guide them to recognize the commutative property (e.g., $3 \times 4 = 4 \times 3$) and associative property (e.g., $(3 \times 2) \times 5 = 3 \times (2 \times 5)$) through hands-on activities or visual representations.

3.OA.C.7 Strategies for Multiplication and Division:

- Present students with multiplication and division problems within 100.
- Encourage them to apply strategies such as breaking down numbers into smaller factors, using known facts to find unknown facts (e.g., if $5 \times 7 = 35$, then $35 \div 7 = 5$), or using properties of operations (e.g., if $6 \times 8 = 48$, then $6 \times 4 = 24$).

3.OA.B.5 Memorization of Multiplication Facts:

- Implement fun games and activities to help students memorize multiplication facts up to 100 (e.g., multiplication bingo, multiplication war card game, multiplication fact races).
- Use flashcards or digital tools for repetitive practice and reinforcement of multiplication facts.

3.OA.D.9 Identifying and Explaining Patterns:

- Introduce students to arithmetic patterns by exploring the addition table or multiplication table.
- Guide them to observe patterns and relationships, such as even and odd numbers, multiples of certain numbers, or repeated sums/products.
- Encourage students to explain these patterns using properties of operations (e.g., explaining why 4 times a number is always even by decomposing 4 times a number into two equal addends).

3.OA.A3 Problem-Solving with Patterns and Properties:

- Provide word problems that require students to identify and apply arithmetic patterns and properties of operations to solve.
- Encourage students to explain their problem-solving strategies and justify their answers using mathematical reasoning.

<i>RESOURCES</i>

Teacher Resources:

- i-Ready Teacher Toolbox
- Place Value Assessment Tool (PVAT)
- Illustrative Math (IM) Unit 1
- IM Student Work
- IM Blackline Masters
- Online District Approved Digital Resources

Equipment Needed:

- Manipulatives
- IM Student Workbook
- Student Whiteboards
- Chart Paper
- Dry Erase Markers
- Chromebooks

UNIT OVERVIEW

Content Area: Mathematics

Unit Title: Area and Multiplication

Target Course/Grade Level: Math/3rd Grade

Unit Summary: In this unit, students encounter the concept of area, relate the area of rectangles to multiplication, and solve problems involving area. In this unit, students make sense of another attribute of shapes: a measure of how much a shape covers. They begin informally by comparing two shapes and deciding which one covers more space. Later, they compare more precisely by tiling shapes with pattern blocks and square tiles. Students learn that the area of a flat figure is the number of square units that cover it without gaps or overlaps. Students then focus on the area of rectangles. They notice that a rectangle tiled with squares forms an array, with the rows and columns as equal-size groups. This observation allows them to connect the area of rectangles to multiplication—as a product of the number of rows and number of squares per row. To transition from counting to multiplying side lengths, students reason about area using increasingly more abstract representations. They begin with tiled or gridded rectangles, move to partially gridded rectangles or those with marked sides, and end with rectangles labeled with their side lengths.

Approximate Length of Unit: 4 weeks

LEARNING TARGETS

NJ Student Learning Standards: Mathematics:

- 3.OA.A.1** Interpret products of whole numbers, e.g., interpret 5×7 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 5×7 .
- 3.OA.B.5** Apply properties of operations as strategies to multiply and divide. Example: If $6 \times 4 + 24$ is known, then $4 \times 6 = 24$ is also. (Commutative property of multiplication) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$. (Associative property of multiplication) Know that $8 \times 5 = 40$ and $8 \times 2 = 16$ one can find 8×7 as $8 \times (5+2) = (8 \times 5) + (8 \times 2) = 40+16= 56$. (Distributive property.) {Clarification: Students need not use formal terms for these properties}.
- 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.M.B.3..** Recognize area as an attribute of plane figures and understand concepts of area measurement.
- 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.
 - 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 non-standard units).

3.M.B.5 Relate area to operations of multiplication and addition,

- a. 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.
- b. 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.
- c. 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 $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning.
- d. 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

Interdisciplinary Connections and Standards:

English Language Arts:

SL.PE.3.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

SL.II.3.2. Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

SL.AS.3.6. Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.

Science & Engineering Practices:

Asking questions and defining problems

Developing and using models

Constructing explanations and designing solutions

Using mathematics and computational thinking

Obtaining, evaluating, and communicating information

Technology:

8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.

8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data.

8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim.

8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.

Career Readiness, Life Literacies, and Key Skills:

9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).

9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.

9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).

9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity.

Unit Understandings:

Students will understand that...

- Area concepts and relate area to multiplication and to addition.

Unit Essential Questions:

- How many more or less does ____ have than ____ in the bar graph?
- How can I measure perimeter?
- How can I measure area?
- How can I measure the area of a rectangle?
- How can I measure irregular figures?
- How can I measure mass?
- How can I measure capacity?
- How can I measure length?

Knowledge and Skills:

Students will know...

- How to solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.
- Geometric measurement: understand concepts of area and relate area to multiplication and to addition.
- Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

Students will be able to...

- Describe area as the number of unit squares that cover a plane figure without gaps and overlaps.
- Measure the area of rectangles by counting unit squares.
- Explain why the area of a rectangle can be determined by multiplying the side lengths.
- Solve problems involving the area of rectangles.
- Find the area of figures composed of rectangles.

<i>EVIDENCE OF LEARNING</i>

Assessment:

What evidence will be collected and deemed acceptable to show that students truly “understand”?

- Cool Downs
- Section Checkpoints
- Common Assessment: Illustrative Math End of Unit 2 Assessment
- Daily Exit Slips
- Standards Mastery Assessment (i-Ready)

Learning Activities:

What differentiated learning experiences and instruction will enable all students to achieve the desired results?

- Online math games/activities
- Centers
- Math Dialogue
- Illustrative Mathematics (IM) 3.2 Lessons 1-15

3.OA.A.1 & 3.OA.B.5 Interpreting Products and Applying Properties:

- Provide students with real-world scenarios involving multiplication (e.g., 5 groups of 7 objects each).
- Ask students to interpret the products in context and represent them using drawings or models.
- Introduce properties of operations through practical examples without using formal terms. For instance, demonstrate how knowing $8 \times 5 = 40$ and $8 \times 2 = 16$ can help find 8×7 as $40 + 16$.

3.OA.D.9 Exploring Arithmetic Patterns and Properties:

- Engage students in activities where they identify patterns in the multiplication table and explain them using properties of operations.
- For example, have students observe that when multiplying by even numbers, the result is always even, and explain why using properties like the distributive property.

3.M.B.3 a-c Understanding Area Measurement:

- Introduce the concept of area using unit squares. Show students how to measure the area of plane figures by counting unit squares.
- Provide examples of plane figures and have students determine their areas by covering them with unit squares without gaps or overlaps.

3.M.B.5 a-c Relating Area to Multiplication and Addition:

- Demonstrate how the area of a rectangle can be found by multiplying its side lengths. Use tiles or grid paper to visually represent this concept.
- Have students solve real-world problems by finding the area of rectangles with whole-number side lengths and represent the products as rectangular areas.
- Show students that the area of a rectangle with side lengths

3.M.B.5 a-c Finding Areas of Rectilinear Figures:

- Provide rectilinear figures and guide students to decompose them into non-overlapping rectangles.
- Have students find the areas of the non-overlapping parts and then add them together to find the total area of the figure.
- Apply this technique to solve real-world problems where students need to find the area of irregular shapes.

RESOURCES

Teacher Resources:

- i-Ready Teacher Toolbox
- Place Value Assessment Tool (PVAT) Use if not given with Unit 1
- Illustrative Math (IM) Unit 2
- IM Student Work
- IM Blackline Masters
- Online District Approved Digital Resources

Equipment Needed:

- Manipulatives
- IM Student Workbook
- Student Whiteboards
- Chart Paper
- Dry Erase Markers

UNIT OVERVIEW

Content Area: Mathematics

Unit Title: Wrapping Up Addition and Subtraction within 1,000

Target Course/Grade Level: Math/ 3rd Grade

Unit Summary: In this unit, students work toward the goal of fluently adding and subtracting within 1,000. Students work with a variety of algorithms starting with those that show expanded form and moving toward algorithms that are more streamlined and closer to the standard algorithm. Students explore various algorithms but are not required to use a specific one. If students begin the unit with knowledge of the standard algorithm, it is still important for them to make sense of the place-value basis of the algorithm. Understanding of place value also comes into play as students round numbers to the nearest multiple of 10 and 100. Students use rounding to estimate answers to two-step problems and determine if answers are reasonable.

Approximate Length of Unit: 4 weeks

LEARNING TARGETS

NJ Student Learning Standards:

Mathematics:

- 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 fluency add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
- 3.OA.B.5** Apply properties of operations as strategies to multiply and divide. Example: If $6 \times 4 + 24$ is known, then $4 \times 6 = 24$ is also. (Commutative property of multiplication) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$. (Associative property of multiplication) Know that $8 \times 5 = 40$ and $8 \times 2 = 16$ one can find 8×7 as $8 \times (5+2) = (8 \times 5) + (8 \times 2) = 40+16= 56$. (Distributive property.) {Clarification: Students need not use formal terms for these properties}.
- 3.OA.C.7** With accuracy and fluency multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.
- 3.OA.D.8** Solve two-step word problems 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.
- 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.

Interdisciplinary Connections and Standards:

English Language Arts:

SL.PE.3.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

SL.II.3.2. Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

SL.AS.3.6. Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.

Science & Engineering Practices:

Asking questions and defining problems

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Obtaining, evaluating, and communicating information

Technology:

8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.

8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data.

8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim.

8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.

Career Readiness, Life Literacies, and Key Skills:

9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).

9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.

9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).

9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity.

Unit Understandings:

Students will understand ...

- How to use place value understanding to round whole numbers and add and subtract within 1,000.
- How to represent and solve two-step word problems using addition, subtraction, and multiplication and assess the reasonableness of answers.

Unit Essential Questions:

- What strategies can students use to add and subtract within 1,000?
- How do various algorithms for addition and subtraction differ in efficiency and complexity?
- How does understanding the expanded form contribute to proficiency in addition and subtraction?
- Why is it important for students to grasp the place-value basis of the standard algorithm for addition and subtraction?
- How does rounding to the nearest multiple of 10 and 100 facilitate addition and subtraction within 1,000?
- How can rounding be used to estimate answers to two-step problems?
- What role does reasoning play in determining the reasonableness of answers in addition and subtraction within 1,000?

Knowledge and Skills:

Students will know...

- Use place value understanding and properties of operations to perform multi digit arithmetic.

Students will be able to...

- Fluently add within 1,000 using algorithms based on place value and properties of operations.
- Use place value understanding to compose and decompose numbers.
- Fluently subtract within 1,000 using algorithms based on place value, properties of operations, and the relationship between addition and subtraction.
- Round whole numbers to the nearest multiple of 10 and 100.
- Assess the reasonableness of answers.
- Solve two-step word problems using addition, subtraction, and multiplication.

EVIDENCE OF LEARNING

Assessment:

What evidence will be collected and deemed acceptable to show that students truly “understand”?

- Cool Downs
- Section Checkpoints
- Common Assessment: Illustrative Math End of Unit 3 Assessment
- Daily Exit Slips
- Standards Mastery Assessment (i-Ready)

Learning Activities:

What differentiated learning experiences and instruction will enable all students to achieve the desired results?

- Online math games/activities
- Centers
- Math Dialogue
- Illustrative Mathematics (IM) 3.3 Lessons 1-21

Mathematical Problem-Solving Stories:

- **3.NBT.A.2** Provide students with story prompts involving everyday scenarios where addition and subtraction within 1,000 are necessary. For example, "Tom has 548 marbles. He gave 256 marbles to his friend. How many marbles does Tom have left?"
- **3.OA.D.8** Have students read the story, identify the mathematical operation required (addition or subtraction), and solve the problem.
- **3.NBT.A.1** Encourage students to explain their problem-solving strategies orally or in writing, emphasizing understanding of place value and mathematical reasoning.

Interactive Math Games:

- **3.NBT.A.2** Set up math stations with interactive games focused on addition and subtraction within 1,000. For example, a "Race to 1,000" game where students roll dice or draw number cards to add or subtract numbers until they reach 1,000.
- **3.NBT.A.2** Incorporate technology by using board approved educational math websites that provide interactive practice with addition and subtraction within 1,000, such as Prodigy Math.

Mathematical Manipulatives:

- **3.NBT.A.2** Use concrete manipulatives like base-10 blocks, place value disks, or number lines to model addition and subtraction within 1,000.
- **3.NBT.A.1** Provide hands-on activities where students can physically manipulate the manipulatives to solve addition and subtraction problems, reinforcing the concept of place value and regrouping.

Estimation Activities:

- **3.NBT.A.1** Engage students in estimation activities where they estimate the sum or difference of two numbers within 1,000 before calculating the exact answer.
- **3.NBT.A.1** Create estimation jars filled with various objects (e.g., beans, paper clips) and have students estimate the total or the difference in quantities, practicing rounding to the nearest 10 or 100.
- **3.OA.D.8** Encourage students to explain their thinking process, justify their answers, and reflect on the effectiveness of different strategies they use.

Real-Life Problem Solving:

- **3.NBT.A.2** Present real-life scenarios or word problems involving addition and subtraction within 1,000, such as budgeting money for a shopping trip or calculating the total weight of groceries.

RESOURCES

Teacher Resources:

- i-Ready Teacher Toolbox
- Illustrative Math (IM) Unit 3
- IM Student Work
- IM Blackline Masters
- Online District Approved Digital Resources

Equipment Needed:

- Manipulatives
- IM Student Workbook
- Student Whiteboards
- Chart Paper
- Dry Erase Markers
- Chromebooks

UNIT OVERVIEW

Content Area: Mathematics

Unit Title: Relating Multiplication to Division

Target Course/Grade Level: Mathematics/3rd Grade

Unit Summary: This unit introduces students to the concept of division and its relationship to multiplication. Students make sense of division also in terms of equal-size groups. Students use the relationship between multiplication and division to develop fluency with single-digit multiplication and division facts. They continue to reason about products of two numbers in terms of the area of rectangles whose side lengths represent the factors, decomposing side lengths and applying properties of operations along the way. As they multiply numbers greater than 10, students see that it is helpful to decompose the two-digit factor into tens and ones and distribute the multiplication. Toward the end of the unit, students solve two-step problems that involve all four operations.

Approximate Length of Unit: 6 Weeks

LEARNING TARGETS

NJ Student Learning Standards:

Mathematics:

- 3.OA.A.2** Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ 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 $56 \div 8$.
- 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 $8 \times ? = 48$, $5 = \diamond \div 3$, $6 \times 6 = ?$.
- 3.OA.B.5** Apply properties of operations as strategies to multiply and divide.2 Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative property of multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$. (Associative property of multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive property.)
- 3.OA.B.6** Understand division as an unknown-factor problem. For example, find $32 \div 8$ 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 $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.
- 3.OA.D.8** Solve two-step word problems 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

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.NBT.A.2 With accuracy and efficiency add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

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.M.B.5 Relate area to the operations of multiplication and addition.

- a. 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.
- b. 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.
- c. 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 $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning.
- d. 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.

Interdisciplinary Connections and Standards:

English Language Arts:

SL.PE.3.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

SL.II.3.2. Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

SL.AS.3.6. Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.

Science & Engineering Practices:

Asking questions and defining problems

Developing and using models

Constructing explanations and designing solutions

Using mathematics and computational thinking

Obtaining, evaluating, and communicating information

Technology:

8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.

8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data.

8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim.

8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.

Career Readiness, Life Literacies, and Key Skills:

9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).

9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.

9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).

9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity.

Unit Understandings:

Students will understand ...

- How to use the relationship between multiplication and division, place value understanding, and the properties of operations to multiply and divide whole numbers within 100.
- How to represent and solve two-step word problems using the four operations.

Unit Essential Questions:

- How does division relate to multiplication, and how can understanding this relationship enhance our fluency with both operations?
- How can we represent division as equal-size groups, and how does this representation aid in our understanding of division concepts?
- How does reasoning about products of two numbers in terms of the area of rectangles deepen our understanding of multiplication and division?
- What strategies can we use to decompose side lengths and apply properties of operations when reasoning about products of two numbers?
- Why is it helpful to decompose two-digit factors into tens and ones when multiplying numbers greater than 10?
- How can we apply the relationship between multiplication and division to develop fluency with single-digit multiplication and division facts?
- What strategies can we employ to solve two-step problems that involve all four operations, and how do these strategies reflect our understanding of multiplication, division, addition, and subtraction?

Knowledge and Skills:

Students will know...

- How to represent and solve problems involving multiplication and division.
- How to understand properties of multiplication and the relationship between multiplication and division.
- How to multiply and divide within 100.
- How to solve problems involving the four operations and identify and explain patterns in arithmetic.

Students will be able to...

- Solve “how many groups?” problems in a way that makes sense to them.
- Solve “how many in each group?” problems in a way that makes sense to them.
- Interpret and relate drawings and descriptions of division situations.
- Understand that a division situation may involve finding an unknown number of groups or finding an unknown number of objects in each group.
- Interpret division expressions.
Understand that the same division expression can be used to represent both types of division situations.
- Solve “how many groups?” and “how many in each group?” problems.
- Write division expressions to represent division situations.
- Explain the relationship between multiplication and division equations.
- Interpret division equations and multiplication equations with a missing factor.

- Represent situations involving equal groups using multiplication and division equations with a symbol for the unknown quantity.
- Use multiplication and division within 100 to solve problems involving equal groups.
- Identify known single-digit multiplication facts and their related division facts.
- Identify arithmetic patterns in the multiplication table and use them to find unknown multiplication facts.
- Recognize that multiplication is commutative.
- Use area diagrams to explore strategies based on properties of multiplication.
- Apply associative and distributive properties of multiplication to find products within 100.
- Recognize that multiplication is associative and can be distributed over addition.
- Multiply one-digit whole numbers by multiples of 10 using strategies based on place value and the properties of operations.
- Multiply within 100, where one factor is a teen number, in a way that makes sense to them.
- Make sense of representations of multiplication (base-ten blocks and area diagrams) where one factor is a teen number.
- Multiply within 100, where one factor is a teen number.
- Multiply within 100, where one factor is greater than 20.
- Use properties based on place value and properties of operations to multiply.
- Represent two-step word problems using equations with a letter standing for the unknown quantity.
- Solve two-step word problems using the four operations.
- Solve problems involving division within 100, with quotients over 10, in a way that makes sense to them.
- Recognize that division of larger numbers can still mean finding the number of groups or finding the size of each group.
- Use base-ten blocks to represent division where the quotient is more than 10.
- Analyze strategies for representing and reasoning about division.
- Divide within 100 using strategies based on place value and properties of operations.
- Represent two-step word problems using equations with a letter standing for the unknown quantity.
- Solve two-step word problems using the four operations.
- Represent and solve “How many groups?” and “How many in each group?” problems in a real-world context.
- Solve two-step problems in a real-world context.

EVIDENCE OF LEARNING

Assessment:

What evidence will be collected and deemed acceptable to show that students truly “understand”?

- Cool Downs
- Section Checkpoints
- Common Assessment: Illustrative Math End of Unit 4 Assessment
- Daily Exit Slips
- Standards Mastery Assessment (i-Ready)

Learning Activities:

What differentiated learning experiences and instruction will enable all students to achieve the desired results?

- Online math games/activities
- Centers
- Math Dialogue
- Illustrative Mathematics (IM) 3.4 Lessons 1-22
- **3.OA.A.2 Equal Groups Exploration:**
 - Provide students with various objects such as counters, cubes, or pictures of objects.
 - Ask students to represent a given number (e.g., 12) using equal groups in different ways (e.g., 3 groups of 4, 4 groups of 3).
 - Guide students to understand that multiplication can represent the total number of objects in equal groups (e.g., 3 groups of 4 equals $3 \times 4 = 12$) and that division can represent the number of groups when given the total number of objects and the size of each group (e.g., 12 objects divided into 3 groups equals $12 \div 4 = 3$).
- **3.OA.B.5 Multiplication and Division Fact Families:**
 - Introduce students to fact families, emphasizing the relationship between multiplication and division.
 - Provide examples of fact families (e.g., $3 \times 4 = 12$, $4 \times 3 = 12$, $12 \div 3 = 4$, $12 \div 4 = 3$) and ask students to identify the related multiplication and division facts.
 - Encourage students to create their own fact families and identify the corresponding multiplication and division facts.
- **3.OA.A.3 & 3.OA.D.8 Word Problem Puzzles:**
 - Present word problems that involve both multiplication and division situations.
 - Provide students with manipulatives or drawings to represent the problem visually.
 - Ask students to analyze the problem, identify whether it involves multiplication or division, and solve it using the appropriate operation.
- **3.OA.C.7 & 3.OA.B.6 Real-Life Scenarios:**
 - Provide real-life scenarios where multiplication and division are used interchangeably.
 - For example, present a scenario where a baker needs to distribute cookies equally among a certain number of boxes or where a farmer needs to plant a certain number of seeds in each row of a field.
 - Guide students to determine whether multiplication or division is the appropriate operation to solve the problem and encourage them to explain their reasoning.
- **3.OA.A.2 & 3.OA.A.4 Interactive Games and Activities:**
 - Utilize board approved online resources or educational games that reinforce the relationship between multiplication and division.
 - Incorporate interactive activities such as digital quizzes, matching games, or flashcards that require students to match multiplication and division facts or solve related problems.

RESOURCES

Teacher Resources:

- i-Ready Teacher Toolbox
- Place Value Assessment Tool (PVAT) Mid Year Progress Check
- Illustrative Math (IM) Unit 4
- IM Student Work
- IM Blackline Masters
- Online District Approved Digital Resources

Equipment Needed:

- Manipulatives
- IM Student Workbook
- Student Whiteboards
- Chart Paper
- Dry Erase Markers
- Chromebooks

UNIT OVERVIEW

Content Area: Mathematics

Unit Title: Fractions as Numbers

Target Course/Grade Level: Mathematics/3rd Grade

Unit Summary: In this unit, students make sense of fractions as numbers, using various diagrams to represent and reason about fractions, compare their size, and relate them to whole numbers. The denominators of the fractions explored here are limited to 2, 3, 4, 6, and 8. Using fraction strips and tape diagrams to represent fractions prepare students to think about fractions more abstractly: as lengths and locations on the number line. In each representation, students take care to identify 1 whole. This helps them reason about the size of the parts and whether a fraction is less or greater than 1. (Fractions greater than 1 are not treated as special cases.) Students then use these representations to learn about equivalent fractions and to compare fractions. They see that fractions are equivalent if they are the same size or at the same location on the number line, and that some fractions are the same size as whole numbers. Later in the unit, students compare fractions with the same denominator and those with the same numerator. They recognize that as the numerator gets larger, more parts are being counted, and as the denominator gets larger, the size of each part in a whole gets smaller.

Approximate Length of Unit: 5 Weeks

LEARNING TARGETS

NJ Student Learning Standards:

Mathematics:

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

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 parts of size $1/b$. For example: If a rectangle (i.e. the whole) is partitioned into 3 equal parts, each part is $\frac{1}{3}$. Two of those parts would be $\frac{2}{3}$.

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

- 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 $\frac{1}{b}$ on the number line. For example, partition the number line from 0 to 1 into 3 equal parts, represents $\frac{1}{3}$ on the number line and show that each part has a size $\frac{1}{3}$.

3.NF.A.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.

- 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.

- b. Recognize and generate simple equivalent fractions by reasoning about their size, (e.g.,

$$\frac{1}{2} = \frac{2}{4}, \frac{4}{6} = \frac{2}{3}$$

). Explain why the fractions are equivalent with the support of a visual fraction model.

3.G.A.2a 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 $\frac{1}{4}$ of the area of the shape.

Interdisciplinary Connections and Standards:

English Language Arts:

SL.PE.3.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

SL.II.3.2. Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

SL.AS.3.6. Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.

Science & Engineering Practices:

Asking questions and defining problems

Developing and using models

Constructing explanations and designing solutions

Using mathematics and computational thinking

Obtaining, evaluating, and communicating information

Technology:

8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.

8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data.

8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim.

8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.

Career Readiness, Life Literacies, and Key Skills:

9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).

9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.

9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).

9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity.

Unit Understandings:

Students will understand that...

- How to develop an understanding of fractions as numbers and of fraction equivalence by representing fractions on diagrams and number lines, generating equivalent fractions, and comparing fractions.

Unit Essential Questions:

- How do various diagrams help us represent and reason about fractions as numbers?
- What strategies can we use to compare the sizes of fractions, and how do we relate them to whole numbers?
- How does identifying one whole in fraction representations aid in understanding the size of parts and comparisons between fractions?
- How do fraction strips and tape diagrams prepare us to think about fractions abstractly, particularly as lengths and locations on the number line?
- Why is it important to understand that fractions greater than 1 are not treated as special cases?
- How do we determine if fractions are equivalent, and what role does the number line play in this understanding?
- What are equivalent fractions, and how can we identify them using different representations?
- What patterns do we observe when comparing fractions with the same denominator versus those with the same numerator?
- How does the relationship between the numerator and denominator affect the size and comparison of fractions?
- How can understanding fractions as numbers help us solve real-world problems and make sense of everyday situations?

Knowledge and Skills:

Students will ...

- Develop an understanding of fractions as numbers

Students will be able to...

- Understand that fractions are built from unit fractions such that a fraction is the quantity formed by a “parts” of size.
- Understand that unit fractions are formed by partitioning shapes into equal parts
- Understand a fraction as a number and represent fractions on the number line.
- Explain equivalence of fractions in special cases and express whole numbers as fractions and fractions as whole numbers.
- Compare two fractions with the same numerator or denominator, record the results with the symbols $>$, $=$, or $<$, and justify the conclusions.

<i>EVIDENCE OF LEARNING</i>

Assessment:

What evidence will be collected and deemed acceptable to show that students truly “understand”?

- Cool Downs
- Section Checkpoints
- Common Assessment: Illustrative Math End of Unit 5 Assessment
- Daily Exit Slips
- Standards Mastery Assessment (i-Ready)

Learning Activities:

What differentiated learning experiences and instruction will enable all students to achieve the desired results?

- Online math games/activities
- Centers
- Math Dialogue
- Illustrative Mathematics (IM) 3.5 Lessons 1-18

- **3.NF.A.1 Fraction Exploration with Manipulatives:**
 - Provide students with fraction manipulatives such as fraction strips, pattern blocks, or fraction circles.
 - Ask students to explore different fractions using the manipulatives, focusing on denominators of 2, 3, 4, 6, and 8 as mentioned in the unit summary.
 - Have students compare the sizes of fractions, identify equivalent fractions, and represent fractions on a number line using the manipulatives.
- **3.G.A.2a Fraction Art Project:**
 - Integrate art with mathematics by having students create fraction art pieces using shapes and colors.
 - Provide students with blank grids or templates and instruct them to color a certain fraction of each shape using specified colors.
 - Encourage students to explain their choices and the fractions represented by each color in their artwork.
- **3.NF.A.2a Fraction Number Line Challenge:**
 - Display a number line on the board or provide individual number lines for students.
 - Present students with fractions within the specified denominators and ask them to place the fractions accurately on the number line.
 - Challenge students to order the fractions from least to greatest or greatest to least on the number line.
- **3.G.A.2a Real-Life Fraction Scenarios:**
 - Present real-life scenarios or word problems that involve fractions, such as sharing snacks among friends or dividing a pizza into equal parts.
 - Ask students to model the situations using drawings, fraction manipulatives, or number lines, and then solve the problems by finding the fractional parts.
 - Encourage students to explain their reasoning and justify their answers using fraction representations.
- **3.NF.A.3a-3b Fraction Games and Puzzles:**
 - Engage students with interactive fraction games and puzzles that reinforce concepts of comparing, ordering, and equivalent fractions.
 - Provide opportunities for students to work collaboratively or independently to solve fraction-based challenges and puzzles, fostering critical thinking and problem-solving skills.

RESOURCES

Teacher Resources:

- i-Ready Teacher Toolbox
- Illustrative Math (IM) Unit 5
- IM Student Work
- IM Blackline Masters
- Online District Approved Digital Resources

Equipment Needed:

- Manipulatives
- IM Student Workbook
- Student Whiteboards
- Chart Paper
- Dry Erase Markers
- Chromebooks

UNIT OVERVIEW

Content Area: Mathematics

Unit Title: Measuring Length, Time, Liquid Volume and Weight

Target Course/Grade Level: Mathematics/3rd Grade

Unit Summary: In this unit, students measure length, weight, liquid volume, and time. They begin with a study of length measurement; building on their recent work with fractions, students explore length measurements in halves and fourths of an inch. They use a ruler to collect measurements and then display the data on line plots, learning about mixed numbers and revisiting equivalent fractions along the way. Students learn about standard units for measuring weight (kilograms and grams) and liquid volume (liters). To build a sense of weights such as 1 gram or 1 kilogram, students hold common objects such as paper clips and bottles of water. To gain familiarity with liters, they fill a container with water by the liter and estimate the volume of everyday containers such as pots, tubs, and buckets. They then use the scale on measurement tools to measure and represent liquid volume. From there, students move on to measure time. They tell time to the minute, using the relationship between the hour hand and the minute hand to make sense of times such as 3:57 p.m. In the final section of the unit, students make sense of and solve problems related to all three measurements. The work here allows students to continue to develop their fluency with addition and subtraction within 1,000 and understanding of properties of operations. It also prompts them to use the relationship between multiplication and division to solve problems.

Approximate Length of Unit: 4 Weeks

LEARNING TARGETS

NJ Student Learning Standards:

Mathematics:

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

3.NBT.A.2 With accuracy and fluency, add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction

3.NF.A.3a 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.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.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

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.

Interdisciplinary Connections and Standards:

English Language Arts:

SL.PE.3.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

SL.II.3.2. Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

SL.AS.3.6. Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.

Science & Engineering Practices:

Asking questions and defining problems

Developing and using models

Constructing explanations and designing solutions

Using mathematics and computational thinking

Obtaining, evaluating, and communicating information

Technology:

8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.

8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data.

8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim.

8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.

Career Readiness, Life Literacies, and Key Skills:

9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).

9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.

9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).

9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity.

Unit Understandings:

Students will understand ...

- How to generate and represent length measurement data in halves and fourths of an inch on line plots.
- How to estimate relative units of measure including weight, liquid volume, and time, and use the four operations to solve problems involving measurement.

Unit Essential Questions:

- Why do we measure things?
- How does measuring help us in everyday life?
- Are there different ways to measure the same thing?
- What are the different tools used to measure length, time, liquid volume, and weight?
- When would you use a ruler versus a measuring tape?

- Why do we use different units for different measurements?
- What does it mean to measure something accurately? Precisely?
- How can we avoid making mistakes when measuring?
- How do we know if one object is longer, heavier, or holds more liquid than another?
- How can we use measurements to solve problems?
- Can we convert between different units of measurement?
- How are these measurements used in other areas of science and math?

Knowledge and Skills:

Students will know...

- How to solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.

Students will be able to...

- Measure lengths using rulers marked with halves and fourths of an inch to generate data for making a line plot.
- Measure and estimate weights and liquid volumes of objects.
- Solve problems involving addition and subtraction of time intervals in minutes.
- Tell time to the minute.
- Solve problems involving the four operations and measurement contexts.

EVIDENCE OF LEARNING

Assessment:

What evidence will be collected and deemed acceptable to show that students truly “understand”?

- Cool Downs
- Section Checkpoints
- Common Assessment: Illustrative Math End of Unit 6 Assessment
- Daily Exit Slips
- Standards Mastery Assessment (i-Ready)

Learning Activities:

What differentiated learning experiences and instruction will enable all students to achieve the desired results?

- Online math games/activities
- Centers
- Math Dialogue
- Illustrative Mathematics (IM) 3.6 Lessons 1-16

3.DL.B.4 Length:

- Mystery Measurement Hunt: Hide objects of different lengths around the classroom. Students use rulers to measure the objects and record their findings. Challenge them to identify the mystery object based solely on its measurement.

- "Measure Me" Relay Race: Divide students into teams. Each team member measures a designated object (desk, door, etc.) and relays the measurement to the next teammate. The first team to finish measuring all objects correctly wins.
- Building with Legos: Challenge students to build a tower of a specific height using Legos. This activity reinforces the concept of using a ruler to measure accurately.

3.M.A.1 Time:

- Daily Routine Schedule: Create a daily schedule together, listing activities and estimating how long each takes (e.g., math - 30 minutes). Throughout the day, track the actual time spent on each activity and discuss any discrepancies.
- "How Long Did It Take?": Game: Play a short game (board game, jump rope) and have students estimate how long it took (in minutes or seconds). Use a stopwatch to measure the actual time and compare it to their estimates.
- Creating a Sundial: This is a more advanced activity but demonstrates the concept of timekeeping using the sun's position. Research and construct a simple sundial to tell time throughout the day.

3.M.A.2 Liquid Volume:

- "Sink or Float?": Fill containers of different sizes with varying amounts of water. Students predict which containers will hold more water and test their predictions by pouring. This activity helps with understanding volume concepts.
- "Cooking Challenge": Divide students into groups and provide them with recipes that use measuring cups and spoons. They can practice measuring liquid ingredients while creating a simple snack.
- Comparing Containers: Collect various containers of different shapes but similar volumes (e.g., juice boxes, water bottles). Students estimate and then measure the amount of liquid each container can hold. This challenges their preconceptions about volume and shape.

3.DL.B.4 Weight:

- "Guess the Weight" Game: Place objects of different weights in opaque bags. Students estimate the weight of each object before carefully lifting them. Discuss the concept of "heavier" and "lighter" based on their experiences.
- Building Challenges: Divide students into teams and provide them with materials like cups, blocks, and paperclips. Challenge them to build a structure that holds the most weight using a limited number of materials.
- "Weighing the Room" Activity: Research the weight of common objects in the classroom (chairs, desks, etc.). Estimate the total weight of the room and then compare it to the actual weight by looking up specifications online.

RESOURCES

Teacher Resources:

- i-Ready Teacher Toolbox
- Illustrative Math (IM) Unit 6
- IM Student Work
- IM Blackline Masters
- Online District Approved Digital Resources

Equipment Needed:

- Manipulatives
- IM Student Workbook
- Student Whiteboards
- Chart Paper
- Dry Erase Markers
- Chromebooks

UNIT OVERVIEW

Content Area: Mathematics

Unit Title: Two Dimensional Shapes and Perimeter

Target Course/Grade Level: Mathematics/3rd Grade

Unit Summary: In this unit, students reason about attributes of two-dimensional shapes and learn about perimeter. Students began to describe, compare, and sort two-dimensional shapes in earlier grades. Here, they continue to do so and to develop language that is increasingly more precise to describe and categorize shapes. Students learn to classify broader categories of shapes (quadrilaterals and triangles) into more specific subcategories based on their attributes. For instance, they study examples and nonexamples of rhombuses, rectangles, and squares, and come to recognize their specific attributes. Students also expand their knowledge about attributes that can be measured. In this unit, students learn the meaning of perimeter and find the perimeter of shapes. They consider geometric attributes of shapes (such as opposite sides having the same length) that can help them find perimeter. At the end of the unit, students solve problems in a variety of contexts. They apply what they learn about geometric attributes of shapes, perimeter, and area, to design a park, a West African wax print pattern, and a robot. They then solve problems within the context of their design.

Approximate Length of Unit: 4 Weeks

LEARNING TARGETS

NJ Student Learning Standards:

Mathematics:

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 $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

3.OA.D.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.

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

- 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 $1/3$ on the number line and show that each part has a size $1/3$.

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.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.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.

Interdisciplinary Connections and Standards:

English Language Arts

SL.PE.3.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

SL.II.3.2. Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

SL.AS.3.6. Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.

Science & Engineering Practices:

Asking questions and defining problems

Developing and using models

Constructing explanations and designing solutions

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Obtaining, evaluating, and communicating information

Technology:

8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.

8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data.

8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim.

8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.

Career Readiness, Life Literacies, and Key Skills:

9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).

9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.

9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).

9.4.5.CI.3: Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity.

Unit Understandings:

Students will understand ...

- How to reason about shapes and their attributes, with a focus on quadrilaterals.
- How to solve problems involving the perimeter and area of shapes.

Unit Essential Questions:

- How can we identify and classify two-dimensional shapes based on their properties?
- What are the different characteristics of common shapes like squares, rectangles, triangles, and circles?
- How can we use these characteristics to sort and classify shapes?
- What is perimeter and how can we calculate it for different shapes?
- What does the word "perimeter" mean?

- How is perimeter different from area?
- Can we find the perimeter of any shape, and how do we do it?
- How are shapes used in the real world, and how does understanding perimeter help us?
- Where can we find two-dimensional shapes in our everyday lives?
- How can calculating perimeter be useful in solving real-world problems (e.g., fencing a garden, building a model)?
- Can understanding shapes and perimeter help us design or create things?
- How can we connect the concept of shapes and perimeter to other areas of math and science?
- How are shapes related to concepts like symmetry and fractions?
- Can understanding shapes help us describe objects in science experiments or models?

Knowledge and Skills:

Students will know...

- Reason with shapes and their attributes

Students will be able to...

- Reason about shapes and their attributes.
- Find the perimeter of two-dimensional shapes, including when all or some side lengths are given.
- Solve problems involving perimeter and area, in and out of context.
- Apply geometric understanding to solve problems.

<i>EVIDENCE OF LEARNING</i>

Assessment:

What evidence will be collected and deemed acceptable to show that students truly “understand”?

- Cool Downs
- Section Checkpoints
- Common Assessment: Illustrative Math End of Unit 7 Assessment
- Daily Exit Slips
- Standards Mastery Assessment (i-Ready)

Learning Activities:

What differentiated learning experiences and instruction will enable all students to achieve the desired results?

- Online math games/activities
- Centers
- Math Dialogue
- Illustrative Mathematics (IM) 3.7 Lessons 1-15

3G.A.1 Shape Identification and Classification:

- **Shape Bingo:** Create bingo cards with squares containing different shapes (square, circle, triangle, etc.). Show students various objects or flashcards with shapes. Students mark the corresponding shape on their bingo card if they see it. The first to complete a row or diagonal wins.
- **Shape Sorting Olympics:** Divide students into teams and provide a collection of objects with different shapes (blocks, buttons, etc.). Set a time limit and challenge each team to sort the objects by shape into designated containers. The team with the most correctly sorted shapes wins.

- "I Spy" with Shapes: Play a game of "I Spy" but focus on shapes in the classroom or outdoors. Take turns describing an object using its shape (e.g., "I spy with my little eye something round and red"). Others guess the object based on the shape clue.

3.M.C.6 Perimeter Exploration:

- Shape Perimeter Relay Race: Divide students into teams and set up stations with different shapes (cutouts or pre-made models). Each team member measures the perimeter of a shape at their designated station and relays the measurement to the next teammate. The first team to complete all stations and add up the perimeters correctly wins.
- "Build It Yourself" Perimeters: Provide students with materials like straws, pipe cleaners, or popsicle sticks. Challenge them to build shapes with specific perimeters (e.g., build a square with a perimeter of 12 cm). This activity reinforces the concept of perimeter as the total length around a shape.
- Perimeter Scavenger Hunt: Hide clues around the classroom or schoolyard written on cards with different shapes. Each clue mentions the perimeter of the hidden object (e.g., "Find something rectangular with a perimeter of 20 cm"). Students use rulers to measure objects and search for the hidden clues based on the perimeter information.

3.M.C.6 Connecting Shapes and Perimeter to Real-World Applications:

- "Design Your Dream House" Activity: Provide students with graph paper and rulers. Challenge them to design their dream house by drawing shapes for walls, doors, and windows. They can then calculate the perimeter of each wall to determine the total amount of fencing needed.
- "Wrap It Up" Challenge: Give students objects of different shapes (boxes, books) and wrapping paper. They estimate how much wrapping paper they will need based on the shape and perimeter of the object. Then, they carefully wrap the object and compare their estimate to the actual amount of paper used.
- "Shape Up Your Garden" Project: Divide students into groups and assign each group a specific garden shape (rectangular, triangular, etc.). They research the best plants for their garden shape and calculate the perimeter to determine how much fencing is needed. This activity combines shapes, perimeter, and real-world problem-solving.

RESOURCES

Teacher Resources:

- i-Ready Teacher Toolbox
- Illustrative Math (IM) Unit 7
- IM Student Work
- IM Blackline Masters
- Online District Approved Digital Resources

Equipment Needed:

- Manipulatives
- IM Student Workbook
- Student Whiteboards
- Chart Paper
- Dry Erase Markers
- Chromebooks

UNIT OVERVIEW

Content Area: Mathematics

Unit Title: Putting it All Together

Target Course/Grade Level: Mathematics/3rd Grade

Unit Summary: In this unit, students revisit major work and fluency goals of the grade, applying their learning from the year. In section A, students reinforce what they learned about fractions, their size, and their location on the number line. In section B, students deepen their understanding of perimeter, area, and scaled graphs by solving problems about measurement and data. Two of the lessons invite students to design a tiny house that meets certain conditions and calculate the cost for furnishing it. Section C enables students to work toward multiplication and division fluency goals through games. In the final section, students review major work of the grade as they create activities in the format of the warm-up routines they have encountered throughout the year (Notice and Wonder, Estimation Exploration, Number Talk, and How Many Do You See?). The sections in this unit are standalone sections, not required to be completed in order. Within each section, many lessons can also be completed independently of the ones preceding them. The goal is to offer ample opportunities for students to integrate the knowledge they have gained and to practice skills related to the expected fluencies of the grade.

Approximate Length of Unit: 4 Weeks

LEARNING TARGETS

NJ Student Learning Standards:

Mathematics:

3.OA.A.1 Interpret products of whole numbers, e.g., interpret 5×7 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 5×7 .

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.6 Understand division as an unknown-factor problem. For example, find $32 \div 8$ 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 $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

3.OA.D.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.

3.NBT.A.2 With accuracy and efficiency, add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

- 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 parts of size $1/b$. For example: If a rectangle (i.e. the whole) is partitioned into 3 equal parts, each part is $1/3$. Two of those parts would be $2/3$.
- 3.NF.A.3** Explain equivalence of fractions in special cases and compare fractions by reasoning about their size.
- 3.DLB.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.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.
- 3.M.B.5** Relate area to the operations of multiplication and addition.
- 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.

Interdisciplinary Connections and Standards:

English Language Arts

- SL.PE.3.1.** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher led) with diverse partners on grade 3 topics and texts, building on others’ ideas and expressing their own clearly.
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- SL.AS.3.6.** Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.

Science & Engineering Practices:

- Asking questions and defining problems
- Developing and using models
- Constructing explanations and designing solutions
- Using mathematics and computational thinking
- Obtaining, evaluating, and communicating information

Technology:

- 8.1.5.DA.1:** Collect, organize, and display data in order to highlight relationships or support a claim.
- 8.1.5.DA.3:** Organize and present collected data visually to communicate insights gained from different views of the data.
- 8.1.5.DA.4:** Organize and present climate change data visually to highlight relationships or support a claim.
- 8.1.5.DA.5:** Propose cause and effect relationships, predict outcomes, or communicate ideas using data.

Career Readiness, Life Literacies, and Key Skills:

- 9.4.5.CT.1:** Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).
- 9.4.5.CT.3:** Describe how digital tools and technology may be used to solve problems.
- 9.4.5.CT.4:** Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).
- 9.4.5.CI.3:** Participate in a brainstorming session with individuals with diverse perspectives to expand one’s thinking about a topic of curiosity.

Unit Understandings:

Students will understand ...

- How to consolidate and solidify their understanding of various concepts and skills related to major work of the grade. They also continue to work toward fluency goals of the grade

Unit Essential Questions:

- What do fractions represent, and how can we picture them on diagrams and number lines?
- How do we compare fractions using symbols like $>$, $=$, and $<$?
- How are whole numbers related to fractions?
- How can we use our understanding of area and perimeter to design and solve problems? (e.g., building a tiny house)
- How can we estimate and measure to the nearest half and fourth of an inch? (e.g., decorating a room)
- How can we collect and organize data into categories?
- How can we use scaled bar graphs to represent data and solve problems?
- What does multiplication represent, and how is it related to division?
- How can we become fluent in multiplying within 100?
- How can we use multiplication and division to solve real-world problems?
- How can we reflect on our learning and identify areas for improvement (e.g., multiplication fluency)?
- How can we make math fun and engaging through games and activities?

Knowledge and Skills:

Students will know...

- How to represent and solve problems involving multiplication and division.
- How to understand properties of multiplication and the relationship between multiplication and division.
- How to multiply and divide within 100.
- How to solve problems involving the four operations and identify and explain patterns in arithmetic.
- How to use place value understanding and properties of operations to perform multi-digit arithmetic.
- How to develop understanding of fractions as numbers.
Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.
- Geometric measurement: understand concepts of area and relate area to multiplication and to addition.
- Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.
- How to understand data-based questions and data collection.
- How to represent and interpret data.

Students will be able to...

- Estimate fractions represented in diagrams and on number lines.
- Record the results of comparisons with the symbols $>$, $=$, or $<$.
- Represent fractions on a number line.
- Generalize key ideas about fractions, such as what fractions mean, whole numbers as fractions, and fraction comparisons.
- Apply understanding of area and perimeter to solve problems about design.
- Solve problems about the cost of finishing a room in a tiny house.

- Collect categorical data to create a data set with several categories.
- Draw 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
- Practice multiplication within 100.
- Reflect on multiplication fluency.
- Practice finding products within 100 by playing multiplication games.
- Interpret representations of the relationship between multiplication and division.
- Represent the relationship between multiplication and division.
- Practice dividing whole numbers within 100.
- Apply understanding of equal groups to create a Notice and Wonder activity.
- Apply understanding of equal groups and multiplication to create a How Many Do You See activity.
- Apply understanding of measuring objects to the nearest half and fourth of an inch to create an Estimation Exploration activity.
- Apply understanding of addition and subtraction within 1,000 to create a Number Talk activity.

EVIDENCE OF LEARNING

Assessment:

What evidence will be collected and deemed acceptable to show that students truly “understand”?

- Cool Downs
- Section Checkpoints
- Common Assessment: Illustrative Math End of Unit 8 Assessment
- Daily Exit Slips
- Standards Mastery Assessment (i-Ready)

Learning Activities:

What differentiated learning experiences and instruction will enable all students to achieve the desired results?

- Online math games/activities
- Centers
- Math Dialogue
- Illustrative Mathematics (IM) 3.8 Lessons 1-15

3.NF.A.1 Fractions:

- Fraction Race: Divide students into teams and provide fraction strips of different lengths. Each team member races to place their fraction strip on a number line marked with fractions in the correct spot (using $<$, $=$, or $>$ symbols). The first team to finish correctly wins.
- Fraction Pizza Party: Cut out large paper pizzas and divide them into fractional slices (halves, fourths, eighths). Students can compare the sizes of slices, represent fractions visually on the pizza, and answer questions like "Which pizza has the most cheese (biggest fraction)?"
- "Whole Numbers in Disguise" Activity: Show students various whole numbers (e.g., 4) and ask them to represent them as fractions with different denominators (e.g., $4/1$, $4/2$). This helps solidify the connection between whole numbers and fractions.

3.M.C.5 Measurement:

- "Tiny House Challenge" Project: Divide students into groups and challenge them to design a tiny house floor plan within a specific area limitation (use grid paper). They can calculate the perimeter of each room to determine the amount of materials needed.
- "Room Reno" Cost Estimation: Show students pictures of different rooms and provide a price list for materials (paint, carpet, etc.) per square foot. They can estimate the area of each surface (walls, floor) and calculate the total cost for renovating the room.

3.DL.B.3 Data Representation:

- "Favorite Food Frenzy": Conduct a survey in class about favorite food categories (pizza, pasta, etc.). Students tally the results and then create a scaled bar graph where each bar represents a category and its height corresponds to the number of votes. Afterwards, pose questions like "Which food category is the most popular?" using the graph.
- "Mystery Bag Mania": Fill different bags with various objects (pencils, erasers, etc.) without students seeing inside. Students take turns reaching in and guessing what they feel. Record the data by category (pencil, eraser) and create a bar graph to compare the number of objects in each category.

3.OA.A.3 Multiplication and Division:

- Multiplication Flashcard Games: Create flashcards with multiplication problems on one side and the answer on the other. Students can play memory games, timed challenges, or "Go Fish" variations using multiplication flashcards to practice fluency.
- "Multiplication in Action" Activity: Set up stations with real-world scenarios involving multiplication (e.g., distributing cookies equally among students, calculating the total cost of several items). Students rotate through stations, solve the multiplication problems, and represent the relationship between multiplication and division (e.g., dividing the total cookies by the number of students).

Math Activities Across Concepts:

- **3.OA.D.8** "Notice and Wonder" with Equal Groups: Display an image with equal groups of objects (e.g., apples in a basket). Students use their understanding of equal groups to "notice" details and "wonder" about mathematical relationships (e.g., "I notice there are 5 apples in each row. I wonder how many total apples there are?").
- **3.OA.A.1** "How Many Do You See?" Multiplication Exploration: Show students an image with repeated objects and ask them "How many do you see?". Encourage them to use multiplication strategies (repeated addition) to find the total number of objects.
- **3.NF.A.3** "Estimation Exploration" Measurement Challenge: Provide students with rulers marked in halves and fourths of an inch. They estimate the length or width of various objects to the nearest half or fourth of an inch, then measure them accurately and compare their estimations.
- **3.NBT.A.2** "Number Talk" Addition/Subtraction Practice: Pose addition or subtraction word problems within 1,000 verbally. Encourage students to think critically, explain their reasoning, and estimate solutions before calculating the exact answer.

RESOURCES

Teacher Resources:

- i-Ready Teacher Toolbox
- Place Value Assessment Tool (PVAT) - End of Year Progress Check
- Illustrative Math (IM) Unit 8
- IM Student Work
- IM Blackline Masters
- Online District Approved Digital Resources

Equipment Needed:

- Manipulatives
- IM Student Workbook
- Student Whiteboards
- Chart Paper
- Dry Erase Markers
- Chromebooks