

## Prime Time

### Standards

The student will:

- 1.1 Understand the relationships among factors, multiples, divisors, and products.
- 1.2 Link area and dimensions of rectangles with products and factors.
- 1.3 Identify numbers as prime or composites and as odd or even based on their factors.
- 1.4 Develop strategies for finding factors and multiples of whole numbers.
- 1.5 Demonstrate the Fundamental Theorem of Arithmetic with specified whole numbers.
- 1.6 Develop strategies to solve problems involving factors and multiples.
- 1.7 Describe and continue given number patterns.

## Prime Time

### Introduction

Prior Work	Current Big Idea	Future Work
<ul style="list-style-type: none"> <li>Operations with whole numbers.</li> </ul>	<ul style="list-style-type: none"> <li>Introduction to the study of whole numbers.</li> </ul>	<ul style="list-style-type: none"> <li>Performing arithmetic operations with fractions.</li> </ul>

### Lesson Process

Steps	Student activity	Teacher Support	Comment/Evaluation
<b>Launch</b> 10-15 minutes	<ul style="list-style-type: none"> <li>Focus on opening pages of <i>Prime Time</i>.</li> <li>Respond to questions indicating that there is a pattern of the dates falling on different days of the week in different years.</li> </ul>	<ul style="list-style-type: none"> <li><b>“Let’s take a few minutes and look at these first two pages.”</b></li> <li><b>“You may want to read some of the questions next to the pictures. We’ll talk about the questions and try to decide on some of the answers.”</b></li> <li><b>“What day of the week did your birthday fall on this year? Does it fall on a different day from year to year?”</b></li> <li><b>“Does this happen for the Fourth of July?”</b></li> <li>Continue discussion of questions.</li> <li>Read page 3 to students or select student to read aloud to class.</li> </ul>	<ul style="list-style-type: none"> <li>Control of behavior.</li> <li>Do not worry about finding the “correct” answers.</li> <li>Support student answers.</li> <li>Produce awareness of importance of gathering full information.</li> </ul>
<b>Explore</b>	Begin journal entry with “My Special	<ul style="list-style-type: none"> <li>Explain that this is the beginning of a</li> </ul>	<ul style="list-style-type: none"> <li>Prepare students to picture in</li> </ul>

Steps	Student activity	Teacher Support	Comment/Evaluation
20-25 minutes	Number.”	<p>project that everyone will be working on throughout the unit for <i>Prime Time</i>.</p> <ul style="list-style-type: none"> <li>• <b>“As we go through the investigations in Prime Time, we will learn more things about these numbers. Think about how these ideas will apply to your special number, and add the new information about your number to your journal.”</b></li> </ul>	<p>their mind what they must look for and what they must do.</p> <ul style="list-style-type: none"> <li>• Students will be looking for relationships by which things can be linked.</li> </ul>
<p><b>Summarize</b></p> <p>5 minutes</p>		<ul style="list-style-type: none"> <li>• Talk about the mathematical Highlights. These are important concepts about whole numbers that will be covered through Prime Time.</li> <li>• Time need not be spent in going over the entire list. Refer back to the list as the class proceeds through <i>Prime Time</i>.</li> </ul>	<ul style="list-style-type: none"> <li>• The Mathematical Highlights are clearly defined so we can remember and talk about information.</li> </ul>
Homework	<ul style="list-style-type: none"> <li>• Complete journal entry.</li> </ul>		

## Prime Time

### Investigation 1: The Factor Game Day 1

#### Connections

Prior Work	Current Big Idea	Future Work
<ul style="list-style-type: none"><li>Multiplication and division facts.</li></ul>	<ul style="list-style-type: none"><li>Determining the factors of given whole numbers.</li></ul>	<ul style="list-style-type: none"><li>Arithmetic operations with fractions.</li><li>Comparing.</li><li>Factoring algebraic expressions.</li></ul>

#### Lesson Process

Steps	Student activity	Teacher Support	Comment/Evaluation
<b>Launch</b> 10-15 minutes	<ul style="list-style-type: none"><li>Read the first paragraph on page 6.</li><li>Play the Factor Game against the teacher.</li></ul>	<ul style="list-style-type: none"><li>Read the first paragraph on page 6 with the class, or have selected students read aloud to the class.</li><li>Review the definition of factor.</li><li>Introduce the Factor Game by playing a game against the class.</li></ul>	<ul style="list-style-type: none"><li>Students need to know the definition of factor.</li><li>Labeling, so we can remember and talk about information.</li><li>The purpose of this investigation is to help students determine the factors for given numbers.</li><li>Talk should be confined to clarifying questions.</li></ul>

<b>Steps</b>	<b>Student activity</b>	<b>Teacher Support</b>	<b>Comment/Evaluation</b>
<p><b>Explore</b></p> <p>25-30 minutes</p>	<ul style="list-style-type: none"> <li>• Play the Factor Game, Problem 1.1, two or three times with a partner.</li> <li>• Record strategies that will help you win.</li> </ul>	<ul style="list-style-type: none"> <li>• Distribute Labsheet 1.1.</li> <li>• Are students able to find the correct factors for given numbers/</li> <li>• Are students able to find all the factors for given numbers?</li> <li>• Do students have a plan for a systematic search?</li> <li>• Suggest that students record the factors for given numbers in a systematic manner.</li> <li>• Are students able to see that some numbers have common factors?</li> <li>• Are students checking their partner's moves to see that they are correct?</li> <li>• Are students able to think ahead in selecting numbers and not "blindly" calling out any number?</li> <li>• Are students able to verbalize their good first move?</li> <li>• Are students able to verbalize their strategies for good moves?</li> <li>• Help students write strategies for good moves in complete sentences.</li> </ul>	<ul style="list-style-type: none"> <li>• How are students keeping track of their moves and scores?</li> <li>• How are students checking their partner's moves and scores?</li> <li>• Are some students consistently missing factors?</li> <li>• Produce awareness of importance of gathering full information.</li> </ul>
<p><b>Summarize</b></p> <p>10 minutes</p>	<ul style="list-style-type: none"> <li>• Be prepared to share ideas of good first moves with the class.</li> <li>• Be prepared to share ideas of good moves with the class.</li> </ul>	<ul style="list-style-type: none"> <li>• Select students to share their ideas for good first moves with the class.</li> <li>• Select students to share their ideas for good moves with the class.</li> </ul>	<ul style="list-style-type: none"> <li>• Chart and record student's ideas.</li> <li>• Request paraphrase to prove understanding.</li> </ul>
<p><b>Homework</b></p>	<p>ACE questions 1-9, 14</p>		

## Prime Time

### Investigation 1: The Factor Game Day 2

#### Connections

Prior Work	Current Big Idea	Future Work
<ul style="list-style-type: none"><li>Multiplication and division facts.</li></ul>	<ul style="list-style-type: none"><li>Determining the factors of given whole numbers.</li></ul>	<ul style="list-style-type: none"><li>Arithmetic operations with fractions.</li><li>Comparing.</li><li>Factoring algebraic expressions.</li></ul>

#### Lesson Process

Steps	Student activity	Teacher Support	Comment/Evaluation
<b>Launch</b> 10-15 minutes	<ul style="list-style-type: none"><li>Create a table to record the first moves for the Factor Game.</li><li>Talk should be confined to clarifying questions.</li></ul>	<ul style="list-style-type: none"><li>Distribute Labheet 1.2.</li><li>Explain to the class that you want to analyze every possible first move of the Factor Game to determine which are “good moves” and which are “bad moves.”</li><li>Create a table for analyzing the first moves in the Factor game.</li><li>Students may not know how to record data systematically.</li><li>Start the first entries for the table with the class.</li></ul>	<ul style="list-style-type: none"><li>Help student gather clear and complete information.</li></ul>

Steps	Student activity	Teacher Support	Comment/Evaluation
<p><b>Explore</b></p> <p>15-20 minutes</p>	<p>Work individually or in pairs to complete the table for first moves. Use the list to complete Problem 1.2.</p>	<ul style="list-style-type: none"> <li>• Did students record the correct entries in table?</li> <li>• How did students find the entries for Proper Factors, My Score, and Opponent's Score?</li> <li>• Did student use a systematic and consistent method for finding the necessary entries?</li> <li>• Are students noticing that some numbers have many factors and other numbers have a few factors?</li> <li>• Can students describe the similarity and differences between the numbers and their factors?</li> <li>• Do students need help in finding the reasons for the best first move and worst first move?</li> <li>• Help students describe patterns they find in the list.</li> </ul>	<ul style="list-style-type: none"> <li>• Are students having difficulties in finding all factors for given numbers?</li> <li>• Use a system or plan so students do not skip or miss or repeat factors..</li> </ul>
<p><b>Summarize</b></p> <p>10 minutes</p>	<ul style="list-style-type: none"> <li>• Share solutions with class.</li> <li>• Start Mathematical Reflections.</li> <li>• Add writings for the special number project.</li> </ul>	<ul style="list-style-type: none"> <li>• "Look at the list of first moves that allow your opponent to score only one point. These kinds of number have a special name. They are called <i>prime numbers</i>."</li> <li>• "Are all prime numbers good first moves? Why?"</li> <li>• "List all the first moves that allow your opponent to score more than one point. These kinds of numbers also have a special name. They are called <i>composite numbers</i>."</li> </ul>	<ul style="list-style-type: none"> <li>• The words prime and composite are defined but introduced in context with the "good" and "bad" first moves of the Factor Game.</li> <li>• The number, 1, is neither prime nor composite.</li> <li>• Labeling is important so that we can remember and talk about information.</li> <li>• Request paraphrase to prove understanding.</li> </ul>

Steps	Student activity	Teacher Support	Comment/Evaluation
		<ul style="list-style-type: none"> <li>• “Which first move would make you lose a turn?”</li> </ul>	
<b>Homework</b>	<ul style="list-style-type: none"> <li>• ACE question 10.</li> <li>• Complete Mathematical Reflections.</li> </ul>		

## Prime Time

### Investigation 1: The Factor Game Day 3

#### Connections

Prior Work	Current Big Idea	Future Work
<ul style="list-style-type: none"><li>Multiplication and division facts.</li></ul>	<ul style="list-style-type: none"><li>Determining the factors of given whole numbers.</li></ul>	<ul style="list-style-type: none"><li>Arithmetic operations with fractions.</li><li>Comparing.</li><li>Factoring algebraic expressions.</li></ul>

#### Lesson Process

Steps	Student activity	Teacher Support	Comment/Evaluation
<b>Launch</b> 10-15 minutes	<ul style="list-style-type: none"><li>Check entries on table for ACE Question 10.</li><li>Share new primes found from table.</li></ul>	<ul style="list-style-type: none"><li>Compare and check the new primes found from ACE Question 10.</li><li>Ask students the reason for identifying specified numbers as primes.</li></ul>	<ul style="list-style-type: none"><li>Use clear and precise language so others can understand.</li></ul>
Explore 20-25 minutes	<ul style="list-style-type: none"><li>Work in pairs or groups to complete ACE Questions 11-15, 17, 18.</li><li>Complete Mathematical Reflections.</li></ul>	<ul style="list-style-type: none"><li>Are students continuing their systematic recording of factors and scores?</li><li>Do students see the similarities and differences between numbers and their factors?</li></ul>	<ul style="list-style-type: none"><li>Are students able to compare numbers and their factors trying to find similarities and differences?</li><li>Guide students in looking for relationships by which numbers can be linked.</li></ul>

<b>Steps</b>	<b>Student activity</b>	<b>Teacher Support</b>	<b>Comment/Evaluation</b>
<b>Summarize</b> 10-15 minutes	<ul style="list-style-type: none"> <li>Share strategies and conclusions with class.</li> </ul>	<ul style="list-style-type: none"> <li>Select students for presentations and discussion of conclusions and strategies.</li> </ul>	<ul style="list-style-type: none"> <li>Look for clear and precise language in presentations.</li> <li>Request paraphrase to prove understanding.</li> </ul>
<b>Homework</b>	<ul style="list-style-type: none"> <li>ACE question 20</li> <li>Complete Mathematical reflections.</li> </ul>	<ul style="list-style-type: none"> <li>Practice in finding the sets to which numbers belong.</li> <li>Practice in considering two sources of information simultaneously.</li> </ul>	<ul style="list-style-type: none"> <li>Comparing numbers to find similarities and differences.</li> </ul>