

## Prime Time

### Investigation 4: Common Factors and Multiples Day 1

#### Connections

Prior Work	Current Big Idea	Future Work
<ul style="list-style-type: none"> <li>Find factors for given whole numbers.</li> <li>Find multiples for given whole numbers.</li> </ul>	<ul style="list-style-type: none"> <li>Find common factors for given sets of whole numbers.</li> <li>Find common multiples for given sets of whole numbers.</li> </ul>	<ul style="list-style-type: none"> <li>Determine the GCF and LCM for given sets of whole numbers.</li> <li>Find common denominators for fractions and ratios.</li> </ul>

#### Lesson Process

Steps	Student activity	Teacher Support	Comment/Evaluation
<p><b>Launch</b></p> <p>10-15 minutes</p>	<ul style="list-style-type: none"> <li>Make a list of factors for 24 and 36 and find the common factors.</li> <li>Make a list of multiples for 24 and 36 and find the common multiples.</li> <li>Read Problem 4.1 aloud.</li> </ul>	<ul style="list-style-type: none"> <li>Ask students for the factors of 24 and the factors of 36.</li> <li>As students find the factors, write them on the board.</li> <li>When there is a list of factors for each number, ask which factors appear in both lists, and discuss what it means for a number to be in both lists.</li> <li>Explain the theses numbers are the <i>common factors</i> of 24 and 36.</li> <li>Ask the students to find the first ten multiples of 24 and the first ten multiples of 36, and list the multiples of</li> </ul>	<ul style="list-style-type: none"> <li>Discuss the differences and connections between factors and multiples.</li> </ul>

		<p>each number on the board.</p> <ul style="list-style-type: none"> <li>• Students may not include the numbers themselves in the list. This gives an opportunity to emphasize that the smallest multiple of any number is the number itself.</li> <li>• When the lists are complete, ask student to find the numbers that appear on both lists.</li> <li>• Explain that these numbers are the <i>common multiples</i> of 24 and 36.</li> <li>• Ask what the numbers that appear on both lists have in common.</li> <li>• Some students may see that every number that appears on both lists is divisible by 72.</li> <li>• <b>“We are going to use the ideas of common factors and common multiples to solve the problem in this investigation.”</b></li> <li>• Read Problem 4.1.</li> </ul>	<ul style="list-style-type: none"> <li>• Make sure students understand what is being asked in Problem 4.1.</li> </ul>
<p><b>Explore</b></p> <p>20-25 minutes</p>	<ul style="list-style-type: none"> <li>• Work in pairs of small groups on Problem 4.1.</li> </ul>	<ul style="list-style-type: none"> <li>• Students work in pairs or small groups to solve Problem 4.1.</li> <li>• Remind students to record their results in their journals.</li> <li>• If a group finishes early, have them work on Problem 4.1 Follow-Up.</li> </ul>	
<p><b>Summarize</b></p> <p>10-15 minutes</p>	<ul style="list-style-type: none"> <li>• Share answers with class.</li> </ul>	<ul style="list-style-type: none"> <li>• Let students share their answers and explain their thinking.</li> <li>• Students may notice that in part A the answer is one of the two numbers, and</li> </ul>	<ul style="list-style-type: none"> <li>• In part B of Problem 4.1, students should realize that the siblings will both be at the bottom every two and a half</li> </ul>

		<p>in part C the answer is the product of the two numbers. If students do not make these observations, prompt them.</p> <ul style="list-style-type: none"> <li>• <b>“Notice that in part A the answer is one of the given numbers. In part C the answer is the product of the two numbers. I wonder what is special about these numbers that made this happen.”</b></li> <li>• <b>“As we work on the rest of this unit, try to notice other number pairs that produce these results.”</b></li> </ul>	<p>minutes.</p> <ul style="list-style-type: none"> <li>• Write the observations on the board.</li> </ul> <ul style="list-style-type: none"> <li>• This is an important question to pose before moving on to the next problem.</li> <li>• Although you are not ready to answer the question, if you ask it now, students may notice this pattern in other problems.</li> </ul>
<b>Homework</b>	<ul style="list-style-type: none"> <li>• ACE questions 1-4.</li> </ul>		

## Prime Time

### Investigation 4: Common Factors and Multiples Day 2

#### Connections

Prior Work	Current Big Idea	Future Work
<ul style="list-style-type: none"> <li>Find factors for given whole numbers.</li> <li>Find multiples for given whole numbers.</li> </ul>	<ul style="list-style-type: none"> <li>Find common factors for given sets of whole numbers.</li> <li>Find common multiples for given sets of whole numbers.</li> </ul>	<ul style="list-style-type: none"> <li>Determine the GCF and LCM for given sets of whole numbers.</li> <li>Find common denominators for fractions and ratios.</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 Problem 4.2.</li> </ul>	<ul style="list-style-type: none"> <li>Remind students of the locust problem posed at the beginning of the book.</li> <li><b>“Problem 4,2 involves the 13-year and 17-year locusts described at the beginning of your book. Like the Ferris wheel problem, the locust problem involves determining when two or more things will happen at the same time.”</b></li> <li>Read Problem 4.2 with the students.</li> <li>Discuss the situation until students understand the questions being asked.</li> </ul>	

Steps	Student activity	Teacher Support	Comment/Evaluation
<b>Explore</b> 20-25 minutes	<ul style="list-style-type: none"> <li>Students work in pairs or small groups to explore Problem 4.2.</li> </ul>	<ul style="list-style-type: none"> <li>Have students work in pairs or small groups to explore Problem 4.2.</li> <li>Help student stay in focus on the problem, and remind students to be ready to share their strategies as well as their solutions.</li> </ul>	<ul style="list-style-type: none"> <li>If students are stuck, ask them to explore how this problem is similar to the Ferris wheel problem and to review the strategies they used to solve that problem.</li> </ul>
<b>Summarize</b> 10-15 minutes	<ul style="list-style-type: none"> <li>Present solutions and strategies to class.</li> </ul>	<ul style="list-style-type: none"> <li>Have students present their strategies and solutions.</li> <li><b>“I noticed that in part A the solutions is the product of the two numbers, and in part B the solution is smaller than the product of the three number. Why do you suppose this happens?”</b></li> <li><b>How can we tell whether the least common multiple will be less than or equal to the product of the number?”</b></li> </ul>	<ul style="list-style-type: none"> <li>Show the solution if it was not shown by a student.</li> <li>Students may not be able to answer this question. Don't push them.</li> <li>If the numbers have no common factors, then the least common multiple will be the product of the numbers.</li> <li>If the numbers have a common factor, the least common multiple will be less than the product of the numbers.</li> </ul>
<b>Homework</b>	<ul style="list-style-type: none"> <li>ACE questions 5-7, 14-16, 18.</li> </ul>		

## Prime Time

### Investigation 4: Common Factors and Multiples Day 2

#### Connections

Prior Work	Current Big Idea	Future Work
<ul style="list-style-type: none"><li>Find factors for given whole numbers.</li><li>Find multiples for given whole numbers.</li></ul>	<ul style="list-style-type: none"><li>Find common factors for given sets of whole numbers.</li><li>Find common multiples for given sets of whole numbers.</li></ul>	<ul style="list-style-type: none"><li>Determine the GCF and LCM for given sets of whole numbers.</li><li>Find common denominators for fractions and ratios.</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 Problem 4.3.</li></ul>	<ul style="list-style-type: none"><li>Read Problem 4.3 aloud.</li><li>Ask students to suggest how they might solve the problem.</li><li>Students may look for multiples, because this is how they solved the earlier problems.</li><li>Remind students that part of problem solving is asking whether the answer seems reasonable.</li></ul>	<ul style="list-style-type: none"><li>Problem 4.3 is different from the first two problems because it involves factors instead of multiples.</li><li>Ask students to make note about this for their Mathematical Reflections.</li><li>Labeling the answer and restating it in the context of the problem helps to determine whether an answer is reasonable.</li></ul>

<p><b>Explore</b></p> <p>20-25 minutes</p>	<ul style="list-style-type: none"> <li>• Work in pairs on Problem 4.3 and Problem 4.3 Follow-Up.</li> </ul>	<ul style="list-style-type: none"> <li>• When students come up with strategies, let them work in pairs on Problem 4.3 and Problem 4.3 Follow-Up.</li> </ul>	
<p><b>Summarize</b></p> <p>10-15 minutes</p>	<ul style="list-style-type: none"> <li>• Present strategies and solutions.</li> <li>• Add entries for Mathematical Reflections.</li> </ul>	<ul style="list-style-type: none"> <li>• Ask students to share their solutions and strategies for Problem 4.3. Discuss how they might start their responses to the Mathematical Reflections.</li> </ul>	<ul style="list-style-type: none"> <li>• Some students may need more practice with problems of this sort – practice provided in the ACE questions – before they are ready to complete the Mathematical Reflections.</li> </ul>
<p><b>Homework</b></p>	<ul style="list-style-type: none"> <li>• ACE questions 17, 21, 22.</li> </ul>		<ul style="list-style-type: none"> <li>• Sign ACE questions 19, 20, and 12 as extra challenge.</li> </ul>