Mathematical Models with Applications Prescriptive focuses on the application of algebraic, geometric, statistics and probability concepts to real world experiences in personal finance, science, art and social science. Through a "Discovery-Confirmation-Practice"-based exploration of these concepts, students are challenged to strengthen their computational skills, to deepen their understanding of key ideas and solution strategies, and to extend their knowledge through a variety of problem-solving applications.

Course topics include applying mathematics to personal finance topics such as income and budgeting, tax and interest, credit, loans, insurance, and retirement. Students will use exponential functions to model growth and decay, quadratic functions to model motion, and use trigonometry to model harmonic motion. Students will apply geometric concepts such as similarity and transformations, statistics and experimental design, and probability and counting principles to a variety of situations.

This course supports all students as they develop computational fluency, deepen conceptual understanding, and apply mathematical process standards. Throughout the course, students are equipped with tools for analyzing a variety of real-world scenarios and mathematical ideas and are asked to solve and communicate mathematics effectively.

The course is built to the TEKS Mathematical Models with Applications Standards.

Length: Two Semesters

Unit 1: Income and Budgeting

- Types of Wages
- Compensation Packages
- Linear Equations and Wages
- Percentages and Commission
- Take-Home Pay: Required Deductions
- Take-Home Pay: Optional Deductions
- Cost of Living and Budget
- Income and Budgeting Wrap-Up

Unit 2: Income Tax

- Taxable Income
- Itemized Deductions
- Tax Brackets
- Submitting Your Tax Form
- Income Tax Wrap-Up

Unit 3: Checking and Savings

- Simple Interest

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- Exponential Growth
- Compound Interest
- Checking Accounts
- Balancing Your Checkbook
- Comparing Checking Accounts
- Savings Accounts
- Comparing Savings Accounts
- Checking and Savings Wrap-Up

Unit 4: Credit

- Credit Cards
- Calculating Credit Card Interest
- Tracking Payments and Purchases
- Comparing Credit Cards
- Credit Scores
- Credit Wrap-Up

Unit 5: Home Ownership

- Mortgages: Fixed Rate
- Mortgages: Variable Rate
- Multiple Mortgages and Refinancing
- Balloon Mortgages
- Additional Costs: Fees
- Additional Costs: Escrow
- Total Housing Payments
- Home Ownership Wrap-Up

Unit 6: Cars, Insurance, and Retirement

- Car Leasing
- Payments
- Equity and Depreciation
- Car Insurance Premiums
- Suggested Premium
- Property and Renters Insurance
- Life Insurance
- Calculating Life Insurance Premiums
- Retirement Accounts
- Cars, Insurance, and Retirement Wrap-Up

Unit 7: Investments

- CDs
- Annuities
- Bonds
- Stocks
- The Stock Market

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- Periodic Investment
- Retirement and Periodic Investment
- Investments Wrap-Up

Unit 8: Semester Exam

Unit 9: Inverse Variation, Exponential Functions, and Quadratic Functions

- Inverse Variation
- Representing Exponential Functions
- Graphing Exponential Functions
- Solving Quadratic Equations: Factoring and Square Roots
- Solving Quadratic Equations: Quadratic Formula
- Graphing Quadratic Functions
- Inverse Variation, Exponential Functions, and Quadratic Functions Wrap-Up

Unit 10: Similarity and Transformations

- Similar Triangles
- Similarity Theorems and Proportional Reasoning
- Similar Right Triangles
- Transformations
- Symmetry
- Similar Solids
- Similarity and Transformations Wrap-Up

Unit 11: Trigonometry and Trigonometric Functions

- The Pythagorean Theorem
- Special Right Triangles
- Trigonometric Ratios
- Graphs of Sine and Cosine
- Graphs of Other Functions
- Simple Transformations of Sinusoids
- Modeling Simple Harmonic Motion
- Trigonometry and Trigonometric Functions Wrap-Up

Unit 12: Collecting Data

- What Is Statistics?
- Observational Studies
- Experimental Design
- Categorical Data
- Point Estimates
- Evaluating Published Reports
- Collecting Data Wrap-Up

Unit 13: Descriptive Statistics

- Numerical Data
- Measures of Center

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- Measures of Spread
- Box Plots
- Two-Variable Data and Scatterplots
- Fitting Linear Models to Data
- Nonlinear Models
- Descriptive Statistics Wrap-Up

Unit 14: Applications of Probability

- What Is Probability?
- Counting Principles
- Permutations and Combinations
- Geometric Models for Probability and Statistics
- Applications of Probability Wrap-Up

Unit 15: Semester Exam

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