

**Mathematics, Pre-Algebra © 2009**  
**Correlated to:**  
**Arizona 2008 Mathematics Standard Articulated by Grade Level, Grade 8**

| <b>ARIZONA 2008 MATHEMATICS<br/>STANDARD ARTICULATED BY GRADE<br/>LEVEL, GRADE 8</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Mathematics, Pre-Algebra © 2009</b>                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| <p><b>Strand 1: Number and Operations</b><br/>           Number sense is the understanding of numbers and how they relate to each other and how they are used in specific context or real-world application. It includes an awareness of the different ways in which numbers are used, such as counting, measuring, labeling, and locating. It includes an awareness of the different types of numbers such as, whole numbers, integers, fractions, and decimals and the relationships between them and when each is most useful. Number sense includes an understanding of the size of numbers, so that students should be able to recognize that the volume of their room is closer to 1,000 than 10,000 cubic feet.<br/>           Students develop a sense of what numbers are, i.e., to use numbers and number relationships to acquire basic facts, to solve a wide variety of real-world problems, and to estimate to determine the reasonableness of results.</p> |                                                                               |
| <p><b>Concept 1: Number Sense</b><br/>           Understand and apply numbers, ways of representing numbers, and the relationships among numbers and different number systems.<br/>           In Grade 8, students extend their knowledge and skills with the classification, comparison, ordering, and modeling real numbers and the real number system.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                               |
| <p><b><u>Performance Objectives</u></b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                               |
| <p><i>Students are expected to:</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                               |
| PO 1. Compare and order real numbers including very large and small integers, and decimals and fractions close to zero.<br><br>Connections: M08-S1C3-02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>SE/TE: 18-22, 60, 62, 205-208, 221-225, 229-230, 237-245, 283-284, 286</b> |
| PO 2. Classify real numbers as rational or irrational.<br><br>Connections: M08-S1C1-03, M08-S1C3-02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>SE/TE: 205, 589-591, 628, 630</b>                                          |
| PO 3. Model the relationship between the subsets of the real number system.<br><br>Connections: M08-S1C1-02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>SE/TE: 205-208, 229-230</b>                                                |
| PO 4. Model and solve problems involving absolute value.<br><br>Connections: M08-S1C2-05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>SE/TE: 19-23, 60, 62</b>                                                   |
| <p><b><u>Process Integration</u></b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                               |
| M08-S5C2-01. Analyze a problem situation to determine the question(s) to be answered.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>SE/TE: 201-204, 228, 230</b>                                               |
| M08-S5C2-06. Communicate the answer(s) to the question(s) in a problem using appropriate representations, including symbols and informal and formal mathematical language.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>SE/TE: 201-204, 228, 230</b>                                               |

**Mathematics, Pre-Algebra © 2009**

Correlated to:

**Arizona 2008 Mathematics Standard Articulated by Grade Level, Grade 8**

| <b>ARIZONA 2008 MATHEMATICS<br/>STANDARD ARTICULATED BY GRADE<br/>LEVEL, GRADE 8</b>                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Mathematics, Pre-Algebra © 2009</b>                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| M08-S5C2-04. Represent a problem situation using multiple representations, describe the process used to solve the problem, and verify the reasonableness of the solution.                                                                                                                                                                                                                                                                                                                    | <b>SE/TE: 201-204, 228, 230</b>                                 |
| <p><b>Concept 2: Numerical Operations</b><br/>           Understand and apply numerical operations and their relationship to one another. In Grade 8, students use exponents and scientific notation to describe very large and very small numbers. Students extend their facility with percents to include percentage increases, decreases, and interest rates. Students will simplify more complex numerical expressions that include grouping symbols, roots, and positive exponents.</p> |                                                                 |
| <b><u>Performance Objectives</u></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                 |
| <i>Students are expected to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                 |
| PO 1. Solve problems with factors, multiples, divisibility or remainders, prime numbers, and composite numbers.                                                                                                                                                                                                                                                                                                                                                                              | <b>SE/TE: 180-184, 190-195, 227-228, 230, 236-240, 283, 286</b> |
| PO 2. Describe the effect of multiplying and dividing a rational number by<br>a number less than zero,<br>a number between zero and one,<br><br>one, and<br>a number greater than one.                                                                                                                                                                                                                                                                                                       |                                                                 |
| PO 3. Solve problems involving percent increase, percent decrease, and simple interest rates.<br><br>Connections: M08-S1C3-01, M08-S3C2-05, M08-S3C4-02                                                                                                                                                                                                                                                                                                                                      | <b>SE/TE: 329-337, 345-346, 386-391, 395-396</b>                |
| PO 4. Convert standard notation to scientific notation and vice versa (include positive and negative exponents).                                                                                                                                                                                                                                                                                                                                                                             | <b>SE/TE: 219-225, 229-230</b>                                  |
| PO 5. Simplify numerical expressions using the order of operations that include grouping symbols, square roots, cube roots, absolute values, and positive exponents.<br><br>Connections: M08-S1C1-04                                                                                                                                                                                                                                                                                         | <b>SE/TE: 8-13, 59, 62</b>                                      |
| <b><u>Process Integration</u></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                 |
| M08-S5C2-08. Describe when to use proportional reasoning to solve a problem.                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>SE/TE: 299-302, 343, 346</b>                                 |

**Mathematics, Pre-Algebra © 2009**  
**Correlated to:**  
**Arizona 2008 Mathematics Standard Articulated by Grade Level, Grade 8**

|                                                                                                                                                                                                                                                                                                                                                                                     |                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <b>ARIZONA 2008 MATHEMATICS<br/>STANDARD ARTICULATED BY GRADE<br/>LEVEL, GRADE 8</b>                                                                                                                                                                                                                                                                                                | <b>Mathematics, Pre-Algebra © 2009</b> |
| <p><b>Concept 3: Estimation</b><br/>         Use estimation strategies reasonably and fluently while integrating content from each of the other strands.<br/>         In Grade 8, students continue to use estimation strategies to check solutions for reasonableness. They extend their knowledge of estimation to approximate the location of real numbers on a number line.</p> |                                        |
| <b><u>Performance Objectives</u></b>                                                                                                                                                                                                                                                                                                                                                |                                        |
| <i>Students are expected to:</i>                                                                                                                                                                                                                                                                                                                                                    |                                        |
| <p>PO 1. Make estimates appropriate to a given situation.</p> <p>Connections: M08-S1C2-03, M08-S1C3-02, M08-S2C1-02, M08-S2C3-02, M08-S3C3-02, M08-S3C4-02, M08-S4C1-02 M08-S4C3-01, M08-S4C4-01, M08-S5C1-01</p>                                                                                                                                                                   | <b>SE/TE: 130-138, 171-172, 174</b>    |
| <p>PO 2. Estimate the location of rational and common irrational numbers on a number line.</p> <p>Connections: M08-S1C1-01, M08-S1C1-02, M08-S1C3-01</p>                                                                                                                                                                                                                            |                                        |

**Mathematics, Pre-Algebra © 2009**

Correlated to:

**Arizona 2008 Mathematics Standard Articulated by Grade Level, Grade 8**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| <b>ARIZONA 2008 MATHEMATICS<br/>STANDARD ARTICULATED BY GRADE<br/>LEVEL, GRADE 8</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Mathematics, Pre-Algebra © 2009</b>                       |
| <p><b>Strand 2: Data Analysis, Probability, and Discrete Mathematics</b><br/>                 This strand requires students to use data collection, data analysis, statistics, probability, systematic listing and counting, and the study of graphs. This prepares students for the study of discrete functions as well as to make valid inferences, decisions, and arguments. Discrete mathematics is a branch of mathematics that is widely used in business and industry. Combinatorics is the mathematics of systematic counting. Vertex-edge graphs are used to model and solve problems involving paths, networks, and relationships among a finite number of objects.</p> |                                                              |
| <p><b>Concept 1: Data Analysis (Statistics)</b><br/>                 Understand and apply data collection, organization, and representation to analyze and sort data. In Grade 8, students build on their experiences of organizing and interpreting data and begin to apply principles to analyze statistical studies by identifying sources of bias. They create displays, including box and whisker plots, with two sets of data in order to compare and draw conclusions. Students use their knowledge of summary statistics to describe the data and the shape of their distribution.</p>                                                                                    |                                                              |
| <p><b><u>Performance Objectives</u></b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                              |
| <p><i>Students are expected to:</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                              |
| <p>PO 1. Solve problems by selecting, constructing, interpreting, and calculating with displays of data, including box and whisker plots and scatterplots.</p> <p>Continued on next page<br/>                 Connections: M08-S2C1-04, SC08-S1C3-01, SC08-S1C3-03, SC08-S1C4-02, SS08-S1C1-01, SS08-S1C1-02, SS08-S1C1-03, SS08-S2C1-01, SS08-S2C1-02, SS08-S4C1-01, SS08-S4C1-03</p>                                                                                                                                                                                                                                                                                            | <p><b>SE/TE: 427-433, 455-456, 636-647, 687-688, 690</b></p> |
| <p>PO 2. Make inferences by comparing the same summary statistic for two or more data sets.</p> <p>Connections: M08-S1C3-01, M08-S2C1-03</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p><b>SE/TE: 636-647, 687-688, 690</b></p>                   |
| <p>PO 3. Describe how summary statistics relate to the shape of the distribution.</p> <p>Connections: M08-S2C1-02</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                              |
| <p>PO 4. Determine whether information is represented effectively and appropriately given a graph or a set of data by identifying sources of bias and compare and contrast the effectiveness of different representations of data.</p> <p>Connections: M08-S2C1-01, SC08-S1C3-04, SC08-S1C3-05, SC08-S2C2-04, SS08-S1C1-02, SS08-S1C1-06, SS08-S2C1-02, SS08-S2C1-06, SS08-S4C1-03</p>                                                                                                                                                                                                                                                                                            | <p><b>SE/TE: 648-656, 688, 690</b></p>                       |

**Mathematics, Pre-Algebra © 2009**  
**Correlated to:**  
**Arizona 2008 Mathematics Standard Articulated by Grade Level, Grade 8**

| <b>ARIZONA 2008 MATHEMATICS<br/>STANDARD ARTICULATED BY GRADE<br/>LEVEL, GRADE 8</b>                                                                                                                                                           | <b>Mathematics, Pre-Algebra © 2009</b>  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| PO 5. Evaluate the design of an experiment.<br><br>Connections: SC08-S1C2-02                                                                                                                                                                   | <b>SE/TE: 682-685, 689-690</b>          |
| <b><u>Process Integration</u></b>                                                                                                                                                                                                              |                                         |
| M08-S5C2-07. Isolate and organize mathematical information taken from symbols, diagrams, and graphs to make inferences, draw conclusions, and justify reasoning.                                                                               | <b>SE/TE: 648-656, 682-685, 688-690</b> |
| M08-S5C2-09. Make and test conjectures based on information collected from explorations and experiments.                                                                                                                                       | <b>SE/TE: 648-656, 682-685, 688-690</b> |
| M08-S5C2-06. Communicate the answer(s) to the question(s) in a problem using appropriate representations, including symbols and informal and formal mathematical language.                                                                     | <b>SE/TE: 648-656, 682-685, 688-690</b> |
| <b>Concept 2: Probability</b><br>Understand and apply the basic concepts of probability.<br>In Grade 8, students expand their work with theoretical and experimental probability to include conditional probabilities in compound experiments. |                                         |
| <b><u>Performance Objectives</u></b>                                                                                                                                                                                                           |                                         |
| <i>Students are expected to:</i>                                                                                                                                                                                                               |                                         |
| PO 1. Determine theoretical and experimental conditional probabilities in compound probability experiments.                                                                                                                                    | <b>SE/TE: 657-666, 672-676, 688-690</b> |
| PO 2. Interpret probabilities within a given context and compare the outcome of an experiment to predictions made prior to performing the experiment.                                                                                          | <b>SE/TE: 672-676, 689-690</b>          |
| PO 3. Use all possible outcomes (sample space) to determine the probability of dependent and independent events.<br><br>Connections: M08-S2C3-01                                                                                               | <b>SE/TE: 657-666, 688-690</b>          |

**Mathematics, Pre-Algebra © 2009**

Correlated to:

**Arizona 2008 Mathematics Standard Articulated by Grade Level, Grade 8**

|                                                                                                                                                                                                                                                                                                                                                                                               |                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <b>ARIZONA 2008 MATHEMATICS<br/>STANDARD ARTICULATED BY GRADE<br/>LEVEL, GRADE 8</b>                                                                                                                                                                                                                                                                                                          | <b>Mathematics, Pre-Algebra © 2009</b> |
| <p><b>Concept 3: Systematic Listing and Counting</b><br/>Understand and demonstrate the systematic listing and counting of possible outcomes. In Grade 8, students use more abstract reasoning and algebraic representation to solve counting problems. Understanding the concepts of probability is enhanced by the foundation of counting strategies. Factorial notation is introduced.</p> |                                        |
| <b><u>Performance Objectives</u></b>                                                                                                                                                                                                                                                                                                                                                          |                                        |
| <i>Students are expected to:</i>                                                                                                                                                                                                                                                                                                                                                              |                                        |
| PO 1. Represent, analyze, and solve counting problems with or without ordering and repetitions.<br><br>Connections: M08-S2C2-03                                                                                                                                                                                                                                                               | <b>SE/TE: 657-666, 688-690</b>         |
| PO 2. Solve counting problems and represent counting principles algebraically including factorial notation.<br><br>Connections: M08-S1C3-01                                                                                                                                                                                                                                                   | <b>SE/TE: 667-672, 689-690</b>         |
| <b><u>Process Integration</u></b>                                                                                                                                                                                                                                                                                                                                                             |                                        |
| M08-S5C2-04. Represent a problem situation using multiple representations, describe the process used to solve the problem, and verify the reasonableness of the solution.                                                                                                                                                                                                                     | <b>SE/TE: 682-685, 689-690</b>         |
| <p><b>Concept 4: Vertex-Edge Graphs</b><br/>Understand and apply vertex-edge graphs. In Grade 8, students explore using directed graphs as a means of problem solving. This will lay a foundation for network and adjacency matrix investigations in high school.</p>                                                                                                                         |                                        |
| <b><u>Performance Objectives</u></b>                                                                                                                                                                                                                                                                                                                                                          |                                        |
| <i>Students are expected to:</i>                                                                                                                                                                                                                                                                                                                                                              |                                        |
| PO 1. Use directed graphs to solve problems.                                                                                                                                                                                                                                                                                                                                                  |                                        |
| <b><u>Process Integration</u></b>                                                                                                                                                                                                                                                                                                                                                             |                                        |
| M08-S5C2-01. Analyze a problem situation to determine the question(s) to be answered.                                                                                                                                                                                                                                                                                                         |                                        |
| M08-S5C2-04. Represent a problem situation using multiple representations, describe the process used to solve the problem, and verify the reasonableness of the solution.                                                                                                                                                                                                                     |                                        |

**Mathematics, Pre-Algebra © 2009**

Correlated to:

**Arizona 2008 Mathematics Standard Articulated by Grade Level, Grade 8**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <b>ARIZONA 2008 MATHEMATICS<br/>STANDARD ARTICULATED BY GRADE<br/>LEVEL, GRADE 8</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Mathematics, Pre-Algebra © 2009</b> |
| <p><b>Strand 3: Patterns, Algebra, and Functions</b><br/>                 Patterns occur everywhere in nature. Algebraic methods are used to explore, model and describe patterns, relationships, and functions involving numbers, shapes, iteration, recursion, and graphs within a variety of real-world problem solving situations. Iteration and recursion are used to model sequential, step-by-step change. Algebra emphasizes relationships among quantities, including functions, ways of representing mathematical relationships, and the analysis of change.</p> |                                        |
| <p><b>Concept 1: Patterns</b><br/>                 Identify patterns and apply pattern recognition to reason mathematically while integrating content from each of the other strands.<br/>                 In Grade 8, students increase their fluency with numerical and geometric sequences by expressing their thinking using a variety of representations. Students describe and analyze patterns and have the opportunity to create both types of sequences.</p>                                                                                                      |                                        |
| <b><u>Performance Objectives</u></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                        |
| <i>Students are expected to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |
| PO 1. Recognize, describe, create, and analyze numerical and geometric sequences using tables, graphs, words, or symbols; make conjectures about these sequences.<br><br>Connections: M08-S3C2-02, M08-S3C2-03, M08-S3C2-05                                                                                                                                                                                                                                                                                                                                                | <b>SE/TE: 696-701, 737, 740</b>        |
| <b><u>Process Integration</u></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |
| M08-S5C2-07. Isolate and organize mathematical information taken from symbols, diagrams, and graphs to make inferences, draw conclusions, and justify reasoning.                                                                                                                                                                                                                                                                                                                                                                                                           | <b>SE/TE: 732-735, 739-740</b>         |
| <p><b>Concept 2: Functions and Relationships</b><br/>                 Describe and model functions and their relationships.<br/>                 In Grade 8, students extend their understanding of functions by exploring proportional algebraic relationships and analyzing functions.</p>                                                                                                                                                                                                                                                                               |                                        |
| <b><u>Performance Objectives</u></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                        |
| <i>Students are expected to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |
| PO 1. Sketch and interpret a graph that models a given context; describe a context that is modeled by a given graph.<br><br>Connections: M08-S3C2-04, M08-S3C2-05, M08-S3C3-01, M08-S3C3-04                                                                                                                                                                                                                                                                                                                                                                                | <b>SE/TE: 427-433, 455-456</b>         |
| PO 2. Determine if a relationship represented by a graph or table is a function.<br><br>Connections: M08-S3C1-01, M08-S3C2 -05                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>SE/TE: 404-408, 453, 456</b>        |

**Mathematics, Pre-Algebra © 2009**  
**Correlated to:**  
**Arizona 2008 Mathematics Standard Articulated by Grade Level, Grade 8**

| <b>ARIZONA 2008 MATHEMATICS<br/>STANDARD ARTICULATED BY GRADE<br/>LEVEL, GRADE 8</b>                                                                                                                                                                         | <b>Mathematics, Pre-Algebra © 2009</b>             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| <p>PO 3. Write the rule for a simple function using algebraic notation.</p> <p>Connections: M08-S3C1-01, M08-S3C2 -05</p>                                                                                                                                    | <b>SE/TE: 422-426, 454, 456</b>                    |
| <p>PO 4. Identify functions as linear or nonlinear and contrast distinguishing properties of functions using equations, graphs, or tables.</p> <p>Connections: M08-S3C2-01</p>                                                                               | <b>SE/TE: 422-426, 454, 456, 702-706, 738, 740</b> |
| <p>PO 5. Demonstrate that proportional relationships are linear using equations, graphs, or tables.</p> <p>Connections: M08-S1C2-03, M08-S3C1-01, M08-S3C2-01, M08-S3C2-02, M08-S3C2-03, M08-S3C3-03, M08-S3C3-04, M08-S3C4-01, M08-S3C4-02, M08-S5C1-01</p> | <b>SE/TE: 414-421, 454, 456</b>                    |
| <b><u>Process Integration</u></b>                                                                                                                                                                                                                            |                                                    |
| M08-S5C2-05. Apply a previously used problem-solving strategy in a new context.                                                                                                                                                                              |                                                    |
| M08-S5C2-02. Analyze and compare mathematical strategies for efficient problem solving; select and use one or more strategies to solve a problem.                                                                                                            |                                                    |
| M08-S5C2-03. Identify relevant, missing, and extraneous information related to the solution to a problem.                                                                                                                                                    |                                                    |
| M08-S5C2-12. Make, validate, and justify conclusions and generalizations about linear relationships.                                                                                                                                                         | <b>SE/TE: 422-426, 454, 456</b>                    |
| M08-S5C2-08. Describe when to use proportional reasoning to solve a problem.                                                                                                                                                                                 | <b>SE/TE: 299</b>                                  |

**Mathematics, Pre-Algebra © 2009**  
**Correlated to:**  
**Arizona 2008 Mathematics Standard Articulated by Grade Level, Grade 8**

| <b>ARIZONA 2008 MATHEMATICS<br/>STANDARD ARTICULATED BY GRADE<br/>LEVEL, GRADE 8</b>                                                                                                                                                                                                                                                                                                                              | <b>Mathematics, Pre-Algebra © 2009</b>                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| <p><b>Concept 3: Algebraic Representations</b><br/>           Represent and analyze mathematical situations and structures using algebraic representations. In Grade 8, students extend their understanding of algebraic expressions, equations, and inequalities through the analysis of contextual situations. Students evaluate expressions and solve equations and inequalities of increasing complexity.</p> |                                                                                                |
| <p><b><u>Performance Objectives</u></b></p>                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                |
| <p><i>Students are expected to:</i></p>                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                |
| <p>PO 1. Write or identify algebraic expressions, equations, or inequalities that represent a situation.</p> <p>Connections: M08-S3C2-01</p>                                                                                                                                                                                                                                                                      | <p><b>SE/TE: 4-7, 14-17, 59-60, 62, 82-87, 98-101, 105-107, 120-122, 366-370, 394, 396</b></p> |
| <p>PO 2. Evaluate an expression containing variables by substituting rational numbers for the variables.</p> <p>Connections: M08-S1C3-01</p>                                                                                                                                                                                                                                                                      | <p><b>SE/TE: 14-17, 60, 62</b></p>                                                             |
| <p>PO 3. Analyze situations, simplify, and solve problems involving linear equations and inequalities using the properties of the real number system.</p> <p>Connections: M08-S3C2-05</p>                                                                                                                                                                                                                         | <p><b>SE/TE: 88-97, 105-107, 268-277, 285-286, 352-365, 377-381, 393-396</b></p>               |
| <p>PO 4. Translate between different representations of linear equations using symbols, graphs, tables, or written descriptions.</p> <p>Connections: M08-S3C2-01, M08-S3C2-05</p>                                                                                                                                                                                                                                 | <p><b>SE/TE: 422-426, 454, 456</b></p>                                                         |
| <p>PO 5. Graph an inequality on a number line.</p>                                                                                                                                                                                                                                                                                                                                                                | <p><b>SE/TE: 104-107, 120, 122</b></p>                                                         |
| <p><b><u>Process Integration</u></b></p>                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                |
| <p>M08-S5C2-04. Represent a problem situation using multiple representations, describe the process used to solve the problem, and verify the reasonableness of the solution.</p>                                                                                                                                                                                                                                  | <p><b>SE/TE: 422-426, 454, 456</b></p>                                                         |

**Mathematics, Pre-Algebra © 2009**

Correlated to:

**Arizona 2008 Mathematics Standard Articulated by Grade Level, Grade 8**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <b>ARIZONA 2008 MATHEMATICS<br/>STANDARD ARTICULATED BY GRADE<br/>LEVEL, GRADE 8</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Mathematics, Pre-Algebra © 2009</b> |
| <p><b>Concept 4: Analysis of Change</b><br/>Analyze how changing the values of one quantity corresponds to change in the values of another quantity.<br/>In Grade 8, students are introduced to the slope-intercept form of an equation. Students analyze linear equations and graphs to identify key characteristics. They solve problems involving interest, distance, and percent change in the context of rate.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |
| <b><u>Performance Objectives</u></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |
| <i>Students are expected to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                        |
| <p>PO 1. Interpret the relationship between a linear equation and its graph, identifying and computing slope and intercepts.</p> <p>Connections: M08-S3C2-05</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>SE/TE: 410-421, 454, 456</b>        |
| <p>PO 2. Solve problems involving simple rates.</p> <p>Connections: M08-S1C2-03, M08-S1C3-01, M08-S3C2-05</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>SE/TE: 293-295, 343, 346</b>        |
| <p><b>Strand 4: Geometry and Measurement</b><br/>Geometry is a natural place for the development of students' reasoning, higher thinking, and justification skills culminating in work with proofs. Geometric modeling and spatial reasoning offer ways to interpret and describe physical environments and can be important tools in problem solving. Students use geometric methods, properties and relationships, transformations, and coordinate geometry as a means to recognize, draw, describe, connect, analyze, and measure shapes and representations in the physical world. Measurement is the assignment of a numerical value to an attribute of an object, such as the length of a pencil. At more sophisticated levels, measurement involves assigning a number to a characteristic of a situation, as is done by the consumer price index. A major emphasis in this strand is becoming familiar with the units and processes that are used in measuring attributes.</p> |                                        |
| <p><b>Concept 1: Geometric Properties</b><br/>Analyze the attributes and properties of 2- and 3- dimensional figures and develop mathematical arguments about their relationships.<br/>In Grade 8, students investigate the "art" of geometric design by changing the shapes of figures and solids. Students increase their knowledge of circles as additional vocabulary is added. They accurately and thoroughly describe figures and their attributes as they work with geometric proof. Students investigate proportionality using triangles and use their knowledge of the Pythagorean Theorem to solve problems.</p>                                                                                                                                                                                                                                                                                                                                                             |                                        |
| <b><u>Performance Objectives</u></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |
| <i>Students are expected to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                        |
| <p>PO 1. Identify the attributes of circles: radius, diameter, chords, tangents, secants, inscribed angles, central angles, intercepted arcs, circumference, and area.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>SE/TE: 490-494, 519-520</b>         |

**Mathematics, Pre-Algebra © 2009**

Correlated to:

**Arizona 2008 Mathematics Standard Articulated by Grade Level, Grade 8**

| <b>ARIZONA 2008 MATHEMATICS<br/>STANDARD ARTICULATED BY GRADE<br/>LEVEL, GRADE 8</b>                                                                                       | <b>Mathematics, Pre-Algebra © 2009</b>             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| <p>PO 2. Predict results of combining, subdividing, and changing shapes of plane figures and solids.</p> <p>Connections: M08-S1C3-01, M08-S4C2-02</p>                      |                                                    |
| <p>PO 3. Use proportional reasoning to determine congruence and similarity of triangles.</p> <p>Connections: M08-S4C4-02</p>                                               | <b>SE/TE: 303-308, 344, 346, 485-489, 518, 520</b> |
| <p>PO 4. Use the Pythagorean Theorem to solve problems.</p> <p>Connections: M08-S4C3-02, M08-S5C2-13</p>                                                                   | <b>SE/TE: 592-597, 628, 630</b>                    |
| <b><u>Process Integration</u></b>                                                                                                                                          |                                                    |
| M08-S5C2-11. Identify simple valid arguments using <i>if... then</i> statements.                                                                                           |                                                    |
| M08-S5C2-09. Make and test conjectures based on information collected from explorations and experiments.                                                                   |                                                    |
| M08-S5C2-08. Describe when to use proportional reasoning to solve a problem.                                                                                               | <b>SE/TE: 303-308, 344, 346</b>                    |
| M08-S5C2-13. Verify the Pythagorean Theorem using a valid argument.                                                                                                        | <b>SE/TE: 592-597, 628, 630</b>                    |
| M08-S5C2-02. Analyze and compare mathematical strategies for efficient problem solving; select and use one or more strategies to solve a problem.                          |                                                    |
| M08-S5C2-06. Communicate the answer(s) to the question(s) in a problem using appropriate representations, including symbols and informal and formal mathematical language. |                                                    |

|                                                                                                                                                                                                                                                                                                                                                                                                                       |                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| <p><b>ARIZONA 2008 MATHEMATICS STANDARD ARTICULATED BY GRADE LEVEL, GRADE 8</b></p>                                                                                                                                                                                                                                                                                                                                   | <p><b>Mathematics, Pre-Algebra © 2009</b></p> |
| <p><b>Concept 2: Transformation of Shapes</b><br/>                 Apply spatial reasoning to create transformations and use symmetry to analyze mathematical situations.<br/>                 In Grade 8, students investigate transformations of shapes on a coordinate grid. Students expand their knowledge of symmetry by finding lines of symmetry and classifying 2-dimensional figures by their symmetry.</p> |                                               |
| <p><b><u>Performance Objectives</u></b></p>                                                                                                                                                                                                                                                                                                                                                                           |                                               |
| <p><i>Students are expected to:</i></p>                                                                                                                                                                                                                                                                                                                                                                               |                                               |
| <p>PO 1. Model the result of rotations in multiples of 45 degrees of a 2-dimensional figure about the origin.</p>                                                                                                                                                                                                                                                                                                     | <p><b>SE/TE: 511-514, 519-520</b></p>         |
| <p>PO 2. Describe the transformations that create a given tessellation.<br/><br/>                 Connections: M08-S4C1-P02</p>                                                                                                                                                                                                                                                                                       | <p><b>SE/TE: 515</b></p>                      |
| <p>PO 3. Identify lines of symmetry in plane figures or classify types of symmetries of 2-dimensional figures.</p>                                                                                                                                                                                                                                                                                                    | <p><b>SE/TE: 507-510, 519-520</b></p>         |
| <p><b><u>Process Integration</u></b></p>                                                                                                                                                                                                                                                                                                                                                                              |                                               |
| <p>M08-S5C2-05. Apply a previously used problem-solving strategy in a new context.</p>                                                                                                                                                                                                                                                                                                                                |                                               |
| <p><b>Concept 3: Coordinate Geometry</b><br/>                 Specify and describe spatial relationships using rectangular and other coordinate systems while integrating content from each of the other strands.<br/>                 In Grade 8, students develop algorithms and investigate midpoint and distance calculations using the coordinate plane.</p>                                                     |                                               |
| <p><b><u>Performance Objectives</u></b></p>                                                                                                                                                                                                                                                                                                                                                                           |                                               |
| <p><i>Students are expected to:</i></p>                                                                                                                                                                                                                                                                                                                                                                               |                                               |
| <p>PO 1. Make and test a conjecture about how to find the midpoint between any two points in the coordinate plane.<br/><br/>                 Connections: M08-S1C3-01</p>                                                                                                                                                                                                                                             | <p><b>SE/TE: 600-603, 628, 630</b></p>        |
| <p>PO 2. Use the Pythagorean Theorem to find the distance between two points in the coordinate plane.<br/><br/>                 Connections: M08-S4C1-04</p>                                                                                                                                                                                                                                                          | <p><b>SE/TE: 592-597, 628, 630</b></p>        |

**Mathematics, Pre-Algebra © 2009**

Correlated to:

**Arizona 2008 Mathematics Standard Articulated by Grade Level, Grade 8**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                         |                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|----------------------------------------|
| <b>ARIZONA 2008 MATHEMATICS<br/>STANDARD ARTICULATED BY GRADE<br/>LEVEL, GRADE 8</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                         | <b>Mathematics, Pre-Algebra © 2009</b> |
| <p><b>Concept 4: Measurement</b><br/>Understand and apply appropriate units of measure, measurement techniques, and formulas to determine measurements.<br/>In Grade 8, students utilize and extend their proportional thinking to solve problems involving measurement conversions, geometric measurements, and calculations of surface area and volume.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                         |                                        |
| <b><u>Performance Objectives</u></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                         |                                        |
| <i>Students are expected to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |                                        |
| <p>PO 1. Solve problems involving conversions within the same measurement system.</p> <p>Connections: M08-S1C3-01, M08-S5C1-01</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>SE/TE: 258-261, 285-286</b>          |                                        |
| <p>PO 2. Solve geometric problems using ratios and proportions.</p> <p>Connections: M08-S4C1-03, M08-S5C2-13</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>SE/TE: 298-308, 343-344, 346</b>     |                                        |
| <p>PO 3. Calculate the surface area and volume of rectangular prisms, right triangular prisms, and cylinders.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>SE/TE: 550-557, 563-567, 580-582</b> |                                        |
| <p><b>Strand 5: Structure and Logic</b><br/>This strand emphasizes the core processes of problem solving. Students draw from the content of the other four strands to devise algorithms and analyze algorithmic thinking. Strand One and Strand Three provide the conceptual and computational basis for these algorithms. Logical reasoning and proof draws its substance from the study of geometry, patterns, and analysis to connect remaining strands. Students use algorithms, algorithmic thinking, and logical reasoning (both inductive and deductive) as they make conjectures and test the validity of arguments and proofs. Concept two develops the core processes as students evaluate situations, select problem solving strategies, draw logical conclusions, develop and describe solutions, and recognize their applications.</p> |                                         |                                        |
| <p><b>Concept 1: Algorithms and Algorithmic Thinking</b><br/>Use reasoning to solve mathematical problems.<br/>In Grade 8, students continue to further their understanding of proportion to create algorithms to solve a variety of problems.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                         |                                        |
| <b><u>Performance Objectives</u></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                         |                                        |
| <i>Students are expected to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |                                        |
| <p>PO 1. Create an algorithm to solve problems involving indirect measurements, using proportional reasoning, dimensional analysis, and the concepts of density and rate.</p> <p>Connections: M08-S1C3-01, M08-S3C2-05, M08-S4C4-01</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                         |                                        |

**Mathematics, Pre-Algebra © 2009**

Correlated to:

**Arizona 2008 Mathematics Standard Articulated by Grade Level, Grade 8**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <b>ARIZONA 2008 MATHEMATICS<br/>STANDARD ARTICULATED BY GRADE<br/>LEVEL, GRADE 8</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Mathematics, Pre-Algebra © 2009</b> |
| <b><u>Process Integration</u></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |
| M08-S5C2-05. Apply a previously used problem-solving strategy in a new context.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |
| M08-S5C2-08. Describe when to use proportional reasoning to solve a problem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                        |
| <p><b>Concept 2: Logic, Reasoning, Problem Solving, and Proof</b><br/>           Evaluate situations, select problem-solving strategies, draw logical conclusions, develop and describe solutions, and recognize their applications.<br/>           In Grade 8, students continue to build their understanding and application of problem solving strategies and processes. Students' solution paths include the analysis of the situation; identification of possible strategies; efficient method in solving the problem; and justification of why the solution is reasonable. Students use multiple representations in their problem solving process.</p> |                                        |
| <b><u>Performance Objectives</u></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |
| <i>Students are expected to:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                        |
| PO 1. Analyze a problem situation to determine the question(s) to be answered.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>SE/TE: 201-204, 228, 230</b>        |
| PO 2. Analyze and compare mathematical strategies for efficient problem solving; select and use one or more strategies to solve a problem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>SE/TE: 732-735, 739-740</b>         |
| PO 3. Identify relevant, missing, and extraneous information related to the solution to a problem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |
| PO 4. Represent a problem situation using multiple representations, describe the process used to solve the problem, and verify the reasonableness of the solution.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>SE/TE: 732-735, 739-740</b>         |
| PO 5. Apply a previously used problem-solving strategy in a new context.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        |
| PO 6. Communicate the answer(s) to the question(s) in a problem using appropriate representations, including symbols and informal and formal mathematical language.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>SE/TE: 434-435, 455-456</b>         |
| PO 7. Isolate and organize mathematical information taken from symbols, diagrams, and graphs to make inferences, draw conclusions, and justify reasoning.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>SE/TE: 338-339, 345-346</b>         |
| PO 8. Describe when to use proportional reasoning to solve a problem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>SE/TE: 303-308, 344, 346</b>        |

**Mathematics, Pre-Algebra © 2009**  
**Correlated to:**  
**Arizona 2008 Mathematics Standard Articulated by Grade Level, Grade 8**

| <b>ARIZONA 2008 MATHEMATICS<br/>STANDARD ARTICULATED BY GRADE<br/>LEVEL, GRADE 8</b>                                                                                                                                                                                                                                                 | <b>Mathematics, Pre-Algebra © 2009</b> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| PO 9. Make and test conjectures based on information collected from explorations and experiments.                                                                                                                                                                                                                                    | <b>SE/TE: 682-685, 689-690</b>         |
| PO 10. Solve logic problems involving multiple variables, conditional statements, conjectures, and negation using words, charts, and pictures.                                                                                                                                                                                       |                                        |
| PO 11. Identify simple valid arguments using <i>if... then</i> statements.                                                                                                                                                                                                                                                           |                                        |
| PO 12. Make, validate, and justify conclusions and generalizations about linear relationships.                                                                                                                                                                                                                                       |                                        |
| PO 13. Verify the Pythagorean Theorem using a valid argument.<br><br>Connections: M08-S4C1-04, M08-S4C3-02                                                                                                                                                                                                                           |                                        |
| <b><u>Process Integration</u></b>                                                                                                                                                                                                                                                                                                    |                                        |
| Some of the Strand 5 Concept 2 performance objectives are listed throughout the grade level document in the Process Integration Column (2nd column). Since these performance objectives are connected to the other content strands, the process integration column is not used in this section next to those performance objectives. |                                        |
| M08-S5C2-07. Isolate and organize mathematical information taken from symbols, diagrams, and graphs to make inferences, draw conclusions, and justify reasoning.                                                                                                                                                                     | <b>SE/TE: 338-339, 345-346</b>         |
| M08-S5C2-09. Make and test conjectures based on information collected from explorations and experiments.                                                                                                                                                                                                                             | <b>SE/TE: 682-685, 689-690</b>         |
| M08-S5C2-03. Identify relevant, missing, and extraneous information related to the solution to a problem.                                                                                                                                                                                                                            |                                        |