Unit 4 Algebraic Thinking and Patterns
Math 4

Last Update: August 1, 2025

Archdiocesan Curriculum > Grade 4 > Math > Length of unit 14 to 15 days

Stage 1: Desired Results

General Information

In this unit, students build a foundational understanding of geometry and number theory. They learn to apply formulas for area and perimeter of rectangles, solve problems involving unknown dimensions, and interpret real-world applications. Students also explore factors, multiples, divisibility, and number patterns, and classify numbers as prime or composite.

Mathematical Practices

- MP2 – Reason abstractly and quantitatively.
- MP4 – Model with mathematics.
- MP6 – Attend to precision.
- MP7 – Look for and make use of structure.

Essential Question(s)

- How can you use a formula to find the perimeter or area of a rectangle?
- What strategies help identify unknown dimensions in geometric problems?
- How do patterns and rules help us predict and describe relationships in numbers?
- What are the differences between factors, multiples, prime, and composite numbers?
- How do we determine if a number is divisible by another number?

Enduring Understanding/Knowledge

Students will:

- Use a formula to find the perimeter of a rectangle.
- Use a formula to find the area of a rectangle.
- Find an unknown measure of a rectangle given its area or perimeter.
- Solve real-world problems involving the area of rectangles.

Review/Assess

- Determine if one number is a factor of another number.
- Recognize how factors and multiples are related.
- Determine whether a whole number is prime or composite.
- Make, describe, and extend patterns.

Review/Assess

Vocabulary

New	Review
• formula • perimeter • area • base (b) • height (h) • square unit • divisible • common multiple • prime number • composite number • pattern • term	• multiplication • division • product • quotient • factor • multiple • equation • number sentence • array • skip count

Connections to Catholic Identity / Other Subjects

Religion/Catholic Identity:

- Look for patterns in religious practices and routines, such as prayers, the rosary (multiples of 10), and the Stations of the Cross.
- https://www.savoringeachmoment.com/50-bible-verses-about-math/
- https://bible.knowing-jesus.com/topics/Math

Other Subject Here:

- **Social Studies**: Design a map of a town or historical site using grids. Use formulas to calculate area and perimeter of buildings, parks, or plots (e.g., town hall = 5 units × 4 units). Label base and

Differentiation

Enrichment

- **Derive Area and Perimeter Formulas** – Allow students to explore and justify the area and perimeter formulas by creating and measuring rectangles.
- **Investigate Composite Rectangles** – Provide complex figures made of multiple rectangles and have students find total area and unknown sides.
- **Explore Prime Factorization** – Introduce factor trees to break numbers into prime factors and identify greatest common factor and least common multiple.
- **Analyze Numeric Patterns** – Encourage students to investigate and graph complex patterns,

height of rectangular regions. Use square units to measure land on a grid. Identify patterns in city layouts or colonial farming plots. ● **ELA**: Math vocabulary storytelling or poem creation. Use math terms like prime, composite, pattern, and term in context-rich stories or creative writing. Describe how a character uses area and perimeter to solve a problem. Create a math-themed poem where each term in the stanza follows a numeric or rhythmic pattern.	including growing and shrinking sequences. **Support** ● **Use Grid Paper for Area** – Reinforce understanding of area by drawing and counting square units on grid paper. ● **Hands-On Perimeter Tasks** – Use string or tiles to trace and measure perimeter physically before introducing formulas. ● **Factor and Multiple Charts** – Provide visual support for identifying factors and multiples using hundreds charts or T-charts. ● **Pattern Blocks and Manipulatives** – Allow students to build patterns physically and describe them with words and numbers. ● **Prime and Composite Sort** – Use cards with numbers for students to sort into prime and composite groups with justification.

Standards & Benchmarks

Apply Multiplication to Perimeter and Area:

4.MD.3

Apply the area and perimeter formulas for rectangles in real-world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.

4.MD.A.3

Apply the area and perimeter formulas for rectangles in mathematical problems and problems in real-world contexts including problems with unknown side lengths.

Factors, Multiples, and Number 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. 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. Explain informally why the numbers will continue to alternate in this way.

4.OA.2

Multiply or divide to solve word problems involving multiplicative comparison, for example, by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.

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.

4.OA.A.2

Multiply or divide within 1000 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.B.4

Find all factor pairs for a whole number in the range 1 to 100 and understand that a whole number is a multiple of each of its factors.

4.OA.C.5

Generate a number pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself and explain the pattern informally (e.g., 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).

Teaching Ideas/Resources

Websites/Resources:

- K5 Learning Factoring Pages