

Subject Area: Mathematics

Grade Level: 5

Big Ideas - Modeling Real Life

Unit Name: Place Value

Big Ideas - Modeling Real Life

Time Frame: 2 Weeks

Unit Rationale:

Students need to learn the Base 10 number system to develop and extend their concept of whole numbers. This understanding will lead to expanded notation, written notation, and scientific notation. The application and use of the Base 10 number system will be applied to money concepts and the metric system.

The base ten numeration system is a scheme for recording numbers using digits 0-9, groups of ten and place value. Numbers can be used for different purposes, and numbers can be classified and represented in different ways. Numbers, expressions, measures, and objects can be compared and related to other numbers, expressions, measures and objects in different way.

Content:

- Students will learn to find the value of each digit in a number from the billions to the millionths place.
- Students will learn to compare and order numbers from the billions to the millionths place.
- Students will learn to read and write decimals in numerical form, number name for and expanded notation.

Enduring Understandings:

- Students will be able to reason abstractly and quantitatively.
- Students will attend to precision.
- Students will need to look for and make use of structure where the position of a digit in a number affects its value.
- Digits to the left of the decimal represent values greater than one and digits to the right of the decimal are less than one.

Skills:

- Students will examine the relationships of the digits in whole and decimal numbers.
- Students will recognize that place value increases and decreases by powers of ten.
- Students will note the pattern in our base ten number system; all places to the right continue to be divided by 10 while places to the left of a digit are multiplied by ten.

New Jersey Social and Emotional Learning Competencies:**Self-Awareness, Self-Management, Social Awareness, Responsible Decision-Making, Relationship Skills****Activities:**

- Give students opportunities to practice social skills in small groups and project-based learning activities.
- Give students authentic feedback anytime they work well with others. Thank students whenever they listen well and tell them specifically what they did well. Give students authentic feedback for resolving conflicts peacefully
- Use rich math problems that demand group effort. Before proceeding, have students discuss norms for mathematical collaboration. Have them answer questions about what they like to do and say while working in groups or how they think others can act to make the group work well.
- Encourage students to reflect on how they approached mathematics “today,” including in journals or pair shares. Ask them to include how their choices could be repeated if successful or improved in order to be more successful.
- Lead a discussion about taking different approaches to problem solutions, identifying feelings and thoughts of others who adopt these strategies
- Source: <https://www.casel.org/wp-content/uploads/2017/08/SEL-in-Elementary-Math-8-20-17.pdf>

New Jersey Student Learning Standards:**Number and Operations in Base Ten****A. Understand the place value system.**

1. Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left.
2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
3. Read, write, and compare decimals to thousandths.

a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.

b. Compare two decimals to thousandths based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.

4. Use place value understanding to round decimals to any place.

B. Perform operations with multi-digit whole numbers and with decimals to hundredths.

5. Fluently multiply multi-digit whole numbers using the standard algorithm.

6. Find whole-number quotients of whole numbers with up to four-digit dividends and two digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

7. Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Assessment:

Benchmark: Renaissance, Big Ideas

Summative

Test:

Paper Tests - Version A, Version B, or Alternative Assessment (based on students needs and abilities)

Online Test (Big Ideas Website)- Teacher selected problems (based on students needs and abilities)

Quiz- Students will write equations to solve real-life problems.

Test- Students will write equations to solve real-life problems.

Accomodations:

Paper based and pdf worksheets (Big Ideas)

- Daily Skills Practice

- Vocabulary practice
- Prerequisite skills practice
- Extra practice
- Reteach
- Enrichment and Extension
- Vocabulary cards
- Differentiating a lesson worksheets

Web based practice and assessments

- Practice problems
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Big Ideas Video Tutorials

Virtual Manipulatives

Digital Examples

Skills Trainer - online (Big Ideas) interactive tool for skills practice - used for remediation or enrichment

Lessons & Activities:

- SE/TE-A: 5-8, 9-10, 12-13, 16, 18, 20-21, 36, 38-39, 52-53, 57-58, 71-72, 75-76, 81
Workbook A: 15A, 15B, 19A, 24A

- SE/TE-B: 7-14, 16-17, 18-19, 20-22, 23, 27-29, 36-39, 42, 43-44, 46-47, 51, 53-58, 60-61, 63-64
Workbook B: 17A, 22A, 42A, 50A, 59A, 59B, 67A

8.1 Technology, 9.1 21st-Century Life & Career Skills and/or Financial Literacy; AND Activities/Lesson(s):

8.1.5.NI.1: Develop models that successfully transmit and receive information using both wired and wireless methods.

8.1.5.NI.2: Describe physical and digital security measures for protecting sensitive personal information.

8.1.8.CS.1: Recommend improvements to computing devices in order to improve the ways users interact with the devices and

8.1.8.CS.4: Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.

8.1.8.DA.4: Transform data to remove errors and improve the accuracy of the data for analysis.

8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.

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9.1 21st-Century Life & Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

A. Critical Thinking and Problem Solving

9.1.8.A.1 Develop strategies to reinforce positive attitudes and productive behaviors that impact critical thinking and problem-solving skills.

9.1.8.A.2 Implement problem-solving strategies to solve a problem in school or the community.

9.1.8.A.3 Summarize strategies used by various organizations and agencies to solve problems that impact communities, and compare them with strategies used by similar organizations in another state or country.

9.1.8.A.4 Design and implement a project management plan using one or more problem-solving strategies.

B. Creativity and Innovation

9.1.8.B.1 Use multiple points of view to create alternative solutions.

9.1.8.B.2 Assess data gathered to solve a problem for which there are varying perspectives (e.g., cross-cultural, gender-specific, generational), and determine how the data can best be used to design multiple solutions.

C. Collaboration, Teamwork, and Leadership

9.1.8.C.1 Determine an individual's responsibility for personal actions and contributions to group activities.

9.1.8.C.2 Demonstrate the use of compromise, consensus, and community building strategies for carrying out different tasks, assignments, and

projects.
9.1.8.C.3 Model leadership skills during classroom and extra-curricular activities.

Subject Area: Mathematics
Grade Level: 5

Unit Name: Number Sentences &
Equations

Big Ideas - Modeling Real Life

Time Frame: 2 Weeks

Unit Rationale:

Students will need to make sense of problems and persevere in solving them. This will include the necessity to construct viable arguments and critique the reasoning of others. Students will need to use appropriate tools strategically.

Some mathematical phrases can be represented using a variable in an algebraic expression. The value of an algebraic expression can be found by replacing the variable (s) with a given number (s) and doing the calculation that results.

Numerical and algebraic expressions can involve more than one operation. The value of an algebraic expression can be found by replacing the variable(s) with a given number(s) and doing the calculation that results. Numerical and algebraic expressions can involve more than one operation.

To simplify a numerical expression, first compute within parentheses. Then do any multiplication and division calculations followed by any addition and subtraction calculations.

Content:

- Students will use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
- Students will use patterns to show relationships and evaluate algebraic expressions.
- Students will write and evaluate expressions involving multiplication, addition, and subtraction.
- Students will use given values for variables to evaluate numerical or algebraic expressions with three or more numbers and two or more operations.

Enduring Understandings:

- The symbolic language of algebra is used to communicate and generalize the patterns in mathematics.
- Algebraic representation can be used to generalize patterns and relationships.
- There is an established order for expressions to be solved/simplified.
- Variables can be used in an algebraic expression to represent an unknown value.

Skills:

- Students will recognize what parentheses mean in an expression.
- Students will recognize what brackets mean in an expression.
- Students will evaluate the contents in the parentheses before evaluating the contents in brackets.
- Students will recognize what braces mean in an expression.
- Students will evaluate the contents in the brackets before evaluating the contents in braces.
- Evaluate expressions using parentheses, brackets, or braces with whole numbers, decimals, and fractions.

New Jersey Social and Emotional Learning Competencies:

Self-Awareness, Self-Management, Social Awareness, Responsible Decision-Making, Relationship Skills

Activities:

- Give students opportunities to practice social skills in small groups and project-based learning activities.
- Give students authentic feedback anytime they work well with others. Thank students whenever they listen well and tell them specifically what they did well. Give students authentic feedback for resolving conflicts peacefully
- Use rich math problems that demand group effort. Before proceeding, have students discuss norms for mathematical collaboration. Have them answer questions about what they like to do and say while working in groups or how they think others can act to make the group work well.
- Encourage students to reflect on how they approached mathematics “today,” including in journals or pair shares. Ask them to include

how their choices could be repeated if successful or improved in order to be more successful.

- Lead a discussion about taking different approaches to problem solutions, identifying feelings and thoughts of others who adopt these strategies

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New Jersey Student Learning Standards:

Operations and Algebraic Thinking

A. Write and interpret numerical expressions.

1. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
2. Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation “add 8 and 7, then multiply by 2” as $2 \times (8 + 7)$. Recognize that $3 \times (18932 + 921)$ is three times as large as $18932 + 921$, without having to calculate the indicated sum or product.

B. Analyze patterns and relationships.

3. Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. For example, given the rule “Add 3” and the starting number 0, and given the rule “Add 6” and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.

Assessment:

Benchmark: Big Ideas

Summative

Test:

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Quiz- Students will write equations to solve real-life problems.

Accomodations:

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Big Ideas Video Tutorials**Virtual Manipulatives****Digital Examples**

Skills Trainer - online (Big Ideas) interactive tool for skills practice - used for remediation or enrichment

Lessons & Activities:

- SE/TE-A: 55, 60-63, 64-66, 68, 73-74, 77-80, 92-95, 109, 113, 216-217, 227-228, 230, 235, 237-240, 242, 245
Workbook A: 63A, 81A, 81B, 95B, 108A, 108B, 109A, 113D, 225A, 240A, 241A, 315B, 315C, 315F, 315H

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9.1 21st-Century Life & Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

A. Critical Thinking and Problem Solving

9.1.8.A.1 Develop strategies to reinforce positive attitudes and productive behaviors that impact critical thinking and problem-solving skills.

9.1.8.A.2 Implement problem-solving strategies to solve a problem in school or the community.

9.1.8.A.3 Summarize strategies used by various organizations and agencies to solve problems that impact communities, and compare them with strategies used by similar organizations in another state or country.

9.1.8.A.4 Design and implement a project management plan using one or more problem-solving strategies.

B. Creativity and Innovation

9.1.8.B.1 Use multiple points of view to create alternative solutions.

9.1.8.B.2 Assess data gathered to solve a problem for which there are varying perspectives (e.g., cross-cultural, gender-specific, generational), and determine how the data can best be used to design multiple solutions.

C. Collaboration, Teamwork, and Leadership

9.1.8.C.1 Determine an individual's responsibility for personal actions and contributions to group activities.

9.1.8.C.2 Demonstrate the use of compromise, consensus, and community building strategies for carrying out different tasks, assignments, and projects.
9.1.8.C.3 Model leadership skills during classroom and extra-curricular activities.

Subject Area: Mathematics Grade Level: 5		
Unit Name: Addition and Subtraction of Decimals	Big Ideas - Modeling Real Life	Time Frame: 2-3 Weeks
Unit Rationale: Adding or subtracting multi-digit decimals is similar to adding or subtracting multi-digit whole numbers. Students can apply estimation skills to verify accuracy. These computation skills can be done using mental math skills. There is more than one way to estimate a sum or difference.		
Content: <ul style="list-style-type: none">• Students will be able to subtract whole numbers using the standard algorithm.• Students will add decimals using the standard algorithm.		

- Students will subtract decimals using the standard algorithm.
- Students will round decimals and whole numbers to specified place values.

Enduring Understandings:

- Students will apply the standard addition and subtraction algorithms to solve multi-digit number sentences.
- In order to round a decimal, look to the place value to the right to determine whether the value is rounded up (5 or more) or down.
- Variables can be used in an algebraic expression to represent an unknown value.

Skills:

- Students will understand that division is the inverse operation of addition and subtraction.
- Students will recognize and use compatible numbers to make a reasonable estimate.
- Students will demonstrate knowledge of expressions, equations, and number sentences.

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Number and Operations in Base Ten

B. Perform operations with multi-digit whole numbers and with decimals to hundredths.

5. Fluently multiply multi-digit whole numbers using the standard algorithm.
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Subject Area: Mathematics
Grade Level: 5

Unit Name: Multiplication of Whole Numbers

Big Ideas - Modeling Real Life

Time Frame: 2 Weeks

Unit Rationale:

The properties of multiplication can be used to simplify computation and to verify mental math and paper and pencil algorithms. Relationships can be described and generalizations made for mathematical situations that have numbers or objects that repeat in predictable ways.

The standard multiplication algorithm is to be applied to number sentences and real-life multiplication problems.

Content:

- Students will identify and apply the Commutative, Associating, Identity, Distributive and Zero Properties of Multiplication.
- Students will use mental math skills to find estimated products.
- Students will apply multiplication skills to solve real-life problems.

Enduring Understandings:

- The standard multiplication algorithm needs to be applied to accurately solve multiplication number sentences.
- To verify answers using estimation skills.
- To apply multiplication skills to solve real-life problems.

Skills:

- Students will reason abstractly and quantitatively.

- Students will attend to precision.
- Students will look for and make use of structure.

New Jersey Social and Emotional Learning Competencies:

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Activities:

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Subject Area: Mathematics

Grade Level: 5

Unit Name: Multiplication of Decimals

Big Ideas - Modeling Real Life

Time Frame: 3 Weeks

Unit Rationale:

Students will apply the previously learned place value skills to multiply decimal numbers. Students will determine if products are reasonable by finding estimated products.

Content:

- Students will multiply decimals by 10, 100 or 1,000.
- Students will estimate the product of a decimals and whole number.
- Students will multiply decimals using the traditional algorithm.

Enduring Understandings:

- Students will understand that rounding and compatible numbers are effective and efficient methods of estimating products.
- Multiplication of a positive number by a factor smaller than 1 results in a product less than the original number.

Skills:

- Students will illustrate correct alignment of digits when multiplying decimal numbers.
- Students will recall multiplication facts.
- Students will recall and demonstrate the steps of the standard multiplication algorithm.
- Students will reason abstractly and quantitatively.
- Students will attend to precision.

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- Source: <https://www.casel.org/wp-content/uploads/2017/08/SEL-in-Elementary-Math-8-20-17.pdf>

New Jersey Student Learning Standards:**Number and Operations in Base Ten****A. Understand the place value system.**

1. Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left.
2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.

3. Read, write, and compare decimals to thousandths.

a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.

b. Compare two decimals to thousandths based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.

4. Use place value understanding to round decimals to any place.

B. Perform operations with multi-digit whole numbers and with decimals to hundredths.

5. Fluently multiply multi-digit whole numbers using the standard algorithm.

6. Find whole-number quotients of whole numbers with up to four-digit dividends and two digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

7. Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Assessment:

Summative

Paper Tests - Version A, Version B, or Alternative Assessment (based on students needs and abilities)

Online Test (Big Ideas Website)- Teacher selected problems (based on students needs and abilities)

Formative

Quiz- teacher created paper quiz (based on students needs and abilities)

Accomodations:

Paper based and pdf worksheets (Big Ideas)

- Daily Skills Practice
- Vocabulary practice

- Prerequisite skills practice
- Extra practice
- Reteach
- Enrichment and Extension
- Vocabulary cards
- Differentiating a lesson worksheets

Web based practice and assessments

- Practice problems
 - Adjustable time
 - Calculator - 4 function, scientific, or graphing
 - Stepped out video examples
 - Answer check - 0,1,2,3,4,5, or Unlimited
- Tests and quizzes
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 - Prevent or Allow late submission
 - Release for review by teacher or upon submission
 - Randomize - recalculates the values for each question so students are not given the same assessment
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8.1.5.NI.1: Develop models that successfully transmit and receive information using both wired and wireless methods.

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8.1.8.CS.1: Recommend improvements to computing devices in order to improve the ways users interact with the devices and
8.1.8.CS.4: Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.
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8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.

<https://www.state.nj.us/education/aps/cccs/career/>

9.1 21st-Century Life & Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

A. Critical Thinking and Problem Solving

9.1.8.A.1 Develop strategies to reinforce positive attitudes and productive behaviors that impact critical thinking and problem-solving skills.

9.1.8.A.2 Implement problem-solving strategies to solve a problem in school or the community.

9.1.8.A.3 Summarize strategies used by various organizations and agencies to solve problems that impact communities, and compare them with strategies used by similar organizations in another state or country.

9.1.8.A.4 Design and implement a project management plan using one or more problem-solving strategies.

B. Creativity and Innovation

9.1.8.B.1 Use multiple points of view to create alternative solutions.

9.1.8.B.2 Assess data gathered to solve a problem for which there are varying perspectives (e.g., cross-cultural, gender-specific, generational), and determine how the data can best be used to design multiple solutions.

C. Collaboration, Teamwork, and Leadership

9.1.8.C.1 Determine an individual's responsibility for personal actions and contributions to group activities.

9.1.8.C.2 Demonstrate the use of compromise, consensus, and community building strategies for carrying out different tasks, assignments, and projects.

9.1.8.C.3 Model leadership skills during classroom and extra-curricular activities.

Subject Area: Mathematics

Grade Level: 5

Unit Name: Dividing Whole Numbers
and Dividing Decimals

Big Ideas - Modeling Real Life

Time Frame: 6-7 Weeks

Unit Rationale:

Students will understand dividing whole numbers
Students will understand dividing decimals

Content:

- Identify a whole number.
- Describe division patterns.
- Solve a problem using division.
- Model division of numbers.
- Identify a decimal.
- Write a decimal equation.
- Solve a problem using decimals.
- Model different types of decimals as equations.

Enduring Understandings:

- Use multiplication to divide
- Use place value and division facts to find quotients.
- Use division facts and compatible numbers to estimate quotients.
- Divide multi-digit numbers by one-digit numbers.
- Use an area model and partial quotients to divide.
- Use partial quotients to divide with a remainder.
- Divide three-digit numbers by two-digit numbers.

- Divide four-digit numbers by two-digit numbers.
- Solve word problems involving division of whole numbers.
- Find quotients involving decimals and powers of 10.
- Use compatible numbers to estimate quotients involving decimals.
- Use models to divide decimals by whole numbers.
- Divide decimals by one-digit whole numbers.
- Divide decimals by two-digit whole numbers.
- Use models to divide decimals by decimals.
- Divide decimals by decimals
- Insert zeros in the dividend when dividing with decimals and whole numbers.
- Solve word problems involving decimals.

Skills:

- Explain how to use an area model to divide.
- Write a related multiplication equation for a division problem.
- Use multiplication to solve a division problem.
- Divide a multiple of ten, one hundred, or one thousand by a one-digit number.
- Divide a multiple of ten, one hundred, or one thousand by a multiple of ten.
- Explain how to use place value and division facts to divide tens, hundreds, or thousands.
- Use division facts and compatible numbers to estimate a quotient.
- Find two estimates that a quotient is between.
- Use place value to divide.
- Show how to regroup when necessary.
- Find a quotient and a remainder.
- Explain how to use an area model to divide.
- Write partial quotients for a division problem.
- Add the partial quotients to find a quotient.
- Use partial quotients to divide.
- Find a remainder.
- Use estimation to place the first digit in a quotient.
- Use place value to divide.
- Use estimation or multiplication to check my answer.
- Use estimation to place the first digit in a quotient.
- Use place value to divide.
- Use estimation or multiplication to check my answer.

- Explain how to divide a number by a power of 10.
- Explain patterns in the placement of the decimal point when dividing a decimal by a power of 10.
- Rename a dividend to estimate a quotient.
- Use compatible numbers to estimate a quotient.
- Explain different ways to estimate a quotient.
- Use division facts and compatible numbers to estimate a quotient.
- Find two estimates that a quotient is between.
- Use a model to represent a decimal.
- Divide a model to show equal groups.
- Use a model to divide a decimal by a whole number.
- Use place value to divide.
- Place the decimal point in the quotient. - Regroup when necessary. - Use estimation to check my answer.
- Multiply a divisor and a dividend by a power of 10 to make the divisor a whole number.
- Place the decimal point in a quotient.
- Divide a decimal by a decimal.
- Explain when to insert one or more zeros in the dividend to find a quotient.
- Insert one or more zeros in a dividend to find a quotient.
- Recognize when a division problem is complete.

New Jersey Social and Emotional Learning Competencies:

Self-Awareness, Self-Management, Social Awareness, Responsible Decision-Making, Relationship Skills

Activities:

- Give students opportunities to practice social skills in small groups and project-based learning activities.
- Give students authentic feedback anytime they work well with others. Thank students whenever they listen well and tell them specifically what they did well. Give students authentic feedback for resolving conflicts peacefully
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New Jersey Student Learning Standards:

5.NBT.B.6

Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

5.NF.B.3

Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers.

5.NBT.A.2

Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole number exponents to denote powers of 10.

5.NBT.B.7

Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

5.NBT.A.4

Use place value understanding to round decimals to any place.

Assessment:

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A. Critical Thinking and Problem Solving

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9.1.8.A.4 Design and implement a project management plan using one or more problem-solving strategies.

B. Creativity and Innovation

9.1.8.B.1 Use multiple points of view to create alternative solutions.
9.1.8.B.2 Assess data gathered to solve a problem for which there are varying perspectives (e.g., cross-cultural, gender-specific, generational), and determine how the data can best be used to design multiple solutions.

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9.1.8.C.2 Demonstrate the use of compromise, consensus, and community building strategies for carrying out different tasks, assignments, and projects.
9.1.8.C.3 Model leadership skills during classroom and extra-curricular activities.

Subject Area: Mathematics

Grade Level: 5

Unit Name: Number and Operations—Fractions

Big Ideas - Modeling Real Life

Time Frame: 8-9 Weeks

Unit Rationale:

Students will apply and extend previous understandings of multiplication and division to multiply and divide fractions
Students will use equivalent fractions as a strategy to add and subtract fractions

Content:

- Add and subtract fractions with unlike denominators.
- Solve word problems involving addition and subtraction of fractions
- Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers
- Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
- Interpret multiplication as scaling
- Solve real world problems involving multiplication of fractions and mixed numbers
- Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions

Enduring Understandings:

- Students will apply the standard addition and subtraction algorithms to solve addition and subtraction of fractions problems.
- Students will apply the standard multiplication and division algorithms to solve multiplication and division of fractions problems
- Students will change mixed numbers to improper fractions and apply multiplications and division of fractions skills to solve problems with mixed numbers

Skills:

- Write fractions in simplest form

- Estimate sums and differences of fractions
- Write fractions using common denominators
- Add and subtract fractions with unlike denominators
- Add and subtract mixed numbers with unlike denominators
- Solve multi-step word problems involving fractions and mixed numbers
- Multiply whole numbers by fractions and fractions by whole numbers
- Find areas of rectangles using fractions
- Multiply mixed numbers by mixed numbers

New Jersey Social and Emotional Learning Competencies:

Self-Awareness, Self-Management, Social Awareness, Responsible Decision-Making, Relationship Skills

Activities:

- Give students opportunities to practice social skills in small groups and project-based learning activities.
- Give students authentic feedback anytime they work well with others. Thank students whenever they listen well and tell them specifically what they did well. Give students authentic feedback for resolving conflicts peacefully
- Use rich math problems that demand group effort. Before proceeding, have students discuss norms for mathematical collaboration. Have them answer questions about what they like to do and say while working in groups or how they think others can act to make the group work well.
- Encourage students to reflect on how they approached mathematics “today,” including in journals or pair shares. Ask them to include how their choices could be repeated if successful or improved in order to be more successful.
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New Jersey Student Learning Standards:

Number and Operations—Fractions 5.NF

A. Use equivalent fractions as a strategy to add and subtract fractions.

1. Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$. (In general, $\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$.)
2. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g.,

by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result $2/5 + 1/2 = 3/7$, by observing that $3/7 < 1/2$.

B. Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

3. Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. For example, interpret $3/4$ as the result of dividing 3 by 4, noting that $3/4$ multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size $3/4$. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?

4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. For example, use a visual fraction model to show $(2/3) \times 4 = 8/3$, and create a story context for this equation. Do the same with $(2/3) \times (4/5) = 8/15$. (In general, $(a/b) \times (c/d) = ac/bd$.) b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.

5. Interpret multiplication as scaling (resizing), by: a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.

6. Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem. New Jersey Student Learning Standards for Mathematics 6

7. Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.1 a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for $(1/3) \div 4$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$. b. Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for $4 \div (1/5)$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$. c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. For example, how much chocolate will each person get if 3 people share $1/2$ lb of chocolate equally? How many $1/3$ -cup servings are in 2 cups of raisins?

Assessment:

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Subject Area: Mathematics Grade Level: 5		
Unit Name: Climate Change	Big Ideas - Modeling Real Life	Time Frame: 1 week
Unit Rationale: Students learn that CO ₂ is emitted when gasoline is burned, that too much CO ₂ is causing global warming, and that trees absorb CO ₂ and produce oxygen. Using simple arithmetic to figure the amount of CO ₂ emissions produced by their own travel, students discover why fuel-efficient cars are more environmentally friendly and consider alternative transportation. As a wrap-up activity, students design bumper stickers that express the information they have learned.		

Content:

- Students will be able to:
- Describe the impact of cars on air quality.
- Understand the importance of trees to air quality.
- Practice basic computation skills.
- Apply math skills to understand real-life issues and problems.
- Create a slogan that expresses the relationship between cars and air quality.

Project Link:

-  Gr 5 Climate Change

Skills:

- Students will illustrate correct alignment of digits when multiplying decimal numbers.
- Students will recall multiplication facts.
- Students will recall and demonstrate the steps of the standard multiplication algorithm.
- Students will reason abstractly and quantitatively.
- Students will attend to precision.

New Jersey Social and Emotional Learning Competencies:

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Activities:

- Give students opportunities to practice social skills in small groups and project-based learning activities.
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- Use rich math problems that demand group effort. Before proceeding, have students discuss norms for mathematical collaboration. Have them answer questions about what they like to do and say while working in groups or how they think others can act to make the group work well.
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New Jersey Student Learning Standards:

Number and Operations in Base Ten

A. Understand the place value system.

1. Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $1/10$ of what it represents in the place to its left.
2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
3. Read, write, and compare decimals to thousandths.
 - a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.
 - b. Compare two decimals to thousandths based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.
4. Use place value understanding to round decimals to any place.

B. Perform operations with multi-digit whole numbers and with decimals to hundredths.

5. Fluently multiply multi-digit whole numbers using the standard algorithm.
6. Find whole-number quotients of whole numbers with up to four-digit dividends and two digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
7. Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the

reasoning used.

3-5-ETS1: Engineering Design ETS1.B: Developing Possible Solutions
MS-ESS3-5

Assessment:

Successful completion of the math problems (this would assess skills gained prior to the session) and application of them to the problem of global warming

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B. Creativity and Innovation

9.1.8.B.1 Use multiple points of view to create alternative solutions.

9.1.8.B.2 Assess data gathered to solve a problem for which there are varying perspectives (e.g., cross-cultural, gender-specific, generational),

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C. Collaboration, Teamwork, and Leadership

9.1.8.C.1 Determine an individual's responsibility for personal actions and contributions to group activities.

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9.1.8.C.3 Model leadership skills during classroom and extra-curricular activities.

Subject Area: Mathematics

Grade Level: 5

Unit Name: Convert and Display
Units of Measure

Big Ideas - Modeling Real Life

Time Frame: 2-3 Weeks

Unit Rationale:

Students will understand measurements

Content:

- Identify length in metric units.
- Describe mass and capacity in metric units.
- Solve a problem using different ways to measure items.
- Compare the values of two different forms of measurement.

Enduring Understandings:

- Write lengths using equivalent metric measures.
- Write masses and capacities using equivalent metric measures.

- Write lengths using equivalent customary measures.
- Write weights using equivalent customary measures.
- Write capacities using equivalent customary measures.
- Make line plots and use them to solve problems.
- Solve multi-step word problems involving units of measure.

Skills:

- Compare the sizes of two metric units of length.
- Write a metric length using a smaller metric unit.
- Write a metric length using a larger metric unit.
- Compare the sizes of two metric units of mass and capacity.
- Write metric masses and capacities using smaller metric units.
- Write metric masses and capacities using larger metric units.
- Compare the sizes of two customary units of length.
- Write a customary length using a smaller customary unit.
- Write a customary length using a larger customary unit.
- Compare the sizes of two customary units of weight.
- Write a customary weight using a smaller customary unit.
- Write a customary weight using a larger customary unit.
- Compare the sizes of two customary units of capacity.
- Write a customary capacity using a smaller customary unit.
- Write a customary capacity using a larger customary unit.
- Make a line plot.
- Interpret a line plot.
- Use a line plot to solve a real-life problem.

New Jersey Social and Emotional Learning Competencies:**Self-Awareness, Self-Management, Social Awareness, Responsible Decision-Making, Relationship Skills****Activities:**

- Give students opportunities to practice social skills in small groups and project-based learning activities.
- Give students authentic feedback anytime they work well with others. Thank students whenever they listen well and tell them specifically what they did well. Give students authentic feedback for resolving conflicts peacefully
- Use rich math problems that demand group effort. Before proceeding, have students discuss norms for mathematical collaboration.

Have them answer questions about what they like to do and say while working in groups or how they think others can act to make the group work well.

- Encourage students to reflect on how they approached mathematics “today,” including in journals or pair shares. Ask them to include how their choices could be repeated if successful or improved in order to be more successful.
- Lead a discussion about taking different approaches to problem solutions, identifying feelings and thoughts of others who adopt these strategies
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New Jersey Student Learning Standards:

5.MD.A.1

Convert among different-sized standard measurement units within a given measurement system, and use these conversions in solving multi-step, real world problems.

5.MD.B.2

Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$) . Use operations on fractions for this grade to solve problems involving information presented in line plots.

Assessment:

Summative

Paper Tests - Version A, Version B, or Alternative Assessment (based on students needs and abilities)

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Quiz- teacher created paper quiz (based on students needs and abilities)

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- Extra practice
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A. Critical Thinking and Problem Solving

9.1.8.A.1 Develop strategies to reinforce positive attitudes and productive behaviors that impact critical thinking and problem-solving skills.

9.1.8.A.2 Implement problem-solving strategies to solve a problem in school or the community.

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Subject Area: Mathematics

Grade Level: 5

**Unit Name: Patterns in the
Coordinate Plane**

Big Ideas - Modeling Real Life

Time Frame: 2 Weeks

Unit Rationale:

Students will understand patterns and the coordinate plane.

Content:

- Identify patterns.
- Plot points on a coordinate plane.
- Analyze line graphs.
- Interpret relationships.

Enduring Understandings:

- Identify and plot points in a coordinate plane.
- Relate points and find distances in a coordinate plane.
- Draw and identify polygons in a coordinate plane
- Graph and interpret data in a coordinate plane.
- Make and interpret line graphs
- Create and describe numerical patterns.
- Use a graph to describe the relationship between two numerical patterns.

Skills:

- Use an ordered pair to identify the location of a point in a coordinate plane.
- Plot and label a point in a coordinate plane.
- Explain the relationship between two points that have the same x-coordinates or y-coordinates.
- Count grid lines to find the distance between two points.
- Use subtraction to find the distance between two points.
- Draw polygons in a coordinate plane.
- Identify polygons in a coordinate plane.
- Draw a symmetric shape in a coordinate plane given one half of the shape and a line of symmetry.
- Use ordered pairs to represent data.
- Graph data in a coordinate plane.
- Interpret data shown in a coordinate plane.
- Make a line graph.

- Interpret a line graph.
- Create a numerical pattern.
- Describe features of a numerical pattern.
- Describe the relationship between two numerical patterns
- Generate two numerical patterns.
- Use two numerical patterns to write and plot ordered pairs in a coordinate plane.
- Use a graph to describe the relationship between two numerical patterns

New Jersey Social and Emotional Learning Competencies:

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Activities:

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- Give students authentic feedback anytime they work well with others. Thank students whenever they listen well and tell them specifically what they did well. Give students authentic feedback for resolving conflicts peacefully
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New Jersey Student Learning Standards:

5.G.A.1

Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond.

5.G.A.2

Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

5.OA.B.3

Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane

Assessment:

Summative

Paper Tests - Version A, Version B, or Alternative Assessment (based on students needs and abilities)

Online Test (Big Ideas Website)- Teacher selected problems (based on students needs and abilities)

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B. Creativity and Innovation

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C. Collaboration, Teamwork, and Leadership

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Subject Area: Mathematics

Grade Level: 5

Unit Name: Understanding Volume

Big Ideas - Modeling Real Life

Time Frame: 2 Weeks

Unit Rationale:

Students will understand volume.

Content:

- Define volume.
- Describe volume.
- Compare volumes.
- Apply the volume formula.

Enduring Understandings:

- Count to find volumes of solid figures.
- Find volumes of right rectangular prisms.
- Use a formula to find volumes of rectangular prisms.
- Find unknown dimensions of rectangular prisms.
- Find volumes of composite figures.

Skills:

- Count the number of unit cubes in a figure.
- Tell the volume of a solid figure in cubic units.
- Identify units as cubic inches, cubic feet, or cubic centimeters.
- Find the number of unit cubes in each layer of a rectangular prism.
- Use the number of unit cubes in each layer to find the volume of a rectangular prism.
- Write a formula for the volume of a rectangular prism.
- Explain how to use the area of the base to find the volume of a rectangular prism.
- Use a formula to find the volume of a rectangular prism.
- Find the height of a rectangular prism given the volume of the prism and the area of the base.
- Find an unknown dimension of a rectangular prism given the volume of the prism and the other two dimensions.
- Break apart a composite figure into rectangular prisms.
- Find an unknown dimension of a composite figure.
- Add the volumes of rectangular prisms to find the volume of a composite figure.

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Activities:

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New Jersey Student Learning Standards:

5.MD.C.3

Recognize volume as an attribute of solid figures and understand concepts of volume measurement. A cube with side length 1 unit, called a “unit cube,” is said to have “one cubic unit” of volume, and can be used to measure volume. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.

5.MD.C.4

Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.

5.MD.C.5

Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.

5.MD.C.5a

Find the volume of a right rectangular prism with whole number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes.

5.MD.C.5b

Apply the formulas $V = \ell \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.

5.MD.C.5c

Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.

Assessment:

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Subject Area: Mathematics Grade Level: 5		
Unit Name: Classify Two-Dimensional Shapes	Big Ideas - Modeling Real Life	Time Frame: 1 Week
Unit Rationale: Students will understand two-dimensional shapes		
Content: <ul style="list-style-type: none">● Define two-dimensional shapes.● Explain different shapes and their features.● Compare shapes.● Draw shapes.		
Enduring Understandings:		

- Classify triangles by their angles and their sides.
- Classify quadrilaterals by their angles and their sides.
- Understand the hierarchy of quadrilaterals.

Skills:

- Identify an angle of a triangle as right, acute, or obtuse.
- Determine whether sides of a triangle have the same length.
- Use angles and sides to classify a triangle.
- Identify parallel sides and sides with the same length in a quadrilateral.
- Identify right angles in a quadrilateral.
- Use angles and sides to classify a quadrilateral.
- Arrange quadrilaterals in a Venn diagram based on their properties.
- Use a Venn diagram to make statements about the relationships among quadrilaterals.

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New Jersey Student Learning Standards:**5.G.B.3**

Understand that attributes belonging to a category of two dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.

5.G.B.4

Classify two-dimensional figures in a hierarchy based on properties.

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