# MUSD Math Curriculum - Year at a Glance

## Algebra 1

| Unit Name | AZ State Standards Algebra 1 | Overview | Assessment Overview |
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| **Unit 1: Statistics** | S-ID.B.6<br>S-ID.C.8<br>S-ID.C.7 | Students make sense of the world around them using linear functions to help them describe and interpret data. Students will represent two-variable data in a scatter plot and determine a line of fit to help them make sense of the data as well as make predictions. The appropriateness and strength of a linear model will also be discussed as students learn about correlation coefficients and variability. Students will be able to model real world situations and determine accuracy of predictions produced by models. | • Create and interpret mathematical model using a line of fit |
| **Unit 2: Expressions, Equations, and Inequalities** | A-CED.A.1<br>A-REI.A.1<br>A-CED.A.3 | Students will take their skills in solving equations to the next level by really focusing on the real world context behind the expressions, equations, and inequalities that are used as models. Students will explore the structure of equations and inequalities to help make sense of inverses and the differences between equality and inequality. Students will be able to justify their method of solving step by step and justify the reasonableness of their solutions in context. | • Write and solve equations and inequalities in a skills test |
| **Unit 3: Systems of equations and Inequalities** | A-CED.A.2<br>A-CED.A.3<br>A-REI.C.6<br>A-REI.D.12<br>A-CED.A.4 | Students will have the opportunity to model two linear situations simultaneously. As students build their understanding of systems of equations, they will learn to work with systems of inequalities. They will be able to create equations or inequalities to model real world situations as they apply their solving skills to determine the solutions to these two models and also interpret the solution in real world context. | • Create and interpret a model using systems of equations and compare situations |
| **Unit 4: Functions and Sequences** | F-IF.A.1<br>F-IF.A.2<br>F-IF.A.3<br>F-BF.A.1<br>F-LE.A.2 | Students will extend their understanding of functions to include mathematical notation and vocabulary. They will then be able to apply concepts and patterns to geometric and arithmetic sequences. These two concepts will set them up for success as they start to explore functions beyond linear and begin to compare and contrast additive increases and multiplicative | • Apply functions and sequences to analyze a real world situation |

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| | | increases of functions. Students will use proper notation as they represent real world relationships using arithmetic and geometric sequences. . | |
| **Unit 5: Exponential Functions and their Applications** | F-LE.A.1<br>F-LE.A.2<br>F-LE.A.3<br>F-LE.B.5 | Students will explore the similarities and differences of linear and exponential functions. Students will be able to apply knowledge of exponential functions to create models and use them to help explain situations. Working with more than one type of function allows students to make decisions about validity of models as well as understand the benefits and weaknesses of different mathematical representations. Students will be able to determine which situations will be more accurately modeled by linear or exponential and justify their decision as they use these models to explain the world around them. . | • Model linear and exponential situations and make comparisons |
| **Unit 6: Quadratics** | F-IF.B.4<br>F-IF.C.7<br>F-IF.C.8<br>A-SSE.B.3<br>A-SSE.A.2<br>A-REI.B.4 | Students will be introduced to a new function, Quadratic. Students will compare and contrast quadratics functions with linear and exponential as they explore behavior. Students will use their knowledge of different mathematical representations to help them make sense of quadratics and what real world situations might be represented using a quadratic function. Students will understand how parts of the equation connect to the graphical representation of quadratics and how factoring can help us manipulate the equation. Students will apply their knowledge of the structure of quadratics to new situations. | • Solve quadratics in a variety of methods in a skills test<br>• Interpret and analyze the graph of a quadratic function |
| **Unit 7: Transformations and Modeling** | F-IF.C.7<br>A-REI.D.10<br>F-BF.B.3 | Students have been exposed to several different types of functions over the course of the year. This unit provides students with a structure on how to transform these functions graphically. As students work with graphs, they will make connections to other representations such as ordered pairs and equations. Students also bring back their understanding of domain and range as they work to make restrictions to help model real world situations. Students will be able to transform functions graphically to help them create an accurate model of real world situations. | • Apply transformations to all algebra 1 functions to create a design |

# Geometry

| Unit Name | AZ State Standards Geometry | Overview | Assessment Overview |
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| **Unit 1: Constructions and Angle Relationships** | G-CO.C.9<br>G-CO.C.10<br>G-CO.D.12<br>G.CO.A.1<br>G.G-C.A.3 | Students will work on using appropriate tools strategically as they learn constructions. Constructions can provide a deeper understanding and insight into the relationships that exist between figures, sides, and angles. Students will also utilize angle relationships to help them determine missing information and use precise mathematical vocabulary. Students will be able to apply concepts from constructions and angle relationships to create designs with mathematics. | • Apply construction and angle relationships in a skills test |
| **Unit 2: Transformations** | G-CO.A.2<br>G-CO.A.3<br>G-CO.A.4<br>G-CO.A.5<br>G-CO.B.6 | Students will build upon their understanding of transformations and rigid motions developed in 8th grade. They will observe and explore how individual reflections, translations, and rotations behave in a sequence. This experience will be formalized with clear definitions and notation that will be pulled forward and students move into working with proofs. Students will be able to transform shapes in different situations, such as video games. | • Apply transformations in the context of a video game |
| **Unit 3: Congruence** | G-CO.B.6<br>G-CO.B.7<br>G-CO.B.8<br>G-CO.C.10b<br>G-CO.C.11 | Students build off of their knowledge involving transformations and congruence to formalize a justification process. Students will move from an exploration to a precise and formally notated understanding of congruence. Students will also develop their skills of working with theorems and the proof process to gain understanding of justification and begin developing mathematical proofs. | • Apply concepts of congruence in a skills test |
| **Unit 4: Proportions and Dilations** | G-SRT.A.1<br>G-SRT.B.4<br>G-SRT.B.5<br>G.G-GPE.B.6<br>G.G-CO.C.10 | Students apply their proportional reasoning skills to solve real world situations using similar figures. Students will use dilations to justify similarity and make connections between dilations and transformations. Students will apply properties of dilations to determine unknown side lengths and angle measurements in real world contexts. | • Apply concepts of proportionality and dilations in a skills test |
| **Unit 5: Similarity** | G-SRT.A.2<br>G-SRT.A.3<br>G.G-SRT.B.4<br>G-SRT.B.5<br>G-SRT.C.6 | Students will extend their understanding of dilations and proportions to include similarity. Students will learn about similarity of shapes and make connections to proportions and dilations. Proofs will be one avenue in which students justify their reasoning with similar figures. Students will be able to apply the knowledge of similarity to real world situations, such as determining the height of difficult objects. | • Apply similarity to determine the measurements of objects |
| **Unit 6: Trigonometry** | G-SRT.C.6<br>G-SRT.C.7<br>G-SRT.C.8<br>G-GPE.B.7 | Students will revisit right triangles as they learn about trigonometric ratios and their applications. They apply the pythagorean theorem in new ways as they learn new skills to help describe right triangles. The trigonometric ratios, sine and cosine, are introduced and students will explore their relationships between angles and similar triangles. Models of real world situations will be incorporated to help students explain the world around them. | • Apply trigonometry to determine the measurement of objects |

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| **Unit 7: Area and Volume** | G-GMD.A.1<br>G-GMD.A.3<br>G.G-GPE.B.7<br>G.G-MG.A.2<br>G-MG.A.1<br>G.G-C.B.5 | Students will expand their understanding of area and volume of shapes as they work with real world situations. They will work to explore the connection between volume and density and include determining the area of sectors and segments of a circle. Students will apply their knowledge and skills in real world situations, such as landscaping design. | • Real a model of a space and include measurements, area, and volume. |

# Algebra 2

| Unit Name | AZ State Standards Algebra 2 | Overview | Assessment Overview |
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| **Unit 1: Probability** | S-CP.A.3<br>S-CP.A.4<br>S-CP.A.5<br>S-CP.B.6<br>S-CP.B.7<br>S-CP.B.8 | Students will apply the concept of the probability to determine the likelihood different events occur. Students will investigate the relationship between two events and develop ways to organize data. Students will gather real world data, represent it in a two way table, and calculate probabilities to help them explain and make predictions about the world around them. | • Gather and analyze data using probabilities |
| **Unit 2: Quadratic Functions** | N-CN.C.7<br>A-REI.A.1<br>A-REI.B.4<br>F-IF.C.8a<br>A-SSE.A.2 | Students will build off of their knowledge and skills of working with quadratics in past courses. They will determine solutions, zeros, and roots using several methods including completing the square. They will then use the knowledge and skills of methods and real world context to determine and justify the most appropriate methods in different situations. | • Solve quadratic equations and justify methods |
| **Unit 3: Polynomials** | A-APR.B.2<br>A-APR.B.3<br>F-IF.B.4<br>F-IF.C.7 | Students will explore polynomial functions, identify key characteristics, and determine the general shapes of polynomials to help model the situations around them. Students will expand their ability to factor from quadratics to higher order polynomials. Factoring will lead to connections and the development of polynomial division as well as the connection to graphs. Students will be able to apply these skills to interpret mathematical models using polynomial functions. | • Analyze, interpret, and create a polynomial model |
| **Unit 4: Rational Functions** | A2.A-REI.A.1<br>A2.A-REI.A.2<br>A2.F-IF.C.7<br>A-SSE.A.2 | Students will continue to use their understanding of factoring to relate to another type of Polynomial function, Rational functions. Rational functions provide the opportunity for students to explore new key characteristics of functions, including domain restrictions such as holes and asymptotes. Students will apply their understanding to make connections between rational function operations and operations with fractions. | • Simplify and Solve rational expressions and equations skills test |

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| **Unit 5: Radical Functions and Rational Exponents** | A2.N-RN.A.1<br>A2.N-RN.A.2<br>A2.A-REI.A.1<br>A2.A-REI.A.2 | Students will be introduced to radical functions and their relationship to exponents. Radical equations will allow students the opportunity to extend their skills and understanding of solving equations to yet another type of functions and continue working with extraneous solutions. Students will create radical equations based off of characteristics and apply properties of rational exponents to show multiple representations | • Solve radical equations skills test<br>• Simplify and rewrite rational exponents skills test |
| **Unit 6: Sequences** | F-BF.A.1<br>F-BF.A.2<br>A-SSE.B.3<br>F-IF.C.7-9<br>F-BF.B.3 | Students analyze patterns of numbers (sequences) and create explicit and recursive equations to model situations. This unit allows students to make connections to linear functions and exponential functions as they work with arithmetic and geometric sequences. Students will apply their knowledge of sequences to develop models to make decisions and predictions about the world around them. | • Apply sequences to model a real world situation |
| **Unit 7: Exponentials and Logarithms** | A2.A-CED.A.1<br>A2.F-IF.B.4<br>A2.F-IF.C.9<br>A2.F-BF.A.1<br>A2.F-BF.B.4<br>A2.F-LE.A.4 | Students will expand their understanding of exponential functions to include their relationship with their inverse, logarithmic functions. They will explore how this inverse relationship helps them solve equations and use it to understand the world around them as they model with exponential functions. Students will also have the opportunity to extend their solving skills to include logarithms. | • Use Exponential and Logarithmic Functions to model situations and justify decision |
| **Unit 8: Transformations and Applications** | A2.A-REI.D.11<br>A2.F-IF.B.4<br>A2.F-IF.B.6<br>A2.F-IF.C.7<br>A2.F-BF.A.1<br>A2.F-BF.B.3 | Students will make connections between all the functions they have been learning about throughout their math career. Function transformations allow students to create models using multiple functions. They will have the opportunity to compare and reflect on which functions might be better suited to work with in different situations. This unit is an opportunity for students to put everything together. | • Apply transformations to model situations using technology |