Application of Mathematics

September 2012
I. **Course Description**

The Application of Mathematics curriculum is aligned with the Algebra One curriculum to provide a life application perspective. Real world situations and experiences are brought into the classroom through structured learning experiences. The study of mathematics also leads to the ability to think logically and solve problems. The course develops thought patterns and mental discipline appropriate to life in a technological age.

As science and technology have come to influence all aspects of life from health and the environment to financial affairs and national defense, mathematics, particularly problem solving, has come to be of vital importance in education today. Mathematics is the foundation of science and technology. The analytical skills critical in mathematics are necessary for almost anything a person will do in today’s society.

This course is designed to develop skills of mathematics, problem solving strategies, and methods of solutions applicable to real life situations. Deductive reasoning, hands-on experience, application and communication of mathematics, college preparatory, and technical field-oriented skills enhance basic math instruction. The students will develop the skill in mathematics necessary to succeed at the college level or in a skilled job area.

Topics include properties of real numbers, solutions of linear equations and inequalities, quadratic equations, polynomials, problem solving, functions, graphing, data analysis, and probability and statistics.
II. COURSE OBJECTIVES/OUTLINE

Note to Teachers:

1. Utilize the graphing calculator for the topics that the textbook as an extra tool.

Review

1. The Set of Real Numbers Page 4
2. Sequences Page 9
3. Absolute value Page 13
4. Adding and Subtracting Real Numbers Page 18
5. Multiplying and Dividing Real Numbers Page 26
6. Properties of Addition and Subtraction Page 140
7. Properties of Multiplication and Division Page 154
8. Inequalities and the number line Page 496

I. EXPRESSIONS, EQUATIONS, AND FUNCTIONS (Chapter 1.4-6)

1. Write Equations and Inequalities Page 49 (A.CED.1)
2. Use Problem Solving Plan Pages 29 & 15 (A.CED.1)
3. Use Precision and Measurement Chapter 2 (N.Q.3)

II. PROBABILITY (Chapter 11.1-5)

1. Find Probabilities and Odds Page 334 (S.CP.1)
2. Find Probabilities Using Permutations Page 354 (S.CP.9)
3. Find Probabilities Using Combinations Page 354 (S.CP.9)
4. Find Probabilities of Disjoint and Overlapping Events Page 348 (S.CP.1)
5. Find Probabilities of Independent and Dependent Events Page 361 (S.CP.2)

End of Marking Period one

III. SOLVING LINEAR EQUATIONS (Chapter 2.1-8)

1. Find Square Roots and Compare Real Numbers Page 296 (N.Q.1)
2. Solve One-Step Equations Page 154 (A.REI.3)
3. Solve Two-Step Equations Page 161 (A.REI.3)
4. Solve Multi-Step Equations Page 161 (A.REI.3)
5. Solve Equations With Variables on Both Sides Page 167 (A.REI.3)
6. Write Ratios and Proportions Page 148 (A.CED.1)
7. Solve Proportions Using Cross Products Page 148 (A.CED.1)
8. Rewrite Equations and Formulas Page 49 (A.CED.4)
IV. SOLVING AND GRAPHING LINEAR INEQUALITIES (Chapter 5.1-6)
1. Solve Inequalities Using Addition and Subtraction Page 501 (A.REI.3)
2. Solve Inequalities Using Multiplication and Division Page 506 (A.REI.3)
3. Solve Multi-Step Inequalities Page 506 (A.REI.3)
4. Solve Compound Inequalities Page 512 (A.REI.3)
5. Solve Absolute Value Equations Page 172 (A.CED.1)
6. Solve Absolute Value Inequalities Page 519 (A.CED.1)

End of Marking Period Two

V. GRAPHING LINEAR EQUATIONS AND FUNCTIONS (Chapter 3.1-5.7)
1. Plot Points in a Coordinate Plane Page 198 (F.IF.7)
2. Graph Linear Equations Page 214 (F.IF.7)
3. Find Slope and Rate of Change Page 207 (F.IF.6)
4. Graph using intercepts Page 230 (F.IF.7)
5. Graph Using Slope-Intercept Form Page 214 (F.IF.7a)
6. Graph Linear Functions Page 230 (F.IF.7a)

VI. SOLVING AND GRAPHING LINEAR INEQUALITIES (Chapter 5.7)
1. Graph Linear Inequalities in Two Variables Page 523 (A.REI.12)

VII. WRITING LINEAR EQUATIONS (Chapter 4.1-2.4.6-7)
1. Write Linear Equations in Slope-Intercept Form Page 223 (A.CED.2)
2. Write Linear Equations in Point-Slope Form Page 223 (A.CED.2)
3. Write Linear Equations in Standard Form (A.CED.2)
4. Fit a Line to Data Page 404 (S.ID.6c)
5. Predict With Linear Models Page 404 (S.ID.6a)

VIII. DATA ANALYSIS (Chapter 10.1-5)
1. Analyze Surveys and Samples Page 366 (S.IC.1)
2. Use Measures of Central Tendency and Dispersion Page 390 (S.ID.2)
3. Analyze Data Chapter 7 (S.ID.5)
4. Interpret Stem-an-Leaf Plots and Histograms Page 412 (S.ID.1)
5. Interpret Box-and-Whisker Plots Page 416 (S.ID.1)

End of Marking Period Three
IX. SYSTEMS OF EQUATIONS AND INEQUALITIES (Chapter 6.1-6)

1. Solve Linear Systems by Graphing Page 446 (A.REI.6)
2. Solve Linear Systems by Substitution Page 457 (A.REI.6)
3. Solve Linear Systems by Adding or Subtracting Page 463 (A.REI.6)
4. Solve Linear Systems by Multiplying First Page 469 (A.REI.6)
5. Solve Special Types of Linear Systems Page 451 (A.REI.6)
6. Solve systems of Linear Inequalities Page 531 (A.REI.12)

X. EXPONENTS AND EXPONENTIAL FUNCTIONS (Chapter 7.1-5)

1. Apply Exponent Properties Involving Products Page 571 (A.SSE.3c)
2. Apply Exponent Properties Involving Quotients Page 571 (ASSE.3c)
3. Define and Use Zero and Negative Exponents Page 571 (F.LE.5)
4. Write and Graph Exponential Growth Functions Page 304 (A.SSE.3c)
5. Write and Graph Exponential Decay Functions Page 304 (A.CED.2)

XI. POLYNOMIALS AND FACTORING (Chapter 8.1-4)

1. Add and Subtract Polynomials Page 560 (A.APR.1)
2. Multiply Polynomials Page 566 (A.APR.1)
3. Find Special Products of Polynomials Page 577 (A.APR.1)
4. Solve polynomial Equations in Factored Form Page 584 (A.REI.4b)

End of Marking Period Four

III. METHODS OF STUDENT EVALUATION/ASSESSMENTS:

Daily homework assignments
Weekly or biweekly quizzes
Unit tests
Class participation
Real-life Projects
Math labs
IV. TEXTBOOKS, INSTRUCTIONAL, RESOURCE & SOFTWARE MATERIALS

Student Textbook:  Algebra 1 Learning in context  
Eric Howe  
3rd Edition  
ISBN 978-1-57837-425-0  
© 2011 by CORD

Resource Materials:  Algebra 1 Learning in context  
TEACHER’S EDITION  
Eric Howe  
3rd Edition  
ISBN 978-1-57837-426-7  
© 2011 by CORD

Algebra I, Holt McDougal  
TEACHER’S EDITION  
Larson, Boswell, Kanold, Stiff  
ISBN 0-618-37421-3  
© 2012 by Houghton Mifflin Harcourt Publishing Company

Algebra I, Holt McDougal  
STUDENT’S EDITION  
Larson, Boswell, Kanold, Stiff  

Real World Math  
Bonnye Wier Cavazos, Leslie Buteyn, Shawna McAllister, Mary Oliver  
© 2008 by PCI Education

Punch line Problem Solving  
Steve Marcy & Janice Marcy  
© 2001, 2006 by Marcy Mathworks

Software:  Texas TI-83 or TI-84 or TI-Nspire Graphing Calculator  
TI Navigator  
Ron Larson Test Generator (CD)

Internet:  
http://www.thefutureschannel.com/algebra  
http://www.AlgebraNotes.com  
http://www.brainpop.com  
http://www.classzone.com  
http://www.kutasoftware.com  
http://www.classzone.com  
http://www.marcymathworks.com
V. INSTRUCTIONAL STRATEGIES:

Various teaching methods are used in this course. These include lecture, discovery-based activities, discussions, cooperative learning, small group/individual instruction and demonstrations. Technology is used to enhance daily lessons. Technology includes graphing calculators, PowerPoint presentations, overhead projectors, smart board, Elmo, Smart Response, and any other software used to augment the effectiveness of the lesson. Vocabulary words and word problems will be infused within each lesson. An understanding of math terms is crucial to students’ ability to understand and execute math problems. In order to support students’ comprehension of math terms, vocabulary instruction practices are useful.
Application of Mathematics

COURSE OVERVIEW

It has been said that the key to success in math is the ability to use mathematics in the real world. This requires both math skills and problem-solving ability. The Application of Mathematics course is designed to provide numerous opportunities for students to develop and fine tune their understanding and use of math. It is also designed to nurture the contextual learning process through five strategies: (1) Relating - Learning in the context of life experiences, (2) Experiencing - Learning in the context of exploration, discovery and invention, (3) Applying - Students apply their new knowledge to real-world situations and to solve problems, (4) Cooperating - Students solve problems as a team to reinforce their knowledge and develop collaborative skills, (5) Transferring - Students take what they have learned and use in new contexts and situations.

In each of the strategies mentioned above students will be involved in (1) identifying variables in the situation and selecting those that represent essential features, (2) formulating a model by creating and selecting geometric, graphical, tabular, algebraic, or statistical representations that describe relationships between the variables, (3) analyzing and performing operations on these relationships to draw conclusions, (4) interpreting the results of the mathematics in terms of the original situation, (5) validating the conclusions by comparing them with the situation, and then either improving the model or, if it is acceptable, (6) reporting on the conclusions and the reasoning behind them.

Main Topics:

i. EXPRESSIONS, EQUATIONS, AND FUNCTIONS
ii. SOLVING LINEAR EQUATIONS
iii. GRAPHING LINEAR EQUATIONS AND FUNCTIONS
iv. WRITING LINEAR EQUATIONS
v. SOLVING AND GRAPHING LINEAR INEQUALITIES
vi. SYSTEMS OF EQUATIONS AND INEQUALITIES
vii. EXPONENTS AND EXPONENTIAL FUNCTIONS
viii. POLYNOMIALS AND FACTORING
ix. QUADRATIC EQUATIONS AND FUNCTIONS
x. DATA ANALYSIS
xi. PROBABILITY

Skills Emphasized:

Problem Solving, Critical Thinking, Understanding Logical Process, and Collaborative Work.