Algebra Math Lab

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Curriculum Overview

The HSD Algebra Math Lab curriculum is intended to support the updated Algebra 1 which was built to be in alignment with updated DESE standards. These mathematics standards, learning progressions and best practices informed by research have drastically changed over the last few years. This rewrite is to comply with MSIP V and to help ensure that all HSD students are receiving a high quality mathematics education.

This course builds on the work from previous math courses. The Algebra Math Lab course is to formalize and extend the mathematics that students learned in the middle grades to facilitate their success in a dually enrolled Algebra 1 course. Because this course is built mostly upon the middle grades standards, this is a cognitive development tool to support a more ambitious version of Algebra I than has generally been offered. The critical areas, called units, deepen and extend understanding of linear and exponential relationships by contrasting them with each other and by applying linear models to data that exhibit a linear trend, where students engage in methods for analyzing, solving, and using linear and basic quadratic functions.

The purpose of Algebra Math Lab is to extend the base of middle school maths and provides students with a bridge to not only Algebra 1 success, but also higher mathematics and pre-college testing. It is a necessary class to higher mathematics and pre-college testing. This subject provides the necessary mathematical tools for complex reasoning and solving problems in the sciences, technology, engineering, and many skilled trades and professions.

The curriculum contains unit assessments that are rigorous and outline clear expectations. As the curriculum is implemented and taught, the assessments will be revised. **The assessments are required**; the learning activities are suggested. Teachers are encouraged to select the learning activities which meet the needs of their students. Some of the learning activities are very sequential and, when all of them are used, a student should be able to successfully complete the unit assessment. Other activities provide a menu of suggestions, and the teacher should select from those offered or design his/her own.

The plan for professional development includes multiple opportunities for training to help ensure that the MS & HS Mathematics curricula are implemented effectively and with fidelity. Initial training will be provided during district professional development opportunities to cover content and pedagogy. Beyond initial training, ongoing professional development to familiarize teachers with specific curriculum activities and expectations. In addition to professional development days, ongoing training will be provided during Professional Learning Community (PLCs) meetings to assist with upcoming skills and nuances in learning objectives. The Mathematics District Curriculum Coach and District Coordinator will provide teachers training to familiarize them with curriculum activities and expectations. Finally, ongoing training during PLC meetings will assist teachers with upcoming skills and with nuances in the learning objectives.

COURSE TITLE: Algebra Math Lab

GRADE LEVEL: 9 – 12

CONTENT AREA: Mathematics

Course Description:
The Algebra Math Lab course is designed to formalize and extend the mathematics that students learned in the middle grades to facilitate their success in a dually enrolled Algebra 1 course. Because this course is built mostly upon the middle grades standards, this is a cognitive development tool to support more ambitious version of Algebra I than has generally been offered. The critical areas, called units, deepen and extend understanding of linear and exponential relationships by contrasting them with each other and by applying linear models to data that exhibit a linear trend, where students engage in methods for analyzing, solving, and using linear and basic quadratic functions. The Mathematical Practice Standards apply throughout each course and, together with the content standards, prescribe that students experience mathematics as a coherent, useful, and logical subject that makes use of their ability to make sense of problem situations.

Course Rationale:
Algebra Math Lab extends the base of middle school maths and provides students with a bridge to not only Algebra 1 success, but also higher mathematics and pre college testing. This subject provides the necessary mathematical tools for complex reasoning and solving problems in the sciences, technology, engineering, and many skilled trades and professions.

Course Scope and Sequence		
Unit 1: Introduction to Algebra (Approx. 15 class periods)	**Unit 2:** Equations, Inequalities, and Absolute Values (Approx. 12 class periods)	**Unit 3:** Functions and Graphs (Approx. 15 class periods)
Unit 4: Exponents and Factoring (Approx. 15 class periods)	**Unit 5**: Systems of Equations and Inequalities (Approx. 14 class periods)	**Unit 6**: Statistical Analysis (Approx. 10 class periods)

Essential Terminology/Vocabulary

Add, Subtract, Multiply, Divide, Fraction, Decimal, Integer, Journal, PEMDAS, Orders of Operations, Term, Like Terms, Properties, Equality, Equivalence, Numerator, Denominator, Common, Reduce, Compare, Rational Number, Additive Inverse, Opposite Number, Negative, Positive, Combine, Distributive Property, Inverse Operations, Reverse Order of Operations, Term, Properties of Equality, Slope, y-intercept, Linear, Steep, Horizontal, Positive, Negative, Unit Rate, Vertical, Initial Value, Inequality, Regions of Solutions, Solutions, Function Notation, Domain, Range, Relation, Function, Quadratic Function, Exponential Function, Linear Function, Absolute Value, Increasing and Decreasing, Translation, Slope-Intercept Form, Restriction, Vertex, Reflection, Symmetry, Polynomial, Factors, Roots, Distribution, Zeros, Trinomial, GCF, Greatest Common Factor, Exponential Rules, Base, Exponent, Expression, Term, Increase, Decrease, Systems of Equations, Consistent, Inconsistent, Dependent, Independent, Graphing, Coordinate Planes, Solving for a Variable, Substitution, Elimination, Multiplication, Scale Factor, Like Terms, Methods, Analyze, Summarize, Incorporate, Systems of Inequalities, Graphing, Regions, Overlapping, Likelihood, Median, Mean, Measures of Central Tendency, Mode, Probability, Range, Randomness, Variance.

Unit Objectives:

Unit 1: Introduction to Algebra
- Use journaling as a tool to help integrate the standards of mathematical practices into strategies for problem solving.
- Reason about and solve one-variable equations and inequalities
- Apply and extend previous understandings of numbers to add and subtract rational numbers.
- Understand solving equations as a process, and solve equations and inequalities in one variable.

Unit 2: Equations, Inequalities, and Absolute Values

- Solve problems using numerical and algebraic expressions and equations.
- Understand the connections between proportional relationships, lines and linear equations.
- Create equations that describe linear, quadratic, and exponential relationships.

Unit 3: Functions and Graphs

- Understand the concept of a function and use function notation
- Interpret Linear, quadratic and exponential functions in terms of the context.
- Analyze linear, quadratic and exponential functions using different representations

Unit 4: Exponents and Factoring

- Perform operations on polynomials
- Extend and use properties of rational exponents
- Use units to solve problem

Unit 5: Systems of Equations and Inequalities

- Graphing Systems of Linear Equations
- Solving Systems of Linear Equations Algebraically
- Applying Systems of Linear Equations
- Solve Systems of Inequalities

Unit 6: Statistical Analysis

- Summarize, Represent and Interpret Data.

Proposed Course Materials and Resources:

Glencoe Algebra 1
McGraw-Hill Education
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