# Mathematics Curriculum ~ Grade Three
## Diocese of Cleveland

## Unit 1:  Multiplication and Division

## Standards Assessed

**CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 3, Reading: Informational Text**
Craft and Structure
4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

- RI.3.4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.

**CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 3, Speaking and Listening**
Comprehension and Collaboration
1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

- SL.3.1d. Explain their own ideas and understanding in light of the discussion.

**CCSS: Mathematics (2011), OH: CCSS: Grade 3, Operations & Algebraic Thinking**
3.OA Represent and solve problems involving multiplication and division.

- 3.OA.1. Interpret products of whole numbers, e.g., interpret $5 \times 7$ as the total number of objects in 5 groups of 7 objects each.
- 3.OA.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.
- 3.OA.3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities.
- 3.OA.4. Determine the unknown whole number in a multiplication or division equation relating three whole numbers.

**3.OA Understand properties of multiplication and the relationship between multiplication and division.**

- 3.OA.5. Apply properties of operations as strategies to multiply and divide.
- 3.OA.6. Understand division as an unknown-factor problem.

3.OA Multiply and divide within 100.

- 3.OA.7. Fluently 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.

**DOC: Mathematics, DOC: Grade 3, Numbers, Number Sense and Operations**
B. Meaning of Operations

- 1. Model, represent and explain multiplication; e.g., repeated addition, skip counting, rectangular arrays and area model.
- 3. Understand that, unlike addition and subtraction, the factors in multiplication and division may have different units; e.g., 3 boxes of 5 cookies each.
- 9. Model and use the commutative and associative properties for addition and multiplication.

## Essential Questions

- How are multiplication and division related?
- How does repeated addition/subtraction represent multiplication/division?
- How do equal jumps on a number line represent multiplication and division?
- What are the properties of multiplication/division?
- Why is it important to memorize multiplication and division facts?

- How do we use multiplication and division to solve problems?

# Content

**The students will know**

1. Multiplication of whole numbers
2. Division of whole numbers
3. Properties of operations as strategies to multiply and divide
4. The factors in multiplication and division may have different units (e.g.3 boxes of 5 cookies each)
5. Multiplication and division facts within 100
6. Multiplication and division within 100 can be used to solve word problems
7. Unknown whole number in a multiplication or division equation relating three whole numbers
8. Division as an unknown-factor problem
9. Commutative, associative, and distributive properties for addition and multiplication.
10. All products of two one-digit numbers

# Skills
Bloom's Taxonomy
DOK Links

**The students will be able to**

1. Model, represent and explain multiplication.
2. Draw a visual representation (array, drawing, area model, etc.) for a given multiplication or division word problem.
3. Model and use the commutative and associative properties for addition and multiplication.
4. Model and use the distributive property for multiplication.
5. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities.
6. Determine the unknown whole number in a multiplication or division equation relating three whole numbers.
7. Fluently multiply and divide within 100. By the end of Grade 3, know from memory all products of two one-digit numbers.
8. Describe whole number products in terms of factors.
9. Draw a model to represent a given product.
10. Create a manipulative model to represent a multiplication equation.
11. State/ list the factors of a given product.
12. Translate word form in a multiplication context to numeric form and vice versa.
13. Describe whole number division in terms of equal groups/ partitions.
14. Translate word form in a division context to numeric form and vice versa.
15. Create a manipulative model to represent a division equation.
16. Write an equation to represent a multiplication or division word problem with a symbol for the unknown.
17. Choose the appropriate operation based on context clues in text.
18. Solve for a missing factor of a given product (divisor, dividend or quotient) with a symbol for the unknown.
19. Evaluate the truth value of a product for a given factor.
20. Explain the process of using the "unknown-factor" as a way of solving a division problem.

### Reading/Writing Skills

1. Define specific vocabulary from the Common Core and apply it to solve problems.
2. Justify solutions verbally or in written form to explain processes and summarize results.

# Common Core Vocabulary

product
whole numbers
multiplication
array
equal groups
digit
solve

# Additional Vocabulary

factor(s)
equal groups/parts
division
dividend
quotient
divisor
digit
solve
factor(s)
fact family
inverse operation
multiplication
unknown factor
commutative property
associative property
distributive property

| Learning Experiences (Suggested) | Assessment (Suggested) |
|---|---|
| 1. Class activity: Using a large number line, demonstrate with a counter how hops of 5 can be taken on the number line. Encourage students to count aloud as the hops are made. Introduce the equation notation $4 \times 5 = 20$, informally reading it as "Four hops of 5, and you land on 20." After several examples with 5 as a factor, ask the students to determine what size hop to use next. Encourage the students to predict the products and to verify their predictions by moving a counter on the large number line. | **Rectangular Arrays & the Commutative Property**<br>**Formative: Response Journal**<br><br>Students draw arrays for multiplication problems showing factors and products and then write explanations of what they did in their math journals. (Commutative Property) |
| 2. Following the class activity, give each student a piece of paper and ask them to make up 2 similar problems and trade them with a friend to solve using the number line. When the pairs have finished, call them together to discuss what they did. Encourage them to use the number line in their explanation. | **Associative Property**<br>**Formative: Homework**<br><br>Students will find the product of three numbers by having them use what they know about the product of two of the factors and multiply this by the third factor (associative property). |
| 3. Working with a partner, students will use arrays to prove multiplication problems. (Provide students with a "corner piece" and a number of cubes, or similar objects, and show them how to place the corner piece and the cubes.)<br>Have students show the array of 3 X 2. Discuss how this is different/the same (commutative property). Ask the students to make other arrays. Have them write the multiplication expression shown in the array. | **Problem Solving**<br>**Formative: Graphic Organizer**<br><br>Given a step-by-step graphic organizer, students draw or write the steps that they would go through in order to solve a given multiplication/division word or numerical problem. |
| 4. Class activity. Using graph paper (or a blank multiplication table), have students create the multiplication table. Students should begin to memorize the multiplication facts. | **Multiplication and Division Facts**<br>**Formative: Peer Assessment**<br><br>Students work with partners to test their multiplication and division fact fluency (flashcards). Students regularly record their personal scores and graph their own improvements over time. |
| 5. Engage students in games and activities to help students know and remember the multiplication facts. | |
| 6. Challenge the students to find the product of three numbers by having them use what they know about the product of two of the factors and multiply this by the third factor. (For example, to multiply 5 X 7 X 2, students know that 5 X 2 = 10. Then, they can use mental math to find the product of 10 X 7 [70].) Discuss the associative property of multiplication with the students. | **Distributive Property**<br>**Formative: Cooperative Group Work**<br><br>Working with a partner, students will "split" a number of arrays to demonstrate their understanding of the distributive property for multiplication. They will write an explanation of the process they used. |
| 7. Class activity. Review with students how they used arrays to picture multiplication. Extend their understanding of multiplication by "splitting" arrays to help them better understand the distributive property. For example, students can split a 7 X 8 array into 7 groups of 5 and 7 groups of 3, then, add the sums of the groups. The 7 groups of 5 are 35 and the 7 groups of 3 is 21. This can be written as 7 X 8 = 7 X 5 + 7 X 3. | **Division as Unknown-Factor Problem**<br>**Formative: Cooperative Group Work**<br><br>Working with a partner, students will solve several division problems (as an "unknown-factor" problem) and explain the process they used. |
| 8. Working with a partner, have students solve a number of multiplication problems using the commutative, associative, and | |

distributive properties. Ask them to explain the process used in solving the problems.

9. Challenge students to explain division as an unknown-factor problem. Ask them to examine a problem such as 36 divided by 9 and determine how they would find the answer. (What number when multiplied by 9 equals 36?)
10. Working with a partner, have students solve several division problems and explain the process they used.

Skip count

Multiplication Activities and Resources

## Resources (Suggested)

1. iPad Resources
2. Literature Connection
   *Bananas* by Jacqueline Farmer
   *Centipede's 100 Shoes* by Tony Ross
   *Hottest, Coldest, Highest, Deepest* by Steve Jenkins
   *One Hundred Hungry Ants* by Elinor J. Pinczes
   *P. Bear's New Year's Party* by Paul Owen Lewis
   *Ten Times Better* by Richard Michelson
   *Two Ways to Count to Ten: A Liberian Folktale* by Ruby Dee
   *2 X 2 = Boo: A Set of Spooky Multiplication Stories* by Loreen Leedy
   *Divide and Ride* by Stuart J. Murphy and George Ulrich
   *Eric the Math Bear* by Caroline Glicksman
   *One Hungry Cat* by Joanne Rocklin and Rowan Barnes-Murphy
   *Two of Everything* by Lily Toy Hong
3. Internet Resources

Multiplication ideas

The National Library of Virtual Manipulatives

The Math Worksheet Site

Brain Pop

Multiplication Resources and Activities

Fun for the Brain ~ Division Activities

Math Charts

Khan Academy & Common Core

## Catholic Identity

**Social Justice Teachings**
- Life And Dignity Of The Human Person
- Call To Family, Community, And Participation
- Rights And Responsibilities
- Solidarity
- Care For God's Creation

**Rights of Children**
- THE RIGHT TO A SAFE ENVIRONMENT that promotes care, protection and security.
- THE RIGHT TO BE RESPECTED AS INDIVIDUALS with human dignity.
- THE RIGHT TO WORK ACTIVELY TOWARD THEIR OWN EMPOWERMENT through the development of their gifts and talents.
- THE RIGHT TO A LEARNING ENVIRONMENT THAT VALUES COOPERATION, and challenges its members to critical and reflective thinking in their search for truth.
- THE RIGHT TO DEVELOP POSITIVE, RESPONSIBLE AND CARING ATTITUDES AND BEHAVIORS TOWARD OTHERS and to recognize the rights of others to be safe and free from harassment and abuse.
- THE RIGHT TO LEARN THE SKILL OF SELF PROTECTION by identifying safe and unsafe situations.
- THE RIGHT TO LEARN RESPONSIBILITY for themselves and their actions.

## Unit 2:  Multiply and Divide Within 100

### Standards Assessed
**CCSS: Mathematics (2011), OH: CCSS: Grade 3, Operations & Algebraic Thinking**
3.OA Represent and solve problems involving multiplication and division.

- 3.OA.1. Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each.
- 3.OA.2. Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 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.
- 3.OA.3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities.
- 3.OA.4. Determine the unknown whole number in a multiplication or division equation relating three whole numbers.

**3.OA Understand properties of multiplication and the relationship between multiplication and division.**

- 3.OA.5. Apply properties of operations as strategies to multiply and divide.
- 3.OA.6. Understand division as an unknown-factor problem.

**3.OA Multiply and divide within 100.**

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

**3.OA Solve problems involving the four operations, and identify and explain patterns in arithmetic.**

- 3.OA.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.9. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.

### Essential Questions

- What are the properties of multiplication/division?
- Why is it important to memorize multiplication and division facts?
- How do we use multiplication and division to solve problems?
- What are efficient methods for finding products and quotients?
- Why is the ability to solve problems the heart of mathematics?

### Content

The students will know

1. Efficient strategies for solving two-step problems using the four operations
2. The connection between multiplication and division
3. Efficient strategies for solving multiplication and division problems
4. Commutative, associative, and distributive properties as they apply to multiplication and division
5. By memory the multiplication and division facts

### Skills
Bloom's Taxonomy
DOK Links

The students will be able to

1. Interpret and explain products of whole numbers.
2. Interpret and explain whole-number quotients of whole numbers.
3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities.
4. Determine the unknown whole number in a multiplication or division equation relating three whole numbers.
5. Describe and illustrate the commutative property as applied to addition and multiplication.

| | 6. Apply the associative property in solving the multiplication of three-whole numbers.<br>7. Describe and illustrate how the distributive property is used in solving multiplication problems.<br>8. Solve multiplication equations within 100.<br>9. Solve division equations within 100.<br>10. Commit to memory the multiplication facts.<br><br>**Reading/Writing Skills**<br><br>1. Define specific vocabulary from the Common Core and apply it to solve problems.<br>2. Justify solutions verbally or in written form to explain processes and summarize results. |
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| **Common Core Vocabulary**<br><br>product<br>whole numbers<br>multiplication<br>array<br>equal groups<br>digit<br>solve<br>factor(s)<br>equal groups/parts<br>division<br>dividend<br>quotient<br>divisor<br>digit<br>solve<br>factor(s)<br>fact family<br>inverse operation<br>multiplication<br>unknown-factor<br>commutative property<br>associative property<br>distributive property | **Additional Vocabulary** |
| **Learning Experiences (Suggested)**<br><br>1. Working with partners, have students solve two and three whole-number multiplication problems within 100. Explain the process used to solve the problems to the class.<br>2. Class activity. Using a variety of arrays and numeric equations have students employ the commutative and associative properties in solving problems.<br>3. Using many arrays, have students practice "decomposing" the whole into groups as a way of developing a thorough understanding of the distributive property and its use in solving multiplication equations.<br>4. Class activity. Have students determine the unknown whole number in a multiplication or division equation relating three whole numbers.<br>5. Working with partners, have students solve two whole-number division problems within 100 expressing division as an unknown-factor problem. Explain the process used to solve the problems to the class. | **Assessment (Suggested)**<br><br>**Multiplication Within 100**<br>Formative: Class Work<br><br>Students will solve two and three whole-number multiplication problems within 100. Explain the process used to solve the problems to the class.<br><br>**Properties of Multiplication**<br>Formative: Class Work<br><br>Using a variety of arrays and numeric equations students will employ the commutative and associative properties in solving problems and explain the process step by step.<br><br>**Distributive Property**<br>Formative: Class Work |

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| 6. Engage students in activities that will assist them in committing the multiplication facts to memory. | Using many arrays, students will practice "decomposing" the whole into groups as a way of showing a thorough understanding of the distributive property and its use in solving multiplication equations.<br><br>**Finding the "Unknown"**<br>**Formative: Homework**<br><br>Working with a number of equations, students will determine the unknown whole number in a multiplication or division equation relating three whole numbers.<br><br>**"Unknown-Factor Problem"**<br>**Formative: Homework**<br><br>Students will solve two whole-number division problems within 100 expressing division as an unknown-factor problem and explain the process used to solve the problems to the class.<br><br>**Multiplication Facts**<br>**Summative: Homework**<br><br>Students will memorize the multiplication facts. |
| <p style="color:blue">**Resources (Suggested)**</p><br>1.  iPad Resources<br>2.  Literature Connection<br>   *Bananas* by Jacqueline Farmer<br>   *Centipede's 100 Shoes* by Tony Ross<br>   *Hottest, Coldest, Highest, Deepest* by Steve Jenkins<br>   *One Hundred Hungry Ants* by Elinor J. Pinczes<br>   *P. Bear's New Year's Party* by Paul Owen Lewis<br>   *Ten Times Better* by Richard Michelson<br>   *Two Ways to Count to Ten: A Liberian Folktale* by Ruby Dee<br>   *2 X 2 = Boo: A Set of Spooky Multiplication Stories* by Loreen Leedy<br>   *Divide and Ride* by Stuart J. Murphy and George Ulrich<br>   *Eric the Math Bear* by Caroline Glicksman<br>   *One Hungry Cat* by Joanne Rocklin and Rowan Barnes-Murphy<br>   *Two of Everything* by Lily Toy Hong<br>3.  Internet Resources<br><br>   Multiplication Activities & Resources<br><br>   The National Library of Virtual Manipulatives<br><br>   The Math Worksheet Site<br><br>   Brain Pop<br><br>   Division Worksheets<br><br>   Free Math Worksheets | <p style="color:blue">**Catholic Identity**</p><br>**Social Justice Teachings**<br>   ⚜ Life And Dignity Of The Human Person<br>   ⚜ Call To Family, Community, And Participation<br>   ⚜ Rights And Responsibilities<br>   ⚜ The Dignity Of Work And The Rights Of Workers<br><br>**Rights of Children**<br>   ⚜ THE RIGHT TO A SAFE ENVIRONMENT that promotes care, protection and security.<br>   ⚜ THE RIGHT TO BE RESPECTED AS INDIVIDUALS with human dignity.<br>   ⚜ THE RIGHT TO WORK ACTIVELY TOWARD THEIR OWN EMPOWERMENT through the development of their gifts and talents.<br>   ⚜ THE RIGHT TO A LEARNING ENVIRONMENT THAT VALUES COOPERATION, and challenges its members to critical and reflective thinking in their search for truth.<br>   ⚜ THE RIGHT TO DEVELOP POSITIVE, RESPONSIBLE AND CARING ATTITUDES AND BEHAVIORS TOWARD OTHERS and to recognize the rights of others to be safe and free from harassment and abuse.<br>   ⚜ THE RIGHT TO LEARN RESPONSIBILITY for themselves and their actions.<br>   ⚜ THE RIGHT TO MAKE RESPONSIBLE DECISIONS founded on religious conviction. |

Commutative, Associative and Distributive Laws

Math Charts

## Unit 3:  Solving Word Problems

## Standards Assessed

**CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 3, Reading: Informational Text**
Key Ideas and Details
1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

- RI.3.1. Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.

3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

- RI.3.3. Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.

Craft and Structure
4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

- RI.3.4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.

**CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 3, Writing**
Production and Distribution of Writing
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

- W.3.4. With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose. (Grade-specific expectations for writing types are defined in standards 1–3 above.)

**CCSS: Mathematics (2011), OH: CCSS: Grade 3, Mathematical Practice**
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.
- 3. Construct viable arguments and critique the reasoning of others.
- 4. Model with mathematics.
- 8. Look for and express regularity in repeated reasoning.

**CCSS: Mathematics (2011), OH: CCSS: Grade 3, Operations & Algebraic Thinking**
3.OA Solve problems involving the four operations, and identify and explain patterns in arithmetic.

- 3.OA.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.9. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.

**DOC: Mathematics, DOC: Grade 3, Patterns, Functions, and Algebra**
A. Patterns, Relations and Functions

- 1. Extend multiplicative and growing patterns, and describe the pattern or rule in words.

## Essential Questions

- How do I know where to begin when solving problems?

- How does explaining my process help me to understand a problem's solution better?
- How do I decide what strategy will work best in a given problem situation?
- How do I know when a result is reasonable?
- In what ways is solving a problem related to computation?
- Why is the ability to solve problems the heart of mathematics?

## Content

**The students will know**

1. Strategies for solving two-step word problems using the four operations
2. Methods for translating word problems into numeric equations with a letter standing for the unknown quantity
3. Mental computation and estimation strategies
4. Arithmetic patterns

## Skills

Bloom's Taxonomy
DOK Links

**The students will be able to**

1. Strategize to solve two-step word problems using the four operations.
2. Represent word problems using equations with a letter standing for the unknown quantity.
3. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
4. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.
5. Represent and analyze patterns, using words, tables, and graphs.
6. Extend multiplicative and growing patterns, and describe the pattern or rule in words.
7. Commit the multiplication facts to memory.
8. Practice addition and subtraction facts.
9. Practice multiplication and division facts.

   **Reading/Writing Skills**

1. Define specific vocabulary from the Common Core and apply it to solve problems.
2. Justify solutions verbally or in written form to explain processes and summarize results.

## Common Core Vocabulary

1. Equation
2. Unknown quantity
3. Mental computation
4. Estimation
5. Rounding
6. Reasonableness
7. Arithmetic patterns
8. Multiplicative patterns
9. Growing patterns
10. Pattern rule
11. Extend

## Additional Vocabulary

1. Variable
2. Multiple
3. Factor
4. Product
5. Double
6. Sequence
7. Table of values

## Learning Experiences (Suggested)

1. Working with a partner, have students represent word problems in drawings, counters, and blocks and write equations to represent the problem.
2. Class activity. Present students with a number of problems and ask them to represent the problem situation in a drawing. Ask them to use mental computation and estimation strategies to determine the reasonableness of the solution.

## Assessment (Suggested)

**Representing Word Problems**
**Formative: Response Journal**

When students represent word problems with manipulatives, they will draw their representations and write the corresponding equations in their math journals. They will judge and discuss verbally or in writing the

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|---|---|
| 3. Working with a partner, students should model how various strategies can be used to solve problems by analyzing the structure of the problem to make sense of it. They should then think through the problem and the meaning of the answer before attempting to solve it. Ask partners to share their thinking with the class.<br>4. Using the link to the NCTM site (see Link), have students explore, identify, and explain the likenesses, differences and changes in patterns using properties of operations. Focus for this activity should be the addition and multiplication tables.<br>5. Engage students in activities that will assist them in committing the multiplication facts to memory.<br><br><br><br><br><br>Patterns | reasonableness of their solutions.<br><br>**Patterns in Addition and Multiplication**<br>**Formative: Writing Assignment**<br><br>As students work together to complete activities to discover patterns in addition and multiplication, they write down pattern rules in a self-made "pattern book." For each page of the pattern book, they explain the pattern in words and drawings.<br><br>**Thinking Through a Problem**<br>**Summative: Class Work**<br><br>Working with a partner, students will model how various strategies can be used to solve problems by analyzing the structure of the problem to make sense of it. They will then think through the problem and the meaning of the answer before attempting to solve it. Ask partners to share their thinking with the class.<br><br>**Looking at Patterns**<br>**Formative: Class Work**<br><br>Using the link to the NCTM site (see Link), students will explore, identify, and explain the likenesses, differences and changes in patterns using properties of operations. Focus for this activity should be the addition and multiplication tables.<br><br>**Knowing the Facts**<br>**Summative: Oral Assessment**<br><br>Students will demonstrate memorization of the multiplication facts. |
| ## Resources (Suggested)<br><br>1. iPad Resources<br>2. Literature Connection<br>  *Bananas* by Jacqueline Farmer<br>  *Centipede's 100 Shoes* by Tony Ross<br>  *Hottest, Coldest, Highest, Deepest* by Steve Jenkins<br>  *In the Next Three Seconds . . . Predictions for the Millennium* by Rowland Morgan<br>  *One Hundred Hungry Ants* by Elinor J. Pinczes<br>  *P. Bear's New Year's Party* by Paul Owen Lewis<br>  *Six-Dinner Sid* by Inga Moore<br>  *Ten Times Better* by Richard Michelson<br>  *Two Ways to Count to Ten: A Liberian Folktale* by Ruby Dee<br>  *Amanda Bean's Amazing Dream* by Cindy Neuschwander<br>  *Bats on Parade* by Kathi Appelt and Melissa Sweet<br>  *The Doorbell Rang* by Pat Hutchins<br>3. Internet Resources<br><br>Math Charts<br><br>The National Library of Virtual Manipulatives<br><br>NCTM: Illuminations Site | ## Catholic Identity<br><br>**Social Justice Teachings**<br>  ⬥ Life And Dignity Of The Human Person<br>  ⬥ Call To Family, Community, And Participation<br>  ⬥ Rights And Responsibilities<br>  ⬥ Solidarity<br>  ⬥ Care For God's Creation<br><br>**Rights of Children**<br>  ⬥ THE RIGHT TO A SAFE ENVIRONMENT that promotes care, protection and security.<br>  ⬥ THE RIGHT TO BE RESPECTED AS INDIVIDUALS with human dignity.<br>  ⬥ THE RIGHT TO WORK ACTIVELY TOWARD THEIR OWN EMPOWERMENT through the development of their gifts and talents.<br>  ⬥ THE RIGHT TO A LEARNING ENVIRONMENT THAT VALUES COOPERATION, and challenges its members to critical and reflective thinking in their search for truth.<br>  ⬥ THE RIGHT TO DEVELOP POSITIVE, RESPONSIBLE AND CARING ATTITUDES AND BEHAVIORS TOWARD OTHERS and to recognize the rights of others to be safe and free from harassment and abuse.<br>  ⬥ THE RIGHT TO LEARN THE SKILL OF SELF PROTECTION by identifying safe and unsafe situations.<br>  ⬥ THE RIGHT TO LEARN RESPONSIBILITY for themselves and their actions. |

[Multiplication Activities and Resources](#)

[The Math Worksheet Site](#)

[Brain Pop](#)

## Unit 4:  Using Place Value with Operations

### Standards Assessed

**CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 3, Reading: Informational Text**
Craft and Structure
4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

- RI.3.4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.

**CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 3, Speaking and Listening**
Comprehension and Collaboration
1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

- SL.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.

**CCSS: Mathematics (2011), OH: CCSS: Grade 3, Mathematical Practice**
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

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

**CCSS: Mathematics (2011), OH: CCSS: Grade 3, Number & Operations in Base Ten**
3.NBT Use place value understanding and properties of operations to perform multi-digit arithmetic.

- 3.NBT.1. Use place value understanding to round whole numbers to the nearest 10 or 100.
- 3.NBT.2. Fluently 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.3. Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., $9 \times 80$, $5 \times 60$) using strategies based on place value and properties of operations.

**DOC: Mathematics, DOC: Grade 3, Numbers, Number Sense and Operations**
A. Number and Number Systems

- 2. Use place value concepts to represent whole numbers and decimals using numerals, words, expanded notation and physical models.
- 4. Describe the multiplicative nature of the number system; e.g., the structure of 2406 as 2 x 1000 plus 4 x 100 plus 6 x 1.

C. Computation and Estimation

- 2. Subtract across zeros with three and four-digit numbers.

### Essential Questions

- How does understanding place value help us add, subtract, and multiply large numbers?
- How does the position of a digit in a number affect its value?
- How do we read and write large numbers?

| Content | Skills |
|---|---|
| The students will know | Bloom's Taxonomy<br>DOK Links |

| | The students will be able to |
|---|---|
| 1. Place value concepts for whole numbers and decimals<br>2. Strategies and algorithms for addition and subtraction within 1000<br>3. Multiplication of one-digit whole numbers by multiples of 10<br>4. The multiplicative nature of the number system (expanded notation)<br>5. Concepts of subtraction across zeros (regrouping) | 1. Use place value concepts to represent whole numbers and decimals using physical models, numerals, words, and expanded notation.<br>2. Use place value understanding to round whole numbers to the nearest 10 or 100.<br>3. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.<br>4. Multiply one-digit whole numbers by multiples of 10 using strategies based on place value and properties of operations.<br>5. Subtract across zeros with three and four-digit numbers.<br>6. Practice addition and subtraction facts.<br>7. Practice multiplication and division facts.<br><br>**Reading/Writing Skills**<br><br>1. Define specific vocabulary from the Common Core and apply it to solve problems.<br>2. Justify solutions verbally or in written form to explain processes and summarize results. |
| **Common Core Vocabulary**<br><br>1. Place value<br>2. Rounding<br>3. Algorithms<br>4. Decimal<br>5. Expanded notation<br>6. Multiples<br>7. Area models<br>8. Properties of operations | **Additional Vocabulary**<br><br>1. Sum<br>2. Difference |
| **Learning Experiences (Suggested)**<br><br>1. Using a place value chart (see Link), dictate a series of whole numbers and decimals to students and ask them to write the number placing each numeral in the correct space on the place value chart.<br>2. Building on the understanding of place value, use a number line to determine which multiple of 10 or 100 a number is nearest (5 or more rounds up, less than 5 rounds down). Use several examples to reinforce the understanding and then have the students round several numbers and explain why they rounded up or down.<br>3. Working with a partner, have students practice using various strategies to add and subtract numbers within 1000. Ask students to explain strategies used and compare their strategies with those used by other students to determine which strategies are more efficient.<br>4. Have students practice subtracting across zeros with three and four-digit numbers.<br>5. Working with a partner, have students model multiplication problems with pictures, diagrams or concrete materials to help them understand what the factors and products represent. Ask them to explain their models to the class.<br>6. Use the video *Area Models for Multiplication* (see Link) to help students understand how the use of area models will help them | **Assessment (Suggested)**<br><br>**Place Value**<br>**Formative: Class Work**<br><br>Dictate a series of whole numbers and decimals to students and have them write the number placing each numeral in the correct space on the place value chart.<br><br>**Rounding Numbers**<br>**Formative: Homework**<br><br>Students will round several numbers and explain why they rounded up or down.<br><br>**Adding and Subtracting Numbers to 1000**<br>**Summative: Response Journal**<br><br>Students will practice using various strategies to add and subtract numbers within 1000 and explain the strategies used and compare their strategies with those used by other students to determine which strategies are more efficient. |

| | |
|---|---|
| understand the properties of operations of multiplication, the relationship of the factors and its product, and the multiplicative nature of the number system.<br>7. Further the understanding of the use of area models by having students compose and decompose the models as a means of deepening their understanding of the distributive property in multiplication. Ask them to explain the distributive property to another student.<br><br><br><br><br>Place Value Charts<br><br>Printable Math Charts<br><br>Area Models for Multiplication | **Subtracting with Zeros**<br>**Summative: Test**<br><br>Students will demonstrate proficiency in subtracting across zeros with three and four-digit numbers.<br><br>**Area Models and Multiplication**<br>**Formative: Homework**<br><br>By providing at least five examples, students will show how the use of area models helps them understand the properties of operations of multiplication, the relationship of the factors and its product, and the multiplicative nature of the number system.<br><br>**Multiplying by 10**<br>**Summative: Class Work**<br><br>Reference learning experiences: Students will engage in math learning games and activities to improve their skills with multiplying one digit whole numbers by multiples of 10. While they play, students will record and explain examples of different types of problems in their math journals.<br><br>**Distributive Property in Multiplication**<br>**Summative: Homework**<br><br>Students will compose and decompose at least 5 area models as a means of demonstrating and explaining their understanding of the distributive property in multiplication. |
| ## Resources (Suggested)<br><br>1. iPad Resources<br>2. Literature Connection<br>   *In the Next Three Seconds . . . Predictions for the Millennium* by Rowland Morgan<br>   *The King's Commissioners* by Aileen Friedman<br>   *Night Noises* by Mem Fox<br>   *One Hundred Hungry Ants* by Elinor J. Pinczes<br>   *P. Bear's New Year's Party* by Paul Owen Lewis<br>   *Ten Times Better* by Richard Michelson<br>   *Two Ways to Count to Ten: A Liberian Folktale* by Ruby Dee<br>3. Internet Resources<br><br>Math Charts<br><br>Math Worksheets and Activities<br><br>The National Library of Virtual Manipulatives<br><br>The Math Worksheet Site<br><br>Addition and Subtraction Word Problems<br><br>Place Value Activities | ## Catholic Identity<br><br>**Social Justice Teachings**<br>　　Life And Dignity Of The Human Person<br>　　Call To Family, Community, And Participation<br>　　Rights And Responsibilities<br>　　Solidarity<br>　　Care For God's Creation<br><br>**Rights of Children**<br>　　THE RIGHT TO A SAFE ENVIRONMENT that promotes care, protection and security.<br>　　THE RIGHT TO BE RESPECTED AS INDIVIDUALS with human dignity.<br>　　THE RIGHT TO WORK ACTIVELY TOWARD THEIR OWN EMPOWERMENT through the development of their gifts and talents.<br>　　THE RIGHT TO A LEARNING ENVIRONMENT THAT VALUES COOPERATION, and challenges its members to critical and reflective thinking in their search for truth.<br>　　THE RIGHT TO DEVELOP POSITIVE, RESPONSIBLE AND CARING ATTITUDES AND BEHAVIORS TOWARD OTHERS and to recognize the rights of others to be safe and free from harassment and abuse.<br>　　THE RIGHT TO LEARN THE SKILL OF SELF PROTECTION by identifying safe and unsafe situations.<br>　　THE RIGHT TO LEARN RESPONSIBILITY for themselves and their actions. |

| Place Value Activities and More... | |

## Unit 5:  Understanding Fractions

## Standards Assessed

**CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 3, Reading: Informational Text**
Craft and Structure
4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

- RI.3.4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.

**CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 3, Writing**
2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

- W.3.2a. Introduce a topic and group related information together; include illustrations when useful to aiding comprehension.

**CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 3, Speaking and Listening**
Comprehension and Collaboration
1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

- SL.3.1d. Explain their own ideas and understanding in light of the discussion.

**CCSS: Mathematics (2011), OH: CCSS: Grade 3, Number & Operations—Fractions**
3.NF Develop understanding of fractions as numbers.

- 3.NF.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.
- 3.NF.2. Understand a fraction as a number on the number line; represent fractions on a number line diagram.
- 3.NF.2a. 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.
- 3.NF.2b. Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.
- 3.NF.3. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.
- 3.NF.3a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
- 3.NF.3b. Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model.
- 3
- 3.NF.3d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or

**DOC: Mathematics, DOC: Grade 3, Numbers, Number Sense and Operations**
A. Number and Number Systems

- 10. Represent fractions and mixed numbers using words, numerals and physical models.
- 12. Recognize and use decimal and fraction concepts and notations as related ways of representing parts of a whole or a set; e.g., 3 of 10 marbles are red can also be described as 3/10 and 0.3 are red.

C. Computation and Estimation

- 7. Develop and use visual models, benchmarks and equivalents to add and subtract with common fractions and decimals.

## Essential Questions

- How do different parts come together to form a whole?
- What is the relationship between a part and a whole?
- How can fractions be used to represent numbers and their parts?
- How can models help me understand fractions?
- How can I compare and order fractions?
- How do fractions relate to whole numbers?
- How can understanding fractions help us to understand the world around us?

## Content

**The students will know**

1. Whole/part relationship and fractions
2. A fraction is a number on the number line
3. Fractions with denominators of 2, 3, 4, 6, and 8
4. Equivalent fractions
5. Whole numbers can be expressed as fractions
6. Fractions can be compared and ordered
7. Mixed numbers
8. Fractions can be expressed as decimals

## Skills

Bloom's Taxonomy
DOK Links

**The students will be able to**

1. Demonstrate fractions are part of a whole.
2. Represent fractions as a number on a number line.
3. Create intervals on a number line using fractions.
4. Compare (>, <, =) and sequence given fractions
5. Construct equivalent fractions.
6. Compare fractions using visual models.
7. Add and subtract common fractions and decimals.
8. Add and subtract fractions and mixed numbers with like denominators.
9. Solve word problems involving fractions.
10. Recognize and create equivalent fractions
11. Read, write, and create fractions as parts of a whole using symbols, words, and models.
12. Use fractions in real-life situations.
13. Relate fractions and decimals.
14. Practice addition and subtraction facts.
15. Practice multiplication and division facts.

**Reading/Writing Skills**

1. Define specific vocabulary from the Common Core and apply it to solve problems.
2. Justify solutions verbally or in written form to explain processes and summarize results.

## Common Core Vocabulary

1. Whole number
2. Fraction
3. Mixed number
4. Numerator
5. Denominator
6. Decimal
7. Equal parts
8. Interval
9. Number line
10. Equivalence
11. Comparison

## Additional Vocabulary

## Learning Experiences (Suggested)

1. Class activity. Using the *Fraction* video (see Link) introduce students to whole/part relationships as the basis for understanding fractions.

## Assessment (Suggested)

**Modeling Fractions**
**Formative: Posters**

2.  Class activity. Use the video *Numerator Denominator Song: Fractions* (see Link) to teach students about the parts of a fraction.
3.  Follow-up the class activity by having students work with a partner. Give each team several different sizes and shapes of paper and ask them to fold them into halves and fourths and to write the fractions for each. Have groups explain their work to the class.
4.  Class activity. Use the *Equivalent Fraction* video (see Link) to introduce students to the concept of equivalent fractions.
5.  Follow-up the class activity by having students work with a partner to create equivalent fractions for a given list of fractions with denominators of 2, 3, and 4. Create simple illustrations to show the equivalence. Explain the processes they used to the class.
6.  Class activity. Use various visual models and a number line to explain to students that whole numbers can be expressed as fractions (3 = 3/1) and recognize fractions that are equivalent to whole numbers (4/4 = 1). Have students create several examples of each and explain them to another student.
7.  Working with a partner, have students compare two fractions with the same numerator or the same denominator by reasoning about their size. Ask them to record the results of their comparison using the symbols >, =, or <, and justify the conclusions by using a visual fraction model.
8.  Class activity. Use visual models and a number line to teach students the concepts of proper fractions, improper fractions, mixed numbers, and decimals. Have students use words, numerals, and physical models to demonstrate their understanding of each of the concepts.
9.  Working in cooperative groups, have students use decimal and fraction concepts and notations to represent parts of a whole or set, such as 3 of 10 marbles are red can be described as 3/10 and 0.3 are red. Have the groups create several examples and explain the examples to the class.
10. After teaching the concept, engage the students in adding and subtracting common fractions and decimals.


Virtual manipulatives--scroll down to fractions


Fractions


Equivalent Fractions


Numerator Denominator Song: Fractions


Grade Three ~ Table of Contents: Fractions

Cooperative group work: Students work together to create and present a group poster that shows their understanding that a fraction is formed by part of a whole and divided into equal parts.

**Creating Fractions**
**Formative: Class Work**

Working with a partner, students will use several different sizes and shapes of paper and fold them into halves and fourths and write the fractions for each. Students will write an explanation of their reasoning.

**Fraction/Whole Number**
**Summative: Homework**

To show their understanding of the relationship between fractions and whole numbers, students will create several examples using various visual models and a number line.

**Comparing Fractions using Number Lines**
**Formative: Written Assessment**

After learning to compare fractions and whole numbers using number lines, students will write fractional numbers on a self-created number line to demonstrate understandings.

**Comparing Fractions**
**Summative: Class Work**

Students will compare two fractions with the same numerator or the same denominator and reason about their size. They will record the results of their comparison using the symbols >, =, or <, and justify the conclusions by using a visual fraction model.

**Equivalent Fractions**
**Formative: Cooperative Group Work**

Students will work with a partner to create equivalent fractions for a given list of fractions with denominators of 2, 3, and 4. They will create simple illustrations to show the equivalence and explain the processes they used to the class.

**Decimals and Fractions**
**Formative: Class Work**

Working with a partner, students will use decimal and fraction concepts and notations to represent parts of a whole or set, such as 3 of 10 marbles are red can be described as 3/10 and 0.3 are red. They will create several examples and explain the examples to the class.

**What Do You Know?**
**Summative: Cooperative Group Work**

Working in cooperative groups, students will use words, numerals, and physical models to demonstrate their understanding of proper fractions, improper fractions, mixed numbers, and decimals.

**Adding Fractions and Decimals**

| | Summative: Class Work |
|---|---|
| | Students will add and subtract common fractions and decimals. |

## Resources (Suggested)

1. iPad Resources
2. Literature Connection
   *Full House: An Invitation to Fractions* by Dayle Ann Dodds and Abby Carter
   *Polar Bear Math: Learning About Fractions from Klondike and Snow* by Ann Whitehead Nagda and Cindy Bickel
   *Apple Fractions* by Jerry Pallotta and Rob Bolster
   *Funny & Fabulous Fraction Stories: 30 Reproducible Math Tales and Problems to Reinforce Important Fraction Skills* by Dan Greenberg
   *The Hershey's Milk Chocolate Bar Fractions Book* by Jerry Pallotta and Robert C. Bolster
3. Internet Resources

   Math Charts

   Illuminations ~ Concentration

   Johnny's Math page ~ Fractions

   Fun Brain ~ Soccer Shoot

   Fraction Videos

   Elementary Power Point Recourses

   You Tube Videos Teaching Fractions

## Catholic Identity

**Social Justice Teachings**
- Life And Dignity Of The Human Person
- Call To Family, Community, And Participation
- Rights And Responsibilities
- Solidarity
- Care For God's Creation

**Rights of Children**
- THE RIGHT TO A SAFE ENVIRONMENT that promotes care, protection and security.
- THE RIGHT TO BE RESPECTED AS INDIVIDUALS with human dignity.
- THE RIGHT TO WORK ACTIVELY TOWARD THEIR OWN EMPOWERMENT through the development of their gifts and talents.
- THE RIGHT TO A LEARNING ENVIRONMENT THAT VALUES COOPERATION, and challenges its members to critical and reflective thinking in their search for truth.
- THE RIGHT TO DEVELOP POSITIVE, RESPONSIBLE AND CARING ATTITUDES AND BEHAVIORS TOWARD OTHERS and to recognize the rights of others to be safe and free from harassment and abuse.
- THE RIGHT TO LEARN THE SKILL OF SELF PROTECTION by identifying safe and unsafe situations.
- THE RIGHT TO LEARN RESPONSIBILITY for themselves and their actions.

# Mathematics Curriculum ~ Grade Three
## Diocese of Cleveland

## Unit 6:  Measurement/Data: Time, Money, and Temperature

### Standards Assessed

**CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 3, Reading: Informational Text**
3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

- RI.3.3. Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.

**CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 3, Writing**
2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

- W.3.2a. Introduce a topic and group related information together; include illustrations when useful to aiding comprehension.

Production and Distribution of Writing
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

- W.3.4. With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose. (Grade-specific expectations for writing types are defined in standards 1–3 above.)

**CCSS: Mathematics (2011), OH: CCSS: Grade 3, Mathematical Practice**
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.

**CCSS: Mathematics (2011), OH: CCSS: Grade 3, Measurement & Data**
3.MD Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.

- 3.MD.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.

**DOC: Mathematics, DOC: Grade 3, Numbers, Number Sense and Operations**
A. Number and Number Systems

- 9. Count money and make change using coins and paper bills to ten dollars.

**DOC: Mathematics, DOC: Grade 3, Measurement**
A. Measurement Units

- 5. Read thermometers in both Fahrenheit and Celsius scales.

**DOC: Mathematics, DOC: Grade 3, Patterns, Functions, and Algebra**
C. Analyze Change

- 1. Create tables to record, organize and analyze data to discover patterns and rules.

### Essential Questions

- How do we measure time, money, and temperature?
- Why is it important to know how to tell time, count money, and identify the temperature?
- How can I model and solve problems by representing, adding, and subtracting units of time, money, and temperature?

- How can I organize data to make sense of it?

## Content

**The students will know**

1. How to count money and make change up to ten dollars
2. Fahrenheit and Celsius scales are used to measure temperature
3. Analog and digital clocks are used to tell time and measure time intervals

## Skills
Bloom's Taxonomy
DOK Links

**The students will be able to**

1. Count money and make change using coins and paper bills to ten dollars.
2. Calculate temperatures using both Fahrenheit and Celsius temperature scales.
3. Estimate, measure, and record temperature using both Fahrenheit and Celsius scales.
4. Use and create tables to record, organize, and analyze changes in temperature over time.
5. Measure and estimate intervals of time in minutes using both digital and analog clocks.
6. Tell and write time to the nearest minute using both digital and analog clocks.
7. Solve word problems involving addition and subtraction of time intervals in minutes.
8. Practice addition and subtraction facts.
9. Practice multiplication and division facts.

**Reading/Writing Skills**

1. Define specific vocabulary from the Common Core and apply it to solve problems.
2. Justify solutions verbally or in written form to explain processes and summarize results.

**Common Core Vocabulary**

1. Intervals of time
2. Timeline (line diagram of time)

**Additional Vocabulary**

1. Fahrenheit
2. Celsius

## Learning Experiences (Suggested)

1. Working with a partner, have students tell and write time from analog and digital clocks to the hour, half hour, quarter hour, nearest five minutes, and nearest minute.
2. Class activity. Using both analog and digital clocks, have students measure and estimate time intervals in minutes.
3. Working in small cooperative groups, have students solve word problems adding and subtracting time intervals in minutes by representing the problems on timelines. (See link-virtual manipulatives.) Have groups explain the process used in solving the problems.
4. Working with a partner, have students count money and make change up to ten dollars using manipulatives.
5. Class activity. Use both Fahrenheit and Celsius temperature scales to record temperature.
6. Class activity. Use a thermometer (both Fahrenheit and Celsius) to record daily temperatures. Have students make a daily log and compare temperatures over a period of time. Discuss the results with the class.
7. Use and create tables to record, organize, and analyze changes in temperature over time.(e.g. weather)

## Assessment (Suggested)

**Measuring and Estimating Time**
**Summative: Graphic Organizer**

Using pre-printed blank analog clock faces, students will represent given times to the nearest minute by drawing hands on the faces. Students will identify the times represented on analog clocks provided by the teacher. Students will describe the steps to identifying the time on an analog clock verbally and in writing.

**Word Problems: Intervals of Time**
**Formative: Response Journal**

Students will draw timelines and other number lines as well as write explanations in their math journals to show how they solved word problems about intervals of time.

**Counting Money and Making Change**
**Formative: Dramatization**

Virtual Manipulatives

Students will work in small groups to create a "store" where they can demonstrate buying and selling of school supplies. The teacher observes students counting money and making change in these dramatizations, and observations are recorded as anecdotal notes.

**Changes in Temperature over Time**
**Formative: Response Journal**

Students will create Tables in their math journals to record changes in the outside temperature over time. After observing temperature changes over a given period of days or weeks, students will write a description of the general trend of data.

**Adding and Subtracting Time Intervals**
**Formative: Cooperative Group Work**

Working in small cooperative groups, students will solve word problems adding and subtracting time intervals in minutes by representing the problems on timelines. Groups will explain the process used in solving the problems.

## Resources (Suggested)

1. iPad Resources
2. Literature Connection
   *A Chair for My Mother* by Vera B. Williams
   *Arthur's Funny Money* by Lillian Hoban
   *How Much is That Guinea Pig in the Window?* by Joanne Rocklin and Meredith Johnson
   *You Can't Buy a Dinosaur With a Dime: Problem-solving in Dollars and Cents* by Harriet Ziefert and Amanda Haley
   *Five Minutes' Peace* by Jill Murphy
   *Just a Minute!* by Teddy Slater, G. Maccarone and J. Feiwel
   *Slowpoke* by Lucille Recht Penner and Gioia Fiammenghi
   *What Time Is It, Mr. Crocodile?* by Judy Sierra and Doug Cushman
   *Twister* by Darlene Bailey and Nancy Carpenter
   *Flash, Crash, Rumble, and Roll* by Franklyn Branley and True Kelly
   *The Kids Book of Weather Forecasting* by Mark Breen and Kathleen Friestad
3. Internet Resources:

   
   Math Charts

   
   The National Library of Virtual Manipulatives

   
   Money Activities for Third Grade

   
   Math 4 Children ~ Grade 3

   
   Temperature Activities for Kids

## Catholic Identity

**Social Justice Teachings**
- Life And Dignity Of The Human Person
- Call To Family, Community, And Participation
- Rights And Responsibilities
- Solidarity
- Care For God's Creation

**Rights of Children**
- THE RIGHT TO A SAFE ENVIRONMENT that promotes care, protection and security.
- THE RIGHT TO BE RESPECTED AS INDIVIDUALS with human dignity.
- THE RIGHT TO WORK ACTIVELY TOWARD THEIR OWN EMPOWERMENT through the development of their gifts and talents.
- THE RIGHT TO A LEARNING ENVIRONMENT THAT VALUES COOPERATION, and challenges its members to critical and reflective thinking in their search for truth.
- THE RIGHT TO DEVELOP POSITIVE, RESPONSIBLE AND CARING ATTITUDES AND BEHAVIORS TOWARD OTHERS and to recognize the rights of others to be safe and free from harassment and abuse.
- THE RIGHT TO LEARN THE SKILL OF SELF PROTECTION by identifying safe and unsafe situations.
- THE RIGHT TO LEARN RESPONSIBILITY for themselves and their actions.

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|---|---|
| [Heat and Temperature](#)<br><br>[Temperature](#)<br><br>[Telling Time Activities](#)<br><br>[The Math Worksheet Site](#) | |

## Unit 7:  Measurement/Data: Length, Mass, and Liquid Volume

### Standards Assessed

**CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 3, Reading: Informational Text**
Key Ideas and Details
1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

- RI.3.1. Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.

**CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 3, Writing**
2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

- W.3.2a. Introduce a topic and group related information together; include illustrations when useful to aiding comprehension.

Production and Distribution of Writing
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

- W.3.4. With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose. (Grade-specific expectations for writing types are defined in standards 1–3 above.)

**CCSS: Mathematics (2011), OH: CCSS: Grade 3, Mathematical Practice**
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.

**CCSS: Mathematics (2011), OH: CCSS: Grade 3, Measurement & Data**
3.MD Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.

- 3.MD.2. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). 6 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.MD Represent and interpret data.

- 3.MD.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.
- 3.MD.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.

**DOC: Mathematics, DOC: Grade 3, Patterns, Functions, and Algebra**
C. Analyze Change

- 1. Create tables to record, organize and analyze data to discover patterns and rules.
- 2. Identify and describe quantitative changes, especially those involving addition and subtraction; e.g., a plant growing 3 centimeters each week.

### Essential Questions

- How do I measure length, mass, and liquid volume?
- Why is it important to know how to measure and estimate length, mass, and liquid volume?

- How can I model and solve problems by representing, adding, and subtracting units of measure length, mass, and liquid volume?
- How does what I measure influence how I measure?
- In what ways do charts, tables, and graphs help me interpret measurement data?

## Content

**The students will know**

1. Concepts of measuring liquid volume
2. Concepts of measuring mass
3. Concepts of measuring length
4. Attributes and purposes of tables

## Skills
Bloom's Taxonomy
DOK Links

**The students will be able to**

1. Measure and estimate liquid volumes using liters (l).
2. Measure and estimate masses of objects using standard units of grams (g) and kilograms (kg).
3. Add, subtract, multiply, and divide to solve one-step word problems involving masses or volumes that are given in the same units.
4. Measure and estimate lengths using rulers marked with halves and fourths of an inch.
5. Show measurement data by making a line plot.
6. Use and create tables/graphs to record, organize, and analyze measurement data.
7. Practice addition and subtraction facts.
8. Practice multiplication and division facts.

**Reading/Writing Skills**

1. Define specific vocabulary from the Common Core and apply it to solve problems.
2. Justify solutions verbally or in written form to explain processes and summarize results.

## Common Core Vocabulary

1. Liquid volume
2. Grams (g)
3. Kilograms (kg)
4. Liters (l)
5. Mass
6. Line plot
7. Data set
8. Horizontal scale
9. Quarters

## Additional Vocabulary

## Learning Experiences (Suggested)

1. Class activity. Use objects and drawings (such as a beaker with a measurement scale) to represent one-step word problems involving masses or volumes in the same units. Have students estimate before finding the actual measure.
2. Working in cooperative groups, have students pour water into different size containers to see how much water a container will hold. Have students record their findings on a chart and share their findings with the class.
3. Class activity. Introduce students to a "liter" container. Using different size containers ask students to estimate how many liters will fill each container. Demonstrate and record information on a chart.
4. Class activity with grams and kilograms. Provide students the

## Assessment (Suggested)

**Mass and Volume: Estimation and Calculation**
**Formative: Response Journal**

Students will record in writing their estimations of solutions to one-step word problems involving masses or volumes. After writing their estimations, students will illustrate their concrete representations used to solve the problems as well as their final solutions.

**Measuring Liquids**
**Formative: Cooperative Group Work**

Working in cooperative groups, students will pour water into different size

opportunity to hold a gram and kilogram weight. Have students work with several different size objects and estimate whether they weigh more or less than a gram, and more or less than a kilogram. Ask them to create a table showing their results and explain their findings.

5. In cooperative groups, have students work with a group of the same kind of objects. Tell them the weight of one of the objects. Ask students to fill a container with more objects and have them estimate the weight of the objects. Share their problem solving strategy with the class.

6. Class activity. Using simple objects to draw, have students create a picture graph using the Illuminations link. (See Link.)

7. Working with a partner, have students 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. Share their data with the class.

8. Working with a partner, have students find the height of 4 designated objects in the classroom. Have the students record this data on graph paper in the form of a simple bar graph. Once they have graphed their data, have them answer the following questions in a notebook:
   a. What do you learn when looking at this graph?
   b. What units did you use to graph your data?
   c. Do these units give you a good representation of the data?
   d. What is something you learned about bar graphs during this activity?
   Have the pairs share their bar graph with another group and share their answers to the questions.

9. Class activity. Have students identify and describe quantitative changes, especially those involving addition and subtraction; e.g., a plant growing 3 centimeters each week. (See Link - lesson plan)

Activities

containers to see how much water a container will hold. Students will record their findings on a chart and share their findings with the class.

**Estimating Weight of Objects**
**Formative: Class Work**

Students will have the opportunity to hold a gram and kilogram weight. They will then work with several different size objects and estimate whether they weigh more or less than a gram, and more or less than a kilogram. Have them create a table showing their results and explain their findings to another student.

**How High?**
**Summative: Cooperative Group Work**

Working with a partner, students will find the height of 4 designated objects in the classroom. They will record this data on a graph paper in the form of a simple bar graph. Once they have graphed their data, they will answer the following questions in a notebook:
a. What do you learn when looking at this graph?
b. What units did you use to graph your data?
c. Do these units give you a good representation of the data?
d. What is something you learned about bar graphs during this activity?
Students will share their bar graph with another group and share their answers to the questions.

**Measurement, Data, and Change**
**Formative: Project**

While completing the stations described in the PBS Math line lesson plan on Measurement (see links in Learning Experiences), students will record written information from each station in a journal or other organizer provided by the teacher.

**Bar Graph and Picture Graph**
**Formative: Technology Project**

Students will use online resources to create scaled bar graphs and picture graphs to depict measurement data gathered in class.

**Measuring Quantitative Changes**
**Summative: Class Work**

Students will identify and describe quantitative changes, especially those involving addition and subtraction; e.g., a plant growing 3 centimeters each week. (See Link - lesson plan)

## Resources (Suggested)

1. iPad Resources
2. Literature Connection
   *Berries, Nuts, and Seeds* by Diane L. Burns
   *Biggest, Strongest, Fastest* by Steve Jenkins
   *Chimp Math: Learning About Time from a Baby Chimpanzee* by Ann W. Nagda and Cindy Bickel
   *G Is for Googol: A Math Alphabet Book* by David M. Schwartz
   *Hottest, Coldest, Highest, Deepest* by Steve Jenkins
   *How Big Is a Foot?* by Rolf Myller
   *How Much, How Many, How Far, How Heavy, How Long, How*

## Catholic Identity

**Social Justice Teachings**
- Life And Dignity Of The Human Person
- Call To Family, Community, And Participation
- Rights And Responsibilities
- Solidarity
- Care For God's Creation

**Rights of Children**
- THE RIGHT TO A SAFE ENVIRONMENT that promotes care, protection and security.

*Tall Is 1000?* by Helen Nolan
*Icebergs and Glaciers* by Seymour Simon
*If the World Were a Village: A Book About the World's People* by David J. Smith
*Tiger Math: Learning to Graph from a Baby Tiger* by Ann W. Nagda and Cindy Bickel
*Wilma Unlimited: How Wilma Rudolph Became the World's Fastest Woman* by Kathleen Krull

3. Internet Resources

Math Charts

The National Library of Virtual Manipulatives

The Math Worksheet Site

Brain Pop Jr

NCTM Illuminations

Chart Tool

- THE RIGHT TO BE RESPECTED AS INDIVIDUALS with human dignity.
- THE RIGHT TO WORK ACTIVELY TOWARD THEIR OWN EMPOWERMENT through the development of their gifts and talents.
- THE RIGHT TO A LEARNING ENVIRONMENT THAT VALUES COOPERATION, and challenges its members to critical and reflective thinking in their search for truth.
- THE RIGHT TO DEVELOP POSITIVE, RESPONSIBLE AND CARING ATTITUDES AND BEHAVIORS TOWARD OTHERS and to recognize the rights of others to be safe and free from harassment and abuse.
- THE RIGHT TO LEARN THE SKILL OF SELF PROTECTION by identifying safe and unsafe situations.
- THE RIGHT TO LEARN RESPONSIBILITY for themselves and their actions.

# Mathematics Curriculum ~ Grade Three
## Diocese of Cleveland

### Unit 8:  Geometry: Area

## Standards Assessed

**CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 3, Reading: Informational Text**
Craft and Structure
4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

- RI.3.4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.

**CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 3, Speaking and Listening**
Comprehension and Collaboration
1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

- SL.3.1c. Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others.
- SL.3.1d. Explain their own ideas and understanding in light of the discussion.

**CCSS: Mathematics (2011), OH: CCSS: Grade 3, Mathematical Practice**
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 2. Reason abstractly and quantitatively.
- 4. Model with mathematics.

**CCSS: Mathematics (2011), OH: CCSS: Grade 3, Measurement & Data**
3.MD Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

- 3.MD.5. Recognize area as an attribute of plane figures and understand concepts of area measurement.
- 3.MD.5a. A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.
- 3.MD.5b. 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.MD.6. Measure areas by counting unit squares (square cm, square m, square in, square ft., and improvised units).
- 3.MD.7. Relate area to the operations of multiplication and addition.
- 3.MD.7a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.
- 3.MD.7b. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.
- 3.MD.7c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning.
- 3.MD.7d. 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.

## Essential Questions

- How do I find the area of a plane figure?
- How can a model be used to represent areas of rectangles and properties of mathematical reasoning?
- In what ways do formulas help me find answers to problems?
- How is a formula used to find the area of a figure?

| Content | Skills |
| --- | --- |
| | Bloom's Taxonomy |
| **The students will know** | DOK Links |
| | |
| | **The students will be able to** |

| | |
|---|---|
| 1. Concepts of area<br>2. Area formula for rectangles | 1. Define area and relate it to the real-world context of maps.<br>2. Determine the area of a shape using square units (square cm, square m, square in, square ft, and improvised units).<br>3. Relate area to multiplication and addition.<br>4. Model the area of a rectangle using unit squares.<br>5. Add areas of non-overlapping rectangles to find total area.<br>6. Multiply side lengths to find areas of rectangles.<br>7. Develop the formula for area of a rectangle and apply it to solve real world problems.<br>8. Practice addition and subtraction facts.<br>9. Practice multiplication and division facts.<br><br>**Reading/Writing Skills**<br><br>1. Define specific vocabulary from the Common Core and apply it to solve problems.<br>2. Justify solutions verbally or in written form to explain processes and summarize results. |
| **Common Core Vocabulary**<br><br>1. Area<br>2. Unit square<br>3. Square unit<br>4. Distributive property | **Additional Vocabulary**<br><br>1. Product |
| **Learning Experiences (Suggested)**<br><br>1. Class activity. Have students cover a rectangular shape with tiles and count the number of units (tiles) they used to cover the shape as a way of developing the idea of area as a measure of covering. Repeat the activity with different size rectangular shapes.<br>2. Working in cooperative groups, have students use square-inch squares they have cut out of square-inch grid sheets. Color all the squares the same color. Have them use the one-inch squares to approximate the area of several different rectangular shapes and record the information. (Repeat this activity using square-centimeter tiles.)<br>3. Following the activity, discuss the concept of square-inches and square-centimeters relating it to what they discovered in their group work. Introduce the mathematical expression for square-inch and square-centimeter.<br>4. Use tiles to find the area of a rectangle with whole-number side lengths. Show that the area is the same as would be found by multiplying the side lengths. (See Link.)<br>5. Class activity. Have the students solve a number of area problems and show how they can use the distributive property to show their reasoning.<br>6. Real-World Problem. Working in cooperative groups, have students plan for redecorating a room in a house with a stated length and width. Challenge them to determine how much carpeting they would need to buy to cover the floor? How much would the carpet cost if each square-foot costs $2.50? Teach area formulas and the distributive property by having students write equations based on the formula "a and b + c is the sum of a × b and a × c."<br>7. Class activity. Provide students with the area of a rectangle (i.e., 42 square inches) and have them determine possible lengths | **Assessment (Suggested)**<br><br>**Tiling to find Area**<br>**Formative: Response Journal**<br><br>In their math journals, students will draw the tiled rectangles they create with manipulatives and/or online tiling websites (see link in "Learning Activities"). Challenge students by having them work to find rectangles with the same area and different perimeters.<br><br>**How much Carpet? What Will it Cost?**<br>**Summative: Project**<br><br>Working in cooperative groups, students will find the area of a room in a house and demonstrate knowledge that "a and b + c is the sum of a × b and a × c" when calculating the area of the room and determining how much it will cost to put carpet in the room.<br><br>**Understanding Area**<br>**Summative: Test**<br><br>Students will be given the area of a rectangle and asked to determine all possible lengths and widths of the rectangle. After completing the problem, students will explain their reasoning in solving the problem. |

and widths of the rectangle. After completing this problem, give the students several others to solve. Ask them to explain their reasoning in solving the problem.

Multiplication-Area

## Resources (Suggested)

1. iPad Resources
2. Literature Connection
   *Not Enough Room!* by Joanne Rocklin and Cristina Ong
   *Spaghetti and Meatballs for All!* by Marilyn Burns and Gordon Silveria
   *Tree of Life: The World of the African Baobab* by Barbara Bash
   *Zachary Zormer: Shape Transformer* by Joanne Anderson Reisberg and David Hohn
3. Internet Resources

Math Charts

The National Library of Virtual Manipulatives

Area and Perimeter

Areas

Math Playground

## Catholic Identity

**Social Justice Teachings**
- Life And Dignity Of The Human Person
- Call To Family, Community, And Participation
- Rights And Responsibilities
- Solidarity
- Care For God's Creation

**Rights of Children**
- THE RIGHT TO A SAFE ENVIRONMENT that promotes care, protection and security.
- THE RIGHT TO BE RESPECTED AS INDIVIDUALS with human dignity.
- THE RIGHT TO WORK ACTIVELY TOWARD THEIR OWN EMPOWERMENT through the development of their gifts and talents.
- THE RIGHT TO A LEARNING ENVIRONMENT THAT VALUES COOPERATION, and challenges its members to critical and reflective thinking in their search for truth.
- THE RIGHT TO DEVELOP POSITIVE, RESPONSIBLE AND CARING ATTITUDES AND BEHAVIORS TOWARD OTHERS and to recognize the rights of others to be safe and free from harassment and abuse.
- THE RIGHT TO LEARN THE SKILL OF SELF PROTECTION by identifying safe and unsafe situations.
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## Unit 9:  Geometric Measurement: Perimeter

## Standards Assessed

**CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 3, Writing**
Text Types and Purposes
1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

- W.3.1b. Provide reasons that support the opinion.

**CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 3, Speaking and Listening**
Comprehension and Collaboration
1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

- SL.3.1c. Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others.

**CCSS: Mathematics (2011), OH: CCSS: Grade 3, Mathematical Practice**
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.

**CCSS: Mathematics (2011), OH: CCSS: Grade 3, Measurement & Data**
3.MD Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

- 3.MD.8. 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.

**DOC: Mathematics, DOC: Grade 3, Measurement**
B. Measurement Techniques and Tools

- 3. Make estimates for perimeter, area, and volume using connecting links, tiles, cubes and other models.

## Essential Questions

- What is perimeter and how is it measured?
- How do I determine the perimeter of a shape using repeated addition?
- How can I use tools to estimate the perimeter of a polygon?
- How are perimeter and area related?

## Content

**The students will know**

1. Perimeters of polygons
2. Relationship between perimeter and area

## Skills

Bloom's Taxonomy
DOK Links

**The students will be able to**

1. Determine perimeter given side lengths.
2. Find an unknown side length.
3. Construct rectangles with same perimeter and different areas.
4. Construct rectangles with same area and different perimeters.
5. Solve real world problems using perimeters of polygons.
6. Create an array to model perimeter and area of a rectangle.

| | |
|---|---|
| | 7. Practice addition and subtraction facts.<br>8. Practice multiplication and division facts.<br><br>**Reading/Writing Skills**<br><br>1. Define specific vocabulary from the Common Core and apply it to solve problems.<br>2. Justify solutions verbally or in written form to explain processes and summarize results. |

| Common Core Vocabulary | Additional Vocabulary |
|---|---|
| 1. Perimeter<br>2. Area<br>3. Polygon<br>4. Rectangle | 1. Length<br>2. Width |

## Learning Experiences (Suggested)

1. Class activity. Have students use geoboards to investigate perimeter of rectangles. (See Link)
2. Class activity. Working with a partner, have students use tiles or one-inch squares to (a) construct rectangles with same perimeter and different areas and (b) construct rectangles with same area and different perimeters. Have them explain their reasoning with other pairs of students.
3. Following the class activity, discuss the patterns that they see and from this have students state the rules for a rectangle:
   a. Area of a rectangle = *Length x Width*
   b. Perimeter of a Rectangle =
      *2 x Length + 2 x Width*
   Have students solve several area and perimeter problems using the rules for a rectangle.
4. Working with a partner, have students address challenges such as:
   a. Create two triangles with an area of 12 square units but with different perimeters.
   b. Create two rectangles with a perimeter of 10 units but with different areas.
   c. A rectangle has a perimeter of 18 and one side length of 6. What is the other side length?
5. In cooperative groups, have students design a clubhouse. Have them determine the perimeter of the clubhouse. Then have them determine how much carpet they would need to cover the floor of the clubhouse. Share the clubhouse drawing with the class and explain the process used to determine perimeter and how much carpet was needed. (Junior Architects - see Link)

virtual geoboard

Junior Architects

## Assessment (Suggested)

**Geoboards**
**Formative: Response Journal**

Students will work with geoboards to create various size rectangles. They will draw the rectangles in their math journals and record the perimeter lengths.

**Tiling for Area and Perimeter**
**Formative: Writing Assignment**

While students tile to create rectangles with different areas and perimeters, they will draw their shapes and record areas/perimeters and write explanations of the patterns they discover about the relationship between area and perimeter of rectangles.

**Using the Formulas to Solve Problems**
**Summative: Class Work**

Students will solve several area and perimeter problems using the rules for a rectangle. (a. Area of a rectangle = *Length x Width* and b. Perimeter of a Rectangle =
*2 x Length + 2 x Width*

**Area and Perimeter**
**Summative: Cooperative Group Work**

Working with a partner, students will address challenges such as:
a. Create two triangles with an area of 12 square units but with different perimeters.
b. Create two rectangles with a perimeter of 10 units but with different areas.
c. A rectangle has a perimeter of 18 and one side length of 6, what is the other side length?

**Clubhouse Project**
**Summative: Project**

In cooperative groups, students will design a clubhouse. and determine the perimeter of the clubhouse. Then they will determine how much carpet

they would need to cover the floor of the clubhouse. They will share the clubhouse drawing with the class and explain the process used to determine perimeter and how much carpet was needed.

## Resources (Suggested)

1. iPad Resources
2. Literature Connection
   *Aunt Harriet's Underground Railroad in the Sky* by Faith Ringgold
   *Chickens on the Move* by Pamela Pollack, Meg Belviso, and Lynn Adams
   *Not Enough Room!* by Joanne Rocklin and Cristina Ong
   *Sam's Sneaker Squares* by Nat Gabriel
   *Spaghetti and Meatballs for All!* by Marilyn Burns and Gordon Silveria
   *Tree of Life: The World of the African Baobab* by Barbara Bash
   *Zachary Zormer: Shape Transformer* by Joanne Anderson Reisberg and David Hohn
3. Internet Resources

   Virtual Geoboard

   Math Charts

   Brain Pop

   Math Playground

   Math Charts

   The National Library of Virtual Manipulatives

   The Math Worksheets Site

## Catholic Identity

**Social Justice Teachings**
- Life And Dignity Of The Human Person
- Call To Family, Community, And Participation
- Rights And Responsibilities
- Solidarity
- Care For God's Creation

**Rights of Children**
- THE RIGHT TO A SAFE ENVIRONMENT that promotes care, protection and security.
- THE RIGHT TO BE RESPECTED AS INDIVIDUALS with human dignity.
- THE RIGHT TO WORK ACTIVELY TOWARD THEIR OWN EMPOWERMENT through the development of their gifts and talents.
- THE RIGHT TO A LEARNING ENVIRONMENT THAT VALUES COOPERATION, and challenges its members to critical and reflective thinking in their search for truth.
- THE RIGHT TO DEVELOP POSITIVE, RESPONSIBLE AND CARING ATTITUDES AND BEHAVIORS TOWARD OTHERS and to recognize the rights of others to be safe and free from harassment and abuse.
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## Unit 10:  Geometry: Shapes and Attributes

## Standards Assessed

**CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 3, Reading: Informational Text**
Craft and Structure
4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

- RI.3.4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.

**CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 3, Speaking and Listening**
Comprehension and Collaboration
1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

- SL.3.1c. Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others.

**CCSS: Mathematics (2011), OH: CCSS: Grade 3, Mathematical Practice**
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 2. Reason abstractly and quantitatively.
- 4. Model with mathematics.
- 8. Look for and express regularity in repeated reasoning.

**CCSS: Mathematics (2011), OH: CCSS: Grade 3, Geometry**
3.G Reason with shapes and their attributes.

- 3.G.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.
- 3.G.2. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.

## Essential Questions

- Where in the real world can I find shapes?
- Where would I find symmetry in the real world?
- How can objects be represented and compared using geometric attributes?
- How can I put shapes together and take them apart to form other shapes with equal areas?

## Content

**The students will know**

1. Characteristics and attributes of shapes
2. Categories and subcategories of shapes
3. Equally-partitioned shapes can be represented as unit fractions

## Skills
Bloom's Taxonomy
DOK Links

**The students will be able to**

1. Identify and describe the attributes of geometric shapes in different categories.
2. Sort and categorize the shapes by shared attributes (e.g., having four sides).
3. Recognize that a shared attribute can define a larger category of shapes (e.g., quadrilaterals).
4. Identify and describe examples of quadrilaterals (rhombuses, rectangles and squares) and draw examples of quadrilaterals

|  | that do not belong to any of these subcategories. |
|  | 5. Partition shapes into equal areas and express the area of each part as a unit fraction of the whole. |
|  | 6. Practice addition and subtraction facts. |
|  | 7. Practice multiplication and division facts. |
|  | **Reading/Writing Skills** |
|  | 1. Define specific vocabulary from the Common Core and apply it to solve problems. |
|  | 2. Justify solutions verbally or in written form to explain processes and summarize results. |

| Common Core Vocabulary | Additional Vocabulary |
|---|---|
| 1. Unit fraction (numerator is 1)<br>2. Categories<br>3. Subcategories<br>4. Rhombus<br>5. Quadrilaterals<br>6. Partition | Additional shape names |

## Learning Experiences (Suggested)

1. Working with a partner, have students identify the properties of two- dimensional shapes using more precise ways to describe the properties that are shared rather than the appearance of individual shapes. Record their descriptions in their math journal and share their thinking with the class.
2. Class activity. Using examples and non-examples, have students classify a variety of shapes based on the identification and description of the properties of the shape. In each case, have the student explain their reasoning for classifying the shape as they did.
3. Working with a partner, have students use a sheet or pre-drawn shapes and show how the shapes can be partitioned into equal areas and express the area of each part as a unit fraction of the whole. Have each pair share their reasoning in doing the work.

## Assessment (Suggested)

**Sorting and Categorizing Shapes**
**Formative: Reflective Writing**

Students complete the activities described in the "Learning Experiences" regarding sorting and categorizing shapes. When students work on the computers to re-create each shape, they should record a brief description describing the process they used to attain the goal. The teacher can share each of the teams' solutions and model their problem solving strategies throughout the activity.

**Classifying Shapes**
**Summative: Homework**

Using examples and non-examples, students will classify a variety of shapes based on the identification and description of the properties of the shape. In each case, students will explain their reasoning for classifying the shape as they did.

**Partitioning Fractions**
**Formative: Visual Arts Project**

Using computers, art supplies, collage, or other visual media, students will demonstrate their understanding of the partitioning of shapes into equal areas to create unit fractions.

## Resources (Suggested)

1. iPad Resources
2. Literature Connection
   *The Quilting Bee* by Gail Gibbons
   *Eight Hands Round: A Patchwork Alphabet* by Ann Whitford Paul
   *The Greedy Triangle* by Marilyn Burns
   *A Cloak For The Dreamer* by Aileen Friedman and Kim Howard

## Catholic Identity

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| | |
|---|---|
| *X Marks The Spot!* by Lucille Recht Penner<br>*The Fly On The Ceiling: A Math Myth* by Julie Glass and Richard Walz<br>3.   Internet Resources<br><br>Math Charts￼<br><br>PBS Learning Media￼<br><br>The National Library of Virtual manipulatives￼<br><br>Brain Pop￼<br><br>Math Playground￼ | **Rights of Children**<br>🖶 THE RIGHT TO A SAFE ENVIRONMENT that promotes care, protection and security.<br>🖶 THE RIGHT TO BE RESPECTED AS INDIVIDUALS with human dignity.<br>🖶 THE RIGHT TO WORK ACTIVELY TOWARD THEIR OWN EMPOWERMENT through the development of their gifts and talents.<br>🖶 THE RIGHT TO A LEARNING ENVIRONMENT THAT VALUES COOPERATION, and challenges its members to critical and reflective thinking in their search for truth.<br>🖶 THE RIGHT TO DEVELOP POSITIVE, RESPONSIBLE AND CARING ATTITUDES AND BEHAVIORS TOWARD OTHERS and to recognize the rights of others to be safe and free from harassment and abuse.<br>🖶 THE RIGHT TO LEARN THE SKILL OF SELF PROTECTION by identifying safe and unsafe situations.<br>🖶 THE RIGHT TO LEARN RESPONSIBILITY for themselves and their actions. |

# PARENT GUIDE
## GRADE THREE MATHEMATICS CURRICULUM
### DIOCESE OF CLEVELAND

Below is a list of skills your child will be taught in Grade Three Mathematics.
As parents, you are encouraged to support the work of your child's teacher in helping your child acquire each of these skills.

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## OPERATIONS AND ALGEBRAIC THINKING

**REPRESENT AND SOLVE PROBLEMS INVOLVING MULTIPLICATION AND DIVISION.**

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|---|---|
|  | Interpret products of whole numbers, e.g., interpret 5 x 7 as the total number of objects in 5 groups of 7 objects each. |
|  | Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally in to 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. |
|  | 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. |
|  | Determine the unknown whole number in a multiplication or division equation relating three whole numbers. |

**UNDERSTAND PROPERTIES OF MULTIPLICATION AND THE RELATIONSHIP BETWEEN MULTIPLICATION AND DIVISION.**

|  |  |
|---|---|
|  | Apply properties of operations (commutative, associative, and distributive) as strategies to multiply and divide. [Students need not use formal terms for these operations.] |
|  | Understand division as an unknown-factor problem. |

**MULTIPLY AND DIVIDE WITHIN 100.**

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|  | Fluently multiply and divide within 100 using strategies such as the relationship between multiplication and division or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers. |

**SOLVE PROBLEMS INVOLVING THE FOUR OPERATIONS, AND IDENTIFY AND EXPLAIN PATTERNS IN ARITHMETIC.**

|  |  |
|---|---|
|  | 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. |
|  | Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. |

## NUMBER AND OPERATIONS IN BASE TEN

**USE PLACE VALUE UNDERSTANDING AND PROPERTIES OF OPERATIONS TO PERFORM MULTI-DIGIT ARITHMETIC. [A RANGE OF ALGORITHMS MAY BE USED]**

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|  | Use place value understanding to round whole numbers to the nearest 10 or 100. |
|  | Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. |
|  | 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. |

## NUMBER AND OPERATIONS ~ FRACTIONS [LIMITED TO FRACTIONS WITH DENOMINATORS 2, 3, 4, 6, AND 8]

**DEVELOP UNDERSTANDING OF FRACTIONS AS NUMBERS.**

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|  | 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. |
|  | 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. |
|  | Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line. |

## NUMBER AND OPERATIONS ~ FRACTIONS [LIMITED TO FRACTIONS WITH DENOMINATORS 2, 3, 4, 6, AND 8] CONTINUED

**DEVELOP UNDERSTANDING OF FRACTIONS AS NUMBERS CONTINUED.**

| | |
|---|---|
| | 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, or the same point on a number line. |
| | b. Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model. |
| | c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. |
| | d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. |

## MEASUREMENT AND DATA

**SOLVE PROBLEMS INVOLVING MEASUREMENT AND ESTIMATION OF INTERVALS OF TIME, LIQUID VOLUMES, AND MASSES OF OBJECTS.**

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| | 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. |
| | 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. |

**REPRESENT AND INTERPRET DATA.**

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|---|---|
| | 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. |
| | 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. |

**GEOMETRIC MEASUREMENT: UNDERSTAND CONCEPTS OF AREA AND RELATE AREA TO MULTIPLICATION AND TO ADDITION.**

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| | 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. |
| | Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units). |
| | Relate area to the operations of multiplication and addition. |
| | 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. |
| | 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. |
| | Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning. |
| | 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. |

**GEOMETRIC MEASUREMENT: RECOGNIZE PERIMETER AS AN ATTRIBUTE OF PLANE FIGURES AND DISTINGUISH LINEAR AND AREA MEASURE.**

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| | 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. |

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| **Geometry** | |
| **REASON WITH SHAPES AND THEIR ATTRIBUTES.** | |
| | 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. |
| | Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. |
| **DOC: Numbers, Number Sense and Operations** | |
| **NUMBER AND NUMBER SYSTEMS** | |
| | Use place value concepts to represent whole numbers and decimals using numerals, words, expanded notation and physical models. |
| | Describe the multiplicative nature of the number system; e.g., the structure of 2406 as 2 x 1000 plus 4 x 100 plus 6 x 1. |
| | Count money and make change using coins and paper bills to ten dollars. |
| | Represent fractions and mixed numbers using words, numerals and physical models. |
| | Recognize and use decimal and fraction concepts and notations as related ways of representing parts of a whole or a set; e.g., 3 of 10 marbles are red can also be described as 3/10 and 0.3 are red. |
| **MEANING OF OPERATIONS** | |
| | Model, represent and explain multiplication; e.g., repeated addition, skip counting, rectangular arrays and area model. |
| | Understand that, unlike addition and subtraction, the factors in multiplication and division may have different units; e.g., 3 boxes of 5 cookies each. |
| | Model and use the commutative and associative properties for addition and multiplication. |
| **COMPUTATION AND ESTIMATION** | |
| | Subtract across zeros with three and four-digit numbers. |
| | Develop and use visual models, benchmarks and equivalents to add and subtract with common fractions and decimals. |
| **DOC: Measurement** | |
| **MEASUREMENT UNITS** | |
| | Read thermometers in both Fahrenheit and Celsius scales. |
| **MEASUREMENT TECHNIQUES AND TOOLS** | |
| | Make estimates for perimeter, area, and volume using connecting links, tiles, cubes and other models. |
| **DOC: Patterns, Functions and Algebra** | |
| **PATTERNS, RELATIONS AND FUNCTIONS** | |
| | Extend multiplicative and growing patterns, and describe the pattern or rule in words. |
| **ANALYZE CHANGE** | |
| | Create tables to record, organize and analyze data to discover patterns and rules. |
| | Identify and describe quantitative changes, especially those involving addition and subtraction; e.g., a plant growing 3 centimeters each week. |
| **OH: CCSS: Literacy: Reading: Informational Text** | |
| **KEY IDEAS AND DETAILS** | |
| | Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. |
| | Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. |

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| **CRAFT AND STRUCTURE** | |
| | Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area. |

## OH: CCSS: Literacy: Writing

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| **TEXT TYPES AND PURPOSES** | |
| | Provide reasons that support the opinion. |
| | Introduce a topic and group related information together; include illustrations when useful to aiding comprehension. |
| **PRODUCTION AND DISTRIBUTION OF WRITING** | |
| | With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose. |

## OH: CCSS: Literacy: Speaking and Listening

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| **COMPREHENSION AND COLLABORATION** | |
| | 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. |
| | Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others. |
| | Explain their own ideas and understanding in light of the discussion. |
| **PRESENTATION OF KNOWLEDGE AND IDEAS** | |
| | Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification. |

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# Mathematics Curriculum
# Grade Three

## Checklist for Common Core State Standards & Diocesan Curriculum

| Date Taught | |
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| | **OPERATIONS AND ALGEBRAIC THINKING** |
| **REPRESENT AND SOLVE PROBLEMS INVOLVING MULTIPLICATION AND DIVISION.** | |
| | Interpret products of whole numbers, e.g., interpret 5 x 7 as the total number of objects in 5 groups of 7 objects each. |
| | Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally in to 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. |
| | 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. |
| | Determine the unknown whole number in a multiplication or division equation relating three whole numbers. |
| **UNDERSTAND PROPERTIES OF MULTIPLICATION AND THE RELATIONSHIP BETWEEN MULTIPLICATION AND DIVISION.** | |
| | Apply properties of operations (commutative, associative, and distributive) as strategies to multiply and divide. [Students need not use formal terms for these operations.] |
| | Understand division as an unknown-factor problem. |
| **MULTIPLY AND DIVIDE WITHIN 100.** | |
| | Fluently multiply and divide within 100 using strategies such as the relationship between multiplication and division or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers. |
| **SOLVE PROBLEMS INVOLVING THE FOUR OPERATIONS, AND IDENTIFY AND EXPLAIN PATTERNS IN ARITHMETIC.** | |
| | 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. |
| | Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. |
| | **NUMBER AND OPERATIONS IN BASE TEN** |
| **USE PLACE VALUE UNDERSTANDING AND PROPERTIES OF OPERATIONS TO PERFORM MULTI-DIGIT ARITHMETIC. [A RANGE OF ALGORITHMS MAY BE USED]** | |
| | Use place value understanding to round whole numbers to the nearest 10 or 100. |
| | Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. |
| | 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. |
| | **NUMBER AND OPERATIONS ~ FRACTIONS [LIMITED TO FRACTIONS WITH DENOMINATORS 2, 3, 4, 6, AND 8]** |
| **DEVELOP UNDERSTANDING OF FRACTIONS AS NUMBERS.** | |
| | 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. |
| | 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. |
| | Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line. |

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| **NUMBER AND OPERATIONS ~ FRACTIONS [LIMITED TO FRACTIONS WITH DENOMINATORS 2, 3, 4, 6, AND 8] CONTINUED** |
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**DEVELOP UNDERSTANDING OF FRACTIONS AS NUMBERS CONTINUED.**

| | |
|---|---|
| | 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, or the same point on a number line. |
| | b. Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model. |
| | c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. |
| | d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. |

| **MEASUREMENT AND DATA** |
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**SOLVE PROBLEMS INVOLVING MEASUREMENT AND ESTIMATION OF INTERVALS OF TIME, LIQUID VOLUMES, AND MASSES OF OBJECTS.**

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| | 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. |
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**REPRESENT AND INTERPRET DATA.**

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|---|---|
| | 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. |
| | 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. |

**GEOMETRIC MEASUREMENT: UNDERSTAND CONCEPTS OF AREA AND RELATE AREA TO MULTIPLICATION AND TO ADDITION.**

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|---|---|
| | 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. |
| | Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units). |
| | Relate area to the operations of multiplication and addition. |
| | 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. |
| | 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. |
| | Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning. |
| | 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. |

**GEOMETRIC MEASUREMENT: RECOGNIZE PERIMETER AS AN ATTRIBUTE OF PLANE FIGURES AND DISTINGUISH LINEAR AND AREA MEASURE.**

| | |
|---|---|
| | 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. |

| | DATE TAUGHT |
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## Geometry

**REASON WITH SHAPES AND THEIR ATTRIBUTES.**

| | |
|---|---|
| | 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. |
| | Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. |

## DOC: Numbers, Number Sense and Operations

**NUMBER AND NUMBER SYSTEMS**

| | |
|---|---|
| | Use place value concepts to represent whole numbers and decimals using numerals, words, expanded notation and physical models. |
| | Describe the multiplicative nature of the number system; e.g., the structure of 2406 as 2 x 1000 plus 4 x 100 plus 6 x 1. |
| | Count money and make change using coins and paper bills to ten dollars. |
| | Represent fractions and mixed numbers using words, numerals and physical models. |
| | Recognize and use decimal and fraction concepts and notations as related ways of representing parts of a whole or a set; e.g., 3 of 10 marbles are red can also be described as 3/10 and 0.3 are red. |

**MEANING OF OPERATIONS**

| | |
|---|---|
| | Model, represent and explain multiplication; e.g., repeated addition, skip counting, rectangular arrays and area model. |
| | Understand that, unlike addition and subtraction, the factors in multiplication and division may have different units; e.g., 3 boxes of 5 cookies each. |
| | Model and use the commutative and associative properties for addition and multiplication. |

**COMPUTATION AND ESTIMATION**

| | |
|---|---|
| | Subtract across zeros with three and four-digit numbers. |
| | Develop and use visual models, benchmarks and equivalents to add and subtract with common fractions and decimals. |

## DOC: Measurement

**MEASUREMENT UNITS**

| | |
|---|---|
| | Read thermometers in both Fahrenheit and Celsius scales. |

**MEASUREMENT TECHNIQUES AND TOOLS**

| | |
|---|---|
| | Make estimates for perimeter, area, and volume using connecting links, tiles, cubes and other models. |

## DOC: Patterns, Functions and Algebra

**PATTERNS, RELATIONS AND FUNCTIONS**

| | |
|---|---|
| | Extend multiplicative and growing patterns, and describe the pattern or rule in words. |

**ANALYZE CHANGE**

| | |
|---|---|
| | Create tables to record, organize and analyze data to discover patterns and rules. |
| | Identify and describe quantitative changes, especially those involving addition and subtraction; e.g., a plant growing 3 centimeters each week. |

## OH: CCSS: Literacy: Reading: Informational Text

**KEY IDEAS AND DETAILS**

| | |
|---|---|
| | Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. |
| | Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. |

| Date Taught | |
|---|---|
| **CRAFT AND STRUCTURE** | |
| | Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area. |

## OH: CCSS: Literacy: Writing

| | |
|---|---|
| **TEXT TYPES AND PURPOSES** | |
| | Provide reasons that support the opinion. |
| | Introduce a topic and group related information together; include illustrations when useful to aiding comprehension. |
| **PRODUCTION AND DISTRIBUTION OF WRITING** | |
| | With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose. |

## OH: CCSS: Literacy: Speaking and Listening

| | |
|---|---|
| **COMPREHENSION AND COLLABORATION** | |
| | 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. |
| | Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others. |
| | Explain their own ideas and understanding in light of the discussion. |
| **PRESENTATION OF KNOWLEDGE AND IDEAS** | |
| | Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification. |

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