GR 8 - ALGEBRA 1
FALL 2017 - PSARELIS

| Trimester 1 | Trimester 2 | Trimester 3 |
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| **Unit 1: Relationships Between Quantities and Reasoning with Equations**<br><br>**Pacing: 30**<br><br>**Power Clusters:**<br>• Interpret the structure of expressions.<br>• Create equations that describe numbers or relationships.<br>• Understand solving equations as a process of reasoning and explain the reasoning.<br>• Solve equations and inequalities in one variable<br><br>**Supporting Standards:** N-Q.1, 2 & 3<br><br>**Standards for Mathematical Practice:**<br>**MP.1 \| MP.2 \| MP.3 \| MP.4 \| MP.6 \| MP.7 \| MP.8**<br><br>**Unit Focus:** By the end of eighth grade students have learned to solve linear equations in one variable and have applied graphical and algebraic methods to analyze and solve systems of linear equations in two variables. This unit builds on these earlier experiences by asking students to analyze and explain the process of solving an equation. Students develop fluency writing, interpreting, and translating between various forms of linear equations and inequalities, and using them to solve problems. They master the solution of linear equations and apply related solution techniques and the laws of exponents to the creation and solution of simple exponential equations. All of this work is grounded on understanding quantities and on relationships between them.<br><br>**Cross Curricular Standards:** | **Unit 2: Linear and Exponential Relationships (continued)**<br><br>**Pacing: 30**<br><br>**Power Clusters:**<br>• Extend the properties of exponents to rational exponents.<br>• Solve systems of equations.<br>• Represent and solve equations and inequalities graphically.<br>• Understand the concept of a function and use function notation.<br>• Interpret functions that arise in applications in terms of a context.<br>• Analyze functions using different representations.<br>• Build a function that models a relationship between two quantities.<br>• Build new functions from existing functions.<br>• Construct and compare linear, quadratic, and exponential models and solve problems.<br>• Interpret expressions for functions in terms of the situation they model.<br><br>**Supporting Standards:** N-Q.1, 2 & 3<br><br>**Standards for Mathematical Practice:**<br>**MP.1 \| MP.2 \| MP.3 \| MP.4 \| MP.5 \| MP.6**<br><br>**Unit Focus:** In this unit, students will learn function notation and develop the concepts of domain and range. They move beyond viewing functions as processes that take inputs and yield outputs and start viewing functions as objects in their own right. They explore many examples of functions, including sequences; they interpret functions given graphically, numerically, | **Unit 4: Expressions and Equations**<br><br>**Pacing: 30**<br><br>**Power Clusters:**<br>• Interpret the structure of expressions.<br>• Write expressions in equivalent forms to solve problems.<br>• Perform arithmetic operations on polynomials.<br>• Create equations that describe numbers or relationships.<br>• Solve equations and inequalities in one variable.<br>• Solve systems of equations.<br><br>**Supporting Standards:** N-Q.1, 2 & 3<br><br>**Standards for Mathematical Practice:**<br>**MP.1 \| MP.2 \| MP.4 \| MP.5 \| MP.6 \| MP.7**<br><br>**Unit Focus:** In this unit, students build on their knowledge from unit 2, where they extended the laws of exponents to rational exponents. Students apply this new understanding of number and strengthen their ability to see structure in and create quadratic and exponential expressions. They create and solve equations, inequalities, and systems of equations involving quadratic expressions.<br><br>**Cross Curricular Standards:** |

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| | symbolically, and verbally, translate between representations, and understand the limitations of various representations. They work with functions given by graphs and tables, keeping in mind that, depending upon the context, these representations are likely to be approximate and incomplete. Their work includes functions that can be described or approximated by formulas as well as those that cannot. When functions describe relationships between quantities arising from a context, students reason with the units in which those quantities are measured. Students explore systems of equations and inequalities, and they find and interpret their solutions. Students build on and informally extend their understanding of integer exponents to consider exponential functions. They compare and contrast linear and exponential functions, distinguishing between additive and multiplicative change. They interpret arithmetic sequences as linear functions and geometric sequences as exponential functions.<br><br>**Cross Curricular Standards:** | |

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| **Trimester 1** | **Trimester 2** | **Trimester 3** |
| **Unit 2: Linear and Exponential Relationships**<br><br>**Pacing:** 30<br><br>**Power Clusters:**<br>• Extend the properties of exponents to rational exponents.<br>• Solve systems of equations.<br>• Represent and solve equations and inequalities graphically.<br>• Understand the concept of a function and use function notation.<br>• Interpret functions that arise in applications in terms of a context.<br>• Analyze functions using different representations.<br>• Build a function that models a relationship between two quantities.<br>• Build new functions from existing functions.<br>• Construct and compare linear, quadratic, and exponential models and solve problems.<br>• Interpret expressions for functions in terms of the situation they model.<br><br>**Supporting Standards:** N-Q.1, 2 & 3<br><br>**Standards for Mathematical Practice:**<br>**MP.1 \| MP.2 \| MP.3 \| MP.4 \| MP.5 \| MP.6**<br>**Unit Focus:** In earlier grades, students define, evaluate, and compare functions, and use them to model relationships between quantities. In this unit, students will learn function notation and develop the concepts of domain and range. They move beyond viewing functions as processes that take inputs and yield outputs and start viewing functions as objects in their own right. They explore many examples of functions, including sequences; they interpret functions given | **Unit 3: Descriptive Statistics**<br><br>**Pacing: 30**<br><br>**Power Clusters:**<br>• Summarize, represent, and interpret data on a single count or measurement variable.<br>• Summarize, represent, and interpret data on two categorical and quantitative variables.<br>• Interpret linear models.<br><br>**Supporting Standards:** N-Q.1, 2 & 3<br><br>**Standards for Mathematical Practice:**<br>**MP.1 \| MP.2 \| MP.4 \| MP.7 \| MP.8**<br><br>**Unit Focus:** Experience with descriptive statistics began as early as Grade 6. Students were expected to display numerical data and summarize it using measures of center and variability. By the end of middle school they were creating scatterplots and recognizing linear trends in data. This unit builds upon that prior experience, providing students with more formal means of assessing how a model fits data. Students use regression techniques to describe approximately linear relationships between quantities. They use graphical representations and knowledge of the context to make judgments about the appropriateness of linear models. With linear models, they look at residuals to analyze the goodness of fit.<br><br>**Cross Curricular Standards:** | **Unit 5: Quadratic Functions and Modeling**<br><br>**Pacing: 30**<br><br>**Power Clusters:**<br>• Use properties of rational and irrational numbers.<br>• Interpret functions that arise in applications in terms of a context.<br>• Analyze functions using different representations.<br>• Build a function that models a relationship between two quantities.<br>• Build new functions from existing functions.<br>• Construct and compare linear, quadratic, and exponential models and solve problems.<br><br>**Supporting Standards:** N-Q.1, 2 & 3, N-RN.3<br><br>**Standards for Mathematical Practice:**<br>**MP.1 \| MP.2 \| MP.4 \| MP.5 \| MP.6**<br><br>**Unit Focus:** In preparation for work with quadratic relationships students explore distinctions between rational and irrational numbers. They consider quadratic functions, comparing the key characteristics of quadratic functions to those of linear and exponential functions. They select from among these functions to model phenomena. Students learn to anticipate the graph of a quadratic function by interpreting various forms of quadratic expressions. In particular, they identify the real solutions of a quadratic equation as the zeros of a related quadratic function. Students learn that when quadratic equations do not have real solutions the number system must be extended so that solutions exist, analogous to the way in which extending the |

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| graphically, numerically, symbolically, and verbally, translate between representations, and understand the limitations of various representations. They work with functions given by graphs and tables, keeping in mind that, depending upon the context, these representations are likely to be approximate and incomplete. Their work includes functions that can be described or approximated by formulas as well as those that cannot. When functions describe relationships between quantities arising from a context, students reason with the units in which those quantities are measured. Students explore systems of equations and inequalities, and they find and interpret their solutions. Students build on and informally extend their understanding of integer exponents to consider exponential functions. They compare and contrast linear and exponential functions, distinguishing between additive and multiplicative change. They interpret arithmetic sequences as linear functions and geometric sequences as exponential functions.<br><br>**Cross Curricular Standards:** | | whole numbers to the negative numbers allows x+1 = 0 to have a solution. Formal work with complex numbers comes in Algebra II. Students expand their experience with functions to include more specialized functions—absolute value, step, and those that are piecewise-defined.<br><br>**Cross Curricular Standards:** |

Standards for Mathematical Practice

MP1: Make sense of problems and persevere in solving them.
MP2: Reason abstractly and quantitatively.
MP3: Construct viable arguments and critique the reasoning of others.
MP4: Model with mathematics.
MP5: Use appropriate tools strategically.
MP6: Attend to precision.
MP7: Look for and make use of structure.
MP8: Look for and express regularity in repeated reasoning.