Year	Development	Grade	Overview
2007	**Integrating Innovative Integers**	**Grades 7-8**	This lesson is an interdisciplinary lesson that integrates mathematics, Social Studies, economics and science using real world applications of integers. The lesson planning and implementation of this unit requires collaboration of all four contents, aligning State Curriculum. The following is the math portion of this effort. For this demonstration we chose to focus on Japan.
2003	**A Study in Classification**	**Grades 7-8**	Classification is an important concept in understanding the Subdivision of the Biological Kingdoms. This lesson will help the students understand the relationships of similarities and differences of a particular thing within a population of many. Students will learn to categorize using at least three different characteristics. Students will also enumerate the individuals within the population based on the characteristics as well as make probability and statistical analysis related to the population based on their sampling.
2003	**What is the Ohm Pattern?**	**Grades 5-8**	Ohm's law is a standard part of middle school science curriculum. However this unit employs a thematic cross-curricular constructionist approach to this basic concept. Ideally, both the math and science teachers will be involved. A lesson may be done in either the math or science class or teachers may wish to combine classes to have a longer module period. The unit encompasses building electrical circuits, writing equations, and graphing. This unit is best done before or during the electricity unit of science class, as students should not already know the relationship between the variables of Ohm's Law. The students will build circuits, observe the effects of manipulating variables, and induce a possible formulaic explanation for their observations, and then conclude by producing data tables for others to deduce the formula.
2002	**Be A Smart Consumer**	**Grades 6-8**	This learning unit provides a variety of strategies and activities to thoughtfully engage students in the application and practice of number concept, decimal computation, and problem solving skills. Students will examine actual food packages and record net weights in a table, then perform estimated and exact calculations using this real life data. They will use information provided to determine the "best" buy on selected ingredients by finding unit rates. Additionally, students will make selections from a restaurant menu to stay within a designated budget while including the necessary sales tax. The culminating performance assessment integrates the practiced skills, and requires students to write an explanation for choices made.

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2002	**Don't Bounce the Check!**	**Grades 7-8, Economics**	In this unit the student council will purchase new sports equipment for the school's gymnasium. The task will be to compare prices for equipment, calculate discounts, keep a running balance of a checkbook based on deposits and withdrawals, and prepare a graph of expenses (spending and deposits). The students also will make decisions regarding money management and cost effectiveness.
2002	**Gathering and Analyzing Data**	**Grades 7-8**	In this unit students will learn how to generate, represent, interpret, and analyze data. Students will focus on graphically representing data and analyzing line graphs, pie graphs, and box plots.
2002	**Puzzling Pizza Paradigms**	**Grades 6-8**	Students will be actively engaged in a thematic unit on pizza. Students will work as a class, small cooperative groups, and individually to complete the activities. The topics that will be covered include: data analysis, collection and interpretation, and geometric concepts involving area.
2002	**What is a Scatter Plot Saying?**	**Grade 8**	This unit is designed to solidify students' understanding of creating, analyzing, and interpreting scatter plots. It starts out with the basic ideas of collecting data and making a scatter plot. It then focuses on analyzing the scatter plot to find relationships and interpret the data. This unit introduces major ideas of linear and non-linear relationships, the y=x line, the line of best fit, and positive and negative relationships (association).
2000	**"A Drop in the Bucket"...**	**Grades 7-8**	The planet water availability is only 1% potable. How we use or abuse our water supply becomes critical to our very existence. This learning unit will permit students to become familiar with our water source, availability, costs, their own family usage, and the opportunity for wise usage through learned conservation techniques
2000	**Down on the Farm**	**Grades 6-8**	Given real-life information regarding farm life, students will design their own farm, select crops and animals, make a cost/profit analysis and data analysis, and communicate these ideas to their classmates/groups.
2000	**Games, Games, Games**	**Grades 6-8**	The following activities are a cross-curricular unit between Mathematics, Science, and Language Arts classes. Students will create a math board game that focuses on fractions, decimals, and percents and their interrelationship. Students also will be able to share their games with members of the student body. *Note to teachers: This unit can be easily adapted to any unit of study.

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2000	**It's a Wrap!**	**Grades 6-8**	The following activities are designed to incorporate mathematics, the arts, and language arts into a project which introduces students to the concepts of design and engineering by applying measurement, estimation, and computational skills. The students will calculate the surface area and volume of boxes and bags. They will design and select materials for a box or bag using a net. They also will communicate mathematical methods and ideas. Students will make a Language Arts connection by creating a jingle for their cookies. They will make an Art connection by decorating their packages.
2000	**Roller Coaster Mania**	**Grade 8**	This unit provides students with opportunities for Internet research, as well as activities that allow for the application of previously-learned mathematics and writing skills. In addition, the unit engages students in scientific inquiry and introduces them to aspects of physical science.
1999	**"But It Is a Dry Heat"**	**Grades 6-7**	During this learning unit students will be investigating the effects of climate conditions on the growth of an agricultural product in order to determine the ideal climate in which to grow this product. This investigation will accompany an identification, definition, and description of the major climate types using the Internet as the primary resource tool. The culminating activity will consist of an electronic media presentation created by the students.
1999	**Concentrating on Acids and Bases**	**Grades 6-8**	Acid and base solutions are an important part of our everyday world. Substances lower than 7 are acidic and give off hydrogen ions (H+). Those over 7 are basic and give off hydroxide ions (OH-). Water is made up of both H+ and OH- and is considered neutral with a pH of 7. Various substances will be tested using pH paper and cabbage juice indicators. This information will be applied to real-life applications such as the testing of rain and water samples. The effect of dilution on pH will also be investigated.
1999	**Eyes on the Eagle**	**Grades 6-8**	This unit explores population statistics for the American Bald Eagle. Students will organize and present data and plan a field trip. The unit will culminate with a presentation to the school administration.
1999	**Go for the Electronic Gold**	**Grades 6-8**	Today's society is a globally oriented one. We move, change jobs, and frequently travel more often to other parts of the country and the world. With this in mind, today's youth need to be versed in all parts of our society. We study many countries and cultures. Today, we buy and sell goods all over the world from the Internet. Determining the foreign currency exchange, students can decide what goods to buy, knowing the value in American dollars. After exploration of foreign currency exchanges, students will apply this knowledge to shop for quality Olympic equipment on the Internet.

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1999	**How Will I Survive?**	Grades 6-8	Middle school students need practical application to experience the ups and downs of finance that plays an integral part of our adult lives. Students will use a career connection project to research how much it costs to survive on their own. Students will choose a career, family situation, housing, transportation, and manage finances. The culminating activity involves an oral, visual, and written representation of their life scenario.
1999	**Making Music and Money**	Grades 7-8	The following activities are a cross-curricular unit between the Mathematics and Language Arts classes. Students will learn the costs and profits of organizing a band, producing a CD, and performing concerts. Using numerical data and personal accounts, students will make and justify decisions dealing with the allocation of funds. Students also will have an opportunity to develop their band and write their own lyrics.
1999	**Marine Life -- Adaptations for Keeping Warm**	Grades 6-8	In this lesson, students (grades 6-8) will lower the freezing point of a substance and demonstrate how it can stay liquid when it normally would be solid. Students will be able to describe how Antarctic fish are able to survive below freezing temperatures. Students will be able to understand how unique biological and physiological adaptations are essential for survival in one environment but detrimental to survival in another environment. Students will be able to compare an earlier prediction with actual observed results of their experiment.
1999	**Model Rocketry -- The Beginning**	Grades 6-8	This lesson will focus on the science, math, and technology of rockets from the ancient Chinese art of pyrotechnics to model rocketry of today. Through a variety of hands on experiences students will get an understanding of the development of model rocketry. Formulas will be used to calculate altitude and velocity. The exercise infuses historical data and contemporary technology to create a fun and exciting lesson!
1999	**The Dilemma of the Three Little Pigs...**	Grades 6-8	Students will be able to draw a scale model of the exterior frame of their dream home. They will be given a budget and choice of building materials. The ultimate goal is to build the most cost efficient house for the money. They must justify why they used the building materials and the size of their house. A possible field trip to a lumber or brick yard might be a nice introduction to this learning unit. They must keep a daily journal explaining their decisions and any changes that they might make. In cooperative groups, they will construct a 3-dimensional model of their house out of inexpensive materials of their choice.
1999	**The Mouse Trap Design Challenge**	Grades 6-8	The students will be given a mousetrap vehicle kit and other material. Using only the given material, the students will design and construct a vehicle that will travel the furthest distance and the fastest speed over a set distance.

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1998	**Constructing Sierpinski's Triangle**	**Grades 5 (gifted)-10**	Students will review the basic techniques necessary to construct congruent line segments, midpoints, perpendicular bisectors, and congruent angles. The students will then be introduced to Sierpinski's triangle through the Chaos game described in the lesson. Afterwards, the student will CONSTRUCT and color their own Sierpinski's triangle.
1998	**Creating the Sno-Cone Zone**	**Grades 6-8**	Students will gain an understanding of running a small business. Students will calculate total costs of materials for their business and estimate their profit potential. Students will culminate the activity with a persuasive letter.
1998	**Flexibility, Fact or Fiction?**	**Grades 6-8**	In this unit students will work in cooperative groups measuring personal flexibility of their body. They will record, display, analyze, predict, and present their own data.
1998	**Global Warming**	**Grades 7-8**	Students will be given temperatures from two cities. They will graph the data on a double line graph and create a box and whisker plot. After graphing the data and reading the literature provided, they will analyze the data and identify any visible trends.
1998	**It All Stacks Up!**	**Grades 7-8**	Students will use the theme of waste disposal and recycling to address math skills such as basic operations, proportions, percents and creating and interpreting graphs and tables. Students will demonstrate their understanding of the content by creating a brochure to inform the public and/or by writing a letter urging the governor to pass a recycling law.
1998	**It's a DRAG!!!**	**Grades 7-12**	Drag is one of the four forces of flight, the others being Lift, Gravity, and Thrust. Within the atmosphere all things are affected by drag. This lesson details how to measure and calculate the drag coefficient for a parachute through hands-on experiments. Parachutes experience only two forces, drag and weight, and at terminal velocity DRAG = WEIGHT (see attachment Background Information). The calculations and formulas are applicable to other flying objects as well.
1998	**Linear Functions--Exploring the Relationship...**	**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 will also work in cooperative groups to collect, record, analyze, and display data on record sheets.

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1998	**Motion Magic**	Grade 8	In this unit students will work with the concepts and formula for velocity. Students will be introduced to the concept of motion in both mathematical representations and, using the TI-83 graphing calculators, graphical representations. Students will than complete a lab and other activities dealing with rate, time, and distance.
1998	**Space Weights**	Grades 6-8	Students will explore the effect of gravitational force. Using bottles filled with sand ,the teacher will demonstrate the differences in weight. Students will then calculate their personal weight on each planet within the solar system. Comparison of and graphing results will enable the students to experience g-force on a personal level. Estimation, computation, ratio and proportion skills will be refined and reinforced.
1998	**Stringing the Solar System**	Grades 6-8	Students will use mathematical conversion methods and scaling in order to calculate and construct a model of the solar system to gain an understanding of proportionate distances between planets, as well as proportionate sizes of the planets. Students will extend their abilities to apply these skills by answering additional challenges that involve conversion.
1998	**Talking with Machines--Binary Conversions**	Grades 6-12	This lesson will model numerical values of machine language with that of other numbering systems. Students will use models to move from numerical systems to a machine system.
1998	**The All-Star, All-Sports Course**	Grades 6-7	Students will use different types of sports balls to perform a variety of tasks. Students will work on logic problems and create a data table. As a culminating activity, the class will design a sports course that requires application of ratio and proportion, measurement, and principles of friction and Newton's Laws.
1998	**The Solar Powered Racer Challenge**	Grades 6-8	The students will develop plans for and construct a vehicle powered by a solar cell using only the materials provided which will travel the length of a lighted track in the fastest time possible.

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1998	**What Will the Weather Be Today?**	Grades 6-8	In this lesson, students (grades 6 - 8) will recognize the factors that interact to create weather, while comparing weather data from a locale in the USA to weather data from Antarctica. To make this comparison, students will make the necessary conversions of units to enable comparison, graph the temperatures and wind speeds for easy comparison, and analyze the data to determine windchill with the help of a windchill index chart. As a culmination of the data collection and analysis, students will make a prediction of the next days forecast using given weather descriptors that represent a range of numerical data. Students will discuss the accuracy of their predictions by comparing them to actual data from the next day.
1998	**Your Local Pond: "A Delicate Aquatic Biome"**	Grades 7-8	In most communities there is a delicate balance between living organisms and abiotic factors. When man disturbs that balance by altering the abiotic factors, the results are usually detrimental. In this unit the basic biology of living organisms will be challenged by chemicals introduced by man. The students should be able to connect basic concepts such as eutrophication, dissolved oxygen and man's societal role in maintaining a balance. They will determine the effects of phosphate concentration on algae growth.
1997	**M & M - Mathemagical Mirrors**	Grade 8	In this unit students will make connections between mathematics and science using technology. The lesson culminates in the application of knowledge to a real-world problem involving a child care center. By using angles of incidence and reflection, mirrors will be placed around a room so that a day care worker may see all the children at any given time.
1997	**Math in the Garden**	Grades 6-8	Students will research, plan, and create a garden using math, science, and technology skills. During the project, students will research the scientific names and characteristics of different types of bulbous flowers. After measuring the perimeter and area of a given plot of land, students will conduct scientific experiments to determine existing soil conditions. Students will then write a persuasive letter to the principal to communicate mathematically the feasibility of planting a garden. Before planting, students will be required to submit a scale drawing of the placement of the bulbs including all measurements. Students will evaluate the accuracy of their scale drawings with their peers. Students will edit and revise their drawings based on suggested recommendations. Students will then predict the estimated height of the flowers and construct an additional scale model including all the features of the garden. The students will then "sell" their plan to their classmates. Through class discussion/debate, the class will collectively critique models and choose the best one. The final stage of the project will have students planting their garden using the appropriate tools required.

Year	Development	Grade	Overview
1996	**Math and Science Are Probably Connected**	**Grades 6-8**	This is an interdisciplinary unit which uses the basics of probability to link concepts in Chemistry, Genetics, and Physical Science. Students will collect, organize, and analyze data; construct graphs and charts, and use writing to communicate what they have learned.
1995	**Acid Rain**	**Grades 7-8**	This lesson creates an awareness of environmental pollution by focusing on issues of acid rain. Causes and effects of acid rain are discussed, investigations are performed to measure pollutants in local areas, and letters of advocacy are written to promote environmental protection.
1995	**Africa in Abundance**	**Grade 7**	These activities integrate Maryland Functional Mathematics, Maryland School Performance skills, and the middle school World Culture curriculum. Students will use the given information on Africa to represent the area and population of the country as a specific fraction, decimal and percent of the continent's total. They will then complete a variety of activities that will allow them to expand and relate their knowledge of Africa and mathematics.
1995	**Are We on the Same Wavelength?**	**Grades 6-8**	This activity generates an elementary mathematical explanation for the scientific concept of waves. Students will experiment with the production of waves and their movement through various media, in order to discover the mathematical relationship among frequency, wavelength and velocity. They will use their findings to suggest a solution to a real-life situation that a working scientist might encounter.
1995	**Defining Resistor Color Codes and Values...**	**Grades 8-10**	This lesson deals with application of color codes to solve mathematical valuation of electrical components.
1995	**Introduction to Hypermedia**	**Grades 6-8, Tech Ed**	This lesson is designed to provide an introduction to Hypermedia and its various capabilities and uses through the development of a student-designed program using the authoring system HyperCardTM. This lesson will provide integration of math, science, and language arts into a technology-based application.
1995	**Mystery Mural: A Visual Display...**	**Grades 6-8**	Constructing a mural is a way for students to display what they have learned in any interdisciplinary project. While cooperatively involved in the construction, students will apply mathematical skills such as using metric measurement, using ratio and proportion to make scale drawings, and coordinate graphing.