

Year	Development	Grade	Overview
2009	Sampling for a Rock Concert	Grades 7-12	Students will design and critique surveys based first upon prior knowledge and then upon principles of simple random sampling learned throughout the unit. Additionally, students will use results from surveys in order to make predictions about a population.
2009	Systems of Equations and Inequalities	Grades 9-12	<p>Students will use symbolic algebra to represent, solve, and graph inequalities and systems of inequalities, a skill learned toward the end of Algebra 1.</p> <p>The students should have previous knowledge of solving systems of equations by graphing, algebraically using substitution, and algebraically using elimination. Students have graphed systems of equations and inequalities. This unit includes three lessons focusing on interpreting mathematical sentences, graphing inequalities, and determines the feasible region in order to find the maximum and minimum values of a system.</p>
2009	Matrix Madness	Grades 9-11	This unit has the students multiplying matrices, finding matrix determinants and inverses, and several real world applications of these processes. Upon completion of unit, the students will be able to use the determinant of a matrix in order to find the area of a triangular region. They will also be able to use matrix multiplication to encode a message and decode the message using its inverse. It is assumed before starting this unit that students are able to multiply matrices with/without calculators depending on level.
2009	Modeling Linear Relationships	Grades 8-10	In this unit, students will work with situations that can be modeled using linear functions. Students will draw connections between a situation, equation, graph, and table. By understanding how the concept of slope and y-intercept show up in different representations, students will gain fluency in moving between the various representations. Representing a situation as an equation, graph, and table will also give students the tools to make predictions about future (or past) behavior. Students start with modeling fairly concrete situations and move towards working with more abstract equations and graphs presented in non-contextual settings.
2008	EI-EI-O	Grades 7-9	<p>This unit is designed to give students an opportunity to apply real world skills to maximize area when given a fixed perimeter. Students will need an understanding of plotting points on a coordinate grid, area and perimeter formulas, function notation and use substitution to solve for unknowns.</p> <p>In the first lesson, students will be exploring to find the dimensions which will yield the maximum area given a fixed perimeter. In the second lesson, students will develop the linear formula which creates the length/width table and examine and interpret the parabola created by the area data. Teachers can decide based on needs of their students if they would like to develop the quadratic equation by hand or using the graphing calculator (or Excel). In the third lesson, students will extend their understanding to a new situation where they must also maximize area given a perimeter, but new constraints are added.</p>

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2008	Sloping It Up	Grade 8	These four lessons are designed to develop a student's ability to graph a function in slope–intercept form ($y=mx+b$) format using the Cartesian Coordinate system. In lesson 1, students explore the Cartesian Coordinate system, its four quadrants, and plotting points using ordered pairs. In lesson 2, students explore the concept of slope. They start with concept of steepness and build that understanding into a more formal understanding of slope within the $y = mx + b$ form of linear functions. Lesson 3 uses patterns to develop a concept of pattern rules: functions. In this lesson, students use function tables to create algebraic expressions and sentences. Lesson 4 explores the concept of y–intercept. Students review and extend what they learned in the previous 3 lessons in order to emerge with a full understanding of the connection between graphs, equations, and function tables. NCTM Content Standard/National Science Education Standard:
2008	Do These Systems Meet Your Expectations?	Grades 9-12	This concept development unit is designed to develop the topic of systems of equations. Students will be able to graph systems of equations to discover the three possible cases: intersecting, parallel or coinciding lines. Students will be able to identify how many solutions each system has by looking at the graphs. Before this unit is taught students will have learned about slope, intercepts, and how to graph linear equations. After this lesson, students will move on to solving systems of linear equations by substitution and linear combination methods.
2008	Slippery Slope	Grades 9-12, Algebra I, Algebra II	Students will learn to calculate slope, write equations of lines and model slope through real world situation using word problems.
2008	Slope - Using a Multi-Sensory Approach	Grades 9-12, Geometry	This lesson allows students to build the understanding of what slope means for a linear function. The target population is secondary struggling learners, grade levels 6–12. Students will share knowledge about slope and the lessons will give a multi–sensory approach to the mastery of determining slope of a line given its graph or two points on it.

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2008	Geometer Jones - The Search for Pythagoras' Treasure	Grades 9-12	This Concept Development Unit is designed to incorporate new instruction as well as review of the concepts of concurrent lines and the four points of concurrency of triangles (circumcenter, incenter, centroid, and orthocenter) using the following activities/tools: constructions, matching, round table, word webs, graphic organizers. Students will identify relevant vocabulary and determine a consistent approach to constructions. Ultimately, each student will construct each point of concurrency in order to locate a hidden treasure. This activity (or any part of it) is meant to introduce the constructions and the points of concurrency before the summative assessment.
2007	Discovering Different Types of Functions	HS Algebra I	This lesson was designed for students who are already familiar with linear equations and is to be used as an introduction to quadratic and exponential functions. In the lesson, students will be graphing experimental data on a coordinate plane. They will then analyze and describe the graphs as linear, exponential or quadratic.
2007	Real World Systems of Linear Equations	Grades 9 - 12, Pre-Algebra, Algebra 1, Consumer Math	In this unit, students will be learning, practicing, and discussing ways of representing real world situations by using systems of linear equations. The student will be able to interpret and discuss the differences between Slope-Intercept Form and Standard Form of Linear Equations, in an attempt to better understand when to use which form to represent different situations.
2007	Whose Line is it Anyway?	Grades 8 - 10, Algebra I	Students will use Systems of Equations to develop ideas relating to savings plans and a spending budget that they would use for their senior trip or any trip they would plan for.
2006	Chances are More than Just a Chance	Grades 6 - 8, Algebra I	This learning unit will demonstrate to the students how probability is used to calculate chances or likelihood of a given event occurring. Students will also be able to distinguish the difference between theoretical and experimental probability. Students will also be able to explain the importance of using a large number of trials using experimental probability.
2006	Measures of Central Tendency	Grades 6 - 8, Algebra I	In this unit, students will study the various representations for data analysis. Students will look at measures of central tendency and variance, line plots, frequency distribution tables, and interpretation, application, representation and presentation of data.

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2006	How Do They Relate? An Investigation of Relationships That Appear Linear. Measures of Central Tendency	Grades 7 -10, Algebra I	This unit is designed to allow students to investigate real world data that follows a linear trend. Students will begin with introductory tasks, such as making crude predictions from a given set of data. The unit will end with more in–depth problem–solving, including using the graphing calculators to find equations for line of best fit, interpolating and extrapolating data. Summaries will include identifying when it is not appropriate to make predictions using a linear regression model.
2006	Line of Best Fit	Grades 7 - 12, Algebra I	This Concept Development Lesson is based on the skills needed to determine the line best fit for a set of data. The focus is based on grade levels 7-12. Students will review basic graphing skills, and constructing scatter plots. They will identify the relationships that are presented by the data on the scatter plot. This knowledge will guide them in understanding how to identify a line of best fit for different data sets.
2006	Probability & Applications of Simulations Part II Part III	Grades 8-10, Algebra I	This lesson revolves around developing the concepts of probability, defining probability, simulations and the tools and rules used to simulate the probability of such events. By the end of the lesson, students should understand the basic concepts of probability and how to conduct simulations using the different tools discussed.
2005	Catapult Trajectories - Don't Let Parabolas Throw You	Grades 9-11, Algebra I and II	<ul style="list-style-type: none"> • Students will use a trajectory as a means of learning about a quadratic function. • Students will model a parabolic path and find the equation of a parabola from given points by solving a system of equations and by using quadratic regression. • Students will study the effects of the constants a, b, and c through an interactive graphing calculator application and learn to find the coordinates of the vertex.
2005	Means of Growth	Grades 9-12, Algebra I and II	In this lesson, the class will explore regression models through the use of the TI-83/TI-84 graphing calculators. Students will use a variety of real-world data sets and activities to explore linear, quadratic and exponential regression models. Students will input data, create scatter plots, find and graph the line of best fit for each model using the graphing calculator.

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2005	Optimization for Breakfast	Grades, 7, 9, 11	Students will use graphs, algebra, and graphing calculators to investigate and optimize box dimensions, meet dietary requirements, and find good consumer value using cereal boxes and their contents. Students will employ algebraic geometry, linear programming and curve fitting. Optional extensions include field work to measure sizes and evaluate unit prices versus purchase prices.
2004	Decoding the Mysteries of Chance: Concepts in Probability	Grades 6-8	The individual lessons of this unit are designed to address content standards for probability. Each lesson focuses on topics that are covered on state assessments required by the No Child Left Behind Act (specifically, the Maryland Student Assessment Test for math in grades 6-8). Each lesson is based on the student learning outcomes appropriate for a specific grade level. Together, the lessons comprise an overview of topics in probability covered in middle school, and could be used as a general review of probability. Lesson five also connects math content standards to science content standards (applications of probability to genetics).
2004	Integers	Grades 6-7	This unit will allow students the opportunity to explore and develop an understanding of integers and absolute value and how to add and subtract with integers. They will order integers on vertical and horizontal number lines. Eventually leading to setting up the "x" and "y" axis on the coordinate grid. Students will also explore the operations of addition and subtraction using manipulatives and or a number line. The students will identify patterns during their explorations of the two operations that will eventually lead the students to the rule for the operations with integers. Students will need to communicate the rules for addition and subtraction of integers in written and verbal formats.
2004	It's Probably Probable!	Grades 6-8	Students will learn the meaning of probability. Students will make predictions and draw conclusions from available information and provide examples, which support or refute their conclusions.
2004	Ratios, Fibonacci, Golden Ratio - There's the Problem!	Grades 6-8	This content unit will enable students to interpret real life problems in mathematical terms and connect mathematical ideas. It will allow students to develop an understanding of ratio by exploring the Fibonacci Sequence and the Golden Ratio.
2004	Decode Word Is ...	Grades 6-12	This learning unit is designed to make connections between properties of linear functions and cryptology. Students will code and decode using basic shift ciphering, arrow diagrams, tables, the coordinate plane, and graphs.

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2004	Making Money and Spreading the Flu!	Grades 10-11, Algebra II	Students will use exponential functions to model exponential growth in several real-life situations: spread of flu in a school, bacteria growth and the continuously compounded interest.
2004	Matchstick Math: Using Manipulatives to Model Linear, Quadratic, and Exponential Functions	Grade 9, Algebra I	Students will use matchsticks and straws to create geometric patterns. Students will use the properties of these patterns (perimeter, area, total number of segments) to model linear, quadratic, and exponential functions, respectively. Students will make predictions based on the models used.
2004	Off to College	Grades 9-12, Algebra II	This learning unit is designed for students to investigate the linear, quadratic, and exponential models using TI-83 Plus. Students will be able to analyze and graph data and relate their model to real-life situations using the APPS: Interactive Graphing (Transformation Graphing).
2004	Strike a Pose: Modeling In The Real World (There's Nothing To It!)	Grades 9-12, Algebra I and II	In this unit, students will analyze data sets and determine appropriate linear, quadratic, and exponential models. Algebra II students will evaluate models by analyzing residuals. Algebra I students will be introduced to the concept of residuals in the third lesson. Students will use the models to make predictions.
2003	Deciphering Word Problems in Order to Write Equations	Grades 7-8	This unit includes three lessons that enable students to effectively unlock word problems. The unit begins with simple translation of equations. Then, the students will work in groups to explore the uses of various organizers that will help them to solve word problems. The last step of our unit includes incorporating the computer lab and using word processing to ease problem solving.
2003	Reel Connections	Grade 8, Algebra	Students will translate real world problems into Algebraic expressions and equations. This unit can be used as a review of Algebra concepts at the end of the year. It begins with translating simple situations and sentences into algebraic expressions. Using a movie theater example (i.e. reel example), they will use their problem solving skills and work in groups to find a solution to the situation. Then they insert variables into equations to find solutions. Finally, students will work with real world problems involving two variables and two equations. They will represent and solve these problems using tables, graphs, and algebra.

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2003	Solving Equations: A Kinesthetically Engaging Approach	Grades 7-8	This Concept Development Unit walks students through the algebraic process for solving increasingly complex algebraic equations. It does so by engaging students in methods that are kinesthetically pleasing, yet, which constantly emphasize the vocabulary and format of the algebraic process.
2003	The Ins and Outs of Functions	Grades 7-8	In these lessons, students will explore what a function is, how to determine if a relation is a function and different ways a function can be represented. Prior knowledge should include patterns, sequences and relations.
2003	Three Ways to Solve Two-Step Linear Equations	Advanced 6th, Pre-Algebra 7th, Pre-Algebra 8th	This lesson provides three alternative methods for solving one-variable/two step equations. Students will move from concrete examples to abstract problem solving by using multiple modalities. Students will use mental math, physical and symbolic representations, and verbalization of skills.
2003	Variable Expressions in Algebra	Grade 7	<p>Algebra could never exist without the concept of variables. Variables and algebra are synonymous. The concept of variable expression, therefore, is the rudiments of algebra, that is, it is the fundamental of algebra. These lessons are the first three lessons when introducing algebra. When students know that variables can be used to represent quantities, then their understanding of the concepts of algebra begins.</p> <p>By the end of these three lessons the students should have a fundamental perception of what algebra is all about. The student will also be able to perform some of the “arithmetic” operations in algebra.</p>
2003	Play Ball!	Grades 9-12, Algebra I & II, Analytical Geometry	This unit uses game theory to explore a quadratic function. Students will play a game to collect data and use this data to find a pattern for game outcomes. They will create numeric and graphic models to describe the pattern they discover while playing the game. This unit proceeds with the use of scatter plots, linear and quadratic regressions using the graphing calculator. To find the quadratic function, the matrix package on the graphing calculator can be used to solve a system of equations. At the teacher’s discretion, the quadratic function can be explored graphically using analytical geometry techniques. Using this model, students will be able to predict future outcomes of this game, explore the impact of modifications of this game, and extend these modeling techniques to other games and possible real-world situations.

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2003	Probability and Simulations	Grades 10-12, Algebra II	Students will be able to transition from quadratic functions to exponential. After noting major differences between the two, they will develop the concept of the multiplier using the TI-83 Plus regression feature and the TI-Interact application. This activity will ultimately lead to the standard equation of an exponential function of both growth and decay. Given a set of data, the students will be able to analyze it and draw conclusions about it.
2002	Feature Presentation: Data Analysis, Starring Box-and-Whisker Plots	Grades 6-8	In this unit students will use movie statistics to determine measures of central tendency and measures of variation. They will also construct box-and-whisker plots manually and with a graphing calculator. Finally students will analyze data by comparing the measures of central tendency, the measures of variation, and double box-and-whisker plots.
2002	Interpreting Slope as a Rate of Change	Algebra I	In this learning unit, students will graph linear equations by using a table of values or the slope-intercept method for a given equation. Then students will identify the slope as a rate of change in order to interpret linear and non-linear graphs that represent real world situations. In addition, students will create a story to describe the situation displayed on non-linear graphs.
2002	The Changing Face of America: Who Are We?	Grades 7-8	Using data from the U.S. Census Bureau and the Immigration and Naturalization Service (INS), the students will explore a variety of statistical concepts such as bar, line and circle graphs, scatter plots and linear relationships. Number operations and geometry skills are extended by having students interpret equivalent data as fractions, decimals, percents, and degrees. Students will be encouraged to make strong interdisciplinary connections with world geography and U.S. History. The final product will be communicated mathematically through a performance product and classroom debate.
2002	Kangaroo Conundrum: A Study Of A Quadratic Function	Grades 9-12, Algebra I & II, Analytical Geometry,	This unit uses game theory to explore a quadratic function. Students will play a game to collect data and use this data to find a pattern for game outcomes. They will create numeric and graphic models to describe the pattern they discover while playing the game. This unit proceeds with the use of scatter plots, linear and quadratic regressions using the graphing calculator. To find the quadratic function, the matrix package on the graphing calculator can be used to solve a system of equations. At the teacher's discretion, the quadratic function can be explored graphically using analytical geometry techniques. Using this model, students will be able to predict future outcomes of this game, explore the impact of modifications of this game, and extend these modeling techniques to other games and possible real-world situations.

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2002	Leap Into Exponential Functions	Grades 10-12, Algebra II	Students will be able to transition from quadratic functions to exponential. After noting major differences between the two, they will develop the concept of the multiplier using the TI-83 Plus regression feature and the TI-Interact application. This activity will ultimately lead to the standard equation of an exponential function of both growth and decay. Given a set of data, the students will be able to analyze it and draw conclusions about it.
2001	How High (Patterns and Functions)	Grades 6-8	Students will complete investigations to discover patterns and develop equations for linear models. Students will use manipulatives to gain knowledge of real-life applications of algebraic concepts. Students will construct scatter plots, as well as use them to analyze and interpret data.
2001	Probability in the 6th Grade	Grade 6	In this unit, students will learn about probability. The topics covered include theoretical probability, experimental probability, and the law of large numbers. Students will use spinners, colored cubes, coins, and dice.
2001	What's Slope Got to Do with It?	Grades 7-9, Algebra I	This learning unit provides students with a variety of opportunities to examine slope and y-intercept in real-world situations. Students will gain a conceptual understanding of slope and y-intercept, as well as be able to see the connections between the equation, graph, and table. Students will also use information provided in word problems to write linear equations, as well as utilize data from tables to determine a line of best fit. Lastly, students will make predictions in order to solve problem-based situations.
2001	An Introduction to Public Key Cryptography	Grades 11-12	Public key cryptography is a common means of securing information on the Internet. It is often used to protect credit card transmissions for on-line shopping. One of the earliest public key algorithms was the RSA algorithm, named for its inventors Ronald Rivest, Adi Shamir and Leonard Adelman. RSA is an important but often transparent part of Internet browsers such as Internet Explorer. In the lessons outlined below, students will learn how to encrypt and decrypt using RSA. In the process of learning RSA, students will become familiar with modular reduction of natural numbers and gain an understanding of some prime number theory.
2001	Curve of Best Fit -- The Swinging Pendulum	Grades 9 - 12, Algebra II	The students will use experimental data and the regression feature of the TI-83 graphing calculator to develop a model that will predict the time period of a pendulum swing or the length of the pendulum. After a review of linear regression on the TI-83, the students will input the data from their conducted experiments into the TI-83, construct a scatter plot, perform quadratic, power, and exponential regressions, compare and contrast curves of best fit, and answer question based on the selected model.

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2001	Exponents and Exponential Functions	Grades 9-12, Algebra I	The focus of this unit is on recognizing, applying, representing, and analyzing exponential forms. The unit will begin with an investigation of the rapid growth of an exponential function. The unit proceeds with the modeling of various exponential functions. Patterns of change using exponential functions will be compared with linear and quadratic functions. Students will create symbolic, graphic, and numerical models to extend their knowledge of exponents. Later properties of exponents will be developed to enable students to simplify expressions containing exponents. The graphing calculator is an essential tool for this unit.
2001	In Debt or Not in Debt	Grades 9-12, Algebra I & II, Consumer Math	In this unit the students will be able to use the TI-83 finance application – TVM (Time-Value-Money) solver. The students will be able to see the effects of varying interest rates of credit cards.
2001	Slopey Math	Grades 9-12, Algebra I & II	This is an introductory unit designed to give students a concrete understanding of what slope really means through the use of the TI-83+ graphing calculator and Calculator Based Laboratory (CBL)2. The students will model different situations generated by the CBL motion detector. The students will discover and interpret important concepts regarding slope, the y-intercept, and the slope-intercept form of a linear equation.
2000	Show Me the Graphs!	Grades 7-8	In this learning unit, students will be given sets of data, and they will have to construct various kinds of graphs. They will learn how to properly interpret graphs and write evaluative statements about the graphs. Students will explore meaningful uses of statistics in the real world. From given sets of data, they also will learn how data can be misrepresented in ways that lead to deceptive information. Lastly, they will have the opportunity to use the graphing calculator to design, create, and interpret graphs.
2000	Iterating the Function, $f(x) = x^2 + c$	Grades 9-12	Students will use a spreadsheet to study the sequences of real numbers obtained by iterating the function $f(x) = x^2 + c$ for various values of c and initial point x_0 . They will discover the various types of behavior that can result and when it occurs. They will use algebra to prove their conjectures.
2000	Modeling Population Growth...	Grades 7-12, Algebra I	Students will use population data to analyze linear growth. They will use their graphing calculators to construct scatter plots, perform linear regressions, and answer questions based on and about their model.

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2000	Transposition Cryptology	Grades 9-12	<p>All forms of cryptography belong to one of two families of cryptosystems: substitution or transposition. Thus far, we have studied substitution systems. That is, some element of the plaintext (a letter, a digraph, a syllable, etc) is substituted for some element of cipher. In transposition systems, the plaintext is left unchanged but re-ordered in such a way that if an unintended recipient should get the message and does not know the decryption key, the plaintext would remain unreadable. There is virtually no limit to the number of ways plaintext can be transposed.</p> <p>However, the easiest and most popular way (probably the most popular because it's the easiest) is matrix transposition. In this form, the message is written into a matrix of predetermined size (# rows, # columns) left-to-right, top-to-bottom, in the normal manner of writing. The plaintext letters are then extracted by columns according to a key. It should be noted that in a matrix of K columns there are K! possible keys. The first column of letters extracted will become the first R letters of cipher, where R equals the number of rows in the matrix.</p>
2000	What You See Is Not Always What You Get!	Grades 8-12, Algebra I, Geometry, Algebra II, Trigonometry, Pre-Calculus	This unit will examine the relationship between the horizontal distance between an object and its reflected image in water vs. height between the water level and the eye of the observer.
1999	Let's Have a Pizza Party	Grades 6-8	This unit will provide students with an opportunity to engage in a real-life problem-solving situation whereby they will determine the number of possible combinations of toppings on a pizza. In addition, students will collect and analyze data about cost and size to determine which pizza is the better buy based on unit price.
1999	Parking Meter Mania	Grades 5-7	Given data based on real life information, students will examine, estimate, predict, calculate, graph, and design problems based on the following data --In the city of Washington, D.C., there are 15,000 parking meters that roughly generate \$1,000,000 weekly. What do you think about this statistic? Can you prove if it is possible?

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1999	State Lottery -- How Good Are Your Chances?	Grades 8-9	In this unit students will determine the probability of winning a state lottery (MD). They also will create a new set of rules to modify the lottery to fit two different situations. The students will use the graphing calculator to find the total number of possible outcomes using the probability menu. They will take part in a classroom simulation of the lottery. Finally, they will use oral or written communication to explain how their rule changes would affect the probability of winning.
1999	The Coming of Census 2000	Grades 6-8	In this learning unit, students will plan and conduct a census survey. In addition, students will use their collected data to make graphic representations.
1999	Winning Is the Sweetest Reward!	Grades 7-9	Middle school students are very competitive and when given the chance will work to increase their odds of winning. In this simulation, students will work independently to record and organize chance data based on the number of candy bars sold.
1999	Arithmetic Chains	Grades 8 - 9	Students will complete a chain of numbers based on given sums to arrive at a final "target" number. The goal is for them to find a way of predicting the target based on the starting number without going through the entire process. They will discover this inductively and use algebra to prove that their prediction method is correct. They will generalize this to chains using other sums and containing more links.
1999	Highs and Lows	Algebra II, Pre-Calculus, and Calculus	This unit teaches students to use the TI-83 to find the relative extrema of a function. The students will be able to determine extrema by using a graph, a table, and the values of the derivative.
1999	Iterating Linear Functions	Grades 9-12	Students will use a spreadsheet to study the sequences of real numbers obtained by iteration of linear functions. They will discover the various types of behavior that can result--divergence, convergence to a fixed point, and alternating behavior--and when it will occur. They will use algebra to prove their conjectures.
1999	Play It	Grades 8-12, GT Grades 6-8	The purpose of this unit is to teach students how to use measurements of central tendency and data summary models to analyze trends and make decisions. The students will make recommendations for a hypothetical new radio station.

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1999	Profitable Soda Stand	Grades 8-12, Algebra I and II	This unit uses a soda stand simulation to encourage problem solving and to explore the real-life meaning of intercepts, domain, range, and linear equations. Students will determine appropriate selling prices for sodas based on costs of supplies using data acquired from a local store and experimentation in the classroom. Students will use tables, graphs, and linear equations to make decisions and answer questions.
1999	What's the Point?	Grades 8-12, Algebra I and II	This unit introduces students to technology as a means of graphing linear equations on a graphing calculator and finding the point of intersection, inputting data into lists, creating scatter plots, finding lines of regression, and making conjectures about data.
1999	Will Exams Be Cancelled?	Grades 9-12, Algebra II or higher, Biology or Chemistry	Students will develop a conceptual understanding of the characteristics of exponential functions using the graphing calculator. The graphing calculator will be used to generate data and their related graphs and perform regression analysis. The students will compare the graphs of polynomial functions and complete a model simulation.
1998	Asian Homes	Grades 6-8	Students will research and compare various styles of Japanese, Korean, and Chinese architecture. They will display their results in a Venn diagram, a scale drawing, and a model. Students will demonstrate an understanding of solving proportions and using fractions and decimals in a real-life situation. Based on a population problem, students will design a new type of Chinese housing that resembles traditional structures. Students will give a written explanation of their design and material needed to construct their proposed building.
1998	Number by Number, Which Team Is the Best	Grades 6-8	Using the Internet, students will access information and statistics about professional basketball teams. They will use these data to explore correlations between player characteristics and their performance on the basketball court.
1998	Nutrition, Exercise, and Mathematics	Grades 6-8	Students will use algebraic formulas to gain an understanding of how the body stores and uses energy, how exercise affects this use.
1998	The Candy Caper!	Grades 6-7	In this learning unit, students will be instructed in the four basic statistical skills: range, mean, median, and mode. Once these skills are mastered, they will then be responsible for gathering data using jelly beans. Class results will be represented in the form of a line graph, as well as a scatter plot and histogram. Finally, each student will be required to compose a business letter informing the candy company of our results. This letter will be sent to the company through the Internet.

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1998	The Only Game in Town	Grades 6-8	Using the 1998 World Cup as a common thread, students will learn how mathematics is involved in sports through varied activities involving statistics, scale drawing, measurement, computation, and a writing activity.
1998	To Foul or Not to Foul?	Grades 6-8	Students will determine the finances of a basketball game fund raiser. They will determine profits, percents, and probabilities. They will construct and analyze tables and graphs and make decisions and predictions based on this data.
1998	Between the Extremes	Grades 9-12, Algebra I and II, Pre-Calculus and Calculus	Students will use the graphing calculator to analyze, write, and graph systems of inequalities from given data. Using real-life situations, students will collect and interpret data using graphing calculators.
1998	Can You Make a Hole in One?	Grades 9-12,	In this activity students will use miniature golf to explore principals of reflection. Students will collect and analyze data to determine the characteristics of the point at which a ball must hit a wall in order to make a hole in one. Students in higher level math classes (geometry, trigonometry, or calculus) will use equations to compare the actual data with what should theoretically happen.
1998	Does Music Calm the Savage Beast?	Grades 9-12, Algebra I, Integrated Math I	In this unit, the students will learn the effects of music on their heart rate (beats per minute, BPM). The students will use the CBL, TI83 graphics calculator, and the heart rate monitor to determine changes in the heart rate after listening to certain forms of music for a specified period of time. The students will use the data collected to form a scatter plot and determine the correlation between amount of time listening to a music type and the heart rate (BPM).
1998	Exploring Exponential Growth and Decay...	Grades 9-12, Algebra I and II	In this unit, students will use and apply exponential functions of growth and decay in realworld situations. Students will collect and analyze data with the use of the TI-83 graphing calculator, graphs, tables, and other sources. From their research students will formulate predictions and communicate their findings throughout the activities and the performance assessment.
1998	Exponential Growth and Decay	Grade 9-12, Algebra II and Pre-Calculus	Using activity sheets and the TI-82/83 students will be able to take statistical information and list independent and dependent variables, plot data points, and find and graph the exponential model that best fits. Real-life examples will be exponential growth and decay.

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1998	How Much Is Too Much?	Grades 9-10	One of the major problems facing watermen is the over harvesting of species. However, how do they make that determination? How much is too much? There must be a way to estimate population changes. In this unit, students will be informed on how to determine and calculate the population of a species. They will then use statistics and technology in order to make future predictions.
1998	How Sharp Is Your Memory?	Algebra I	In this activity students will be asked to test their memories using picture or word sets. Students will be asked to recall as many items as they can from each set in a certain length of time. Students will collect, organize, and interpret this data through several statistical methods.
1998	Investing	Grades 9-12, Algebra II and beyond	This activity will use interest calculations as an introduction to exponential functions. Students will investigate the effects of changing the principal and/or interest rates.
1998	Iterating the Function, $f(z) = z^2 + c$	Grades 10-12	Students will use a spreadsheet to study the sequences of complex numbers obtained by iterating the function $f(z) = z^2 + c$ where z and c are complex numbers. They will discover the various types of behavior that can result--divergence, convergence to fixed points and cycles, and chaos, depending upon the value of c .
1998	La Tolteca--A Tropical Paradise	Grades 7-12	Students will analyze data given to determine time, distance, and schedules. Students will use this information to predict a ferry schedule and compute information regarding depth and oxygen intake for a scuba diving expedition.
1998	Let's Get Physical	Grades 8-12, Algebra I and II, Pre-Calculus	Students will collect heart rate data at rest, while exercising, and returning to rest, using the TI-CBL. The equations of the resulting piecewise functions are determined. After presenting their results to the class, the students will predict the graphs of heart rates formed as the result of various athletic activities.
1998	Linear Functions ... Running and Walking	Grades 6-12	When we want to know how fast or slow anything moves, we measure its speed - the total path a moving object travels per unit or time. In this learning unit, students will gain an understanding of how to measure the constant speed of runners at different time intervals. Students also will work in cooperative groups to collect, record, analyze, and display data on record sheets.

Year	Development	Grade	Overview
1998	Move It	Grades 8-12, Algebra I and II, Pre-Calculus	This unit is a means of studying linear data and functions, and working with linear data gathered from an experiment using a motion detector and a toy vehicle with constant velocity. Students will graph data points and find a linear equation which fits the data, both manually and using the TI Graphing Calculator.
1998	Putting Your Money to Work	Grades 9-12, Algebra I and II, Business Math	This unit will introduce the student to computational science using a spreadsheet as a tool. The students will enter data and formulas in a spreadsheet, create graphical representations of the data, and solve real-world situations involving compound interest.
1998	Regressive Music	Grades 9-12, Advanced Algebra II, or Pre-Calculus/ Trigonometry	Students will use the TI-83 calculator and the CBL microphone probe to plot a sinusoidal graph determined by the vibrations of a tuning fork. Using their knowledge of the trigonometric equation $y = a \sin b(x-c) + d$ the students will change values of the variables to try to create a curve of best fit. Once they have determined their curve, the students will use the sine regression on the TI-83 to find the curve that best fits the data. Students will compare their curve of best fit to the one given by the calculator.
1998	The Way to Better Grades!	Grades 9-12, Algebra I	Students will use anonymous data concerning student quarter grades, homework, and attendance. Initially, a scatter plot and line of best fit will be created by hand. The data set will then be transferred to a graphing calculator to determine the scatter plot and line of best fit. The results of the two methods will be compared. Using the calculator to make a scatter plot, line of best fit, and the median fit method students will analyze the second set of data. Students will make conclusions as to which factor had a greater effect on the quarter grades. Their written conclusions will include comparing the plotting techniques and best fit methods. Additionally, students will use the best-fit line to make predictions.
1998	Videobusters	Grades 9-12	Students will utilize fundamental properties of matrix arithmetic to solve real-world situations. They will also integrate prior knowledge of matrices with TI-83 graphing calculators.
1997	A Stroke of Genius	Grades 6-7	In this unit students will be working in cooperative groups in a putting exercise. They will record, display, and analyze their own data.

Year	Development	Grade	Overview
1997	Can We Have a Dance?	Grades 7-8	Students will plan a school dance using budgetary constraints. They will use percents and proportions to predict expenses. They will use the concept of area measurement to determine the space needed for the dance and produce a scale drawing. Using comparison shopping skills, they will determine the refreshments to be served and their costs. They will write a proposal in the form of a business letter to the PTA for pre-dance funding and approval.
1997	It's Batty!!	Grades 6-8	Students will share statistical experiences with Batman. Various graphs will be created and interpreted. The students will determine how to read and match various data items in a graph based on given data. As a result, the students will create a graph based on the data and write a descriptive story about Batman's heart rate while he chases his enemies.
1997	Let's Go to the Carnival	Grades 6-8	Students will use concepts of linear and area measurement to formulate a scale model of a carnival setting. Students will determine the cost and profit margin of a refreshment stand. Students will determine the probability of winning a carnival game.
1997	When I Grow Up I Want to...	Grades 6-10	Students will use a local newspaper to research and select a job, home, and car. Students will use these choices and the concepts of percents, positive and negative numbers, and evaluating algebraic expressions to develop a monthly income and expense report. The students will determine the reasonableness of their selections and present a budget summary to the class.
1997	Another Way of Factoring	Grades 8-12	Students will find factors for quadratic equations with a leading coefficient of one. The students will then graph these equations using a graphing calculator and analyze the factors and the graphs of the equations in order to determine a relationship between the two. This relationship will then be used to help factor more difficult polynomial equations. Students will also explore a real-life application in physics.
1997	Conductivity of Salt Solutions	Algebra II	Data is collected using the CBL with a conductivity probe in an experiment by varying the concentration of three different salts in aqueous solutions. This data will then be graphed and analyzed using the TI-82.
1997	Know the System	Grades 9-12, Algebra I and II	This unit is a review of solving systems of linear equations. The systems will be solved graphically (using the TI-83), numerically (using matrices), and algebraically (verify algebraically). The highlight of the lesson will be solving real-world problems culminating in a performance task. The students will communicate their findings in a final lab report.

Year	Development	Grade	Overview
1997	Linear Functions - Learn Your Lines	Grades 9-12, Algebra I and II	Students will collect and analyze data using motion detectors of the TI Calculator-Based Laboratory (CBL) to solve and describe if and where data, representing two straight lines, intersect using numbers, symbols, and graphs.
1997	Round and Round and Round We Go!	Grades 8-10, Algebra I and II	Many CBL (Calculator-Based Laboratory) lessons have been created using the motion detector and straight motion. This lesson allows the student to investigate graphs of nonlinear motions such as a circle, ellipse, or figure-eight pattern using the CBL or CBR (Calculator-Based Ranger). The student will also investigate the concepts of amplitude and period.
1997	The Absolute Truth	Grades 8-12	Students will use an activity sheet, mathematical reasoning, and a graphing calculator to find and check solutions to absolute value inequalities. Students will use the activity sheet, a homework assignment, and a writing assignment to communicate their understanding of the methods available to find and check solutions to absolute value inequalities.
1997	Using Data Analysis to Review Linear Functions	Algebra I	This activity is intended as an end of semester review of linear functions. It is assumed that each student has worked through other data analysis problems on the graphing calculator. Students will use data provided by the teacher (sample attached), or data they have collected or researched (Internet, newspapers, student data collection, etc.). Students will use the graphing calculator to construct a scatter plot, find the line of best fit, determine function properties if applicable, and make predictions. The student will summarize predictions and write a brief analysis of their data.
1997	Walking on Air	Grades 9-10, Algebra I	Students will use graphing calculators to compile information and to explore various statistical measures.
1996	Are You a Hot Shot?	Grades 5-8	Students divided into small cooperative groups will perform free-throw shots using three varieties of balls. They will use the statistical information to draw conclusions and to make graphs and to calculate mean, median, and mode. Bar graphs, scatter plots, and statistical computation will be done from data using a graphing calculator.
1996	Grasping at Graphs	Grades 7-8	In this unit students will gather and use real-life data to find measures of central tendency. They will also use the data to construct stem-and-leaf plots, and box-and-whisker graphs. Real-life situations and higher-level thinking problems are used as motivational techniques.

Year	Development	Grade	Overview
1996	Patterns with Equilateral Triangles	Grades 6-8	Students will explore two different patterns created by equilateral triangles. They will use a geometric model to establish a data table and then develop a formula to describe the relationship between the variables. Students will use this formula to make predictions about answers that would be very difficult to find with a concrete model. Finally, students will use the graphing calculator to plot their data and determine an appropriate model that would fit the data (linear, quadratic, exponential).
1996	The Smart Move Wins (Is This a "Fair Game?")	Grades 7-8	Students will be organized into groups (2 to 4) to play The Smart Move Wins, to analyze the results, and determine the fairness of the game.
1996	Sweet Charity	Grades 7-9	Your class has been given the task of organizing a fund raising activity. You will conduct a survey, analyze the results and the proceeds will be donated among different charities. Since this is an extended fund raising activity, the teacher may want to take in to consideration: principal approval, time of year, and conflicts with other fund raising activities.
1996	Fuelish Fact Finding	Grades 8-10, Algebra I, Integrated Mathematics	Most young adults live on a budget. As the price of goods fluctuate, budgets are harder to maintain. Understanding the cause and effect of these changes is important. Good decision-making requires analyzing data in an intelligent and discriminating manner. This lesson requires students to assemble data from a variety of sources, evaluate to find the pertinent and truthful facts, analyze the information, and present the results for interpretation. Additional activities will involve determining the causes of gasoline price fluctuation and predicting future changes.
1996	Graphing and Interpreting Linear Equations...	Grades 8-12, Pre-Algebra and Algebra I	Using linear equations of the form $Ax + By = C$, the lesson demonstrates how to make a table of values and graph using pencil, paper and the graphing calculator. The lesson also explores connections to real-life situations.
1996	Making Connections: Matrices, Graphs, ...	Grades 9-12, Algebra I and II	Students will use graphing calculators to solve systems of linear equations in two ways. They will first solve the systems by graphing the equations and finding the point of intersection. They will then solve systems of equations by writing related matrices and solving by using inverse matrices.
1996	The Price Is Right	Grades 9-12, Algebra I and II	The students will estimate retail prices of chosen consumer products and compare their estimates with actual costs of the item.
1996	Tune...UM!	Grades 9-12	This is a lesson in which the students collect real data related to sound. By using the TI-82 and CBL units both force and frequency will be graphically displayed. After collecting data, conclusions can be drawn.

Year	Development	Grade	Overview
1996	Watts Up, Doc?	Grades 10-12, Algebra II, Pre-Calculus	Students will investigate the parameters of the inverse square relationship, $y = AxB$, between light intensity and distance. A CBL and light intensity probe will be used to collect light intensity data for a light bulb of specific wattage at varying distances; the graphical calculator will be used to develop an appropriate mathematical model. Students will compare the parameters of the algebraic models for different wattages. They will predict the wattage of an unknown bulb from its intensity data. Students will work in cooperative learning groups to collect and analyze the data. Each group member will be assigned a specific task.
1996	What "OHMS's" You?	Grades 10-12	This lesson is designed to help students learn to use the CBL and the Voltage Probe. Using the CBL, TI-82, and Voltage Probe, students will see the discharge of voltage over time through their body. This can lead to discussions on Ohm's Law, Kirchhoff's Rules, resistors, capacitors, exponential equations, and basic algebraic equations.
1996	When Am I Ever Going to Use This? Part 1	Grades 9-12, Basic Algebra, and/or Algebra I Class	This unit is an introductory lesson in obtaining info on the Internet to utilize basic algebra skills. It is designed to get students interested in math by relating realworld data to algebra by using the current technology and hopefully answer their question of, "When will I ever use algebra?" Working in groups of two, the students will collect data from the Internet and answer questions on worksheets. Students will use algebraic concepts of adding and subtracting positive and negative integers, ratios, percents, formulas, graphing, and rounding. Students will also write across the curriculum, integrate geography and social studies, and practice higher learning and thinking skills.
1996	When Am I Ever Going to Use This? Part 2	Grades 9-12, Beginning Algebra	We are again trying to excite Algebra students with the use of technology. Students will access the USA Today website and use the weather information section to gather the average monthly temperatures for several cities. Students will then organize the data in tabular form and plot line graphs, which they will compare to graphs of algebraic equations. Students will then make connections to Earth Science by making conjectures as to why some cities have similar graphs while other cities are radically different.

Year	Development	Grade	Overview
1995	Anatomath with the TI-80	Grades 7-8	Students will use a TI-80 graphing calculator to construct a scatter plot using class data collected while in small groups. Data will consist of four measurements for each student: radius, foot, index finger, height. Students will be asked to determine if relationships exist between lengths of specific body parts. Students will arrive at their conclusions by using scatter plots, ratios, and decimal equivalents. Algebra students will also apply correlation coefficients and linear regressions. Teacher's note: It is suggested that this be a culminating activity for a statistics unit due to the prerequisite components.
1995	Approximation of Pi	Grades 8-9, Honors Algebra	Students will approximate pi by writing a computer simulation of points being randomly placed in regions defined by a unit circle circumscribed by a square and a square inscribed in the circle. The instructor will need to determine the amount of computer expertise of the students carefully before assigning the final project.
1995	Authentic Variation	Grades 7-8	Middle school students are often interested in the application of algebra to real-life situations. In order to show this connection, students will cooperatively participate in authentic data gathering activities. They will graph their data using a graphing calculator and determine whether the two quantities measured in a particular experiment are directly or inversely proportional. After developing working equations for the graphs, they will make predictions, find applications, and draw conclusions based on the data.
1995	Catch and Release!	Grades 6-8	Students will discuss and compare different methods of estimating population of animals in the wild. In groups, students will experiment with various samples using the method of capture-and-recapture. Using a simulation as a basis for prediction, the students will estimate the size of the Rockfish population in a simulated Chesapeake Bay.
1995	Does It Fit?	Pre-Algebra, Algebra I, Algebra II	Students will use data to draw the line which best fits a scatter plot. The students will then express the equation of the line using the slope and y-intercept taken from the graphs they drew. Students will draw conclusions and make predictions based on the extrapolated lines. Initially, the teacher will provide the students with the data to be graphed, then the teacher and students will collect the data together. Finally, as an assessment, the students will conduct an experiment to collect the data which they will then graph.

Year	Development	Grade	Overview
1995	Have You Heard about the Herd?	Grades 6-8	Students will learn about mathematical sampling in order to determine population size, and the probability of the number of offspring within animal families. They will work on journal writing and respond to writing prompts in English class. Students will also participate in an all-day field trip to the zoo (in this activity the students will go to the Baltimore Zoo), maintaining a journal of responses to guided questions as well as observations and drawings of animals in their zoo habitat. Lastly, the students will demonstrate their ability to determine population sizes and write about how animal populations should be maintained in the zoo and in their natural environment.
1995	Some Like It Hot!	Grades 7-8	Students will demonstrate, in small cooperative groups and individually, the ability to measure temperature changes in water during a specified time period under various experimental conditions. Students will organize and interpret temperature measurement data using mean, median, and mode, in addition to statistical displays such as scatter plots and box plots. Using conclusions based on experimental data, students will be asked to consider a hypothetical real-life problem and provide reasonable answers. Extension questions require students to apply their understanding of experimental results to the environmental issue of the greenhouse effect and global warming.
1995	Two Different Numbers Can Represent...	Grades 6-8	This is an interdisciplinary unit on temperature. Scatter plots will be done from data found in the daily newspaper, road atlas and classroom. Cooperative learning and technology (TI-80) are utilized. This lesson, with modifications, is appropriate for different levels.
1995	Which Line Fits Best?	Grades 8-9, Algebra	Students will work in groups to collect data on circumference and diameter of various objects. They will be asked to construct and describe a scatter plot, estimate the line of best fit, and determine the relationship between the slope of the line and the formula for the circumference of the circle.
1995	Which Sells Best?	Grades 6-8	The students are asked to solve a business problem using probability and statistics. Cooperative groups will use previously taught mathematics skills to analyze and present the data they have collected. Each group will prepare a written proposal, including visual aids, to be presented orally.
1995	Beginning Modeling for Linear and Quadratic Data	Grades 8-10, Algebra I and II	This lesson will deal with modeling using three different sets of data. For two of the sets, students will collect the data themselves, make tables, then graph and find equations on the calculator. It can be done in pairs or groups. For the third set, students will use given data to graph, find equations, and then extrapolate their results.

Year	Development	Grade	Overview
1995	A Slice of the Cone	Grades 10-12, Algebra II, Algebra III, or Analytic Geometry, Pre-Calculus	<p>Quadratic equations are often used as algebraic models for real-life situations. This unit is designed to provide a cooperative learning environment in which students solve, analyze, and apply several quadratic models. Students will be assigned to cooperative learning groups (4-5/group) to identify and differentiate conics according to their equations and graphs. This will be further facilitated by the use of the TI-82 graphics calculator. Applying previous knowledge of quadratic equations, the students will use ice cream cones and flashlights to investigate how each conic is produced by the way a plane cuts the cone.</p>
1995	Affine Transformations on the "Fractal Fern"	Grades 9 - 12, Geometry through Algebra II/ Trigonometry	<p>Affine transformations are used to generate fractal images because they allow complex graphic computer images to be created and stored with little input and memory. Students will define affine transformation verbally and mathematically and demonstrate how it is used by applying a given transformation to a specified point. Students will define and identify preimages and images and their corresponding points. Instructor will then explain how an affine transformation performs the operations of shrinking, stretching, rotating, and shearing.</p>
1995	An Introduction to Functions by Calculation	Grades 10-12, Advanced Mathematics and Business	<p>This is a teacher-taught lesson in which the student will complete worksheets by using a spreadsheet on a computer. The students will look for patterns in various functions as they plot the data. The emphasis on this lesson will be an introduction to functions and their growth rates. The content is centered around the business concept of how a student will be paid on a monthly basis.</p>
1995	Binary Counter Circuit	Basic Algebra	<p>The goal of this lesson is to design and build an electronic circuit that counts in binary from zero to nine. The students will combine their knowledge of number systems and basic digital electronics to complete this project. Once the basic requirement has been met, more advanced students are encouraged to enhance their circuits in several ways. These enhancements include, but are not limited, to the following:</p> <ul style="list-style-type: none"> • Cascading counters to make a 0-99 or 0-999 counter. • Modifying the circuit, such that, it counts backwards. • Modifying the circuit, such that, it starts counting at a preset value, rather than zero. • Tuning the timer circuit to the frequency of one beat per second, representing a very basic clock.

Year	Development	Grade	Overview
1995	Cannonball!	Grades 8-12	This lesson is a group activity in which students compute the velocity and motion of a projectile. Some crude measurements of size and distance are made with a meter stick and calipers and some sophisticated measurements of very small time intervals are made with the CBL / TI-82 system. The students perform appropriate calculations to make discoveries regarding velocity, motion, and “free-fall.”
1995	Charting a New Course	Grades 7-12, Geometry/ Algebra I and II	Students learn to use the CBL and the Ultrasonic Motion Detector and they learn to become proficient with the TI-82. Students gather data from the Ultrasonic Motion Detector to determine lengths of sides of triangles. Using the Motion Detector and calculation, students determine the hypotenuse with that information and can calculate areas of the triangles. Students are expected to verify the length of the hypotenuse by using the Pythagorean Theorem. These results are used to find the hypotenuse of a much larger similar triangle.
1995	Exploring the Stock Market	Grades 9-12, Algebra II or Math Analysis	Real-world problem situations are becoming more important in the study of mathematics. Students gathering and analyzing data makes these real-world situations more relevant to their lives. This lesson allows students, working in teams of four, to develop stock portfolios and track performance over the course of several weeks. In the process, students will utilize both human and technological resources, including the TI-82 graphics calculator and the Internet. Students will have the ongoing task of preparing written support and documentation and compiling it into a research portfolio (hereafter referred to as their “project folder”).
1995	Fun with Fractals	Grades 9 - 12, Algebra I - Pre-Calculus	This unit explores relationships and patterns with numbers and geometric figures. Pascal’s Triangle is used to introduce Sierpinski’s Triangle. Properties of Koch’s Curve are explored. Matrices are employed in the construction of Sierpinski’s Triangle.
1995	Functions in Motion	Pre-Algebra, Algebra I, Algebra II	Graphing of polynomial functions incorporates a wide variety of algebraic levels and skills. The students will begin by sketching algebraic functions using graph paper and pencil. By analyzing their graphs, the students will determine what they think each variable in an equation does to the graph. Technology will then be used to look at a larger range of similar polynomial equations and determine any relationships between these functions.

Year	Development	Grade	Overview
1995	HOT WHEELS	Grades 10-12, Algebra II/ Physics	An investigation of acceleration and quadratic equations through discovery and exploration of toy Hot Wheels cars and motion. Galileo in the 17th century approximated the force of gravity using a series of inclined planes without sophisticated equipment. The students will duplicate Galileo's experiment using the CBL and the TI-82. The use of these tools have allowed us to simplify this ancient experiment as well as make it more accurate. The students investigate the principle of acceleration as a quadratic function. The students collect data to determine that the force of gravity is a function of the angle of inclination.
1995	Homecoming Tickets	Grades 9-12, Algebra I and II	Students will use principles of linear programming to solve a multi-condition problem. By successively eliminating possible solutions, they will derive a range of usable solutions.
1995	Impact!!!	Grades 8-12, Algebra I	Students will gather data in an experiment in order to investigate Newton's Second Law of Motion, force = mass x acceleration. They will perform two investigations. Acceleration will be measured on a laboratory cart of constant mass while force propelling the cart is varied. In the second investigation, acceleration will again be determined but force applied to the cart will be held constant while the mass of the cart is varied. Students will analyze motion graphs, use the data to determine acceleration for each trial and draw graphs of the relationships in the two investigations. Students will use this information to predict variables affecting a car crash.
1995	Lines, Lines, Everywhere!!	Grades 8 - 12, Algebra/Statistics	Acceleration will be measured on a laboratory cart of constant mass while force propelling In this lesson, the students will explore the effects of changing values for the y-intercept and for the slope of a line. They will explain/discover the concepts of slope, intercepts, parallel, and perpendicular lines.
1995	Linking Real World Data to the Classroom	Grades 9-10, Pre-Algebra, Basic Algebra, and Algebra I	In order to make intelligent decisions from the vast amounts of available information, students need to have experience in collecting and analyzing data. In this lesson students will research a collection of data and construct a graphical representation of that data. Students will analyze the relationships that exist and make inferences.
1995	Matrices at the Speed of Light	Grades 9-12, Algebra II, Selected Topics, Pre-Calculus	Students will receive detailed instruction on the use of the TI-82 graphics calculator to perform basic matrix operations. To reinforce these concepts, students will solve typical matrix applications using the TI-82 graphics calculator.

Year	Development	Grade	Overview
1995	Matrices: A Secret Weapon	Grades 9-12, Algebra I - Calculus	Many students have a fascination with secret messages. This lesson uses matrices and modular mathematics to explore the encoding and decoding of such messages. Students will investigate methods of coding, which include shift transformations, keyword codes, and polygraphic systems. Students will be able to encipher and decipher messages using these methods. Students will discover the importance of matrices and their application to cryptology. For the lower level courses, this lesson could be an exploratory activity not only for Cryptology but for the math content (matrices). For the higher level courses, this lesson could help students discover the complex mathematical basis and apply their mathematical knowledge of matrices to both Cryptography and Cryptanalysis.
1995	Modeling Drug Assimilation in the Human Body	Grades 10-12, Biology, Chemistry, Physics, Health, Algebra II/Trig, Pre- Calculus, Calculus	The color of an object is the result of reflected waves of light; complementary wavelengths are absorbed. The concentration of colored solutions, therefore, can be determined by measuring the absorption of a specific transient wavelength of light. This concept is utilized to collect data on the rate of assimilation of drugs in the human body. Solutions are prepared to represent concentration of drugs in the body at specific time intervals. Students will then use these samples to obtain absorption values of green light using the colorimeter probe of the CBL system. The COLOR1 and COLOR2 programs of the TI-82 are then used to convert absorbance into concentration, relating residual concentration to time. The resulting data will be analyzed for a best fit regression equation. From the graph of the equation, predictions will be made about the retention of various drugs over time and the effect of multiple doses of the drug. Biological, social, and medical consequences will be discussed.
1995	Plugging into the Best Price	Grades 8 - 10, Pre-Algebra and Algebra I	Students will use a graphing calculator and the instructional activity sheets to explore the parameters of a linear function and the significance of the slope and y-intercept. This knowledge will be used to interpret a linear relationship between the cost and time of performing a job.
1995	Relating Distance and Velocity over Time	Grades 10-12, Algebra II, Trigonometry, Pre-Calculus, and Calculus	Students will collect data using a CBL and motion detector. The data will be graphed using distance-time and velocity-time. Teachers will have the option of using this investigation at three increasingly difficult skill levels (data collection, line of best fit, and comparison of slope and velocity). Cooperative learning groups will be formed consisting of two to four students. Each will be assigned a specific task in the collection of data. Students will study linear MOTION.

Year	Development	Grade	Overview
1995	SHHHHH! It's a Secret	Algebra I, Geometry, Algebra II	<p>Understanding symbols has been an important factor in human history. The symbols enhance understanding, but without a key for unlocking the message held within the symbols, the information is useless.</p> <p>Allowing only a select group of people to have information is an important part of the world of business, nations, and individuals. Each of us has information which is important to us and would pose a threat to our security if it were public knowledge. Social security numbers, pin codes, bank accounts, personal health information, etc. are essential in our personal world but in the hands of someone else, may be threatening. In business coding messages is important so that only those who purchase a service such as HBO may use the service, and the messages are not pirated by those who do not pay for the access.</p> <p>In the international arena, coding of secure information has moved from fairly simple methods used in the Civil and Revolutionary Wars to the highly complex coding done today with super computers. Mathematics has played an integral part in the development of the programs used in the encoding and decoding processes.</p> <p>The ciphering and deciphering of codes is termed cryptography and cryptanalysis. These words are derived from the Greek, KRYPTOS (meaning hidden), and LOGOS (meaning speech).</p> <p>In this lesson, students will gain an understanding of the history and a few of the methods which can be used to hide messages.</p>
1995	Sectors of Pizza	Grades 9-12, Algebra, Geometry, Consumer Math	Students will apply their knowledge of circles by using technology with practical applications. This learning unit is designed to be an enrichment and/or culminating activity.
1995	Slip Slide'n Away	Grades 9-12, Algebra I and II, Physics, Pre-calculus	This is a lesson in which the math student collects real data related to friction. The resulting mathematical analysis allows them to plot data points and find the equation of the graph. The lesson also includes a discussion on the type of graph, its slope, and its physical meaning.

Year	Development	Grade	Overview
1995	Speaking Parametrically	Grades 7 - 12; Pre-Algebra, Algebra I and II	<p>Students will use the TI-82 graphing calculator in parametric mode to solve distance, rate, and time problems.</p> <p>Initial activity will be teacher directed to show students how to use the calculator in parametric mode. The students will work along with the teacher to solve a problem . The students will be required to write their observations of what is occurring on the calculator and explain what it means with respect to the given problem.</p> <p>The class will be separated into cooperative learning groups to set up simulations of five different problems. They must submit a written report describing their findings on each of the five problems.</p>
1995	The Fat and the Lean	Grades 9-12, Basic Algebra, Algebra I, Algebra-Geometry	<p>Many adolescents have not developed proper eating habits; therefore, they are unaware of the nutritional value in the foods they consume. In this activity, students will evaluate their personal nutrition using tables and equations. Each student will record food consumption for a two-day period, determine fat and calorie intake, and develop nutritional goals.</p>
1995	The Physics of Auto Racing	Grades 9-12, Physics/Geometry, Algebra I or II, Pre-Calculus	<p>This learning unit is designed to give students a guided introduction to telecommunications for accessing data and guidance in the interpretation of that data. There are additional addresses provided to direct students to launching sites for collecting data into auto racing related independent research.</p>