

MATHEMATICS ILLUMINATED



Mathematics Illuminated is a course on the theories, history, and beauty of mathematics. The series explores major themes in the field of mathematics, from mankind's earliest study of prime numbers to the cutting-edge mathematics used to reveal the shape of the universe. Mathematics is presented as play we engage in to answer deep questions and also as a powerful language for uncovering and describing phenomena in the world around us. The groundbreaking videos, interactive web exploration, text materials, and group activities included in *Mathematics Illuminated* reveal the hidden delights of the ever-evolving world of mathematics. *Produced by Oregon Public Broadcasting. 2008.*

30-MINUTE PROGRAMS

1. The Primes
2. Combinatorics Counts
3. How Big Is Infinity?
4. Topology's Twists and Turns
5. Other Dimensions ▶
6. The Beauty of Symmetry ▶
7. Making Sense of Randomness
8. Geometries Beyond Euclid ▶
9. Game Theory
10. Harmonious Math
11. Connecting with Networks
12. In Sync ▶
13. The Concepts of Chaos ▶

For individual program descriptions, visit
www.learner.org/resources/series210.html

PRICES

- DVD-R [MADVD] ■ \$375.00
13 half-hour programs on 4 discs
- COURSE FACILITATOR GUIDE [MAGS] ■ \$44.95
- COURSE PARTICIPANT GUIDE [MAGF] ■ \$44.95

WEBSITE

www.learner.org/courses/mathilluminated

Other Dimensions

The conventional notion of dimension consists of three degrees of freedom: length, width, and height, each of which is a quantity that can be measured independently of the others. This unit explores different aspects of the concept of dimension, what it means to have higher dimensions, and how fractional or "fractal" dimensions may be better for measuring objects such as ferns, mountains, and coastlines.



The Beauty of Symmetry

Mathematicians comprehend symmetries as motions whose interactions and overall structure give rise to an important mathematical concept called "group." This unit explores Group Theory, the mathematical quantification of symmetry, which is key to understanding how to remove structure from (i.e., shuffle) a deck of cards or to fathom structure in a crystal.

Geometries Beyond Euclid

Our first exposure to geometry is that of Euclid, in which all triangles have 180 degrees. As it turns out, triangles can have more or less than 180 degrees. This unit explores these curved spaces that are at once otherworldly, yet firmly of this world—and present a key to understanding the human brain.

- ✓ A professional development series for high school, college, and adult learners
- + 3 graduate credits or 3 CEUs
- ✓ Distance learning course

In Sync

The regular beating of the human heart and the simultaneous flashing of gangs of fireflies in Southeast Asia share the property of spontaneous synchronization. This unit shows how synchronization can be analyzed, studied, and modeled via the mathematics of differential equations, an outgrowth of calculus. The application of these ideas leads us toward understanding the workings of the heart.

The Concepts of Chaos

The flapping of a butterfly's wings over Bermuda causing a rainstorm in Texas exemplifies the phenomenon of chaos. Chaos is characterized by a widely sensitive dependence of the future on slight changes in a system's initial conditions. This unit explores the mathematics of chaos, which involves finding structure in what initially appears to be random, and imposes limits on predictability.



For current pricing and to order: 1-800-LEARNER® or www.learner.org

AGAINST ALL ODDS: INSIDE STATISTICS

Picking up where the original *Against All Odds* left off, the new series maintains the same emphasis on “doing” statistics. Each unit is based on a video module that introduces a statistical topic in real-world context and takes you on location to where people from all walks of life are using statistics in their work. Starting with descriptive statistics, the course continues through probability and inference. Examples range from finding patterns in lightning strikes, to examining possible genetic resistance to deadly Lassa fever in West Africa, to linking DDT to the decline of peregrine falcons. A new website and online interactives allow viewers to practice and review what they’ve learned. *Produced by Chedd-Angier in collaboration with COMAP. 2013.*

10-MINUTE VIDEO MODULES

1. What Is Statistics?
2. Stemplots
3. Histograms and Distributions
4. Measures of Center
5. Boxplots
6. Standard Deviation
7. Normal Curves ▶
8. Normal Calculations
9. Checking Assumption of Normality
10. Scatterplots
11. Fitting Lines to Data
12. Correlation
13. Two-Way Tables
14. The Question of Causation
15. Designing Experiments
16. Census and Sampling
17. Samples and Surveys
18. Introduction to Probability
19. Probability Models
20. Random Variables ▶
21. Binomial Distributions
22. Sampling Distributions
23. Control Charts
24. Confidence Intervals
25. Tests of Significance
26. Small Sample Inference for One Mean
27. Comparing Two Means
28. Inference for Proportions
29. Inference for Two-Way Tables
30. Inference for Regression
31. One-Way ANOVA
32. Case Study

For individual program descriptions, visit
www.learner.org/resources/series65

PRICES

- DVD [AADVDR] = \$220.00
 32 10-minute video modules on 4 discs
- Coordinated books and guides are also available.
 For more information, call 1-800-Learner or visit
www.learner.org.

WEBSITE

www.learner.org/courses/againstallodds

✓ A course for high school teachers and college-level instruction

✓ Distance learning course

**NEWLY
UPDATED!**



Coordinated new website with interactive statistical tools.

Normal Curves

A nature preserve that's tracked bird migrations through New England for decades records tons of bird-related data; everything from wingspan measurements to arrival dates provides examples of normal distributions.

Random Variables

The Challenger space shuttle disaster was blamed on faulty O-rings. How can probability calculations on random variables help predict the chances of this kind of failure?



Computational geneticist Dr. Pardis Sabeti hosts the updated series. She uses statistics in her own work combing through the evolutionary record found in our genes.

See **DISCOVERING
PSYCHOLOGY**

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CURRICULUM CONNECTION

For current pricing and to order: 1-800-LEARNER® or www.learner.org

Learning Math

PATTERNS, FUNCTIONS, AND ALGEBRA



Part of the NCTM standards-based series *Learning Math*, this course explores the big ideas in algebraic thinking, such as finding, describing, and using patterns; using functions to make predictions; understanding linearity and proportional reasoning; understanding nonlinear functions; and understanding and exploring algebraic structure. *Produced by WGBH Boston. 2001.*

- ✓ A professional development course for elementary and middle school teachers
- + 3 graduate credits or 2.5 CEUs
- ✓ Distance learning course

30-MINUTE PROGRAMS

1. Algebraic Thinking
2. Patterns in Context
3. Functions and Algorithms
4. Proportional Reasoning
5. Linear Functions and Slope
6. Solving Equations
7. Non-Linear Functions
8. More Non-Linear Functions
9. Algebraic Structure
10. Classroom Case Studies, Grades K–2
11. Classroom Case Studies, Grades 3–8

For individual program descriptions, visit www.learner.org/resources/series140.html

PRICES

- DVD-R [LMADVDRK] ■ \$240.00
11 half-hour programs on 4 discs, 1 guide
- ADDITIONAL PROFESSIONAL DEVELOPMENT COURSE GUIDE [LMASGF] ■ \$39.95

WEBSITE

www.learner.org/courses/learningmath/algebra



Learning Math

NUMBER AND OPERATIONS



This course examines the three main categories in the Number and Operations strand of the NCTM Principles and Standards of School Mathematics. The video programs cover the real number system, place value, the behavior of zero and infinity, meanings and models of basic operations, percentages, and modeling operations with fractions. Topics are explored in-depth, with both practical examples and more abstract concepts providing teachers with the higher mathematics behind the basic topics they teach. *Produced by WGBH Educational Foundation. 2003.*

- ✓ A professional development course for elementary and middle school teachers
- + 3 graduate credits or 2.5 CEUs
- ✓ Distance learning course

30-MINUTE PROGRAMS

1. What Is a Number System?
2. Number Sets, Infinity, and Zero
3. Place Value ▶
4. Meanings and Models for Operations
5. Divisibility Tests and Factors ▶
6. Number Theory
7. Fractions and Decimals
8. Rational Numbers and Proportional Reasoning
9. Fractions, Percents, and Ratios
10. Classroom Case Studies, K–2
11. Classroom Case Studies, 3–5

12. Classroom Case Studies, 6–8

For individual program descriptions, visit www.learner.org/resources/series171.html

PRICES

- DVD-R [LMNDVDRK] ■ \$310.00
12 half-hour programs on 4 discs, 1 guide
- ADDITIONAL PROFESSIONAL DEVELOPMENT COURSE GUIDE [LMNSGF] ■ \$39.95

WEBSITE

www.learner.org/courses/learningmath/number

Place Value

Look at place value systems based on numbers other than 10. Examine the base two numbers and learn uses for base two numbers in computers. Explore exponents and relate them to logarithms. Examine the use of scientific notation to represent numbers with very large or very small magnitude. Interpret whole numbers, common fractions, and decimals in base four.

Divisibility Tests and Factors

Explore number theory topics. Analyze Alpha math problems and discuss how they help with the conceptual understanding of operations. Examine various divisibility tests to see how and why they work. Begin examining factors and multiples.



INSIGHTS INTO ALGEBRA 1: TEACHING FOR LEARNING

This professional development workshop explores strategies to improve how 16 topics found in most Algebra 1 programs are taught. Each video includes two lessons that showcase effective strategies for teaching. The workshop guide provides activities to help teachers examine their practice and incorporate what they are learning into their daily lessons. *Produced by Thirteen/WNET. 2004.*

60-MINUTE PROGRAMS

1. Variables and Patterns of Change
2. Linear Functions and Inequalities
3. Systems of Equations and Inequalities ▶
4. Quadratic Functions
5. Properties
6. Exponential Functions
7. Direct and Inverse Variation
8. Mathematical Modeling

For individual program descriptions, visit
www.learner.org/resources/series196.html

PRICES

- DVD-R [IADVDRK] ■ \$220.00
8 one-hour programs on 4 discs
- Workshop guide available online.

WEBSITE

www.learner.org/workshops/algebra

- ✓ A professional development video workshop for middle and high school
- ➕ 2 graduate credits or 1.5 CEUs
- ✓ Distance learning course



Patricia Valdez helps a student interpret a graph and solve a linear programming problem.

ALGEBRA: IN SIMPLEST TERMS

This series explains the sometimes baffling concepts of algebra. Series host Sol Garfunkel explains why this branch of mathematics is necessary for solving real-world problems. With this visual textbook, students and adult learners will grasp the concepts behind the abstract equations and learn the language of algebra. This series has applications in geometry and calculus instruction. *Produced by the Consortium for Mathematics and Its Applications and Chedd-Angier. 1991.*

- ✓ An instructional series for high school, college, and adult learners
- ✓ Distance learning course

30-MINUTE PROGRAMS

- | | |
|----------------------------|---------------------------------------|
| 1. Introduction | 13. Functions |
| 2. The Language of Algebra | 14. Composition and Inverse Functions |
| 3. Exponents and Radicals | 15. Variation |
| 4. Factoring Polynomials | 16. Polynomial Functions |
| 5. Linear Equations | 17. Rational Functions |
| 6. Complex Numbers | 18. Exponential Functions |
| 7. Quadratic Equations | 19. Logarithmic Functions |
| 8. Inequalities | 20. Systems of Equations |
| 9. Absolute Value | 21. Systems of Linear Inequalities |
| 10. Linear Relations | 22. Arithmetic Sequences and Series |
| 11. Circle and Parabola | 23. Geometric Sequences and Series |
| 12. Ellipse and Hyperbola | 24. Mathematical Induction |

25. Permutations and Combinations
26. Probability

For individual program descriptions, visit
www.learner.org/resources/series66.html

PRICES

- DVD-R [ALDVDR] ■ \$389.00
26 half-hour programs on 7 discs
- TEACHER GUIDE [ALSGT] ■ \$20.00

For current pricing and to order: 1-800-LEARNER® or www.learner.org



Learning Math

DATA ANALYSIS, STATISTICS, AND PROBABILITY

This course introduces statistics as a problem-solving process. Increase your understanding through investigations of different ways to collect and represent data and to analyze and interpret variation in data. Through practical examples, come to understand statistical concepts, such as data representation, variation, the mean and median, bivariate data, probability, designing statistical experiments, and population estimations. *Produced by WGBH Educational Foundation. 2001.*

30-MINUTE PROGRAMS

1. Statistics As Problem Solving
2. Data Organization and Representation ►
3. Describing Distributions
4. The Five-Number Summary ►
5. Variation About the Mean ►
6. Designing Experiments
7. Bivariate Data and Analysis
8. Probability ►
9. Random Sampling and Estimation ►
10. Classroom Case Studies: Grades K–2 ►
11. Classroom Case Studies: Grades 3–5
12. Classroom Case Studies: Grades 6–8

For individual program descriptions, visit
www.learner.org/resources/series158.html

PRICES

- DVD-R [LMDDVDK] ■ \$240.00
12 half-hour programs on 4 discs, 1 guide
- ADDITIONAL PROFESSIONAL DEVELOPMENT
COURSE GUIDE [LMDSGF] ■ \$39.95

WEBSITE

www.learner.org/courses/learningmath/data

Data Organization and Representation

Explore different ways of representing, analyzing, and interpreting data, including line plots, frequency tables, cumulative and relative frequency tables, and bar graphs. Learn how to use intervals to describe variation in data. Learn how to determine and understand the median. ▼



A line plot helps teachers visualize variation in data.

The Five-Number Summary

Investigate various approaches for summarizing variation in data, and learn how dividing data into groups can help provide other types of answers to statistical questions. Understand numerical and graphic representations of the minimum, the maximum, the median, and quartiles. Learn how to create a box plot.

Variation About the Mean

Explore the concept of the mean and how variation in data can be described relative to the mean. Concepts include fair and unfair allocations, and how to measure variation about the mean.

✓ A professional development course for K–8 teachers

+ 3 graduate credits

✓ Distance learning course



K–12 teachers use the question “Do you have ESP?” to collect data in studying the binomial probability model.

Probability

 ▲

Investigate some basic concepts of probability and the relationship between statistics and probability. Learn about random events, games of chance, mathematical and experimental probability, tree diagrams, and the binomial probability model.

Random Sampling and Estimation

Learn how to select a random sample and use it to estimate characteristics of an entire population. Learn how to describe variation in estimates, and the effect of sample size on an estimate’s accuracy.

Classroom Case Studies, Grades K–2

Explore how the concepts developed in this course can be applied through a case study of a K–2 teacher, Ellen Sabanosh, a former course participant who has adapted her new knowledge to her classroom.



Learning Math GEOMETRY

This course uses geometric reasoning as a method for problem solving. Explore the properties of geometric figures; make constructions using pencil and paper, and also use dynamic software; and practice using mathematical language to express ideas and justify your reasoning. Explore other important geometric ideas, such as symmetry, similarity, and trigonometry, as well as the basis of formal mathematical proofs and solid geometry. The course material progresses from visual, intuitive ways of solving problems to more formal explorations of geometric ideas, properties, and proofs. *Produced by WGBH Educational Foundation. 2003.*

30-MINUTE PROGRAMS

- | | |
|---------------------------------|---|
| 1. What Is Geometry? | 8. Similarity |
| 2. Triangles and Quadrilaterals | 9. Solids |
| 3. Polygons | 10. Classroom Case Studies, K–5 |
| 4. Parallel Lines and Circles | 11. Classroom Case Studies, 6–8, Part 1 |
| 5. Dissections and Proof | 12. Classroom Case Studies, 6–8, Part 2 |
| 6. The Pythagorean Theorem | |
| 7. Symmetry | |

For individual program descriptions, visit
www.learner.org/resources/series167.html

- ✓ A professional development course for elementary and middle school teachers
- + 3 graduate credits or 2.5 CEUs
- ✓ Distance learning course

★ More on 3D shapes at
www.learner.org/interactives/geometry

PRICES

- DVD-R [LMGDVDRK] ■ \$310.00
12 half-hour programs on 4 discs, 1 guide
- ADDITIONAL PROFESSIONAL DEVELOPMENT
COURSE GUIDE [LMGSGF] ■ \$39.95

WEBSITE

www.learner.org/courses/learningmath/geometry



Learning Math MEASUREMENT

Part of the NCTM standards-based *Learning Math* series, this course explores procedures for measuring and covers standard units, the relationships among units, and the approximate nature of measurement. Examine how measurement can illuminate concepts such as irrational numbers, properties of circles, and area and volume formulas, and discover how other mathematical concepts can inform measurement tasks. *Produced by WGBH Educational Foundation. 2002.*

30-MINUTE PROGRAMS

1. What Does It Mean To Measure?
2. Fundamentals of Measurement
3. The Metric System
4. Angle Measurement
5. Indirect Measurement and Trigonometry
6. Area
7. Circles and Pi (π)
8. Volume
9. Measurement Relationships
- 10, 11, and 12. Classroom Case Studies, Grades K–8

For individual program descriptions, visit
www.learner.org/resources/series184.html

PRICES

- DVD-R [LMMDVDRK] ■ \$310.00
12 half-hour programs on 4 discs, 1 guide
- ADDITIONAL PROFESSIONAL DEVELOPMENT
COURSE GUIDE [LMMSGF] ■ \$39.95

WEBSITE

www.learner.org/courses/learningmath/measurement

- ✓ A professional development course for elementary and middle school teachers
- + 3 graduate credits
- ✓ Distance learning course



THE MISSING LINK: ESSENTIAL CONCEPTS FOR MIDDLE SCHOOL MATH TEACHERS



This workshop explores four concepts identified by TIMSS (the Third International Mathematics and Science Study) as crucial to students' future success. Learn about these math topics through instructional techniques that involve students in their own learning. In the "Discovery" session of each topic pair, Master Teacher Jan Robinson (from the First in the World Consortium) leads the on-camera "learner teachers" as they investigate a series of problem-based activities. The learner teachers customize and expand upon these lessons in their own classrooms and return with samples of their students' work. In the "In Practice" sessions, they report on their experiences, evaluate student work, and develop new instructional and assessment techniques. *Produced by A-Plus Communications and Lavine Production Group. 2000.*

- ✓ **A professional development workshop for middle school teachers**
- + **2 graduate credits**
- ✓ **Distance learning course**

60-MINUTE PROGRAMS

1. **Proportionality and Similar Figures: Discovery**
2. **Proportionality and Similar Figures: In Practice**
3. **Patterns and Functions: Discovery**
4. **Patterns and Functions: In Practice**
5. **Polygons and Angles: Discovery**
6. **Polygons and Angles: In Practice**
7. **Sampling and Probability: Discovery**
8. **Sampling and Probability: In Practice**

For individual program descriptions, visit www.learner.org/resources/series119.html

PRICES

- **DVD-R** [MLDVDRK] ■ \$220.00
8 one-hour programs on 4 discs, 1 guide
- **ADDITIONAL PROFESSIONAL DEVELOPMENT WORKSHOP GUIDE** [MLSGF] ■ \$39.95

WEBSITE

www.learner.org/workshops/missinglink



Teachers experience group work before introducing it to their students.

TEACHING MATH: A VIDEO LIBRARY 5-8

See real middle school teachers incorporating the NCTM standards into their lessons, while learning as much about teaching as their students do about math. The programs demonstrate how teachers guide and assess student understanding. They also offer strategies for keeping students motivated and engaged as they learn mathematics at this critical age. *Produced by WGBH Boston. 1997.*



- ✓ **A professional development library for middle school teachers**

15-MINUTE PROGRAMS

1. **Fraction Tracks** ▶
2. **Hexominoes** ▶
3. **The Location** ▶
4. **Building Viewpoints** ▶
5. **The Largest Container** ▶
6. **Building Rafts With Rods** ▶

PRICES

- **DVD-R** [TM5DVDRK] ■ \$125.00
6 fifteen-minute programs on 1 disc, 1 guide
- **ADDITIONAL PROFESSIONAL DEVELOPMENT LIBRARY GUIDE** [TM5SG] ■ \$17.00

Fraction Tracks

Using a board game, a fifth-grade class studies and practices fractions and equivalent fractions.

Hexominoes

A fifth-grade class studies geometry by creating hexominoes, figures made up of six squares.

The Location

A sixth-grade teacher uses a secret location game to teach the class about statistics, connections, and reasoning.

Building Viewpoints

Seventh-graders learn about spatial sense and geometry from a blueprint of ancient buildings. They then create their own three-dimensional models and draw them from different viewpoints.

The Largest Container

Seventh- and eighth-grade students work on geometry and measurement as they attempt to create the largest container from a single sheet of paper.

Building Rafts With Rods

Groups of students learn about patterns, functions, and problem-solving as they calculate the surface area and volume of various-sized rafts, then graph their data.

TEACHING MATH: FREE ONLINE COURSES

The *Teaching Math* online courses provide pre-service and in-service teachers with an overview and exploration of the National Council of Teachers of Mathematics process standards. There are four courses, one each for the four NCTM grade bands: pre-kindergarten–2, 3–5, 6–8, and 9–12. Each session includes text, illustrations, animations, video, and interactive activities.

WEBSITE

www.learner.org/courses/teachingmath/index.html

+ 2 graduate credits



TEACHING MATH: A VIDEO LIBRARY K-4

Watch the excitement of young children as they solve problems, communicate, reason, and make connections between math and their physical world. This extraordinary video library documents effective teaching and learning in many sizes and types of schools: small, large, rural, suburban, inner-city, and with and without technology. *Produced by WGBH Boston. 1995.*

✓ A professional development library for elementary school teachers

✓ Distance learning course



15-MINUTE PROGRAMS

1. Introduction

CONTENT STANDARDS (15 MINS.)

Number Sense and Numeration

2. K Ants Go Marching
3. K Math Buddies
4. 1 Place-Value Centers
5. 1–2 Pumpkin Seeds
6. 4–5 Animals in Yellowstone

Concepts of Whole Number Operations

7. K Cubes and Containers
8. 1–2 Amazing Equations
9. 1–2 Domino Math
10. 2 Marshmallows
11. 3 What's the Price?

Whole Number Computation

12. K Dino Math
13. 1 Window Puzzle
14. 1 Wheel Problem
15. 2 Bean Sprouts
16. 2–3 This Small House
17. 4 Choose a Method

Geometry and Spatial Sense

18. 1 Thanksgiving Quilt
19. 2 Pattern Blocks
20. 2–3 Shapes from Squares
21. 2–3 A Rocket Shape
22. 4 Circumference/ Diameter

Measurement

23. 1 Windows, Dinos, and Ants
24. 1 How Long Is a Minute?
25. 2–3 Balloon Travel
26. 3–4 Meter Cords
27. 4 Pencil Box Staining

Statistics and Probability

28. 1 Lady Bugs
29. 1–2 Woodpecker Habitat
30. 3 Bubble Gum Contest
31. 4 Dice Toss
32. 4–6 Questioning Data

Fractions and Decimals

33. 1–2 Fraction Strips
34. 1–3 Arrays and Fractions
35. 2–3 Everyday Decimals
36. 4 Cookies to Share
37. 4–5 Fractions With Geoboards

Patterns and Relationships

38. K People Patterns
39. K–1 All Sorts of Buttons
40. 2 Story-Based Centers
41. 4 Products and Sums
42. 4 Valentine Exchange

Estimation

43. K Beans, Beans, Beans
44. 1 How Many People Will Fit?
45. 2 Cranberry Estimation
46. 3 Buffalo Estimation
47. 4 The White Pages

PROCESS STANDARDS (30 MINS.)

48. Problem Solving
49. Communication
50. Reasoning
51. Mathematical Connections
52. Classrooms Over Time

For individual program descriptions, visit
www.learner.org/resources/series32.html

PRICES

- DVD [TM4DVDRK] ■ \$375.00
52 programs (varying lengths) on 11 discs

For current pricing and to order: 1-800-LEARNER® or www.learner.org

MATHEMATICS ASSESSMENT: A VIDEO LIBRARY K-12

This video library portrays the Assessment Standards of the National Council of Teachers of Mathematics. Showing classrooms where informal and formal assessments are used, the videos help educators sort through many options. They also help teachers see the link between instruction and assessment. *Produced by WGBH Boston. 1997.*

PROGRAMS

1. Introduction—10 mins.

SCHOOL-LEVEL VIDEOS (60 MINS.) ▶

2. Elementary Assessment
3. Middle School Assessment
4. High School Assessment
5. Beyond Testing—30 mins. ▶

For individual program descriptions, visit
www.learner.org/resources/series31.html

PRICES

- DVD [TMADVDRK] ■ \$220.00
5 video programs (varying lengths) on 3 discs, 1 guide
- ADDITIONAL PROFESSIONAL DEVELOPMENT
LIBRARY GUIDE [TMSG] ■ \$39.95



- ✓ A professional development library for K–12 teachers

School-Level Videos

Each one-hour program contains two case studies and a sequence of teacher insights that shows a variety of assessment techniques.

Beyond Testing

This program addresses questions such as equity, openness, validity, and consistency at the state, district, and school levels. It will also help spur discussions on assessment with educators and community members.

TEACHING MATH: A VIDEO LIBRARY 9-12

In this high school library, teachers demonstrate the fine art of guiding students through reasoning and problem solving. Students comment on the new way of learning, often expressing frustration as well as the sense of accomplishment they feel when working through problems with peers. *Produced by WGBH Boston. 1996.*



- ✓ A video library for grade 9–12 teachers
- ✓ Distance learning course

PROGRAMS

1. Introduction

Content Standards

2. Alice to the Moon (algebra)
3. Group Test (functions)
4. Exploring Functions (functions)
5. Bungee Jump (functions) ▶
6. Staircase Problem (functions)
7. Ferris Wheel (functions)
8. Properties of Parallelograms (geometry synthetic)
9. Finding Proof (geometry synthetic)
10. Exploring Congruence (geometry synthetic)
11. Enveloping Functions (trigonometry)
12. Calculator-Based Labs (statistics)
13. Taxicabs (probability)

14. Fish Derby (discrete math)
15. Maximizing Profits (discrete math)
16. Conjectures Through Graphing (calculus)

Process Standards

17. Problem Solving
18. Communication
19. Reasoning
20. Connections ▶

For individual program descriptions, visit
www.learner.org/resources/series34.html

PRICES

- DVD [TM9DVDRK] ■ \$250.00
20 video programs on 4 discs



Bungee Jump

Students work with functions and statistics while they investigate the mathematics of bungee jumping.

Connections

In excerpts from eight classrooms, students make connections within mathematics, to other disciplines, and to situations in the real world.



PRIVATE UNIVERSE PROJECT IN MATHEMATICS

Research shows that children formulate extraordinarily interesting and complex mathematical ideas, even at a very young age. *The Private Universe Project in Mathematics* demonstrates and honors the power and sophistication of these ideas, and explores how mathematics teaching can be structured to resonate with children's sophisticated thinking. This six-program workshop, with a companion interactive website, offers a rare opportunity to follow the mathematical development of one group of students throughout grades 1–12 and to observe teachers in the process of redefining what mathematics is for themselves and for their students. *Produced by the Harvard-Smithsonian Center for Astrophysics. 2000.*

- ✓ **A professional development workshop for K–12 educators**
- ✚ **2 graduate credits**
- ✓ **Distance learning course**

60-MINUTE PROGRAMS

1. Following Children's Ideas in Mathematics
2. Are You Convinced?
3. Inventing Notations
4. Thinking Like a Mathematician
5. Building on Useful Ideas
6. Possibilities of Real-Life Problems

For individual program descriptions, visit
www.learner.org/resources/series120.html

PRICES

- DVD-R [PMDVDRK] ■ \$149.00
6 one-hour programs on 3 discs, 1 guide
- ADDITIONAL PROFESSIONAL DEVELOPMENT
WORKSHOP GUIDE [PMSGF] ■ \$39.95

WEBSITE

www.learner.org/workshops/pupmath

SURPRISES IN MIND

Many people—in and out of school—find mathematics frustrating. This documentary uncovers a surprise: Mathematical creativity—expressed in art, architecture, and music and valued by industry—is built into the brain and can flourish under the right conditions. A 12-year study following students from first grade through high school demonstrates the brain's surprising natural abilities for learning math. The results of the study, led by Professor Carolyn Maher of Rutgers University, have been corroborated by new research from leading cognitive psychologists. *Produced by the Harvard-Smithsonian Center for Astrophysics. 2001.*

- ✓ **A video documentary for K–8 teachers and administrators**
- ✓ **Distance learning course**



ONE 60-MINUTE PROGRAM

Surprises in Mind

PRICE

- DVD-R [URDVDRK] ■ \$39.95
1 one-hour program on 1 disc



For current pricing and to order: 1-800-LEARNER® or www.learner.org

LEARNER EXPRESS is a gallery of short video modules chosen from classroom content and professional development series in the Annenberg Learner Collection. Use the videos to enhance classroom explanations, to see targeted examples of teaching and learning standards, or for a discussion starter in professional development sessions.

MATHEMATICS: COMMON CORE STANDARDS PROFESSIONAL DEVELOPMENT MODULES



Excerpts from the *Teaching Math K–4 Video Library* illustrate teaching and learning goals from the Common Core Standards for mathematics. NCTM President Linda Gojak and Life LeGeros, a state-level mathematics supervisor, explain how each classroom scene (from K to grade 4) captures the intent of the eight Common Core Practice Standards and helps teachers to fine tune lessons and to develop students' analytical and problem solving skills. Produced by WGBH Boston. 2012.

✓ **Professional development modules for elementary teachers**

MODULE TOPICS

Problem Solving • 2 modules / 7:48 minutes ▶

Reasoning • 4 modules / 19:27 minutes ▶

Construct Arguments ▶

3 modules / 15:52 minutes

Modeling • 2 modules / 6:48 minutes ▶

Strategic Tool Use • 3 modules / 13:06 minutes

Attend to Precision • 3 modules / 17:46 minutes

Structures Use • 1 module / 4:41 minutes ▶

Repeated Reasoning

2 modules / 8:56 minutes

PRICE

• DVD [XPMDVD] • \$39.95
20 programs of varying lengths on 1 disc,
module description book

WEBSITE

www.learner.org/series/modules/express

Problem Solving: Bubble Gum Contest

Students work on an activity where they gather data for a bubble gum contest, as part of a larger activity involving recording data on a number line and writing up results.



Construct Arguments: Fractions and Geoboards

Students work with geoboards to explore the concept of "halves." This requires them to explain their reasoning and justify their findings to their classmates.

Reasoning: Cranberry Estimation

In this estimation lesson, students are asked to predict and record how many scoops of cranberries fit into a jar. Actual scoop counts and discussions help students understand measures of central tendency, and hone their estimation skills.

Structures Use: Products and Sums

Students use array structures to reason and conjecture about relationships between sums and products. They seek patterns using concrete and pictorial models.

Modeling: Domino Math

A teacher uses dominoes to help students explore properties of addition. The dominoes are a concrete representation of the lesson's mathematical ideas. This tool helps students develop an abstract understanding of addition.

