

## Unit 0

### Getting Started: Working in Teams

#### Standards:

M/J Mathematics 2

1.1 Find areas and perimeters of rectangular shapes and non-rectangular shapes.

Pre-Algebra

1.1 Represent relationships among variables in a variety of ways, including the use of words, tables, graphs, and symbols.

3.5 Use probability and equivalent fractions to find expected values.

## Day 1 Introduction

### Connections

Prior Work	Current Big Idea	Future Work
<ul style="list-style-type: none"> <li>Rituals and routines used in mathematics classroom.</li> </ul>	<ul style="list-style-type: none"> <li>Develop good work habits for study team and homework.</li> <li>Become accustomed to working in a team to solve mathematics problems.</li> </ul>	<ul style="list-style-type: none"> <li>Establish rituals and routines for mathematics class.</li> </ul>

### Lesson Process

Steps	Student activity	Teacher Support	Comment/Evaluation
<b>Launch</b> 5-8 minutes	<ul style="list-style-type: none"> <li>Sit in teams as directed by teacher.</li> <li>Read PZL-1.</li> </ul>	<ul style="list-style-type: none"> <li>Divide students into study teams of four.</li> <li>Read PZL-1 with students or select students to read aloud for the entire class.</li> </ul>	<ul style="list-style-type: none"> <li>Opportunity to assess students' reading ability.</li> </ul>
<b>Explore</b> 10-15 minutes	<ul style="list-style-type: none"> <li>Complete Mission Possible.</li> <li>Copy Guidelines for Study Teams into notebooks.</li> <li>Record names of members of study team.</li> </ul>	<ul style="list-style-type: none"> <li>Help students see that key ideas are printed in bold.</li> </ul>	<ul style="list-style-type: none"> <li>Be sensitive to students who do not learn well in a team setting.</li> <li>Watch for situations where one or two students are not doing the work and are "monkey wrenching" the</li> </ul>

<b>Steps</b>	<b>Student activity</b>	<b>Teacher Support</b>	<b>Comment/Evaluation</b>
			learning process. <ul style="list-style-type: none"> <li>Do not penalize the cooperative students because persons in their team is uncooperative.</li> </ul>
<b>Summarize</b> 15-20 minutes	<ul style="list-style-type: none"> <li>Discussion on the Guidelines for Study Teams.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss the need for sections in students' notebooks.</li> <li>Restate goals for the Algebra I course.</li> </ul>	

## Day 2

### Graph Interpretation

#### Connections

Prior Work	Current Big Idea	Future Work
<ul style="list-style-type: none"> <li>Operations with rational numbers.</li> <li>Interpretations of charts and graphs.</li> </ul>	<ul style="list-style-type: none"> <li>Pattern application.</li> <li>Use of mathematical language.</li> </ul>	<ul style="list-style-type: none"> <li>Create different forms of systematic lists.</li> <li>Factor binomials.</li> </ul>

#### Lesson Process

Steps	Student activity	Teacher Support	Comment/Evaluation
<b>Launch</b> 6-10 minutes	<ul style="list-style-type: none"> <li>Work on GS-3 – Diamond Problems.</li> </ul>	<ul style="list-style-type: none"> <li>Show students the shortcut of drawing a large X.</li> <li>Finding patterns is an important problem solving skill that is used in algebra.</li> <li>Start students on GS-4 – Progress Report.</li> </ul>	<ul style="list-style-type: none"> <li>Informal assessment of students' arithmetic skills.</li> <li>Do not stop to teach how to add integers. It will be thoroughly introduced in Unit One.</li> </ul>
Explore 20-25 minutes	<ul style="list-style-type: none"> <li>Work on GS-4 – Progress Report with study team.</li> <li>Each student should complete his/her own individual write-up.</li> </ul>	<ul style="list-style-type: none"> <li>Encourage students to talk about the problem and share their own understanding.</li> <li>Encourage language that is concrete and visual (for example, left, right, up, down on a graph).</li> <li>Students should use complete sentences to complete responses.</li> </ul>	<ul style="list-style-type: none"> <li>Although the language used in the explanations should be mathematically precise, accept answers that are basically correct.</li> <li>Add proper vocabulary to the word wall.</li> </ul>

<b>Steps</b>	<b>Student activity</b>	<b>Teacher Support</b>	<b>Comment/Evaluation</b>
		<ul style="list-style-type: none"> <li>• Help students formulate their strategies and ideas into words.</li> <li>• Guide students in recording ideas and information systematically.</li> </ul>	
<p><b>Summarize</b> 10-15 minutes</p>	<ul style="list-style-type: none"> <li>• Share solutions and strategies with class.</li> <li>• Share write-ups with class.</li> </ul>	<ul style="list-style-type: none"> <li>• Select students to share solutions and strategies with class.</li> <li>• Students may present only portions of the questions.</li> <li>• Record major ideas and strategies on board or chart paper.</li> </ul>	<ul style="list-style-type: none"> <li>• Strategies should be recorded and posted for reference.</li> <li>• Cue students to prepare for presentation of strategies.</li> </ul>
<p>Homework</p>	<ul style="list-style-type: none"> <li>• Read PZL-2 – The Key to Success in CPM Algebra I</li> <li>• Complete GS-5 – Mathography</li> </ul>	<ul style="list-style-type: none"> <li>• Indicate to students who will be reading the Mathography – teacher only or other team members.</li> </ul>	

**Day 3**  
**Team Building, Area, and Perimeter**

**Connections**

Prior Work	Current Big Idea	Future Work
<ul style="list-style-type: none"> <li>Find area and perimeter for rectangles.</li> <li>Determine factors for given whole numbers.</li> </ul>	<ul style="list-style-type: none"> <li>Recognize relationship between multiplication and area of rectangles.</li> <li>Construct and use systematic lists.</li> </ul>	<ul style="list-style-type: none"> <li>Factor whole numbers.</li> <li>Factor binomials.</li> <li>Find maximums and minimums for given situations.</li> </ul>

**Lesson Process**

Steps	Student activity	Teacher Support	Comment/Evaluation
<p><b>Launch</b></p> <p>5-8 minutes</p>	<ul style="list-style-type: none"> <li>Read GS-7</li> <li>Student talk should be confined to clarifying questions.</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate drawing and labeling of the dimensions and area for the specified rectangles on graph paper.</li> </ul>	<ul style="list-style-type: none"> <li>Do not insist on a particular way student should complete the drawings other than that the drawing should include the dimensions and area for each rectangle.</li> </ul>
<p><b>Explore</b></p> <p>20-25 minutes</p>	<ul style="list-style-type: none"> <li>Complete GS-7.</li> <li>Read PZL-3 – Building A Successful Math Course.</li> </ul>	<ul style="list-style-type: none"> <li>If students question whether the rectangles with dimensions of 2 x 8 and 8 x 2 are the same, ask for their ideas on why or why not.</li> <li>Were students able to find all factor pairs?</li> </ul>	<ul style="list-style-type: none"> <li>Some students will include both the 2 x 8 and 8 x 2 rectangles, others will only include one. Accept both.</li> <li>Informal assessment on students' conception of area</li> </ul>

Steps	Student activity	Teacher Support	Comment/Evaluation
		<ul style="list-style-type: none"> <li>• Were students completing the rectangles systematically or randomly?</li> <li>• Do students need help in completing their explanations for parts c and d?</li> <li>• Are students using clear language for the explanations?</li> <li>• Read PZL-3 while all teams complete GS-7.</li> </ul>	<ul style="list-style-type: none"> <li>• and perimeter,</li> <li>• Parts c and d lead into work in calculus towards maximizing and minimizing.</li> </ul>
<p><b>Summarize</b></p> <p>15-20 minutes</p>	<ul style="list-style-type: none"> <li>• Students present solutions and explanations.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>“Are the rectangles with dimensions 2 x 8 and 8 x 2 the same?”</b></li> <li>• <b>Record and post answers to parts c and d.</b></li> </ul>	<ul style="list-style-type: none"> <li>• Discussion of the 2 x 8 and 8 x 2 rectangles can lead to informal identification of the commutative property for multiplication.</li> <li>• The discussion can also lead to ideas on transformation (rotations).</li> </ul>
<p>Homework</p>	<ul style="list-style-type: none"> <li>• GS-8 through GS-11.</li> </ul>		

**Day 4**  
**Roll and Win, Part 1: Data Collection**

**Connections**

Prior Work	Current Big Idea	Future Work
<ul style="list-style-type: none"> <li>• Basic concepts of probability related to working with dice.</li> <li>• Basic operations with rational numbers.</li> </ul>	<ul style="list-style-type: none"> <li>• Collect and display data.</li> <li>• Use problem-solving strategy to develop systematic lists.</li> </ul>	<ul style="list-style-type: none"> <li>• Find patterns and generalizations from systematic lists.</li> </ul>

**Lesson Process**

Steps	Student activity	Teacher Support	Comment/Evaluation
<p><b>Launch</b> 5-10 minutes</p>	<ul style="list-style-type: none"> <li>• Display problems from GS-9 on poster provided when entering the class.</li> <li>• Read GS-13 – Roll and Win</li> </ul>	<ul style="list-style-type: none"> <li>• Provide poster so that students may share answers to GS-9.</li> <li>• Read GS-13 with students.</li> <li>• Students should work on GS-13 in teams of twos, each team should be provided with two dice.</li> <li>• Clarify the meaning of “difference.”</li> </ul>	<ul style="list-style-type: none"> <li>• Good review leading to basic concepts for probability.</li> </ul>
<p>Explore 20-35 minutes</p>	<ul style="list-style-type: none"> <li>• Working in pairs, complete GS-13 – Roll and Win.</li> </ul>	<ul style="list-style-type: none"> <li>• Guide students in recording data in a systematic method.</li> <li>• Students may not be familiar with the term “histogram.”</li> <li>• “Fair game” may not have been developed formally, but most students</li> </ul>	<ul style="list-style-type: none"> <li>• Students are not calculating probability.</li> </ul>

Steps	Student activity	Teacher Support	Comment/Evaluation
		will understand the meaning.	
<b>Summarize</b> 10-15 minutes	<ul style="list-style-type: none"> <li>Prepare to combine data with another team.</li> </ul>	<ul style="list-style-type: none"> <li>Combine data from the entire class or data from two teams.</li> <li>Discuss whether the game was a “fair game.”</li> </ul>	<ul style="list-style-type: none"> <li>Discuss the idea of having a greater number of samples vs. a few samples.</li> </ul>
<b>Homework</b>	<ul style="list-style-type: none"> <li>GS-14 through GS-18</li> </ul>		

**Day 5**  
**Roll and Win, Part 2: Probability**

**Connections**

Prior Work	Current Big Idea	Future Work
<ul style="list-style-type: none"> <li>• Basic concepts of probability related to working with dice.</li> <li>• Basic operations with rational numbers.</li> </ul>	<ul style="list-style-type: none"> <li>• State basic definition for probability.</li> <li>• Solve simple problems related to probability.</li> </ul>	<ul style="list-style-type: none"> <li>• Find probability for independent and dependent events.</li> </ul>

**Lesson Process**

Steps	Student activity	Teacher Support	Comment/Evaluation
<p><b>Launch</b></p> <p>5-10 minutes</p>	<p>Exchange notebooks with a member of the study team to make sure notebooks are organized.</p>	<ul style="list-style-type: none"> <li>• Informally check students' organization of notebooks.</li> <li>• State basic definition for probability and give examples related to the throwing of one die.</li> <li>• Model proper notation.</li> </ul>	<ul style="list-style-type: none"> <li>• Students do not need to copy the definition of probability. It will be included in the tool kit page.</li> </ul>
<p><b>Explore</b></p> <p>20-30 minutes</p>	<ul style="list-style-type: none"> <li>• Complete GS-20, GS-21, GS-22, GS-23</li> </ul>	<ul style="list-style-type: none"> <li>• Guide students in making a list systematically to include all possible outcomes on GS-20.</li> <li>• Some students may not have had experience in reading the table used in GS-21.</li> </ul>	<ul style="list-style-type: none"> <li>• Emphasize the importance of recording and arranging data in a systematic manner.</li> </ul>

<b>Steps</b>	<b>Student activity</b>	<b>Teacher Support</b>	<b>Comment/Evaluation</b>
<b>Summarize</b> 8-10 minutes	<ul style="list-style-type: none"> <li>Share possible methods of recording and arranging data.</li> </ul>	<ul style="list-style-type: none"> <li>Lists and charts are ways to make data more meaningful and easier to work with.</li> </ul>	<ul style="list-style-type: none"> <li>Lists and charts are ways to make patterns more visible.</li> </ul>
<b>Homework</b>	<ul style="list-style-type: none"> <li>GS-25, GS-26</li> </ul>		<ul style="list-style-type: none"> <li>Students will need data from GS-25 to use in the first lesson of Unit 1.</li> </ul>