

Mathematics Curriculum ~ Grade Four

Diocese of Cleveland



Unit 1: Patterns

Standards Assessed

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, Reading: Informational Text
Integration of Knowledge and Ideas

7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

- RI.4.7. Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, 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.
- 6. Attend to precision.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, Operations & Algebraic Thinking

4.OA Generate and analyze patterns.

- 4.OA.5. Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.

DOC: Mathematics, DOC: Grade 4, Patterns, Functions, and Algebra

A. Patterns, Relations and Functions

- 3. Determine the rule and identify missing numbers in a sequence of numbers or in a table of numbers.
- 5. Represent and analyze patterns and functions using words, tables and graphs.
- 7. Identify, express, and verify generalizations and use them to make predictions.

Essential Questions

- What is a pattern?
- How do I describe a pattern?
- How do I express a pattern or show a relationship?
- How can patterns be used to make predictions?
- In what ways are patterns important in the world today?

Content

Skills

Bloom's Taxonomy

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| <p>The students will know</p> <ol style="list-style-type: none"> 1. What a pattern is and how it can be described 2. Methods for finding rules for mathematical patterns 3. Linear patterns 4. Number and shape patterns 5. Functions 6. How to make predictions from patterns 7. Importance of patterns in today's world | <p><u>DOK Links</u></p> <p>The students will be able to</p> <ol style="list-style-type: none"> 1. Create, extend, analyze, describe, and record linear patterns with shapes. 2. Identify the missing element in a linear pattern. 3. Find, record, and analyze patterns of hundreds and multiplication charts and state the rule for the pattern. 4. Generate a number or shape pattern that follows a given rule. 5. Identify apparent features of the pattern that were not explicit in the rule itself. 6. Create, analyze, and describe growing patterns and then record them. 7. Create, extend, analyze, describe, and record number patterns. 8. Determine the rule and identify missing numbers in a sequence of numbers or in a table of numbers. 9. Represent and analyze patterns and functions using words, tables and graphs. 10. Identify, express, and verify generalizations based on patterns in a chart and use them to make predictions. 11. Explain how and why patterns are important in today's world. <p>Reading/Writing Skills</p> <ol style="list-style-type: none"> 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. |
| <p>Common Core Vocabulary</p> <ol style="list-style-type: none"> 1. Patterns 2. Classify 3. Series 4. Rule 5. Functions | <p>Additional Vocabulary</p> <ol style="list-style-type: none"> 1. Sequence 2. Table 3. Graph |
| <p>Learning Experiences (Suggested)</p> <ol style="list-style-type: none"> 1. Class activity. Using pattern blocks, make a pattern with at least three repeats of the pattern core (for example, square, trapezoid, hexagon, square, trapezoid, hexagon, square, trapezoid, hexagon). Ask a volunteer to read the pattern. Repeat with other patterns and other volunteers. Next, place the students in pairs and give each pair several pattern blocks. Ask each student to make a pattern with at least three repeats. Call on volunteers to read their patterns and ask if anyone else has a similar pattern. Encourage several students to read their patterns using both descriptive language (square, square, triangle) and generic pattern cores (AAB). Finally, have each student make a new pattern with three repeats, trade patterns with their partner and extend the pattern they were given. 2. Working with a partner, have students circle the patterns they find on a hundreds chart. Call on volunteers to describe patterns they find. Encourage students to find skip-counting patterns for 2's, 5's, and 10's, the pattern of odd and even numbers, and the patterns in the tens and ones places. Have students record the patterns they find and state the rule for the pattern. | <p>Assessment (Suggested)</p> <p>Creating Patterns Formative: Class Work</p> <p>Following the class activity, each student will make a new pattern with three repeats, trade patterns with another student and extend the pattern they were given.</p> <p>Patterns on a Hundred Chart Formative: Class Work</p> <p>Students will circle the patterns they find on a hundred chart and record the patterns they find and state the rule for the pattern.</p> <p>Patterns in Multiplication Table Formative: Homework</p> <p>Students will circle the patterns they find on a multiplication chart and</p> |

3. Follow-up the preceding learning experience with the multiplication chart. Again have the students record their patterns and state the rule for the pattern.
4. Class activity. Show students a "bowling pin" pattern (which is a "counting-on" pattern). Talk about the pattern and ask the students how many pins would be in the next row and ask them to explain how they got their answer. Repeat the activity by having students add more rows to the pattern and stating the rule for each. Use a chart to record the number of pins in each row. Continue to reinforce the growing patterns concept by using other patterns.
5. Working in cooperative groups, have students use given rules to generate several stages of a pattern predict the outcome for any stage.
6. Class activity. Given the rule "Add 3" and the starting number 1, have students generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way. Use a calculator to help see a pattern.
7. Working with a partner, have students use stamps and ink pads to create a pattern. Give the pattern to another pair of students and have them complete more of the pattern. Write an explanation of what could happen next and justify the reasoning involved.



[Math Wire ~ Growing Patterns!](#)

record the patterns they find and state the rule for the pattern.

Finding and Generating Shapes and Patterns

Summative: Cooperative Group Work

Working in cooperative groups, students will find and/or generate shapes/patterns following a given rule. They will make graphs of their findings and explain their reasoning in creating the shapes/patterns.

Growing Patterns

Summative: Class Work

Working with a partner, students will create a growing pattern, create a chart for the pattern, and justify their work.

Resources (Suggested)

1. iPad Resources
2. Literature Connections
 - Eight Hands Round: A Patchwork Alphabet* by John A. Adam and J. Winter
 - Max Found Two Sticks* by B. Pinkney
 - Two of Everything* by Lily Toy Hong
 - One Grain of Rice: A Mathematical Folk Tale* by Demi
 - The King's Chessboard* by David Birch
 - Nature's Paintbrush: The Patterns and Colors Around You* by S. Stockdale
 - Two Tiny Mice* by Alan Baker
 - Millions of Cats* by Wanda Gag
 - Seven Blind Mice* by Ed Young
3. Internet Resources



[Patterns!](#)



[Number Patterns!](#)



[The National Library of Virtual Manipulatives!](#)



[Patterning Math Worksheets!](#)



[Math Pattern Resources!](#)

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 CATHOLIC COMMUNITY that witnesses to Christ and the Gospel by protecting them from child abuse, including sexual abuse and neglect.
- 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 RESPONSIBILITY for themselves and their actions.
- THE RIGHT TO MAKE RESPONSIBLE DECISIONS founded on religious conviction.



[Patterns](#)



[Video: Math Patterns with Riley](#)



[Video: Number Patterns](#)

Mathematics Curriculum ~ Grade Four

Diocese of Cleveland



Unit 2: Operations with Whole Numbers

Standards Assessed

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, Reading: Informational Text
 5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.

- RI.4.5. Describe the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.2d. Use precise language and domain-specific vocabulary to inform about or explain the topic.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, 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.
- 6. Attend to precision.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, Operations & Algebraic Thinking

4.OA Use the four operations with whole numbers to solve problems.

- 4.OA.1. Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.
- 4.OA.2. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.
- 4.OA.3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. 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.

Essential Questions

- What strategies would you use to solve a multi-step word problem involving multiplication comparison?
- How can we use the relationship between multiplication and division to solve problems?
- How can word problems be translated into numeric problems?
- How does estimation in math help me solve real-life problems?

Content

The students will know

1. Verbal statements of multiplication comparisons and equations
2. How to use drawings and equations to solve problems
3. How to use the four operations to solve word problems
4. Importance of mental computation and estimation strategies including rounding to solve word problems

Skills

Bloom's Taxonomy

DOK Links

The students will be able to

1. Show understanding of each operation (addition, subtraction, multiplication and division) by explaining the "action" of the operation (combining, separating or comparing).
2. Describe and illustrate strategies such as act it out, mental images, making models and drawing pictures to represent the "actions" used in solving problem.
3. Predict the operations needed to determine the solution to a problem.
4. Assess the reasonableness of a solution of the problem

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| | <p>situation.</p> <ol style="list-style-type: none"> Solve word problems involving multiplicative comparison. Distinguish multiplicative comparison from additive comparison. Solve multi-step word problems posed with whole numbers and having whole-number answers using the four operations. Interpret remainders. Represent problems using equations with a letter for the unknown quantity. Assess the reasonableness of answers. Recite from memory the addition and subtraction facts. Recite from memory the multiplication and division facts. <p>Reading/Writing Skills</p> <ol style="list-style-type: none"> Define specific vocabulary from the Common Core and apply it to solve problems. Justify solutions verbally or in written form to explain processes and summarize results. |
| <p>Common Core Vocabulary</p> <ol style="list-style-type: none"> Multiplication equation Multiplicative comparison Remainders Unknown quantity Estimation Rounding Mental computation | <p>Additional Vocabulary</p> |
| <p>Learning Experiences (Suggested)</p> <ol style="list-style-type: none"> Class activity. Begin this unit by assessing students' understanding of the four operations and strategies used for solving problems in each of the four operations. Working with a partner, have students represent, in writing, verbal statements of multiplicative comparisons as multiplication equations (e.g., $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5). Ask them to explain their thinking. Working with a partner, have students solve word problems involving multiplicative comparison using multiplication or division. In solving the problem, students should use drawings or equations with a symbol for the unknown number to represent the problem. Class activity. Provide the students with several word problems and ask them to determine whether the problem involves the multiplicative comparison or the additive comparison (solved when using adding and subtracting). Working in cooperative groups, have students work with a number of multi-step word problems with whole numbers and whole number answers using the four operations. They should: <ol style="list-style-type: none"> Identify which operations are needed to solve the problem. Draw pictures or use models to show their understanding of what the problem is asking. Check the reasonableness of their answer using mental computation and estimation strategies. Have groups share their reasoning in solving the problems with the class. | <p>Assessment (Suggested)</p> <p>What Do I Know? Diagnostic: Written Assessment</p> <p>Students will be assessed regarding their understanding of the four operations and strategies used for solving problems in each of the four operations.</p> <p>Multiplication Rap/Song Summative: Performance</p> <p>Children will write a song or rap in small groups and perform for class.</p> <p>Word Problems with Multiplication and Division Summative: Technology Project</p> <p>Using Technology available, in groups students will write multi step word problems including all four operations.</p> <p>Multiplicative Comparisons Formative: Homework</p> <p>Students will represent verbal statements of multiplicative comparisons as multiplication equations (e.g., $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5) and explain their thinking.</p> <p>Solving Problems with Multiplicative Comparisons Formative: Cooperative Group Work</p> |

6. Engage in activities to ensure student memorization of the multiplication and division facts.

Working with a partner, students will solve word problems involving multiplicative comparison using multiplication or division. In solving the problem, students should use drawings or equations with a symbol for the unknown number to represent the problem.

Which Is It?

Formative: Class Work

Students will be presented with several word problems and be asked to determine whether the problem involves the multiplicative comparison or the additive comparison (solved when using adding and subtracting).

Solving Multi-Step Problems

Summative: Cooperative Group Work

Working in cooperative groups, students will work with a number of multi-step word problems with whole numbers and whole number answers using the four operations. They will:

- Identify which operations are needed to solve the problem.
- Draw pictures or use models to show their understanding of what the problem is asking.
- Check the reasonableness of their answer using mental computation and estimation strategies.

Groups will share their reasoning in solving the problems with the class.

Resources (Suggested)

- iPad Resources
- Literature Connections
Annabelle Swift, Kindergartner by Amy Schwartz
Anno's Magic Seeds by Mitsumasa Anno
Counting on Frank by Rod Clement
Dealing with Addition by Lynette Long
Each Orange Had 8 Slices: A Counting Book by Paul Giganti Jr.
Esio Trot by Roald Dahl
Hottest, Coldest, Highest, Deepest by Steve Jenkins
In the Next Three Seconds . . . Predictions for the Millennium Comp by Rowland Morgan
The King's Chessboard by David Birch
Math Curse by Jon Scieszka and Lane Smith
On the Day You Were Born by Debra Frasier
One Tiny Turtle by Nicola Davies
A Remainder of One by Elinor J. Pinczes
Ten Times Better by Richard Michelson
Wilma Unlimited: How Wilma Rudolph Became the World's Fastest Woman by Kathleen Krull
- Internet Resources



[Multiplication Lesson plans](#)



[Math Goodies Aligned to Common Core Standards](#)



[Solving World and Real Problems](#)

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 CATHOLIC COMMUNITY that witnesses to Christ and the Gospel by protecting them from child abuse, including sexual abuse and neglect.
- 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 RESPONSIBILITY for themselves and their actions.
- THE RIGHT TO MAKE RESPONSIBLE DECISIONS founded on religious conviction.



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[The Math Worksheet Site](#)

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Unit 3: Place Value

Standards Assessed

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, Reading: Informational Text

5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.

- RI.4.5. Describe the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.2d. Use precise language and domain-specific vocabulary to inform about or explain the topic.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

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

CCSS: Mathematics (2011), OH: CCSS: Grade 4, Number & Operations in Base Ten

4.NBT Generalize place value understanding for multi-digit whole numbers.

- 4.NBT.1. Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.
- 4.NBT.2. Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.
- 4.NBT.3. Use place value understanding to round multi-digit whole numbers to any place.

DOC: Mathematics, DOC: Grade 4, Numbers, Number Sense and Operations

A. Number and Number Systems

- 1. Use place value structure of the base-ten number system to read, write, represent, compare and order whole numbers through millions and decimals through thousandths.

Essential Questions

- How does understanding place value help me to solve multi digit problems?
- How does understanding place value help me compare large numbers?
- How do I read, write, compare, and order large numbers with and without decimal points?

Content

The students will know

1. The place value of multi-digit whole numbers
2. Whole numbers through millions
3. Decimals through thousandths
4. Rounding of multi digit numbers
5. Base ten numerals

Skills

Bloom's Taxonomy

DOK Links

The students will be able to

1. Explain that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.
2. Read and write multi-digit whole numbers using base-ten

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| <ol style="list-style-type: none"> 6. Number names 7. Expanded form of numerals 8. $<$, $>$, $=$ symbols | <p>numerals, number names, and expanded form to the millions.</p> <ol style="list-style-type: none"> 3. Compare two multi-digit numbers based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons. 4. Use place value structure to read, write, represent, compare and order decimals to the thousandths. 5. Recite from memory the addition and subtraction facts. 6. Recite from memory the multiplication and division facts. <p>Reading/Writing Skills</p> <ol style="list-style-type: none"> 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. |
| <p>Common Core Vocabulary</p> <ol style="list-style-type: none"> 1. Place value 2. Expanded form 3. Whole number 4. Decimal | <p>Additional Vocabulary</p> <ol style="list-style-type: none"> 1. Greater than – $>$ 2. Less than – $<$ 3. Equal to – $=$ |
| <p>Learning Experiences (Suggested)</p> <ol style="list-style-type: none"> 1. Class activity. Provide students with cards numbered 0 through 9. Ask students to select 4 to 6 cards; then, using all the cards make the largest number possible with the cards, the smallest number possible and the closest number to 5000 that is greater than 5000 or less than 5000. Read and write the numbers. 2. Working with a partner, have students use the number cards to create and compare multi digit numbers using $<$, $>$ and $=$. Record the numbers and write their numeral name. 3. Class activity. Have students write the expanded form for several given numbers. [For example: $3,732 = (3 \times 1000) + (7 \times 100) + (3 \times 10) + (2 \times 1)$]. Ask students to explain the process used in writing the expanded form. Then ask students to write the standard form for an expanded number. Ask students to explain their thinking. 4. Working with a partner, have students round a series of whole numbers. Have them write a statement justifying their answers. 5. Class activity. Using a place value chart for decimals, engage students in a number of exercises in which they identify and name the place value of decimals to the thousandths. 6. Working in cooperative groups, have students use place value structure to read, write, represent, compare and order decimals to the thousandths. Ask them to share their work with another group. 7. Class activity. Provide students with a number of "real" world problems involving concepts addressed in this unit and ask them to solve the problems and justify the reasoning used to solve them. | <p>Assessment (Suggested)</p> <p>Multi Digit Whole Numbers Formative: Cooperative Group Work</p> <p>Working with a partner, students will use number cards to create and compare multi-digit numbers using $<$, $>$ and $=$. They will record the numbers and write their numeral name.</p> <p>Place Value Formative: Posters</p> <p>In small groups, have students make a poster showing place value structure of the base-ten number system to read, write, represent, compare and order whole numbers through millions and decimals through thousandths.</p> <p>Expanded Form and Standard Form Formative: Homework</p> <p>Students will write the expanded form for several given numbers and explain the process used in writing the expanded form. Students will then write the standard form for an expanded number and explain their thinking in doing this.</p> <p>Rounding Whole Numbers Summative: Homework</p> <p>Students will round a series of whole numbers and write a statement justifying their answers.</p> <p>Place Value of Decimals Formative: Class Work</p> |

Using a place value chart for decimals, students will identify and name the place value of decimals to the thousandths.

Working with Decimals

Formative: Cooperative Group Work

Students will read, write, represent, compare and order decimals through thousandths.

Solving Real World Problems

Summative: Written Assessment

Working with a number of "real" world problems involving concepts addressed in this unit, students will solve the problems and justify the reasoning used to solve them.

Resources (Suggested)

1. iPad Resources
2. Literature Connections
How Much, How Many, How Far, How Heavy, How Long, How Tall Is 1000? by Helen Nolan
Is a Blue Whale the Biggest Thing There Is? by Robert E. Wells
The King's Chessboard by David Birch
A Million Fish . . . More or Less by Patricia C. McKissack
On the Day You Were Born by Debra Frasier
A Grain of Rice by Helena Clare Pittman
Math For All Seasons: Mind-Stretching Math Riddles by Gregory Tang and Harry Brigg
One...Two...Three...Sassafras! by Stuart J. Murphy and John Wallace
3. Internet Resources



[Interactive Mathematics](#)



[Math Activities and Resources](#)



[The National Library of Virtual Manipulatives](#)



[The Math Worksheet Site](#)



[Video: Rounding Whole Numbers](#)



[Rounding Decimals](#)



[Video ~ Whole Numbers: Place Value and Expanded Form](#)



[Video: Standard and Expanded Form](#)

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 CATHOLIC COMMUNITY that witnesses to Christ and the Gospel by protecting them from child abuse, including sexual abuse and neglect.
- + 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 RESPONSIBILITY for themselves and their actions.
- + THE RIGHT TO MAKE RESPONSIBLE DECISIONS founded on religious conviction.

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Unit 4: Multi-digit Operations

Standards Assessed

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.4. Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.4. Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, 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.
- 6. Attend to precision.
- 7. Look for and make use of structure.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, Number & Operations in Base Ten

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

- 4.NBT.4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.
- 4.NBT.5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
- 4.NBT.6. Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Essential Questions

- How do I use standard algorithms to solve multi-digit addition and subtraction problems?
- How can modeling, illustrations, and explanations help me better understand multiplication, division, and the relationship between the two?
- How do I know which mathematical operation to use to solve problems?
- How do I know which computational method (mental math, estimation, paper and pencil, and calculator) to use?
- What strategies can be used to approach a challenging addition, subtraction, multiplication, or division problem?

Content

Skills

Bloom's Taxonomy

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| <p>The students will know</p> <ol style="list-style-type: none"> 1. Multi-digit addition and subtraction 2. Operations to use in solving multi-digit problems 3. Standard algorithms 4. How to multiply four-digit whole numbers by one-digit whole numbers. 5. How to multiply two two-digit numbers. 6. Whole number quotients and remainders with up to four-digit dividends and one-digit divisors 7. Place value strategies 8. Properties of Operations 9. Relationship between multiplication and division | <p><u>DOK Links</u></p> <p>The students will be able to</p> <ol style="list-style-type: none"> 1. Fluently add and subtract multi-digit whole numbers. 2. Multiply a whole number of up to four digits by a one-digit whole number. 3. Multiply two two-digit numbers. 4. Illustrate and explain the calculations by using equations, rectangular arrays, and/or area models. 5. Divide whole numbers with up to four-digit dividends and one-digit divisors (with and without remainders). 6. Describe and illustrate the relationship between multiplication and division. 7. Recite from memory the addition and subtraction facts. 8. Recite from memory the multiplication and division facts. <p>Reading/Writing Skills</p> <ol style="list-style-type: none"> 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. |
| <p>Common Core Vocabulary</p> <ol style="list-style-type: none"> 1. Algorithm 2. Properties of operations 3. Equation 4. Rectangular Arrays 5. Area model 6. Quotient 7. Remainder | <p>Additional Vocabulary</p> <ol style="list-style-type: none"> 1. Place Value |
| <p>Learning Experiences (Suggested)</p> <ol style="list-style-type: none"> 1. Working with a partner, have students solve multi digit addition and subtraction problems and illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. Ask them to share their work with the class. 2. Class activity. Teach students a mnemonic to help them to remember the steps to take in solving problems. <ol style="list-style-type: none"> a. McDonalds Multiply Sell Subtract Big Bring Down Cheeseburgers Check b. Does Divide McDonalds Multiply Sell Subtract Cheese Compare Burgers Bring Down c. Dad Divide Mom Multiply Sister Subtract Brother Bring Down Rover Repeat or Remainder 3. Working with a partner, have students solve multiplication problems involving whole numbers of up to four digits multiplied | <p>Assessment (Suggested)</p> <p>Game Project Formative: Cooperative Group Work</p> <p>In small groups, the students will make a board game that will include multi-digit multiplication/division problems, multiply whole numbers up to 4 digits and whole number quotients with remainders. The children will write out directions for the game and have a written set of rules.</p> <p>Addition and Subtraction Problems Summative: Homework</p> <p>Students will solve multi-digit addition and subtraction problems and illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.</p> <p>Multiplication of Four-Digit Numbers by One-Digit Whole Numbers Summative: Cooperative Group Work</p> <p>Working with a partner, students will solve multiplication problems involving whole numbers of up to four digits multiplied by a one-digit whole number and illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. They will share their</p> |

by a one-digit whole number and illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. Ask them to share their work with the class.

4. Class activity. Have students solve multiplication problems involving two two-digit numbers and illustrate and explain the calculation by using equations and rectangular arrays.
5. Working with a partner, have students divide whole numbers with up to four-digit dividends and one-digit divisors with and without remainders. Explain the reasoning used to solve the problem to another pair of students.
6. Class activity. Work with the students to create a graphic illustrating the relationship between multiplication and division. Ask students to explain the relationship in their own words.



[Long division!](#)

work with the class.

Multiplying Two Two-Digit Whole Numbers

Formative: Homework

Students will solve multiplication problems involving two two-digit numbers and illustrate and explain the calculation by using equations and rectangular arrays.

Division of Four-Digit Dividends by One-Digit Divisors

Summative: Cooperative Group Work

Working with a partner, students will divide whole numbers with up to four-digit dividends and one-digit divisors with and without remainders and explain the reasoning used to solve the problem to another pair of students.

Resources (Suggested)

1. iPad Resources
2. Literature Connection
Annabelle Swift, Kindergartner by Amy Schwartz
Anno's Magic Seeds by Mitsumasa Anno
Bananas by Jacqueline Farmer
Centipede's 100 Shoes by Tony Ross
Counting on Frank by Rod Clement
Dealing with Addition by Lynette Long
Each Orange Had 8 Slices: A Counting Book by Paul Giganti Jr.
In the Next Three Seconds . . . Predictions for the Millennium Comp by Rowland Morgan
The King's Chessboard by David Birch
The Man Who Counted: A Collection of Mathematical Adventures ("Beasts of Burden") by Malba Tahan
Math Curse by Jon Scieszka and Lane Smith
On the Day You Were Born by Debra Frasier
A Remainder of One by Elinor J. Pinczes
Ten Times Better by Richard Michelson
3. Internet Resources



[Fun 4 the Brain!](#)



[Exciting Math Site for Kids!](#)



[Fun Games and Activities!](#)



[The National Library of Virtual Manipulatives!](#)



[The Math Worksheet Site!](#)



[Brain Pop Math Activities!](#)

Catholic Identity

Social Justice Teachings

- ✚ Life And Dignity Of The Human Person
- ✚ Call To Family, Community, And Participation
- ✚ Rights And Responsibilities
- ✚ The Dignity Of Work And The Rights Of Workers
- ✚ Solidarity
- ✚ Care For God's Creation

Rights of Children

- ✚ THE RIGHT TO A CATHOLIC COMMUNITY that witnesses to Christ and the Gospel by protecting them from child abuse, including sexual abuse and neglect.
- ✚ 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 RESPONSIBILITY for themselves and their actions.
- ✚ THE RIGHT TO MAKE RESPONSIBLE DECISIONS founded on religious conviction.

Mathematics Curriculum ~ Grade Four

Diocese of Cleveland



Unit 5: Factors and Multiples

Standards Assessed

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.4. Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.1b. Provide reasons that are supported by facts and details.

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, 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.
- 3. Construct viable arguments and critique the reasoning of others.
- 4. Model with mathematics.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, Operations & Algebraic Thinking

4.OA Gain familiarity with factors and multiples.

- 4.OA.4. Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.

DOC: Mathematics, DOC: Grade 4, Numbers, Number Sense and Operations

A. Number and Number Systems

- b. Identify squares of numbers and perfect squares.

Essential Questions

- Why is it important to know the factors that make up a whole number?
- Why do some numbers have few factors and others have many?
- How do I use multiplication properties and division rules to find the factors of numbers?
- What strategies and patterns can help me identify prime and composite numbers as well as perfect squares?
- How does knowing the multiplication facts help me solve problems?

Content

Skills

Bloom's Taxonomy

| | |
|---|---|
| <p>The students will know</p> <ol style="list-style-type: none"> 1. That a specific list of factors is finite 2. That a specific list of multiples is infinite 3. That one is a factor of every number 4. Every number is a factor of itself 5. 1 is neither prime nor composite 6. 2 is the only even prime number 7. Square numbers have an odd number of factors 8. Know that every number can be written as a unique product of prime numbers 9. That factors come in pairs 10. Perfect squares | <p><u>DOK Links</u></p> <p>The students will be able to</p> <ol style="list-style-type: none"> 1. Generate all factor pairs for a whole number in the range 1–100. 2. Generate a finite list of multiples of a number and understand that the list is infinite. 3. Analyze whether a given whole number in the range 1–100 is prime or composite. 4. Investigate squares of numbers and perfect squares. 5. Classify numbers as prime, composite, square, even, and odd. 6. Use factors and multiples to solve problems and explain facts of everyday life. 7. Write any number as the product of prime numbers. 8. Use mathematical language accurately to express whole number relationships. 9. Compare and contrast characteristics of whole numbers. 10. Use visual representations to demonstrate understandings of factors and multiples. 11. Recite from memory the addition and subtraction facts. 12. Recite from memory the multiplication and division facts. <p>Reading/Writing Skills</p> <ol style="list-style-type: none"> 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. |
| <p>Common Core Vocabulary</p> <ol style="list-style-type: none"> 1. Prime Numbers 2. Composite Numbers 3. Finite 4. Infinite 5. Factor 6. Multiple 7. Squares of numbers 8. Perfect squares | <p>Additional Vocabulary</p> |
| <p>Learning Experiences (Suggested)</p> <ol style="list-style-type: none"> 1. Class activity. Provide students with a given word bank and a set of numbers with many relationships amongst them. Ask them to write sentences using the vocabulary and given numbers to show their understanding of the terms to be used in this unit. 2. Working with a partner, have students use counters to show how many ways they can put 24 into groups of equal size. Ask them to write the mathematical expression for each group and have the partners list all the factors of 24 and the pairs of factors for 24. Repeat the activity by having the partners find several factors of 10, 14, 25, or 32, and write multiplication expressions for the numbers. 3. Class activity. Ask students to consider 5×8 is 40 and have them write all of the multiples of 5 and of 8. Ask them what they notice about the multiples (40 is a multiple of both numbers). Identify this as the "common" multiple. Try several other | <p>Assessment (Suggested)</p> <p>Identifying Factors Formative: Cooperative Group Work</p> <p>Working with a partner, students will use counters to show how many ways they can put a given number into groups of equal size and write the mathematical expression for each group. Partners will then list all the factors of the number and the pairs of factors for the number.</p> <p>Prime and Composite Numbers Formative: Class Work</p> <p>Following the lesson on prime and composite numbers, students will work with a partner to construct all rectangles whose area is equal to a given number (use tile squares). Partners will justify their findings in writing explaining which rectangles represent a prime number or a composite</p> |

problems with the class.

4. Class activity/Online learning. Use the video **Prime and Composite Numbers** to teach students the meaning of prime and composite numbers. (See Link)
5. Following the lesson on prime and composite numbers, have students work with a partner to construct all rectangles whose area is equal to a given number (use tile squares). After several examples, students should see that prime numbers are associated with exactly two rectangles, whereas composite numbers are associated with more than two rectangles. (See Link on Factoring.)
6. Have students work with a partner to write at least ten multiplication expressions for numbers with several factors and for numbers with a few factors. Create a chart listing all the factors of the numbers and identify the numbers as prime or composite.
7. Class activity/Online learning. Use the video **Prime Factorization [factor tree]** found in the Links to teach students how to use the factor tree to find all the factors of a number. Then, using a "factor tree" have the students list all of the factors of a number such as 24. Identify which factors are prime and which are composite. Ask them what they notice about the factors in the tree. Introduce the concept of square numbers and perfect squares.



[Product Game](#)



[factoring](#)



[Video ~ Prime and Composite Numbers](#)



[Prime Factorization \(factor tree\)](#)

number.

Prime and Composite Group Project Summative: Cooperative Group Work

Students will make a game that shows prime and composite numbers; write rules to play games and then trade with classmates.

Prime and Composite Numbers Formative: Class Work

Students will work with a partner to write at least ten multiplication expressions for numbers with several factors and for numbers with a few factors. They will create a chart listing all the factors of the numbers and identify the numbers as prime or composite.

Factor Tree ~ Squares Formative: Class Work

Using a "factor tree", students will list all of the factors of a number such as 24 and identify which factors are prime and which are composite. They will summarize what they notice about the factors in the tree.

Resources (Suggested)

1. iPad Resources
2. Literature Connections
Two Ways to Count to Ten: A Liberian Folktale by Ruby Dee
Ben Franklin and the Magic Squares by Frank Murphy and Richard Walz
Uno's Garden by Graeme Base
Two Hundred Rabbits by Lonzo Anderson
3. Internet Resources



[Math Is Fun](#)



[Math Goodies](#)



[The Math Playground](#)



[Fact Monster](#)

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 CATHOLIC COMMUNITY that witnesses to Christ and the Gospel by protecting them from child abuse, including sexual abuse and neglect.
- ✚ 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



Prime Numbers

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 RESPONSIBILITY for themselves and their actions.
-  THE RIGHT TO MAKE RESPONSIBLE DECISIONS founded on religious conviction.

Mathematics Curriculum ~ Grade Four

Diocese of Cleveland



Unit 6: Decimal Notation for Fractions

Standards Assessed

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.4. Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.

Integration of Knowledge and Ideas

7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

- RI.4.7. Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 3. Construct viable arguments and critique the reasoning of others.
- 4. Model with mathematics.
- 6. Attend to precision.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, Number & Operations—Fractions

4.NF Understand decimal notation for fractions, and compare decimal fractions.

- 4.NF.5. Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.
- 4.NF.6. Use decimal notation for fractions with denominators 10 or 100
- 4.NF.7. Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or

Essential Questions

- How are decimals and fractions related?
- What strategies can I use to understand fractions with denominators of 10 or 100 and decimals?
- How can I use models to compute fractions with like denominators?
- In what ways can I model, compare, and order fractions and decimals?
- How are common fractions and decimals alike and different?

Content

The students will know



1. Fractions with denominators of 10 and 100

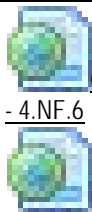
Skills

Bloom's Taxonomy

DOK Links

The students will be able to

| | |
|--|--|
| <ol style="list-style-type: none"> 2. Equivalent fractions 3. Decimal notation for fractions with denominators 10 or 100 4. Comparisons with the symbols $>$, $=$, and $<$ | <ol style="list-style-type: none"> 1. Express a fraction with denominator 10 as an equivalent fraction with denominator 100. ($3/10$ as $30/100$). 2. Add two fractions with the same denominators of 10 and 100. ($3/10 + 4/100 = 34/100$). 3. Use decimal notation for fractions with denominators 10 or 100. (Rewrite 0.62 as $62/100$) 4. Compare two decimals to hundredths. 5. Recognize that comparisons are valid only when the two decimals refer to the same whole. 6. Justify conclusions regarding fraction comparisons. 7. Recite from memory the addition and subtraction facts. 8. Recite from memory the multiplication and division facts. <p>Reading/Writing Skills</p> <ol style="list-style-type: none"> 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. |
| <p>Common Core Vocabulary</p> <ol style="list-style-type: none"> 1. Equivalent fractions 2. Decimal notation 3. Hundredths 4. Numerator 5. Denominator 6. Comparison symbols | <p>Additional Vocabulary</p> |
| <p>Learning Experiences (Suggested)</p> <ol style="list-style-type: none"> 1. Class activity. Have students work with a partner to express a list of fractions with denominator 10 as equivalent fractions with denominator 100. Have partners exchange their work with another team and check for accuracy of work. 2. Have students practice adding two fractions with the same denominators of 10 and 100. 3. Class activity. Have students work with a partner to write decimal notations for a list of fractions with denominators 10 and 100. Have partners exchange their work with another team and check for accuracy of work. 4. Give students a list of fractions with denominators 10 or 100 and equivalent decimals. Ask them to determine if the fractions/decimals are less than, greater than, or equal and justify the conclusions, e.g., by using a visual model. 5. Class activity. Reinforce the understanding of numerator and denominator by teaching the students the Numerator and Denominator Song: Fractions. (See Link) <p> Video ~ Use decimal notation for fractions with denominators 10 or 100 - 4.NF.6</p> <p> Convert fractions into decimals to the tenths place - 4.NF.6</p> | <p>Assessment (Suggested)</p> <p>Equivalent Fractions Formative: Class Work</p> <p>Working with a partner and a list of fractions with denominator 10, students will write equivalent fractions with denominator 100. Partners will exchange their work with another team and check for accuracy of work.</p> <p>Writing Fractions as Decimals Formative: Class Work</p> <p>Students will work with a partner to write decimal notations for a list of fractions with denominators 10 and 100. Partners will exchange their work with another team and check for accuracy of work.</p> <p>Adding Fractions Summative: Test</p> <p>Students will add fractions with the same denominators of 10 and 100.</p> <p>Formative: Graphic Organizer</p> <p>Working with a given list of fractions and decimals, the children will record results of $<$, $>$ and $=$ and justify the conclusions by making a visual model.</p> <p>Fractions around us Summative: Response Journal</p> |



[Convert fractions into decimals to the hundredths place](#)
- 4.NF.6

[Numerator and Denominator Song](#)

The students will keep track of a time period of the fractions they see in real life and mathematical situations. They will then compare two decimals to hundredths by reasoning about their size.

Resources (Suggested)

1. iPad Resources
2. Literature Connections
Ed Emberley's Picture Pie: A Circle Drawing Book by Ed Emberley
Icebergs and Glaciers by Seymour Simon
The Man Who Counted: A Collection of Mathematical Adventures by Malba Tahan
Jumanji by Chris Van Allsburg
Apple Fractions by Jerry Pallotta and Rob Bolster
Full House: An Invitation to Fractions by Dayle Ann Dodds and Abby Carter
Funny & Fabulous Fraction Stories: 30 Reproducible Math Tales and Problems to Reinforce Important Fraction Skills by Dan Greenberg
3. Internet Resources



[Math Activities and Resources](#)



[AAA Math ~ Activities and Resources](#)



[Math Games and Activities](#)



[Home School Math ~ Practice Activities](#)



[Math Goodies ~ Common Core](#)



[4th Grade Math Lessons and Activities](#)



[Brain Pop](#)

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 CATHOLIC COMMUNITY that witnesses to Christ and the Gospel by protecting them from child abuse, including sexual abuse and neglect.
- 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 RESPONSIBILITY for themselves and their actions.
- THE RIGHT TO MAKE RESPONSIBLE DECISIONS founded on religious conviction.

Mathematics Curriculum ~ Grade Four

Diocese of Cleveland



Unit 7: Fraction Equivalence

Standards Assessed

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.4. Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.

Integration of Knowledge and Ideas

7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

- RI.4.7. Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 3. Construct viable arguments and critique the reasoning of others.
- 4. Model with mathematics.
- 6. Attend to precision.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, Number & Operations—Fractions

4.NF Extend understanding of fraction equivalence and ordering.

- 4.NF.1. Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
- 4.NF.2. Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $1/2$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or

Essential Questions

- How do we use fraction equivalency and comparisons in real life?
- How can I use fraction models to explain properties of equivalent fractions?
- How does knowledge about the properties of fractions help represent, compare, and order fractions with different numerators and denominators?

Content

The students will know

1. Concepts of fractions

Skills

Bloom's Taxonomy

DOK Links

The students will be able to

| | |
|---|---|
| <ol style="list-style-type: none"> 2. Comparisons with symbols $>$, $=$, and $<$ 3. Equivalent fractions 4. Fraction models 5. Common denominators and numerators | <ol style="list-style-type: none"> 1. Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models. 2. Generate equivalent fractions. 3. Compare two fractions with different numerators and different denominators. 4. Recognize that comparisons are valid only when the two fractions refer to the same whole. 5. Justify conclusions regarding fraction comparisons. 6. Recite from memory the addition and subtraction facts. 7. Recite from memory the multiplication and division facts. <p>Reading/Writing Skills</p> <ol style="list-style-type: none"> 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. |
| <p>Common Core Vocabulary</p> <ol style="list-style-type: none"> 1. Fraction equivalence 2. Numerator 3. Denominator 4. Fraction comparisons 5. Common denominator 6. Benchmark fractions | <p>Additional Vocabulary</p> |
| <p>Learning Experiences (Suggested)</p> <ol style="list-style-type: none"> 1. Class activity. Have students use fraction strips to add fractions with like and unlike denominators. Have them justify their work. 2. Working in cooperative groups, give each group a zip lock bag of M&M's. Ask the group to determine what fraction of each color is in the bag. The task: <ol style="list-style-type: none"> a. Count each color of M&M's. <i>Ask them what part of the fraction is this (numerator).</i> b. Add amounts of each color or count all of the M&M's. <i>Ask them what part of the fraction is this (denominator).</i> c. Write fractions of each color on a piece of paper in order from greatest to least. <p>Once everyone is done, write the results on the board and compare each group's results and determine which group has the highest fraction of each color.</p> 3. Class activity/Online learning. Use the video <i>Equivalent Fractions</i> (See Link) to review and extend student understanding of equivalent fractions. Follow this by having students work with a partner to determine the equivalent fractions of a list of fractions. Ask partners to explain the thinking process used to complete the task. 4. Have students practice writing the equivalent fraction for a number of given fractions. Ask them to show their thinking process and be prepared to justify their reasoning. 5. Class activity. Use the video <i>Comparing Fractions</i> (See Link) to review and extend student understanding of how we compare fractions with like and unlike denominators. Follow this by having students work with a partner to compare fractions with unlike denominators. Ask partners to explain the thinking process used to complete the task. 6. Have students practice comparing fractions with unlike | <p>Assessment (Suggested)</p> <p>M & M Activity Formative: Cooperative Group Work</p> <p>Working in cooperative groups, give each group a zip lock bag of M&M's. Groups will determine what fraction of each color is in the bag. They will:</p> <ol style="list-style-type: none"> a. Count each color of M&M's. b. Add amounts of each color or count all of the M&M's. c. Write fractions of each color on a piece of paper in order from greatest to least. d. Students will compare each group's results and determine which group has the highest fraction of each color. <p>Determining Equivalent Fractions Formative: Class Work</p> <p>Students will work with a partner to determine the equivalent fractions of a list of fractions and explain the thinking process used to complete the task.</p> <p>Writing Equivalent Fractions Summative: Homework</p> <p>Students will practice writing the equivalent fraction for a number of given fractions, show their thinking process, and be prepared to justify their reasoning.</p> <p>Comparing Fractions Formative: Class Work</p> |

denominators for a number of given fractions. Ask them to show their thinking process and be prepared to justify their reasoning.

7. Give students a list of fractions with like and unlike denominators. Ask them to determine if the fractions are less than, greater than, or equal and justify the conclusions, e.g., by using a visual model.



[Equivalent Fractions!](#)



[Comparing Fractions!](#)

Students will work with a partner to compare fractions with like and unlike denominators and explain the thinking process used to complete the task.

Comparing Fractions

Summative: Homework

Students will practice comparing fractions with unlike denominators for a number of given fractions. They will show their thinking process and be prepared to justify their reasoning.

Are they $<$, $>$, or $=$?

Summative: Test

Given a list of fractions with like and unlike denominators, students will determine if the fractions are less than, greater than, or equal and justify the conclusions using visual models.

Resources (Suggested)

- iPad Resources
- Literature Connection
Ed Emberley's Picture Pie: A Circle Drawing Book by Ed Emberley
Icebergs and Glaciers by Seymour Simon
The Man Who Counted: A Collection of Mathematical Adventures by Malba Tahan
Jumanji by Chris Van Allsburg
Apple Fractions by Jerry Pallotta and Rob Bolster
Full House: An Invitation to Fractions by Dayle Ann Dodds and Abby Carter
Funny & Fabulous Fraction Stories: 30 Reproducible Math Tales and Problems to Reinforce Important Fraction Skills by Dan Greenberg
- Internet Resources



[Equivalent Fractions!](#)



[Equivalent Fractions!](#)



[Fraction Manipulatives!](#)



[The National Library of Virtual Manipulatives!](#)



[The Math Worksheet Site!](#)



[Math Playground ~ Equivalent Fractions!](#)



[Math Playground ~ Comparing 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 CATHOLIC COMMUNITY that witnesses to Christ and the Gospel by protecting them from child abuse, including sexual abuse and neglect.
- 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 RESPONSIBILITY for themselves and their actions.
- THE RIGHT TO MAKE RESPONSIBLE DECISIONS founded on religious conviction.

Mathematics Curriculum ~ Grade Four

Diocese of Cleveland



Unit 8: Operations with Fractions

Standards Assessed

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.4. Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.1d. Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, 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.
- 8. Look for and express regularity in repeated reasoning.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, Number & Operations—Fractions

4.NF Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

- 4.NF.3. Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.
- 4.NF.3a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
- 4.NF.3b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model.
- 4.NF.3c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
- 4.NF.3d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
- 4.NF.4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
- 4.NF.4a. Understand a fraction a/b as a multiple of $1/b$.
- 4.NF.4b. Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number.
- 4.NF.4c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem.

Essential Questions

- How can fractions be added (joined), subtracted (separated), multiplied, and decomposed to solve real world problems?
- How do I identify and record the fraction of a whole group?
- How can I use models to represent properties and operations involving fractions and mixed numbers?
- How can fractions help me represent and solve word problems?

Content

The students will know

1. Adding two unit fractions results in fraction a/b where $a > 1$
2. Addition and subtraction of fractions with like denominators are

Skills

Bloom's Taxonomy

DOK Links

The students will be able to

| | |
|---|---|
| <p>performed by joining and separating parts of the same whole</p> <p>3. Fraction a/b is a multiple of $1/b$</p> | <ol style="list-style-type: none"> 1. Decompose (break apart) a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. 2. Justify decompositions, e.g., by using a visual fraction model. 3. Add and subtract mixed numbers with like denominators. 4. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators. 5. Multiply a fraction by a whole number by using the understanding that fraction a/b is a multiple of $1/b$. 6. Solve word problems involving multiplication of a fraction by a whole number. 7. Recite from memory the addition and subtraction facts. 8. Recite from memory the multiplication and division facts. <p>Reading/Writing Skills</p> <ol style="list-style-type: none"> 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. |
| <p>Common Core Vocabulary</p> <ol style="list-style-type: none"> 1. Unit fraction (1 as the numerator) 2. Common denominator 3. Equivalent fractions 4. Decomposition of fractions 5. Denominator 6. Numerator 7. Multiple 8. Mixed number | <p>Additional Vocabulary</p> |
| <p>Learning Experiences (Suggested)</p> <ol style="list-style-type: none"> 1. Class activity. Have students decompose (break apart) a fraction into a sum of fractions with the same denominator in more than one way. Have them record each decomposition by an equation and justify the decomposition. (For example: $3/8 = 1/8 + 1/8 + 1/8$) 2. Follow-up the class activity by having the students work with a partner to decompose a list of fractions showing the equation and justifying the decomposition. 3. Class activity/Online learning. Using a video source, such as Khan Academy, guide students in developing skill in adding and subtracting mixed numbers with like denominators by: <ol style="list-style-type: none"> a. replacing each mixed number with an equivalent fraction, and/or b. using properties of operations and the relationship between addition and subtraction. 4. Follow-up the class activity by having pairs of students work together to find the sum or difference of a number of mixed number problems. Ask them to draw a number line to show their work and then justify the steps taken to solve the problem. 5. Working with a partner, have students solve a number of word problems involving addition and subtraction of fractions referring to the same whole and having like denominators. Have each pair explain their work to another pair of students. | <p>Assessment (Suggested)</p> <p>Decomposing Fractions Formative: Class Work</p> <p>Students will work with a partner to decompose a list of fractions showing the equation used and justifying the decomposition.</p> <p>Adding and Subtracting Mixed Numbers Formative: Cooperative Group Work</p> <p>Students will work with a partner to find the sum or difference of a number of mixed number problems. They will draw a number line to show their work and then justify the steps taken to solve the problem.</p> <p>Solving Addition and Subtraction of Fractions Problems Summative: Homework</p> <p>Students will solve a number of word problems involving addition and subtraction of fractions referring to the same whole and having like denominators and justify, in writing, the steps taken.</p> <p>Multiplying Fractions By Whole Numbers Summative: Class Work</p> |

6. Class activity/Online learning. Using the videos found in the Links, develop student understanding of multiplication of a fraction by a whole number using visual models, using repeated addition, and using the properties of operations. Challenge students to solve several problems using all three methods. Ask them to explain the process used in solving the problems.
7. Follow-up the class activity by having pairs of students work together to multiply several mixed number problems. Ask them to justify the steps taken to solve each problem.
8. Working in cooperative groups, have students determine the amount of each ingredient in a recipe if they are going to make 5 batches of the recipe. Have them use visual fraction models and equations to represent how each ingredient is increased. (Provide students with a simple cookie recipe.)



[Multiplying Fractions Using Visual Models](#)



[Multiplying Fractions Using Repeated Addition](#)



[Multiplying Fractions Using Properties of Operations](#)

Students multiply several fractions by a whole number using visual models, repeated addition, properties of operations. They will explain the process used and justify, in writing, the steps taken in solving the problems.

Making Cookies

Summative: Cooperative Group Work

Working in cooperative groups, students will determine the amount needed for each ingredient in a recipe if they are going to make 5 batches of the recipe. They will use visual fraction models and equations to represent how each ingredient is increased.

Resources (Suggested)

1. iPad Resources
2. Literature Connections
 - Ed Emberley's Picture Pie: A Circle Drawing Book* by Ed Emberley
 - Icebergs and Glaciers* by Seymour Simon
 - The Man Who Counted: A Collection of Mathematical Adventures* by Malba Tahan
 - Jumanji* by Chris Van Allsburg
 - Apple Fractions* by Jerry Pallotta and Rob Bolster
 - Full House: An Invitation to Fractions* by Dayle Ann Dodds and Abby Carter
 - Funny & Fabulous Fraction Stories: 30 Reproducible Math Tales and Problems to Reinforce Important Fraction Skills* by Dan Greenberg
 - The Doorbell Rang* by Pat Hutchins
3. Internet Resources



[Fractions Jeopardy Game](#)



[mixed numbers](#)



[Adapted Math ~ A Better Way to Learn Math](#)



[Learn Zillion ~ Math Lessons on Core and More](#)



[Virtual Nerd ~ Video Lessons for Teachers](#)



[The National Library of Virtual Manipulatives](#)

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 CATHOLIC COMMUNITY that witnesses to Christ and the Gospel by protecting them from child abuse, including sexual abuse and neglect.
- 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 RESPONSIBILITY for themselves and their actions.
- THE RIGHT TO MAKE RESPONSIBLE DECISIONS founded on religious conviction.



[The Math Worksheet Site!](#)

Mathematics Curriculum ~ Grade Four

Diocese of Cleveland



Unit 9: Measurement

Standards Assessed

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.4. Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- W.4.2d. Use precise language and domain-specific vocabulary to inform about or explain the topic.

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.1c. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, 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.
- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, Measurement & Data

4.MD Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

- 4.MD.1. Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.
- 4.MD.2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
- 4.MD.3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

DOC: Mathematics, DOC: Grade 4, Measurement

B. Measurement Techniques and Tools

- 3. Write, solve and verify solutions to multi-step problems involving measurement.

Essential Questions

- How do I use weight and measurement in my daily life?

- What tools and units are used to measure the attributes of an object?
- How are the units within a standard system related?
- In what ways can I represent measurement quantities by using diagrams and measurement scales?
- How can letters be used to symbolize standard algorithms (formulas)?

Content

The students will know

1. Relative sizes of measurement units
2. Measurement equivalents
3. Standard measurement tools
4. Metric measures
5. Weight measures
6. English measures
7. Time measures
8. Area and perimeter formulas
9. Strategies to solve multi-step problems

Skills

Bloom's Taxonomy

DOK Links

The students will be able to

1. Investigate relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec.
2. Express measurements in a larger unit in terms of a smaller unit.
3. Record measurement equivalents in a two-column table.
4. Solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money.
5. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
6. Apply the area and perimeter formulas for rectangles in real world and mathematical problems.
7. Write, solve and verify solutions to multi-step problems involving measurement.
8. Recite from memory the addition and subtraction facts.
9. Recite from memory the 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. Measurement units (km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec; in, ft, yd)
2. Measurement equivalents
3. Intervals of time
4. Liquid volumes
5. Mass
6. Decimal
7. Measurement scale
8. Area
9. Perimeter
10. Number line diagram

Additional Vocabulary

Learning Experiences (Suggested)






1. Class activity. Have students work with a partner to find the measurement of at least ten objects in the classroom using both the metric system (mm, cm, m) and the English system (in, ft, yd). Create a chart listing the item and its measure in each of the systems.
2. Have students work with a partner to explore the relationships between the centimeter rod, the decimeter rod, and a meter ruler. Ask them to describe how these three metric units

Assessment (Suggested)

How Big, How Long, How Wide?

Formative: Class Work

Students will work with a partner to find the measurement of at least ten objects in the classroom using both the metric system (mm, cm, m) and the English system (in, ft, yd). They will create a chart listing the item and its measure in each of the systems.

| | |
|--|--|
| <p>(centimeter, decimeter, and meter) relate to each other. Their work should include diagrams and include answers to the following questions:</p> <ul style="list-style-type: none"> - How do centimeters relate to decimeters? - How do decimeters relate to meters? - How do centimeters relate to meters? - How would you describe these relationships as fractions and decimals? <ol style="list-style-type: none"> 3. Class activity. To reinforce the understanding of the relationship between liquid measures, have students create a "capacity creature." (See Link) 4. Class activity. Have students show their understanding of the relationships among inches, feet and yards by having them solve a number of word problems. Ask them to justify the steps taken in solving the problems. 5. Online learning. Using <i>Brain Pop</i>, <i>The National Library of Virtual Manipulatives</i>, or another online resource engage students in solving word problems addressing the following. Problems should involve simple fractions and decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. <ol style="list-style-type: none"> a. distances b. intervals of time c. liquid volumes d. masses of objects e. money 6. Have students work with a partner to solve problems that involve the multiplication of a fraction by a whole number (denominators are 2, 3, 4, 5, 6, 8, 10, 12 and 100) and the addition and subtraction of fractions with the same denominator. 7. Read the book <i>Spaghetti and Meatballs</i> by Marilyn Burns to the class. Then pose the following problem and have the students work in groups of three to solve it. <ol style="list-style-type: none"> a. Suppose that you had six tables to seat guests at a dinner party. b. Show different ways you could arrange the tables. c. Which arrangement would seat the most guests? d. Which arrangement would seat the least number of guests? Use pictures, numbers, and words to explain your thinking. Share your solution with the class. 8. Have students work with a partner to solve word problems in which they must calculate area and perimeter. Have them draw a diagram and explain the steps taken to solve the problem. Ask them to share their work with another pair of students. | <p>Working with Metric Measures Formative: Cooperative Group Work</p> <p>Students will work with a partner to explore the relationships between the centimeter rod, the decimeter rod, and a meter ruler. They will describe how these three metric units (centimeter, decimeter, and meter) relate to each other. Their work will include diagrams and answers to the following questions:</p> <ul style="list-style-type: none"> - How do centimeters relate to decimeters? - How do decimeters relate to meters? - How do centimeters relate to meters? - How would you describe these relationships as fractions and decimals? <p>Inches, Feet, Yards Formative: Homework</p> <p>Students will show their understanding of the relationships among inches, feet and yards by solving a number of word problems. They will write a statement to justify the steps taken in solving the problems.</p> <p>Solving Word Problems Formative: Smartboard/Activboard Interactive Activity</p> <p>Ongoing Assessment during the unit.</p> <p>Students will solve word problems addressing the topics listed below.</p> <p>Problems should involve simple fractions and decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. The topics are:</p> <ol style="list-style-type: none"> a. distances b. intervals of time c. liquid volumes d. masses of objects e. money <p>Addition, Subtraction, Multiplication of Fractions By Whole Number Formative: Homework</p> <p>Students will solve problems that involve the multiplication of a fraction by a whole number (denominators are 2, 3, 4, 5, 6, 8, 10, 12 and 100) and the addition and subtraction of fractions with the same denominator.</p> <p>Area and Perimeter Formative: Class Work</p> <p>Students will work with a partner to solve word problems in which they must calculate area and perimeter. They will draw a diagram and explain the steps taken to solve the problem. They will share their work with another pair of students.</p> |
| <p>Resources (Suggested)</p> <ol style="list-style-type: none"> 1. iPad Resources 2. Literature Connection <i>Spaghetti and Meatballs</i> by Marilyn Burns <i>Perimeter, Area, and Volume</i> by David A. Adler and Edward Miller <i>Sir Cumference and the Great Knight of Angleland: A Math</i> | <p>Catholic Identity</p> <p>Social Justice Teachings</p> <ul style="list-style-type: none">  Life And Dignity Of The Human Person  Call To Family, Community, And Participation  Rights And Responsibilities  Solidarity  Care For God's Creation |

Adventure by Cindy Neuschwander and Wayne Geehan
Millions to Measure by David M. Schwartz and Steven Kellogg
Biggest, Strongest, Fastest by Steve Jenkins
G Is for Googol: A Math Alphabet Book by David M. Schwartz
How Much, How Many, How Far, How Heavy, How Long, How Tall Is 1000? by Helen Nolan
How Tall, How Short, How Faraway by David A. Adler

3. Internet Resources



[measurement index](#)



[math conversion](#)



[Learn Zillion ~ Lessons and Activities for Common](#)

Core



[The National Library of Virtual Manipulatives](#)



[The Math Worksheet Site](#)



[Brain Pop](#)

Rights of Children

- ✚ THE RIGHT TO A CATHOLIC COMMUNITY that witnesses to Christ and the Gospel by protecting them from child abuse, including sexual abuse and neglect.
- ✚ 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 RESPONSIBILITY for themselves and their actions.
- ✚ THE RIGHT TO MAKE RESPONSIBLE DECISIONS founded on religious conviction.

Mathematics Curriculum ~ Grade Four

Diocese of Cleveland



Unit 10: Measurement: Using Graphs to Display Data

Standards Assessed

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, Reading: Informational Text
Integration of Knowledge and Ideas

7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

- RI.4.7. Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.2d. Use precise language and domain-specific vocabulary to inform about or explain the topic.

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.1c. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, 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.
- 4. Model with mathematics.
- 5. Use appropriate tools strategically.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, Measurement & Data

4.MD Represent and interpret data.

- 4.MD.4. Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots.

DOC: Mathematics, DOC: Grade 4, Data Analysis and Probability

A. Data Collection

- 3. Construct, bar graphs, line graphs and Venn diagrams to sort and describe data.
- 5. Construct graphs using the correct format; e.g., titles, axis names, reasonable scales, and legends or keys.
- 6. Compare different representations of the same data to evaluate how well each representation shows important aspects of the data, and identify appropriate ways to display the data.

Essential Questions

- How can I collect, organize, and display data?
- How does the display method (charts, tables, graph, line plot) help me interpret data?
- How do line plots help me solve problems involving addition and subtraction of fractions?
- How can knowledge of fractions be used to solve real-world measurement problems?

Content

Skills

Bloom's Taxonomy

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| <p>The students will know</p> <ol style="list-style-type: none"> 1. Types, purposes, and formats for representing data <ol style="list-style-type: none"> a. bar graphs b. line graphs c. Venn diagrams d. line plots 2. Addition and subtraction of fractions with line plot data 3. Operations of addition and subtraction of fractions | <p><u>DOK Links</u></p> <p>The students will be able to</p> <ol style="list-style-type: none"> 1. Construct a line plot marked with appropriate units (whole numbers, halves or fourths/quarters) to display a data set of measurements in fractions of a unit. 2. Solve problems involving addition and subtraction of fractions by using information presented in line plots. 3. Construct bar graphs, line graphs and Venn diagrams to sort, describe, and interpret data. 4. Construct graphs using the correct format; e.g., titles, axis names, reasonable scales, and legends or keys. 5. Compare different representations of the same data to evaluate how well each representation shows important aspects of the data, and identify appropriate ways to display the data. 6. Recite from memory the addition and subtraction facts. 7. Recite from memory the multiplication and division facts. <p>Reading/Writing Skills:</p> <ol style="list-style-type: none"> 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. |
| <p>Common Core Vocabulary</p> <ol style="list-style-type: none"> 1. Line plot | <p>Additional Vocabulary</p> <ol style="list-style-type: none"> 1. Bar graph 2. Line graph 3. Venn diagram 4. Title 5. Axis names 6. Legend 7. Key 8. Scales |
| <p>Learning Experiences (Suggested)</p> <ol style="list-style-type: none"> 1. Class activity. Have students graph the number of M&M's found in a small bag using different representations of the same data. Discuss and explain which representations best communicates the data. 2. Have students work in a cooperative group to write a simple survey, consisting of five questions, to question others on a topic. Have them conduct the survey by asking at least ten persons to answer their questions. They should report their findings using a correctly labeled graph. 3. Have students work with a partner to create a line plot using objects found in one of their desks. They should: <ol style="list-style-type: none"> a. Measure ten objects in their desk to the nearest 1/2 inch and record the data in a table. b. Using graph paper, draw a horizontal line and determine the scale to use. Divide the line into equal parts that will hold the scale. c. Plot their data by placing an X over the correct number for each measurement collected. If a number is repeated place one X above the other. d. Label the horizontal axis and record the title of the line plot. Ask the partners to calculate the combined length of all the | <p>Assessment (Suggested)</p> <p>Survey Formative: Cooperative Group Work</p> <p>Students will write a simple survey, consisting of five questions, to use with a random audience on a topic (i.e. favorite sport, book). They will conduct the survey by asking at least ten persons to answer their questions and report their findings using a correctly labeled graph.</p> <p>Length of Ants Line Plot Summative: Written Assessment</p> <p>Students will create a line plot showing the data collected on the length of ants. (See Link)</p> <p>Creating a Line Plot Formative: Cooperative Group Work</p> <p>Students will work with a partner to create a line plot using objects found in one of their desks. They should measure ten objects in their desk to the nearest ½ inch and record the data in a table.</p> |

- objects they measured. They should show their work.
- Class activity. Present students with several sets of data and have them collect, organize, and display the data in a Venn diagram, line graph, and/or bar graph. They should use reasonable scales and correctly label their diagram. Ask them to interpret the data and justify their conclusions.
 - Class activity/Online learning. Using the interactive site *IXL ~ Working With Bar Graphs* (See Link), have students examine various graphs and determine which type of graph best represents the data. Ask them why it is important to know which type of graph to use when presenting data.



[Bar Graphing Worksheets](#)



[IXL ~ Working With Bar Graphs](#)

- Using graph paper, draw a horizontal line and determine the scale to use. Divide the line into equal parts that will hold the scale.
- Plot their data by placing an X over the correct number for each measurement collected. If a number is repeated place one X above the other.
- Label the horizontal axis and record the title of the line plot.

The partners will calculate the combined length of all the objects they measured and show their work.

Collecting, Organizing, and Interpreting Data Summative: Class Work

Given several sets of data, students will collect, organize, and display the data in a Venn diagram, line graph, and/or bar graph. They will use reasonable scales and correctly label their diagram. Finally, they will interpret the data and justify their conclusions.

Resources (Suggested)

- iPad Resources
- Literature Connection
Berries, Nuts, and Seeds by Diane L. Burns
Chimp Math: Learning About Time from a Baby Chimpanzee by Ann W. Nagda and Cindy Bickel
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
The Great Turkey Walk by Kathleen Karr
What's Faster Than a Speeding Cheetah? by Robert E. Wells
- Internet Resources



[IXL Math Activities and Resources](#)



[Bar Graph Games](#)



[Math is Fun ~ Bar Graphs](#)



[The National Library of Virtual Manipulatives](#)



[The Math Worksheet 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 CATHOLIC COMMUNITY that witnesses to Christ and the Gospel by protecting them from child abuse, including sexual abuse and neglect.
- + 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 RESPONSIBILITY for themselves and their actions.
- + THE RIGHT TO MAKE RESPONSIBLE DECISIONS founded on religious conviction.

Mathematics Curriculum ~ Grade Four

Diocese of Cleveland



Unit 11: Geometry: Measuring Angles

Standards Assessed

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.4. Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.2d. Use precise language and domain-specific vocabulary to inform about or explain the topic.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 5. Use appropriate tools strategically.
- 6. Attend to precision.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, Measurement & Data

4.MD Geometric measurement: understand concepts of angle and measure angles.

- 4.MD.5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:
- 4.MD.5a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $1/360$ of a circle is called a “one-degree angle,” and can be used to measure angles.
- 4.MD.5b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.
- 4.MD.6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.
- 4.MD.7. Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.

Essential Questions

- How can I measure angles?
- How do I classify angles?
- What is the difference between a point, ray, line, line segment?
- In what ways are points, lines, line segments, rays, and angles related?
- How do tools help me identify angles when solving real-world problems?
- How can addition and subtraction help me find unknown angles?

Content

The students will know

1. Obtuse angles
2. Acute angles
3. Right angles
4. Angle measurements

Skills

Bloom's Taxonomy

DOK Links

The students will be able to

1. Use a protractor to measure angles.
2. Measure and add to find the total measurement of non-

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| <ol style="list-style-type: none"> 5. Relationship of angles to circles 6. An angle that turns through n one-degree angles = an angle measure of n degrees 7. Benchmark angles (45, 90, 135, 180) | <p>overlapping angles.</p> <ol style="list-style-type: none"> 3. Identify angles as acute, right, obtuse or straight. 4. Apply appropriate techniques, tools and formulas to determine measurements. 5. Measure the size of angles to the nearest five degrees using a protractor. 6. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems. 7. Use benchmark angles (45, 90, 135, 180) to estimate the measure of angles. 8. Describe angles based on angle measures (obtuse, acute, straight, or right). 9. Recite from memory the addition and subtraction facts. 10. Recite from memory the multiplication and division facts. <p>Reading/Writing Skills:</p> <ol style="list-style-type: none"> 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. |
| <p>Common Core Vocabulary</p> <ol style="list-style-type: none"> 1. Protractor 2. Ray 3. Line segment 4. End point 5. Arc 6. Intersection 7. n degree 8. Intersect | <p>Additional Vocabulary</p> <ol style="list-style-type: none"> 1. Acute angle 2. Obtuse angle 3. Right angle 4. Vertex |
| <p>Learning Experiences (Suggested)</p> <ol style="list-style-type: none"> 1. Class activity. Introduce students to the study of angles by reading <i>Sir Cumference and the Great Knight of Angleland: A Math Adventure</i> by Cindy Neuschwander. Engage students in a discussion of the different attributes of the angles described in the book. Ask students what they noticed about the angles? What similarities did they see? Any differences? How were angles used in the story? Have students draw angles from the story on a piece of chart paper. 2. Display, describe and define the different types of angles as acute (less than 90°) right (equal to 90°, the letter "L"), obtuse (greater than 90° and less than 180°) and straight (equal to 180°, straight line). Then have students work with a partner to identify angles of objects in the classroom (i.e., poster – right angle corner, floor tile – right angle corner, door – straight angle). Ask partners to share their observations of angles they found in the classroom. 3. Class activity. Using SMARTBoard/ActivBoard or another online image familiarize students with a protractor. Demonstrate how to read and use the protractor to measure angles. Provide students with protractors (See Link for "paper" protractors) and have them become familiar with the markings on it. Ask students to use their protractor to measure several angles (right, acute, straight, obtuse). 4. Provide students with several different size angles and have them work with a partner to | <p>Assessment (Suggested)</p> <p>Angles in the Classroom Formative: Cooperative Group Work</p> <p>Students will work with a partner to identify and list angles of objects found in the classroom (i.e., poster – right angle corner, floor tile – right angle corner, door – straight angle). Partners will share their observations of angles they found in the classroom.</p> <p>Knowing The Angle Formative: Class Work</p> <p>Students will be provided with several different size angles and will work with a partner to:</p> <ol style="list-style-type: none"> a. estimate the degrees in each b. measure the degree to the nearest 5 degrees for each c. name each angle as right, acute, straight, or obtuse <p>Angle Measurement Formative: Quiz</p> <p>Students will use a protractor to measure angles (right, acute, straight, obtuse).</p> <p>Angle Project – State capitals</p> |

- a. estimate the degrees in each
 - b. measure the degree to the nearest 5 degrees for each
 - c. name each angle as right, acute, straight, or obtuse
5. Cooperative group activity. On a map of the United States have the students use a ruler to connect two state capitals. Have them measure and classify the angle constructed. Repeat this activity by connecting at least 5 more state capitals.
 6. Class activity. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems. Following the class activity, have students practice adding and subtracting angles to find the unknown angle.



[What's My Angle?!](#)

Summative: Project

On a map of the United States students use a ruler to connect two state capitals and measure and classify the angle constructed. They will repeat this activity by connecting at least 5 more state capitals.

Quiz- Add and Subtract unknown angles

Summative: Quiz

The children will add and subtract to find unknown angles on a diagram that represents real world and mathematical problems.

Resources (Suggested)

1. iPad Resources
2. Literature Connection
 - A Cloak for the Dreamer* by Aileen Friedman
 - Grandfather Tang's Story* by Ann Tompert
 - Angles Are Easy As Pie* by Robert Froman and Byron Barton
 - Right Angles: Paper-Folding Geometry* by Jo McKeely Phillips
 - The Adventures of the Angles* by Kristie Carpenter
 - It Looked Like Split Milk* by Charles G. Shaw
 - Let's Fly a Kite* by Stuart J. Murphy and Brian Floca
 - Symmetry* by Loreen Leedy
3. Internet Resources



[Interactive Activity: Measuring Angles!](#)



[Acute, obtuse, right, and straight angles!](#)



[Measuring angles with a protractor!](#)



[Angles of 90 degrees, 180 degrees, 270 degrees, and 360 degrees](#)



[Angles Video!](#)



[The National Library of Virtual Manipulatives!](#)



[Brain Pop ~ Math!](#)

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 CATHOLIC COMMUNITY that witnesses to Christ and the Gospel by protecting them from child abuse, including sexual abuse and neglect.
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- + 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.
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Mathematics Curriculum ~ Grade Four

Diocese of Cleveland



Unit 12: Geometry: Draw and Identify Angles

Standards Assessed

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.4. Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.

CCSS: ELA & Literacy in History/Social Studies, Science, & Technical Subjects K-5, OH: CCSS: Grade 4, 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.4.2d. Use precise language and domain-specific vocabulary to inform about or explain the topic.

CCSS: Mathematics (2011), OH: CCSS: Grade 4, 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 4, Geometry

4.G Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

- 4.G.1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
- 4.G.2. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.
- 4.G.3. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

DOC: Mathematics, DOC: Grade 4, Geometry and Spatial Sense

A. Characteristics and Properties

- 4. Identify and define triangles based on angle measures (equiangular, right, acute and obtuse triangles) and side lengths (isosceles, equilateral and scalene triangles).

C. Transformations and Symmetry

- 1. Identify, describe and use reflections (flips), rotations (turns), and translations (slides) in solving geometric problems; e.g., use transformations to determine if two shapes are congruent.

Essential Questions

- How can I classify geometric shapes and objects?
- How can triangles be classified by the measure of their angles?
- How will a shape look when rotated, reflected, and /or translated?
- How can illustrations help display and represent two-dimensional figures?
- How is symmetry used in areas such as architecture and art? In what areas is symmetry important?

Content

Skills

| | |
|---|---|
| <p>The students will know</p> <ol style="list-style-type: none"> 1. Characteristics and properties of two-dimensional figures 2. Transformations and symmetry | <p><u>Bloom's Taxonomy</u> <u>DOK Links</u></p> <p>The students will be able to</p> <ol style="list-style-type: none"> 1. Identify, draw, and name 2-dimensional figures (circles, triangles, quadrilaterals, rectangles, squares, rhombuses, pentagons, hexagons, and octagons). 2. Describe the properties of the figures identified in #1 above (number of sides, number of angles, length of sides, whether there are right angles, and whether sides are parallel). 3. Identify differences and similarities among two-dimensional figures based on the absence or presence of characteristics such as parallel or perpendicular lines and angles of a specified size. 4. Sort objects based on parallelism, perpendicularity, and angle types. 5. Classify two-dimensional figures by properties of their lines and angles. 6. Recognize a right triangle as a category for classification. 7. Identify lines of symmetry and classify line-symmetric figures. 8. Draw lines of symmetry. 9. Distinguish between parallel and perpendicular lines and use them in geometric figures. 10. Identify, define, and draw triangles based on angle measures and side lengths. 11. Identify, describe, and use reflections (flips), rotations (turns), and translations (slides) in solving geometric problems. 12. Recite from memory the addition and subtraction facts. 13. Recite from memory the multiplication and division facts. <p>Reading/Writing Skills:</p> <ol style="list-style-type: none"> 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. |
| <p>Common Core Vocabulary</p> <ol style="list-style-type: none"> 1. Perpendicular 2. Parallel 3. Line segment 4. Symmetry 5. Line symmetry | <p>Additional Vocabulary</p> <ol style="list-style-type: none"> 1. Equiangular triangle 2. Isosceles triangle 3. Equilateral triangle 4. Right triangle 5. Transformation 6. Reflection 7. Rotation |
| <p>Learning Experiences (Suggested)</p> <ol style="list-style-type: none"> 1. Class activity. Begin this unit by reading <i>A Cloak for the Dreamer</i> by Aileen Friedman. Extend children's thinking (in a mathematical direction) by providing them with paper, scissors, and glue, and have them choose at least two shapes from the book (square, rectangle, triangle, or hexagon) and have them create their own tapestry by fitting the shapes together. Through discovery, students will become familiar with the characteristics and relationships of geometric shapes (what fits together and what doesn't, how different shapes can be manipulated and changed, which shapes can be combined to form another | <p>Assessment (Suggested)</p> <p>Comparing Two-Dimensional Geometric Figures Formative: Homework</p> <p>Using several pairs of two-dimensional figures, students will identify differences and similarities among the pairs of two-dimensional figures based on the absence or presence of characteristics such as parallel or perpendicular lines and angles of a specified size. They will justify, in writing, their conclusions about the pairs of figures.</p> |

shape).

2. Have students work with a partner on a scavenger hunt around the classroom/school. On the hunt, students are to look for points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. They will use a digital camera (if possible) to take pictures of the objects and use the pictures to create a PowerPoint presentation to share with the class.
3. Using several pairs of two-dimensional figures, have students identify differences and similarities among the pairs of two-dimensional figures based on the absence or presence of characteristics such as parallel or perpendicular lines and angles of a specified size. Justify their conclusions about the pairs of figures.
4. Online learning. Have students explore (virtual) the transformations: reflections, translations, and rotations. (See Links.)
5. Online learning. Engage students in the online activity on symmetry (See Link). Individually, or as a class, create a pattern that shows symmetry.
6. Have students create symmetry with magazine pictures. Ask each child to bring a picture of a flower, butterfly, or other simple object from a magazine. Have them cut it in half, glue one half to a sheet of drawing paper and then draw the missing half to mirror the image on the paper.



[Symmetry Activity](#)

Scavenger Hunt Summative: Lab Assignment

Students will work with a partner on a scavenger hunt around the classroom/school. On the hunt, students will look for points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. They will use a digital camera (if possible) to take pictures of the objects and use the pictures to create a PowerPoint presentation to share with the class.

Line of Symmetry Poster Summative: Posters

Students will create a poster that shows lines of symmetry in letters of the alphabet. Draw a rotation, translation, and reflection of the letter. Then describe all concepts learned in this unit that apply to the given figures.

Triangle Classification Formative: Quiz

Given several examples of triangles, students will classify them and justify their classification.

Creating Symmetry Summative: Class Work

Students will create symmetry with magazine pictures. Each child will bring a picture of a flower, butterfly, or other simple object from a magazine. They will cut it in half, glue one half to a sheet of drawing paper and then draw the missing half to mirror the image on the paper.

Resources (Suggested)

1. iPad Resources
2. Literature Connection
A Cloak for the Dreamer by Aileen Friedman
Grandfather Tang's Story by Ann Tompert
Angles Are Easy As Pie by Robert Froman and Byron Barton
Right Angles: Paper-Folding Geometry by Jo McKeeby Phillips
What's Your Angle, Pythagoras? by Julie Ellis and Phyllis Hornung
The Adventures of the Angles by Kristie Carpenter
It Looked Like Split Milk by Charles G. Shaw
3. Internet Resources



[Interactive Geometry Sites](#)



[Exploring Transformation Video](#)



[AAA Math ~ Resources and Activities](#)



[Math Frog ~ Geometry - Symmetry](#)



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- ✚ Call To Family, Community, And Participation
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- ✚ Solidarity
- ✚ Care For God's Creation

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- ✚ 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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PARENT GUIDE

GRADE FOUR MATHEMATICS CURRICULUM

DIOCESE OF CLEVELAND

Below is a list of skills your child will be taught in Grade Four Mathematics.

As parents, you are encouraged to support the work of your child's teacher in helping your child acquire each of these skills.

| | |
|--|---|
| OPERATIONS AND ALGEBRAIC THINKING | |
| USE THE FOUR OPERATIONS WITH WHOLE NUMBERS TO SOLVE PROBLEMS. | |
| | Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. |
| | Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. |
| | Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. 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. |
| GAIN FAMILIARITY WITH FACTORS AND MULTIPLES. | |
| | Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite. |
| GENERATE AND ANALYZE PATTERNS. | |
| | Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. For example, given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. |
| NUMBER AND OPERATIONS IN BASE TEN | |
| GENERALIZE PLACE VALUE UNDERSTANDING FOR MULTI-DIGIT WHOLE NUMBERS. | |
| | Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. |
| | Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons. |
| | Use place value understanding to round multi-digit whole numbers to any place. |
| USE PLACE VALUE UNDERSTANDING AND PROPERTIES TO PERFORM MULTI-DIGIT ARITHMETIC. | |
| | Fluently add and subtract multi-digit whole numbers using the standard algorithm. |
| | Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. |
| | Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. |
| NUMBER AND OPERATIONS ~ FRACTIONS (LIMITED TO FRACTIONS WITH DENOMINATORS 2, 3, 4, 5, 6, 8, 10, 12,100) | |
| EXTEND UNDERSTANDING OF FRACTION EQUIVALENCE AND ORDERING. | |
| | Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. |

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| NUMBER AND OPERATIONS ~ FRACTIONS (LIMITED TO FRACTIONS WITH DENOMINATORS 2, 3, 4, 5, 6, 8, 10, 12, 100) CONTINUED | |
| EXTEND UNDERSTANDING OF FRACTION EQUIVALENCE AND ORDERING CONTINUED. | |
| | Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model. |
| BUILD FRACTIONS FROM UNIT FRACTIONS BY APPLYING AND EXTENDING PREVIOUS UNDERSTANDINGS OF OPERATIONS ON WHOLE NUMBERS. | |
| | Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$. |
| | Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. |
| | Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: $\frac{3}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$; $\frac{3}{8} = \frac{1}{8} + \frac{2}{8}$; $2\frac{1}{8} = 1 + 1 + \frac{1}{8} = \frac{8}{8} + \frac{8}{8} + \frac{1}{8}$. |
| | Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. |
| | Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem. |
| | Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. |
| | Understand a fraction $\frac{a}{b}$ as a multiple of $\frac{1}{b}$. |
| | Understand a multiple of $\frac{a}{b}$ as a multiple of $\frac{1}{b}$, and use this understanding to multiply a fraction by a whole number |
| | Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. |
| UNDERSTAND DECIMAL NOTATION FOR FRACTIONS, AND COMPARE DECIMAL FRACTIONS. | |
| | Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. |
| | Use decimal notation for fractions with denominators 10 or 100. |
| | Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model. |
| MEASUREMENT AND DATA | |
| SOLVE PROBLEMS INVOLVING MEASUREMENT AND CONVERSION OF MEASUREMENTS FROM A LARGER UNIT TO A SMALLER UNIT. | |
| | Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. |
| | Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. |
| | Apply the area and perimeter formulas for rectangles in real world and mathematical problems. |
| REPRESENT AND INTERPRET DATA. | |
| | Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. |
| GEOMETRIC MEASUREMENT: UNDERSTAND CONCEPTS OF ANGLE AND MEASURE ANGLES. | |
| | Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: |
| | An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $\frac{1}{360}$ of a circle is called a "one-degree angle," and can be used to measure angles. |

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| GEOMETRIC MEASUREMENT: UNDERSTAND CONCEPTS OF ANGLE AND MEASURE ANGLES CONTINUED. | |
| | An angle that turns through n one-degree angles is said to have an angle measure of n degrees. |
| | Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure. |
| | Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure. |
| GEOMETRY | |
| DRAW AND IDENTIFY LINES AND ANGLES, AND CLASSIFY SHAPES BY PROPERTIES OF THEIR LINES AND ANGLES. | |
| | Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. |
| | Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles. |
| | Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. |
| DOC: Patterns, Function and Algebra | |
| PATTERNS, RELATIONS AND FUNCTIONS | |
| | Determine the rule and identify missing numbers in a sequence of numbers or in a table of numbers. |
| | Represent and analyze patterns and functions using words, tables and graphs. |
| | Identify, express, and verify generalizations and use them to make predictions. |
| DOC: Data Analysis and Probability | |
| DATA COLLECTION | |
| | Construct bar graphs, line graphs and Venn diagrams to sort and describe data. |
| | Construct graphs using the correct format; e.g., titles, axis names, reasonable scales, and legends or keys. |
| | Compare different representations of the same data to evaluate how well each representation shows important aspects of the data, and identify appropriate ways to display the data. |
| DOC: Numbers, Number Sense and Operations | |
| NUMBER AND NUMBER SYSTEMS | |
| | Use place value structure of the base-ten number system to read, write, represent, compare and order whole numbers through millions and decimals through thousandths. |
| | Identify squares of numbers and perfect squares. |
| DOC: Measurement | |
| MEASUREMENT TECHNIQUES AND TOOLS | |
| | Write, solve and verify solutions to multi-step problems involving measurement. |
| DOC: Geometry and Spatial Sense | |
| CHARACTERISTICS AND PROPERTIES | |
| | Identify and define triangles based on angle measures (equiangular, right, acute and obtuse triangles) and side lengths (isosceles, equilateral and scalene triangles). |
| TRANSFORMATIONS AND SYMMETRY | |
| | Identify, describe and use reflections (flips), rotations (turns), and translations (slides) in solving geometric problems; e.g., use transformations to determine if two shapes are congruent. |

MATHEMATICS CURRICULUM

GRADE FOUR

CHECKLIST FOR COMMON CORE STATE STANDARDS & DIOCESAN CURRICULUM

| DATE TAUGHT | |
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| OPERATIONS AND ALGEBRAIC THINKING | |
| USE THE FOUR OPERATIONS WITH WHOLE NUMBERS TO SOLVE PROBLEMS. | |
| | Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. |
| | Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. |
| | Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. 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. |
| GAIN FAMILIARITY WITH FACTORS AND MULTIPLES. | |
| | Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite. |
| GENERATE AND ANALYZE PATTERNS. | |
| | Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. For example, given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. |
| NUMBER AND OPERATIONS IN BASE TEN | |
| GENERALIZE PLACE VALUE UNDERSTANDING FOR MULTI-DIGIT WHOLE NUMBERS. | |
| | Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. |
| | Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons. |
| | Use place value understanding to round multi-digit whole numbers to any place. |
| USE PLACE VALUE UNDERSTANDING AND PROPERTIES TO PERFORM MULTI-DIGIT ARITHMETIC. | |
| | Fluently add and subtract multi-digit whole numbers using the standard algorithm. |
| | Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. |
| | Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. |
| NUMBER AND OPERATIONS ~ FRACTIONS (LIMITED TO FRACTIONS WITH DENOMINATORS 2, 3, 4, 5, 6, 8, 10, 12, 100) | |
| EXTEND UNDERSTANDING OF FRACTIONS EQUIVALENCE AND ORDERING. | |
| | Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. |

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| DATE TAUGHT | |
| NUMBER AND OPERATIONS ~ FRACTIONS (LIMITED TO FRACTIONS WITH DENOMINATORS 2, 3, 4, 5, 6, 8, 10, 12, 100) CONTINUED | |
| EXTEND UNDERSTANDING OF FRACTION EQUIVALENCE AND ORDERING CONTINUED. | |
| | Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model. |
| BUILD FRACTIONS FROM UNIT FRACTIONS BY APPLYING AND EXTENDING PREVIOUS UNDERSTANDINGS OF OPERATIONS ON WHOLE NUMBERS. | |
| | Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$. |
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