Integrated Math 1 with Support

Date: January 2014

Proposed Grade Level(s): 9th-12th   **Subject Area: Mathematics**

Grading: A-F   **Course Length: Two 4x4 Terms**

Prerequisites: None   **Number of Credits: 20(10 per term)**

COURSE DESCRIPTION:

Math 1 with Support is an integrated math course designed to formalize and extend the mathematics that students learned in the middle grades and to provide additional support in developing foundational skills not previously mastered. The course is designed specifically for the 4x4 schedule, allowing extra time for struggling students to learn new material while reviewing basic skills. The standards are based on the Common Core State Standards for Mathematics and include topics from the conceptual categories: Number and Quantity, Algebra, Functions, Geometry, and Statistics and Probability. Instructional time will focus on six critical areas: (1) extend understanding of numerical manipulation to algebraic manipulation; (2) synthesize understanding of function; (3) deepen and extend understanding of linear relationships; (4) apply linear models to data that exhibit a linear trend; (5) establish criteria for congruence based on rigid motions; and (6) apply the Pythagorean Theorem to the coordinate plane.

GENERAL GOALS/PURPOSES:

This course is designed to meet the needs of struggling learners so that they can successfully meet the Math 1 Standards. As stated in the *Mathematics Framework (2013),* the fundamental purpose of Math 1 is to formalize and extend students' understanding of linear functions and their applications. The critical topics of study deepen and extend understanding of linear relationships, in part by contrasting them with exponential phenomena, and in part by applying linear models to data that exhibit a linear trend. Math 1 uses properties and theorems involving congruent figures to deepen and extend understanding of geometric knowledge from prior grades. The courses in the Integrated Pathway follow the structure began in the K-8 standards of presenting mathematics as a coherent subject, mixing standards from various conceptual categories. In addition, students will also review standards from 6-8 grades from the following domains: ratios and proportional relationships, the number system, and expressions and equations. Math 1 with Support is intended to be an introductory high school course for struggling learners and will satisfy the Algebra 1 graduation requirement.

CCSS READING/WRITING/ORAL COMPONENT:

The eight *Standards for Mathematical Practice* describe the attributes of mathematically proficient students and expertise that mathematics educators at all levels should seek to develop in their students. Mathematical practices provide a vehicle through which students engage with and learn mathematics – with a heavy focus on reading, writing, and explaining.

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

DETAILED UNITS OF INSTRUCTION:

Units of instruction are based on the model course pathways as outlined in Appendix A of the Common Core State Standards for Mathematics (http://www.corestandards.org/assets/CCSSI_Mathematics_Appendix_A.pdf)

Units	Standards Clusters
Unit 1 Relationships Between Quantities	• Reason quantitatively and use units to solve problems. • Interpret the structure of expressions. • Create equations that describe numbers or relationships.
Unit 2 Linear and Exponential Relationships	• Represent and solve equations and inequalities graphically. • Understand the concept of a function and use function notation. • Interpret functions that arise in applications in terms of a context. • Analyze functions using different representations. • Build a function that models a relationship between two quantities. • Build new functions from existing functions. • Construct and compare linear, ~~quadratic~~ and exponential models and solve problems. • Interpret expressions for functions in terms of the situation they model.
Unit 3 Reasoning with Equations	• Understand solving equations as a process of reasoning and explain the reasoning. • Solve equations and inequalities in one variable. • Solve systems of equations.
Unit 4 Descriptive Statistics	• Summarize, represent, and interpret data on a single count or measurement variable. • Summarize, represent, and interpret data on two categorical and quantitative variables. • Interpret linear models.
Unit 5 Congruence, Proof, and Constructions	• Experiment with transformations in the plane. • Understand congruence in terms of rigid motions • Make geometric constructions.
Unit 6 Connecting Algebra and Geometry through coordinates	• Use coordinates to prove simple geometric theorems algebraically.

TEXTBOOKS:
State Adoption to be determined

COMMON CORE STATE STANDARDS ADDRESSED:

Middle School standards:
- Ratios and Proportional Relationships
  - Understand ratio concepts and use ratio reasoning to solve problems.
  - Analyze proportional relationships and use them to solve real-world and mathematical problems.

- The Number System
  - Operations with rational numbers.
  - Compute fluently with multi-digit numbers and find common factors and multiples.
  - Apply and extend previous understanding of numbers to the system of rational numbers.
- Expressions and Equations
  - Solve one variable equations and inequalities
  - Use properties of operations to generate equivalent expressions
  - Solve real-life and mathematical problems using numerical and algebraic expressions and equations.
  - Work with radicals and integer exponents.
  - Understand the connection between proportional relationships, lines, and linear equations.

High School Standards by conceptual categories:
- Number and Quantity
- Algebra
- Functions
- Modeling
- Geometry
- Statistics and Probability

*See attachment for specific standards addressed.

DISTRICT ESLRs TO BE ADDRESSED:
When students exit a secondary mathematics course, they will be:

• **Self-directed Learners** who will be able to use notes and a textbook to assist them in continuing their learning outside of the classroom setting.

• **Efficient Communicators** who can explain mathematical concepts to others and use mathematics to organize and explain data.

• **Quality Producers** who understand the importance of neat, organized work that demonstrates their thinking and understanding of the solution they've formed to solve a problem.

• **Constructive Thinkers** who are able to attack problems with organization, logic, and mathematical skills they've developed in a systematic fashion.

• **Collaborative Workers** who can work in a variety of settings in culturally diverse groups. They will be able to form and use study groups to strengthen their own understanding in addition to providing the same service for classmates.

• **Responsible Citizens** who accept the consequences of their actions and who demonstrate their understanding of their role in the learning process.