Unit 0
Prelude: Study Teams and Coordinate Grids

Standards

M/J Mathematics 2

3.4 Create tables, graphs, and simple symbolic rules that describe the patterns of change.
9.5 Use probability and equivalent fractions to find expected values.

Algebra I

1.3 Find solution sets for equations and inequalities over a given domain.
4.1 Solve equations using the addition property of equality or subtraction property of equality.
4.2 Solve equations using the multiplication property of equality or division property of equality.
7.4 Graph sets of ordered pairs, linear equations in two variables by using intercepts, slope and a points, and point-plotting.

Day 1
Welcome, Notebooks

Connections

Prior Work	Current Big Idea	Future Work
• Rituals and routines used in mathematics classroom	• Develop good work habits for study team and homework. • Become accustomed to working in a team to solve mathematics problems.	• Establish rituals and routines for mathematics class.

Lesson Process

Steps	Student activity	Teacher Support	Comment/Evaluation
Launch 8-15 minutes	• Sit in teams as directed by teacher. • Read PZL –1.	• Divide students into study teams of four. • Read PZL-1 with students or select students to read aloud for the entire class.	• Opportunity to assess students' reading ability.
Explore **10-15 minutes**	• Complete Mission Possible • Copy Guidelines for Study Teams into notebooks. • Record names of members of study team.	• Help students see that key ideas are printed in bold.	• Be sensitive to students who do not learn well in a team setting. • Watch for situations where one or two students are not doing the work and are

Steps	Student activity	Teacher Support	Comment/Evaluation
			"monkey wrenching" the learning process. • Do not penalize the cooperative students because persons in their team are uncooperative.
Summarize 15-20 minutes	• Discussion on the Guidelines for Study Teams.	• Discuss the need for sections in students' notebooks. • Restate goals for Geometry course.	

Day 2
Paper Towers

Connections

Prior Work	Current Big Idea	Future Work
• Operations with rational numbers.	• Pattern application. • Use of mathematical language.	• Make generalizations from patterns.

Lesson Process

Steps	Student activity	Teacher Support	Comment/Evaluation
Launch 8-15 minutes	• Read rules for building of paper towers.	• Read and discuss rules for building of paper towers. • Distribute materials needed for building paper towers.	• Activity is to get all students actively involved. • It is difficult for one person alone to get the tower to stand.
Explore **10-15 minutes**	• Work in teams to build the paper tower.	• Call out measurements periodically to give the class a friendly competitive edge.	
Summarize	• Read PZL-2	• Discuss answers to Mission Possible.	

Steps	Student activity	Teacher Support	Comment/Evaluation
15-20 minutes	• Complete Mission Possible.		
Homework	• PR-4, PR-5, PR-6, PR-7	• Answers for the review problems are in student text.	• Informal and quick assessment of students' ability in basic topics in algebra.

Day 3
Pick's Theorem Investigation

Connections

Prior Work	Current Big Idea	Future Work
• Operations with rational numbers. • Making systematic lists.	• Pattern recognition. • Use of mathematical language.	• Make systematic lists. • Develop generalizations from given patterns.

Lesson Process

Steps	Student activity	Teacher Support	Comment/Evaluation
Launch 5 minutes	• Read PR-8.	• Read PR-8 with students. • Distribute dot paper.	
Explore **20-25 minutes**	• Complete PR-8, PR-9, PR-10.	• Check to see that students are recording the number of dots on the perimeter and not the length of the perimeter. • Guide students in discussing and comparing their figures with those of the other members of the study team. • Guide students in setting up the table.	• Students are finding relationships between two numbers, or variables. • How are the two numbers, dots on the perimeter and area, related?

Steps	Student activity	Teacher Support	Comment/Evaluation
	• Complete PR-11, PR-12, PR13, PR14.	• Help students record their findings systematically. • Have students discuss the relationships found in PR-10 together with their strategies. • Help students record findings. • Prepare students to report on findings and strategies in completing the assignment.	• Students are finding relationship between three numbers, or variables. • How are the three numbers, dots on the perimeter, area, and dots in the interior related?
Summarize 15-20 minutes	• Present relationships found in explore session. • Present strategies used in finding relationships.	• Select students using different strategies. • Post student "discoveries" as theorems with student's name, such as Rick's Theorem.	• Accept various descriptions of the same relationship. • Request paraphrase to prove understanding.
Homework	• PR-15 through PR-18		

Day 4
Using a Coordinate System

Connections

Prior Work	Current Big Idea	Future Work
• Graph ordered pairs on the coordinates system.	• Review identifying and graphing ordered pairs on the coordinate system.	• Graph equations with two variables.

Lesson Process

Steps	Student activity	Teacher Support	Comment/Evaluation
Launch 5 minutes	• Review inequality symbols $\leq$ and $\geq$.	• Review inequality symbols $\leq$ and $\geq$ with examples.	• The symbols are on the Tool Kit page.
Explore 20-35 minutes	• Complete PR-19.	• Do not tell students how to do this activity. Let the students explore by themselves. • One purpose of this activity is to establish the fact that in teams, students can figure out directions for themselves. • Do not correct students too soon if student is going in the wrong direction.	• Assessment of students' ability to graph ordered pairs • Do students have a plan of completing the drawing systematically? • Were students able to predict the visual results for the graphs in quadrants II, III, and IV?

Steps	Student activity	Teacher Support	Comment/Evaluation
	• Complete PR20, PR-21, and P2222.	• Ask students to check their results with members of the study team. • Ask students to complete PR-20 , PR-21, and PR-22. • Was the language used for answering PR-22 clear?	
Summarize 5 minutes	• Students may need more time to finish their designs.	• Consistent error may produce nice designs. • Help students describe the technical changed that produced a different design. • Praise students for even unexpected outcomes.	
Homework	• PR-23 through PR-25.		

Day 5
The Silent Square

Connections

Prior Work	Current Big Idea	Future Work
• Solve simple equations in one variable.	• Review or introduce using Guess and Check to solve equations.	• Translate verbal situation into algebraic equations.

Lesson Process

Steps	Student activity	Teacher Support	Comment/Evaluation
Launch 5-10 minutes	• Complete PR-26 without talking.	• Prepare puzzle pieces for the teams. • State the rules. • Activity usually moves quickly.	• Rules of problems forces students to help each other.
Explore 20-25 minutes	• Use Guess and Check method to complete PR-27.	• Review or introduce using Guess and Check to solve PR-27. • Help student set up table. • Work jointly with students to find solutions for two to three 'guesses.' • Are students systematically recording their findings? • Are students able to define the problem?	• The Guess and Check process is to help students bridge the transition of developing the skill systematically translating the problem solving process into algebraic symbols.

Steps	Student activity	Teacher Support	Comment/Evaluation
Summarize 5-8 minutes	• Students present solutions to PR-27.	• Students will have used different number of step to arrive at solution.	• Did students use whole numbers or did some use decimals or fractions for the number of year?
Homework	• PR-28 through PR-34.	• Solutions are provided for review problems.	