

## Prime Time

### Investigation 3: Factor Pairs Day 1

#### Connections

Prior Work	Current Big Idea	Future Work
<ul style="list-style-type: none"><li>• Multiplication facts.</li><li>• Determine factors for specified numbers.</li></ul>	<ul style="list-style-type: none"><li>• Recognize that factors come in pairs.</li></ul>	<ul style="list-style-type: none"><li>• 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>• Read, with teacher, the story of the art exhibit.</li></ul>	<ul style="list-style-type: none"><li>• Tell the story of the art exhibit.</li></ul>	
<b>Explore</b> 20-25 minutes	<ul style="list-style-type: none"><li>• Work in pairs or groups on Problem 3.1.</li></ul>	<ul style="list-style-type: none"><li>• Students work in pairs or groups on Problem 3.1</li><li>• To record the rectangles they find, ask students to trace their tile figures or draw a representation on a sheet of grid paper.</li><li>• Have students compare rectangles with other group.</li></ul>	<ul style="list-style-type: none"><li>• Students may say that the 4x4 square is not a rectangle. Use the opportunity to help students see that the definition of a rectangle includes squares.</li></ul>

<p><b>Summarize</b></p> <p>10-15 minutes</p>	<ul style="list-style-type: none"> <li>• Discuss solutions to the problem as a class.</li> </ul>	<ul style="list-style-type: none"> <li>• Ask students what patterns they see in the rectangles.</li> <li>• <b>“What do all your rectangles for the number 12 have in common?”</b></li> <li>• Discuss patterns students see in the rectangles made with 16 tiles.</li> <li>• Some students may see that all numbers that are not squares have an even number of factors.</li> <li>• Square numbers have an odd number of distinct factors.</li> <li>• Do not go for closure here.</li> </ul>	<ul style="list-style-type: none"> <li>• Note that the 4, which appears as both the length and the width of the square, is not counted as two factors. It represents only one distinct factor.</li> <li>• Students might be asked to devise another physical representation of even and odd numbers.</li> </ul>
<p><b>Homework</b></p>	<ul style="list-style-type: none"> <li>• ACE question 16.</li> </ul>		

## Prime Time

### Investigation 3: Factor Pairs Day 2

#### Connections

Prior Work	Current Big Idea	Future Work
<ul style="list-style-type: none"> <li>• Multiplication facts.</li> <li>• Determine factors for specified numbers.</li> </ul>	<ul style="list-style-type: none"> <li>• Recognize that factors come in pairs.</li> </ul>	<ul style="list-style-type: none"> <li>• 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>• Make rectangles with the whole numbers given by teacher.</li> <li>• Divide work among members of the group.</li> </ul>	<ul style="list-style-type: none"> <li>• Distribute the whole numbers from 1 to 30 among the groups of students.</li> <li>• Ask the groups to divide the work so that each member has about the same amount of work to do.</li> <li>• Demonstrate how grid-paper models of each rectangle can be made for the numbers assigned. Tiles may be used to help student find the rectangles.</li> </ul>	<ul style="list-style-type: none"> <li>• Many observations come out of this investigation.</li> <li>• Students should see that many even number can be modeled by two matching rows.</li> <li>• When odd numbers are modeled this way, there is always one square left over.</li> </ul>
<b>Explore</b>	<ul style="list-style-type: none"> <li>• Works alone to complete Problem 3.2.</li> <li>• Work with group to correct individual displays.</li> <li>• Look for patterns in the rectangles.</li> </ul>	<ul style="list-style-type: none"> <li>• Divide class into groups.</li> <li>• Decide how to split up the work among the groups.</li> <li>• Distribute prime, square, abundant,</li> </ul>	<ul style="list-style-type: none"> <li>• Some students may have the notion that larger numbers have more factors, keep an eye on these students during</li> </ul>

<b>Steps</b>	<b>Student activity</b>	<b>Teacher Support</b>	<b>Comment/Evaluation</b>
	<ul style="list-style-type: none"> <li>Post the displays.</li> </ul>	<p>composite, and deficient numbers so that each group will have about the same amount of work to do.</p> <ul style="list-style-type: none"> <li>The class may want to discuss how to divide the work within each group.</li> <li>“What would be a fair way to divide the work within each group so that every member will have about an equal amount of work to do?”</li> </ul>	<p>the class summary.</p>
<p><b>Summarize</b> 10-15 minutes</p>	<ul style="list-style-type: none"> <li>Display all rectangles found for each of the numbers.</li> <li>Post displays in order from 1 to 30.</li> </ul>	<ul style="list-style-type: none"> <li>Write the following questions on the board and ask students to think about them. <ul style="list-style-type: none"> <li>What patterns do you see in the rectangles you are making?</li> <li>What patterns do you see across all the numbers on which your group is working?</li> <li>What is the relationship between the rectangles for a number and the factors of the number?</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Students who finish early may wish to extend the display beyond 30.</li> <li>Students may be challenged further to extend the list to 50 or 60.</li> </ul>
<p><b>Homework</b></p>	<p>ACE questions 1-8, 17-19, 21-15.</p>		

## Prime Time

### Investigation 3: Factor Pair Day 3

#### Connections

Prior Work	Current Big Idea	Future Work
<ul style="list-style-type: none"><li>• Multiplication facts.</li><li>• Determine factors for specified numbers.</li></ul>	<ul style="list-style-type: none"><li>• Recognize that factors come in pairs.</li></ul>	<ul style="list-style-type: none"><li>• 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>• Review concept of odd and even numbers.</li><li>• Discuss Jocelyn's tile models for even and odd numbers.</li></ul>	<ul style="list-style-type: none"><li>• Review concept of odd and even numbers.</li><li>• <b>“We will be working with odd and even numbers. Can anyone explain what makes a number even and what makes a number odd?”</b></li><li>• Discuss Jocelyn's tile models.</li><li>• <b>“How are the tile models for odd numbers different from the models for even numbers?”</b></li><li>• Students should notice that the models for even numbers are rectangles with a height of 2 tiles. Models for odd numbers are rectangles with an extra tile sticking out.</li></ul>	<ul style="list-style-type: none"><li>• Students may have many ideas.</li><li>• Be sure that the questions on top of page 28 of the student edition are discussed.</li></ul>

Steps	Student activity	Teacher Support	Comment/Evaluation
		<ul style="list-style-type: none"> <li>• Discuss what it means to make a conjecture.</li> <li>• <b>“In the problem, you are asked to make conjectures about the results of adding or multiplying odd and even numbers. A conjecture is your best guess about a relationship. For example, part A of Problem 3.3 asks you to make a conjecture about whether the sum of two even numbers is even or odd.”</b></li> <li>• After students have made a conjecture, try to show why it is true.</li> </ul>	
<b>Explore</b> 15-20 minutes	<ul style="list-style-type: none"> <li>• Work in pairs on Problem 3.3.</li> <li>• Record answers in journal.</li> <li>• Start Mathematical Reflections.</li> </ul>	<ul style="list-style-type: none"> <li>• Students work in pairs on Problem 3.3 and record findings in their journals.</li> <li>• Students who finish early can work on Problem 3.3 Follow-Up.</li> </ul>	
<b>Summarize</b> 10-15 minutes	<ul style="list-style-type: none"> <li>• Discuss solutions.</li> </ul>	<ul style="list-style-type: none"> <li>• Discuss the solutions.</li> <li>• Focus not just on what happens, but on why it happens.</li> </ul>	
<b>Homework</b>	<ul style="list-style-type: none"> <li>• ACE questions 10-15.</li> </ul>		<ul style="list-style-type: none"> <li>• ACE questions 26-30 maybe assigned as an extra challenge.</li> </ul>