**4th math-Selected Topics in Math (STM)**

**Rationale, Expectations, and Description-** *This course is designed to meet the fourth math requirement for graduation.* ***It is not accepted for admission into the NC public university system but will fulfill community college or other institution requirements*.** This course will review Algebra and Geometry as well as study some skills used in Advanced Functions and Modeling. The course will also look at practical applications of math in everyday life such personal finance, homeowner projects, data analysis, and career applications. This class is intended for the student who will be entering a community college or the workforce immediately following graduation from high school.

**Timeline and Topics**:

1st six weeks- “Algebra”

Solving multi-step equations

Factoring

Matrices

Systems and graphing (lines and Inequalities)

Linear programming

 Lego/Table/Chair Activity

Quadratics functions

solve by factoring, graphing and quad formula

max/min

2nd six weeks- “AFM-lite”

Statistics

 Data Analysis

 Mean, median, mode

 Box plot (outliers)

 Standard Deviation

 Normal Distribution

Sample Survey

 Regression Models- r and r2-

M&M Activity-Exponential

Body Exploration Activity-Linear

Football Braking Distance Activity- Quadratic

Probability

 Combinations

 Permutations

 AND/Or

 Simulation

Trigonometry

 Right Triangle and applications

 Law of Sine

\*\*Sequence and Series-if time

 Arithmetic, Geometric, Recursive

3rd six weeks– “Practical Math Application and Activities”-

credit cards, budget, commission, tips, car/house loans, checks, plan event-vacation,wedding, party, interest/exponential functions, percent

Resources for Practical Math Unit:

<http://learning.blogs.nytimes.com/category/lesson-plans/> -lots of plans/activities for real-life topics

<http://learningtogive.org/lessons/unit351/lesson4.html> -credit card lesson plan with handouts

<http://learningtogive.org/teachers/financialliteracy> -financial lesson plans

<http://www.adprima.com/budgeting.htm> - very basic outline for budgeting lesson plan

<http://www.teachingideas.co.uk/more/pshe/files/budgetingforks2.pdf> -budgeting lesson plan with handouts

**Assessments:**

Pre-Assessment- 30 question test created with answers

Topic Tests within Units

Unit Assessments- cumulative test or project

Concept Quizzes

Exit Tickets

Questioning Practices

 Demonstration

**Resources for entire course:**

AFM Modules CD

 Textbooks

[www.PendaLearning.com](http://www.PendaLearning.com)

<http://www.dlt.ncssm.edu/AFM> - NC School of Science and Math resource and project list for AFM

<http://www.dlt.ncssm.edu/algebra> - NC School of Science and Math resources and project list for Algebra 2

<http://www.regentsprep.org/Regents/math/ALGEBRA/math-ALGEBRA.htm>

<http://www.problem-attic.com> -Free problem generator and question bank

<http://www.dgelman.com/graphicorganizers> -Graphic organizers and skeleton notes for various topics

<http://edu.glogster.com> -Create digital posters

<http://piecolor.com> - Create your own pie charts

<http://teacherweb.com/TN/ClevelandHighSchool/MathDepartment/apt1.aspx> -link to lots of plans and activities

<http://hennesseymath.wordpress.com/about> - activities and ideas from a NC teacher

<http://www.davidson.k12.nc.us/education/components/docmgr/default.php?sectiondetailid=37454&catfilter=1400>

**Recommendation for Final Exam**- Individual teacher-made exam with multiple choice and constructed response

**Set of Standards:**

 1stsix weeks-
A.REI.3, A.CED.1: Solve multi-step equations
A.SSE.3a: Factoring
N.VM.6-10: Matrices
A.REI.6, A.CED.3: Systems and graphing (linear programming),
A.REI.4.b: Solving and graphing quadratics (factoring, quad formula, max/min)

Common Core Standards:
**A-REI.3**: Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

**A-CED.1**: Create equations and inequalities in one variable and use them to solve problems , include equations arising from linear and quadratic functions, and simple rational and exponential functions.

**A.SSE.3**: Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

a. Factor a quadratic expression to reveal the zeros of the function it defines.

**N.VM.6**: Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.

**N.VM.7**: Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.

**N.VM.8**: Add, subtract, and multiply matrices of appropriate dimensions.

**N.VM.9**: Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.

**N.VM.10**: Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.

**A.REI.6**: Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

**A.CED.3**: Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequities describing nutritional and cost constraints on combinations of different foods.

**A.REI.4**: Solve quadratic equations in one variable.

b. Solve quadratic equations by inspection (e.g., for *x*2 = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as *a* +/- *bi* for real numbers *a* and *b*.

2ndsix weeks-

**Data Analysis**:
S.ID.2: Measures of Central Tendency
S.ID.1: Boxplots (outliers)
S.ID.2: Standard Deviation
S.ID.2: Normal Distribution
S.IC.3:Sample Survey
S.ID.6,6.a, S.ID.7, S.ID.8, S.ID.9: Regression Models – correlation coefficient / coefficient of determination

**Probability:**S.CP.8: Multiplication Rule
S.CP.7: Addition Rule
S.CP.9: Combinations and Permutations
Simulation

**Trigonometry**:
G.SRT.11: Law of Sines

Common Core Standards:
**S.ID.1**: Represent data with plots on real number line (dot plots, histograms, and boxplots).

**S.ID.2:** Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

**S.ID.6**: Represent data on two quantitative variables on a scatterplot, and describe how the variables are related.

c. Fit a linear function for a scatterplot that suggests a linear association.

**S.ID.7**: Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

**S.ID.8**: Compute (using technology) and interpret the correlation coefficient of a linear fit.

**S.ID.9**: Distinguish between correlation and causation.

**S.IC.3**: Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.

**S.CP.7**: Apply the Addition Rule, P(A or B) = P(A) + P(B) –P(A and B), and interpret the answer in terms of the model.

**S.CP.8**: (+) Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model.

**List of Differentiation Strategies:**

<http://www.dgelman.com/graphicorganizers> -Graphic organizers and skeleton notes for various topics

 -Video taping using FlipCameras/cell phones pairs of students explaining problems, then exchange videos and discuss

 <http://edu.glogster.com> -Create digital posters

**Integration Opportunities:**

This section will be revisited later in the year after more experience with the class.