



Unit Plan

Factors and Multiples

Chester / Littleville Elementary / Grade 4 / Mathematics

[↗](#) Week 3 - Week 4 | 5 Curriculum Developers | Last Updated: Mar 19, 2024 by LeBlanc, Deanna

[Style Guide](#)

What is the purpose of the unit? What are the major take-aways?

Standards

MA: Mathematics (2017)

MA: Grade 4

Operations & Algebraic Thinking

4.OA Gain familiarity with factors and multiples.

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.

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Enduring Understandings

1. Whole Numbers and Relationships: Students will understand that whole numbers have interconnected relationships, specifically through factors and multiples. Every whole number is connected to other numbers through these relationships.
2. Factors as Building Blocks: Students will recognize that factors are the building blocks of whole numbers and that every whole number can be broken down into factor pairs (with the exception of the number 1).
3. Multiples as Extensions: Students will understand that a multiple of a whole number is an extension or accumulation of that number. Multiples represent repeated addition, similar to how multiplication operates.
4. Prime and Composite Distinction: Students will learn to distinguish between prime and composite numbers. Primeness means having only two distinct factors: one and the number itself, while compositeness indicates multiple factor pairs.
5. Factor-Multiple Connection: Students will understand that a whole number is a multiple of each of its factors. This fundamental relationship helps determine the divisibility and multiplicative structure of numbers.
6. Systematic Factor Identification: Students will be able to

Essential Questions

1. What are factors, and why are they essential in understanding whole numbers?
2. How do we find all the factor pairs of a particular whole number between 1 and 100?
3. Why is every whole number a multiple of each of its factors, and how can we illustrate this relationship?
4. How can we determine if a whole number in the range of 1–100 is a multiple of a specific one-digit number?
5. What is the difference between prime and composite numbers, and how can we identify them within the range of 1–100?
6. How can recognizing factors and multiples help us solve real-world problems involving division and multiplication?
7. In what ways can understanding prime numbers be beneficial, and how do they relate to composite numbers?
8. How does the knowledge of factors and multiples contribute to finding common denominators or comparing fractions?
9. Why is it important to be able to determine whether a number is prime or composite, and how does this knowledge apply to mathematics beyond the fourth grade?

systematically find all factors of a number, seeing patterns in factor pairs and understanding the significance of factors in division and multiplication.

7. Number Analysis: Students will learn to analyze numbers within the range of 1–100 to determine factor pairs, recognize when a whole number is a multiple of a given one-digit number, and identify if it is prime or composite.

Content

In this unit, students extend their knowledge of multiplication, division, and the area of a rectangle to deepen their understanding of factors and to learn about multiples.

In grade 3, students learned that they can multiply the two side lengths of a rectangle to find its area, and divide the area by one side length to find the other side length.

To represent these ideas, they used area diagrams, wrote expressions and equations, and learned the terms “factors” and “products.”

In this unit, students return to the concept of area to make sense of factors and multiples of numbers. Given a rectangle with a particular area, students find as many pairs of whole-number side lengths as they can. They make sense of those side lengths as factor pairs of the whole-number area, and the area as a multiple of each side length.

Students also learn that a number can be classified as prime or composite based on the number of factor pairs it has.

Throughout the unit, students encounter various contexts related to school, gatherings, and celebrations. They are intended to invite conversations about students’ lives and experiences. Consider them as opportunities to learn about students as individuals, to foster a positive learning community, and to shape each lesson based on insights about students.

Throughout the unit

The warm-up activities in this unit allow students to build on multiplication and division fluency from grade 3 and prepare to work with factors and multiples. Number Talks are used to help further develop multiplication fluency and mental math strategies. These Number Talks focus on multiples of 6 and 7, and the factor 3, and allow students to use the distributive and associative properties to mentally find the value of expressions.

Skills

Section A Goals

- Determine if a number is prime or composite.
- Explain what it means to be a factor or a multiple of a whole number.
- Relate the side lengths and area of a rectangle to factors and multiples

Section B Goals

- Apply multiplication fluency within 100 and the relationship between multiplication and division to find factor pairs and multiples.

How will you gauge student learning?

Assessments

4.1 End-of-Unit Assessment | Summative | Written Test

[Grade4-1-End-of-Unit-Assessment-assessment.pdf](#)

1 State Standard Assessed

How will students learn?

Learning Activities

Section A:

In this section, students revisit the ideas of area and factors from grade 3 and encounter the idea of multiples. They begin by building rectangles given specific side lengths and identifying possible areas when only one side length is known. Students use tiles and diagrams to build their understanding before learning new terminology.

Next, students build rectangles given a certain area. They see that the side lengths of the rectangles represent the factor pairs of the given area value. Students also observe the commutative property of multiplication when they see that rectangles with the same pair of side lengths have the same area, regardless of their orientation.

Build 5 different rectangles with the given width. Record the area of each rectangle in the table.

	Area of Rectangle				
2 tiles wide					
3 tiles wide					
4 tiles wide					

Students discover that for some whole-number values of area, only one rectangle can be built, and for other values, more than one rectangle is possible. Likewise, some numbers have only one factor pair (the number itself and 1) and other numbers have more than one factor pair.

Students learn that we call the former "prime numbers" and the latter "composite numbers."

The section closes with an optional game day, which is an opportunity to see students' fluency with multiplication and division within 100.

Section B:

In this section, students apply and deepen their understanding of the ideas of factors and multiples as they play games and solve problems in context. The activities prompt students to look for patterns in factors, multiples, and prime and composite numbers, and use them to make predictions and generalize their observations.

In the last lesson, students have a chance to use the ideas from this unit to create geometric art.

Differentiated Instruction

Technology Integration

21st Century Skills

Positive Behavior

CASEL

Collaborative for Academic, Social, and Emotional Learning

Resources

Teacher Notes and Reflections