# 6-1: Prime Time

Unit Goals, Focus Questions, and Mathematical Reflections

## Unit Goals

**Factors and Multiples** Understand relationships among factors, multiples, divisors, and products

- Classify numbers as prime, composite, even, odd, or square
- Recognize that factors of a number occur in pairs
- Recognize situations that call for common factors and situations that call for common multiples
- Recognize situations that call for the greatest common factor and situations that call for the least common multiple
- Develop strategies for finding factors and multiples
- Develop strategies for finding the least common multiple and the greatest common factor
- Recognize and use the fact that every whole number can be written in exactly one way as a product of prime numbers
- Use exponential notation to write repeated factors
- Relate the prime factorization of two numbers to the least common multiple and greatest common factor of two numbers
- Solve problems involving factors and multiples

**Equivalent Expressions** Understand why two expressions are equivalent

- Relate the area of a rectangle to the Distributive Property
- Recognize that the Distributive Property relates the multiplicative and additive structures of whole numbers
- Use the properties of operations of numbers, including the Distributive Property, and the Order of Operations convention to write equivalent numerical expressions
- Solve problems involving the Order of Operations and Distributive Property

# 6-1 Prime Time: Focus Questions (FQ) and Mathematical Reflections

| Investigation 1 | Investigation 2 | Investigation 3 | Investigation 4 |
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| Building on Factors and Multiples | Common Multiples and Common Factors | Factorizations: Searching for Factor Strings | Linking Multiplication and Addition: The Distributive Property |
| **Problem 1.1**<br>**Playing the Factor Game: Finding Proper Factors**<br>FQ: How can you find all the factors (or divisors) of a number?<br><br>**Problem 1.2**<br>**Playing to Win: Prime and Composite Numbers**<br>FQ: What information about a number can you find by looking at its factors?<br><br>**Problem 1.3**<br>**The Product Game: Finding Multiples**<br>FQ: If you know one factor of a number, how can you find another factor of the number?<br><br>**Problem 1.4**<br>**Rectangles and Factor Pairs**<br>FQ: How do you know when you have found all of the factors of a number? | **Problem 2.1**<br>**Riding Ferris Wheels: Choosing Common Multiples or Common Factors**<br>FQ: How can you decide when finding common multiples is useful in solving a problem?<br><br>**Problem 2.2**<br>**Looking at Cicada Cycles: Choosing Common Multiples or Common Factors**<br>FQ: How can you find the least common multiple of two or more numbers?<br><br>**Problem 2.3**<br>**Bagging Snacks: Choosing Common Multiples or Common Factors**<br>FQ: How can you decide when finding common factors is useful in solving a problem? How can you find the greatest common factor of two numbers? | **Problem 3.1**<br>**The Product Puzzle: Finding Factor Strings**<br>FQ: How can you find the prime factorization of a number?<br><br>**Problem 3.2**<br>**Finding the Longest Factor String**<br>FQ: How many unique prime factorizations of a number are there?<br><br>**Problem 3.3**<br>**Using Prime Factorizations**<br>FQ: How can the prime factorization of a number be used to find the LCM and GCF of two or more numbers?<br><br>**Problem 3.4**<br>**Unraveling the Locker Problem: Putting It All Together**<br>FQ: What characteristics of numbers, such as factors and multiples did you use to answer the questions? What special numbers, such as prime numbers, composite numbers, and square numbers, did you use? | **Problem 4.1**<br>**Reasoning With Even and Odd Numbers**<br>FQ: How do you decide whether a number is even or odd?<br><br>**Problem 4.2**<br>**Using the Distributive Property**<br>FQ: How is the Distributive Property used to create equivalent expressions? How is finding the area of a rectangle related to the Distributive Property?<br><br>**Problem 4.3**<br>**Ordering Operations**<br>FQ: How do you decide the order when you work on number sentences with more than one operation?<br><br>**Problem 4.4**<br>**Choosing and Operation**<br>FQ: How do you decide what operations are needed in a given situation? |
| **Mathematical Reflections**<br>1a. Explain how factors and multiples of a number are related.<br><br>1b. Describe a situation where it is useful to know about factors and multiples.<br><br>1c. Describe strategies for finding factors or multiples of a number. | **Mathematical Reflections**<br>1. How can you decide if finding common multiples or common factors is helpful in solving a problem? Explain.<br><br>2a. Describe how you can find the common factors and the greatest common factor of two numbers. | **Mathematical Reflections**<br>1a. Why it is helpful to write a number as a product of primes?<br><br>1b. Describe how you can find the prime factorization of a number.<br><br>2a. When it is useful to find the LCM or GCF of two or more numbers to solve a problem? | **Mathematical Reflections**<br>1a. Explain what the Distributive Property means for multiplication, addition, and subtraction. Use the area of a rectangle to illustrate your answer.<br><br>1b. Explain how you can use the Distributive Property to write a number as two equivalent expressions. Give two examples. |

| 2. You can describe a number by both the number of its factors and the kind of its factors. Describe several kinds of numbers that you studied in this Investigation. Give examples. | 2b. What information does the greatest common factor of two numbers provide in a problem?<br><br>3a. Describe how you can find the common multiples and the least common multiple of two numbers.<br>3b. What information does the least common multiple of two numbers provide in a problem? | 2b. Describe a method for finding the LCM of two numbers. Is there another method? Explain.<br><br>2c. Describe a method for finding the GCF of two numbers. Is there another method? Explain. | 2a. What rules for ordering computations with numbers does the Order of Operations convention provide? Why is it important?<br><br>2b. How do you decide what operation, addition, subtraction, multiplication, or division, is needed to solve a problem? |