mathematics journals, magazines,
associations, conferences, educational supplies,
posters, videos, books, games, puzzles,
sudukos, software, handhelds, websites,
wordplay, a licence to do math, anamorphic art,
origami, magic,
places to go to for pi, a coffee and dinner

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Cafe p, Montreal

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Introduction

This document contains a list of the resources that have been important to me as a classroom teacher, an independent mathematics consultant and now as a Lecturer in Mathematics Education at the University of Toronto. In my work space at home I am surrounded by mathematics books, videos, puzzles, games and journals. Having access to this material while I prepare my lessons, assignments, tests and examinations has made it possible for me to make my classes more interesting without having to reinvent the wheel.

If you are new to teaching and just starting to build a collection of resources for yourself or for your school, this list may be overwhelming, so much so that it will not be clear where you should begin. Before you buy any particular item I would suggest that you look up some information about it on-line, see if it will tie in with what you are teaching and then buy the items over a period of time. Perhaps you can build a collection of resources with a teaching friend. This will certainly reduce the overall cost.

If you have any comments about how you see this document being used or suggestions on how to modify it so that it is more useful, feel free to contact me. I am also interested in knowing about other resources for me to consider buying, so send me the names of any items that you come across.

Ron Lancaster

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Independent Mathematics Consultant, North America, Asia and Israel
National Instructor, Texas Instruments
Member of NCTM writing team for *Principles and Standards for School Mathematics* (2000)

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Document last updated on September 1, 2005

Children's literature with a math focus

I became acquainted with many of the books in this section from three wonderful educators, Carly Ziniuk, Diane Devine and Diane Linder Berman. Carly is an outstanding mathematics teacher at the Bishop Strachan School in Toronto and is well known for the innovative ways in which she uses literature, technology and manipulatives with her middle and high school students. Diane Devine teaches elementary mathematics in Massachusetts. She is a popular and engaging speaker at national conferences in the United States on a wide range of topics and is highly regarded for her ability to work with teachers. Diane Linder Berman was a creative and passionate mathematics teacher at the Trinity School in Manhattan. She is currently looking after her own children and teaching a course on connecting children's literature with mathematics at Queens College in New York City.

I really like the book G is for Googol. It contains mathematical material for every letter of the alphabet and every grade level. The list of chapters includes F is for Fibonnaci, M is for the Mobius Strip, R is for Rhombicosidodecahedron and W is for "When are we ever gonna use this stuff, anyway?"

Making Faces is a perfect book for introducing students young and old to permutations and combinations. The publishers of the book claim that by mixing up the pages it is possible to make more than 65,000 faces. Using some simple counting techniques students can verify if this claim is in fact true and if it is, how long it would take to view every possible face.

One Grain of Rice is a gorgeous book to read to your students while they are learning about exponents and exponential growth. It tells the story of a young girl named Rani who after doing a good deed for the raja is invited to choose her own award. Rani asks for just one grain of rice, doubled every day for 30 days. Through the use of exquisitely detailed art, the author illustrates that Rani eventually ends up with more than a billion grains of rice.

Names, authors and publishers

Anno's Mysterious Multiplying Jar, Masaichiro Anno and Mitsumasa Anno
Philomel Books, ISBN 0-3992-0951-4

The Greedy Triangle, Marilyn Burns
Scholastic Press, ISBN 0-590-48991-7

Mrs. McTats and her Houseful of Cats, Alyssa Satin Capucilli
Aladdin Paperbacks, ISBN 0-689-86991-6

One Grain of Rice - A Mathematical Folktale, Demi
Scholastic Press, ISBN 0-590-93998-X

A Second Is a Hiccup, Hazel Hutchins and Kady MacDonald Denton
North Winds Press, ISBN 0-439-97400-3

The Great Divide, Dayle Ann Dodds
Candlewick Press, ISBN 0-7636-0442-9

What's Your Angle, Pythagoras?, Julie Ellis
Charlesbridge, ISBN 1-57091-150-9

The Wing on a Flea: A Book About Shapes, Ed Emberly
Little, Brown & Company, ISBN 0-316-23487-7

Mathematickles, Betsy Franco
Margaret K. McElderry Books, 0-689-84357-7

A Cloak for the Dreamer, Aileen Friedman
Scholastic Press, ISBN 0-590-48987-9

Roman Numerals I to MM, Arthur Geisert
Walter Lorraine Books, ISBN 0-618-15321-7

The Quilting Bee, Gail Gibbons
Harper Collins, ISBN 0-688-16397-1

Shapes, Shapes, Shapes, Tana Hoban
Greenwillow Books, ISBN 0-688-14740-2

So Many Circles, So Many Squares, Tana Hoban
Greenwillow Books, ISBN 0-688-15165-5

Round Buildings, Square Buildings & Buildings That Wiggle Like a Fish, Philip M. Isaacson
Alfred A. Knopf, ISBN 0-394-89382-4

Actual Size, Steve Jenkins
Houghton Mifflin Company, ISBN 0-618-37594-5

Looking Down, Steve Jenkins
Houghton Mifflin Company, ISBN 0-618-31098-3

Arithme-Tickle: An Even Number of Odd Riddle-Rhymes, J. Patrick Lewis
Harcourt, ISBN 0-15-216418-9

Making Faces, Norman Messenger
Dorling Kindersley Publishing, ISBN 1-56458-111-X

I Spy Shapes in Art, Lucy Micklethwait
Collins Picture Books, 0-00-713133-X

The Slant Book, Peter Newell
Tuttle Publishing, ISBN 0-8048-0532-6

Amanda Bean's Dream: A Mathematical Story, Cindy Neuschwander
Scholastic Press, ISBN 0-590-30012-1

Sir Cumference and the Dragon of Pi, Cindy Neuschwander
Charlesbridge, ISBN 1-57091-164-9

Sir Cumference and the Great Knight of Angleland, Cindy Neuschwander
Charlesbridge, ISBN 1-57091-169-X

Gregory and the Magic Line, Dawn Piggot
Dolphin Paperbacks, ISBN 1-84255-278-3

626 by 9, I. Sheldon Posen
Canadian Museum of Civilization, ISBN 0-660-19255-1

square, triangle, round, skinny: 4 little books, Vladimir Radunsky
Candlewick Press, ISBN 0-7636-1532-3

G is for Googol - A Math Alphabet Book, David M. Schwartz
Tricycle Press, Berkeley, California, ISBN 1-883672-58-9

On Beyond a Million: An Amazing Math Journey, David M. Schwartz
Doubleday, ISBN 0-385-32217-8

The Math Curse, Jon Scieszka and Lane Smith
Viking, ISBN 0-670-86194-4

People, Peter Spier
Bantam Doubleday Dell Publishing, ISBN 0-385-13181-X

The Art of Shapes, Margaret Steele and Cindy Estes
Los Angeles Museum of Contemporary Art, ISBN 0-914357-50-6

How Big is Big, Stephen Strauss
Key Porter Kids, ISBN 1-55263-017-X

One Monday Morning, Uri Shulevitz
A Sunburst Book, ISBN 0-374-45648-8

The Best of Times: Math Strategies that Multiply, Greg Tang
Scholastic Press, ISBN 0-439-21044-5

Grapes of Math: Mind-Stretching Math Riddles, Greg Tang
Scholastic Press, ISBN 0-439-21040-2

Math Appeal: Mind-Stretching Math Riddles, Greg Tang
Scholastic Press, ISBN 0-439-21046-1

Matherpieces: The Art of Problem-Solving, Greg Tang
Scholastic Press, ISBN 0-439-44388-1

Math Fables: Lessons that Count, Greg Tang
Scholastic Press, ISBN 0-439-45399-2

Math for all Seasons: Mind-Stretching Math Riddles, Greg Tang
Scholastic Press, ISBN 0-439-21042-9

Round is a Mooncake: A Book of Shapes, Roseanne Thong
Chronicle Books, ISBN 0-8118-2676-7

Spotted Yellow Frogs: Fold-Out Fun with Patterns, Colors, 3-D Shapes, Animals, Matthew
Van Fleet
Dial Books for Young Readers, ISBN 0-8037-2350-4

Square Triangle Circle, William Wegman
Hyperion Books for Children, ISBN 0-7868-0104-2

Squarehead, Harriet Ziefert
Houghton Mifflin Company, ISBN 0-618-08378-2

Books on how to use children's literature in a mathematics classroom

Books You Can Count on: Linking Mathematics and Literature, Rachel Griffiths and Margaret Clyne
Heinemann, ISBN 0-435-08322-8

Read Any Good Math Lately: Children's Books for Mathematical Learning, David J. Whitin and Sandra Wilde
Heinemann, ISBN 0-435-08334-1

It's the Story That Counts: More Children's Books for Mathematical Learning K-6, David J. Whitin and Sandra Wilde
Heinemann, ISBN 0-435-08369-4

Exploring Mathematics Through Literature: Articles and Lessons for Prekindergarten through Grade 8, Diane Thiessen
National Council of Teachers of Mathematics, ISBN 0-87353-553-7
URL: www.nctm.org

The Wonderful World of Mathematics: A Critically Annotated List of Children's Books in Mathematics, Diane Thiessen, Margaret Matthias and Jacquelin Smith
National Council of Teachers of Mathematics, ISBN 0-87353-439-5
URL: www.nctm.org

How to Use Children's Literature to Teach Mathematics, Rosamond Welchman-Tischler
National Council of Teachers of Mathematics, ISBN 0-87353-371-2
URL: www.nctm.org

Pop-Up and Flap Books

Names, authors and publishers

Loose Lace!: A fun tale, plus pop-up shoe and shoelace, Keith Faulkner
Back Pack Books, ISBN 0-7607-1616-1

How To Make Pop-ups, Joan Irvine
Kids can Press, ISBN 0-921103-36-0

Bow Wow: A pop-Up Book of Shapes, Chuck Murphy
Simon & Schuster, ISBN 0-689-82265-0

Slide 'N' Seek, Chuck Murphy
Simon & Schuster, ISBN 0-689-84477-8

One to Ten Pop-Up Surprises, Chuck Murphy
Simon & Schuster, ISBN 0-671-89908-2

Counting: A book with fabulous flaps, Maureen Roffey
Reader's Digest Children's Books, ISBN 0-7944-0405-7

Books about the calendar and time

Names, authors and publishers

Calendar Art, Leonard Everett Fisher
Four Winds Press, ISBN 0-02-735350-8

A Mathematical Look at the Calendar, Richard L. Francis
Consortium for Mathematics and Its Applications, ISSN 0889-2652
URL: www.comap.com
Telephone: (781) 862-7878

Time, Brian Knapp
Grolier Limited, ISBN 0-7172-2875-4

In The Next Three Seconds, Rowland Morgan
Hamlyn Children's Books, ISBN 0-600-58937-4

Alphabet and counting books

There is certainly an endless supply of books that can be used to help students learn the letters of the alphabet and how to count. The following books are particularly engaging.

Names, authors and publishers

Anno's Counting Book, Mitsumasa Anno
A Harper Trophy Book, ISBN 0-06-443123-1

los Numeros, Arianna Candell and Francesc Rovira
Barron's, ISBN 0-7641-2996-1

1001 Animals to Spot, G. Doherty
Usborne, ISBN 0-7460-4753-3

1001 Things to Spot in the Sea, G. Doherty
Usborne, ISBN 0-7460-5208-1

1001 Things to Spot in the Town, G. Doherty
Usborne, ISBN 0-7460-2954-3

1001 Things to Spot Long Ago, G. Doherty
Usborne, ISBN 0-7460-3318-4

1001 Things to Spot on the Farm, G. Doherty
Usborne, ISBN 0-7460-2955-1

The Turn-Around, Upside-Down Alphabet Book, Lisa Campbell Ernst
Simon & Schuster Books for Young Readers, ISBN 0-689-85685-7

Ten Little Ladybugs, Melanie Gerth
Piggy Toes Press, ISBN 1-58117-091-2

1001 Bugs to Spot, Emma Helbrough
Usborne, ISBN 0-7460-6241-9

Zoo Flakes ABC, Will C. Howell
Walker, ISBN 0-8027-8827-0

There were ten in the bed, Annie Kubler
Child's Play International Ltd., ISBN 0-85953-897-4

I Spy Two Eyes - Numbers In Art, Lucy Micklethwait
Mulberry Books, 0-68816158-8

Eight Hands Round: A Patchwork Alphabet, Ann Whitford Paul
Harper Collins, ISBN 0-06-443464-8

10, V. Radunsky
Viking, ISBN 0-670-03563-7

One is a Snail, Ten is a Crab, April Pulley Sayre and Jeff Sayre
Candlewick Press, ISBN 0-7636-1406-8

Hanukkah: A Counting Book, in English, Hebrew and Yiddish, Emily Sper
Scholastic, ISBN 0-439-28291-8

Numbers At Play, Charles Sullivan
Rizzoli, New York, ISBN 0-8478-1501-3

1 2 3, William Wegman
Hyperion Books for Children, ISBN 0-7868-0103-0

Can You Count to a Googol?, Robert Wells
Albert Whitman & Company, ISBN 0-8075-1061-0

Teeth, Tails and Tentacles, Christopher Wormell
Running Press Book Publishers, ISBN 0-7642-2100-2

A number of books about numbers

My favourite book about numbers is Numbers - facts, figures and fiction by Richard Phillips. This book is filled with interesting properties of numbers along with photographs of numbers. The book has material for elementary and secondary students.

Names, authors and publishers

Joy of Pi, David Blatner
Walker and Company, ISBN 0-8027-1332-7, Grades 7-12

The Book of Numbers, John Conway and Richard Guy
Springer-Verlag, ISBN 0-387-97993-X, Grades 7-12

The Book of Numbers, William Hartston
Richard Cohen Books, ISBN 1-86066-112-2, Grades 4-12

Think of a Number, Malcolm E. Lines
Adam Hilger Publishing, ISBN 0-85274-183-9, Grades 7-12

A Number For Your Thoughts, Malcolm E. Lines
Adam Hilger Publishing, ISBN 0-85274-495-1, Grades 7-12

Numbers - facts, figures and fiction, Richard Phillips
Badsey Publications, ISBN 0-9546-5620-2, Grades 7-12

problem pictures themes: a CD-ROM of photographs with activities for mathematics teaching, Richard Phillips
Badsey Publications, ISBN 0-9546-5623-7, Grades 7-12

Mathematical World: Exploring Mathematics through Photographic Images (CD-ROM), Richard Phillips
Key Curriculum Press, ISBN 1-55953-794-9, Grades7-12

p: A Biography of the World's Most Mysterious Number, Alfred S. Posamentier
Promethus Books, ISBN 1-59102-200-2, Grades7-12

The Guinness Book of Numbers, Adrian Room
Sterling Publishing Company, ISBN 0-85112-372-4, Grades 4-12

A Friendly Introduction to Number Theory, Joseph H. Silverman
Pearson Prentice Hall, ISBN 0-13-186137-9, Grades 9-12, gifted

The Penguin Dictionary of Curious and Interesting Numbers, David Wells
Penguin Books, ISBN 0-14-026149-4, Grades 7-12

Books that involve finding numbers and letters in unintended places

Names, authors and publishers

Arlene Alda's 1 2 3 What Do *You* See, Arlene Alda
Tricycle Press, ISBN 1-883672-71-6, Grades K-12

Arlene Alda's A B C What Do *You* See, Arlene Alda
Tricycle Press, ISBN 1-883672-01-5, Grades K-12

City by Numbers, Stephen T. Johnson
Viking, ISBN 0-670-87251-2, Grades K-12

Archabet: An Architectural Alphabet, Balthazar Korab
Preservation Press, John Wiley and Sons, ISBN 0-471-14352-9, Grades K-12

The City ABC Book, Zoran Milich
Kids Can Press, ISBN 1-55074-942-0, Grades K-12

Finding an e with ease in San Francisco

A book about stamps and math

There are many countries around the world where mathematics is so highly valued that it is commonplace to find stamps issued with mathematical themes and references. If you have not started a collection, you might want to begin one that contains stamps of this nature. Or you could have your students seek out these stamps. The book Stamping Through Mathematics contains an amazing collection of math related stamps. The book will give you a lovely way of bringing more aspects of the history of mathematics into your classes.

Stamping Through Mathematics, Robin J. Wilson
Springer-Verlag, ISBN 0-387-98949-8, Grades K-12

Books and videos for K-8 mathematics teachers from Marilyn Burns

Marilyn Burns is known throughout the world for creating outstanding resources for teaching mathematics at the elementary school level. Information about her books and videos is posted at the site www.mathsolutions.com

Two highly unique textbooks for teaching middle school mathematics

Carly Ziniuk is a well known mathematics teacher at Bishop Strachan, an all-girls school in Toronto. Carly teaches middle and high school mathematics, she has a high level of expertise in assessment and she is a National Instructor for Texas Instruments. Carly has written two textbooks for teaching middle school mathematics. The material is drawn from her many years of teaching in which she has made extensive use of projects and engaging activities. Rubrics are included with the activities. Carly wrote the books specifically for the Ontario grades 7-8 mathematics curriculum but teachers anywhere in the world will find a treasure trove of material that will fit into any middle school curriculum. The names of the books are Tessellating Emus (Grade 7 and Grade 8). Each book is over 300 pages long. The cost is CAD $39.95 per book plus shipping.

Carly can be reached at CZiniuk@bss.on.ca To place an order for the books, contact Linda Houselander by email at lhouselander@bss.on.ca or by phone at 416-483-4325.

Books about teaching mathematics from Heinemann

Heinemann is regarded by leaders in mathematics education as one of the world's best publishers of books that deal with teaching mathematics at the elementary level. The books are all worth their weight in gold. For more information go to http://www.Heinemann.com/ and click on the link for Mathematics.

A book that integrates social justice issues into the mathematics curriculum

This wonderful book contains 30 articles that discuss and demonstrate how to integrate social justice issues into the mathematics curriculum and how to integrate mathematics into other subjects. This is one of a number of excellent books from Rethinking Schools.

Rethinking Mathematics: Teaching Social Justice by the Numbers, edited by Eric Gutstein and Bob Peterson
Rethinking Schools, ISBN 0-942961-54-4, Grades 7-12
URL: www.rethinkingschools.org

Books about women and men who love and use mathematics

She Does Math! contains the career histories of 38 professional women and math problems supplied by them. This book should be in the library of every math teacher because it provides strong female role models mixed in with highly engaging real-life problems. The material in this book tends to be at the middle and high school level. The book Women and Numbers also has profiles of women along with plenty of activities for students. It is suitable for students in elementary school.

Mathematical People is one of my favourite books. The book consists of in-depth interviews with living mathematicians. The question and answer format used throughout the book works very well and readers are given a true sense for why some people devote their lives to mathematics. The people interviewed in the book are passionate about mathematics and they have lead lives that will interest you and your students. The list of people interviewed includes John Conway, H. S. M. Coxeter, Persi Diaconis, Paul Erdos, Martin Gardner, Ronald Graham, Paul Halmos and Henry Pollack.

The Man Who Loved Only Numbers and My Brain is Open both tell the life story of Paul Erdos, one of the greatest mathematicians of the last century. Erdos posed and solved thousands of problems in number theory and other areas and founded the field of discrete mathematics. Go to http://www.maa.org/features/erdos.html for information about Erdos.

Names, authors and publishers

Mathematical People, Profiles and Interviews, Edited by Donald J. Albers and G. L. Alexanderson
Birkhauser Publishing, ISBN 0-8176-3191-7, Grades 7-12

The Man Who Loved Only Numbers: The Story of Paul Erdos and the Search for Mathematical Truth, Paul Hoffman
Hyperion, ISBN 0-7868-6362-5 , Grades 9-12

She Does Math!, Marla Parker, Editor
Mathematical Association of America, ISBN 0-88385-702-2, Grades 6-12
URL: www.maa.org

Women and Numbers, Teri Perl
Wide World Publishing/Tetra, ISBN 0-933174-87-X, Grades K-6

My Brain Is Open: The Mathematical Journeys of Paul Erdos, Bruce Schecter
Sagebrush Education Resources, ISBN: 0613263073, Grades 9-12

Games for the classroom

Throughout my teaching career I have a collection of games and puzzles in my classroom for students to enjoy if they are finished their work or if I sense that the class or an individual is in need of a break. My collection includes standard games such as scrabble, chess, checkers, dominoes, backgammon, Mah Jong and rummy tiles.

SET
URL: www.setgame.com, Grades 4-12

The card game SET has been one of the most popular games. The rules are easy, the game is reasonably priced, the appeal of the game never seems to wear off and students at even a very young age can learn to play the game. SET involves finding groups of three cards that satisfy certain criteria. The makers of SET have posted materials for mathematics teachers at their website along with a daily puzzle that can be completed on-line without a set of cards.

Games and puzzles from ThinkFun (formerly known as Binary Arts)
URL: www.thinkfun.com, Grades 4-12

Many years ago I started to buy products from this highly creative company. Their games and puzzles are very engaging and many of them can be linked to the curriculum.

Rush Hour has been a major hit with my students. I have heard from owners of toy shops, it has been a major success with the general public too. Rush Hour is a sliding block puzzle with a contemporary twist. Instead of numbered tiles that you would see on the 15 puzzle, Rush Hour involves cars and trucks that need to be moved around in order to free a particular car. It is wonderful and great fun to try.

Like many games, Rush Hour can be used as a tool for teaching problem solving. An excellent handout that describes how this can be done can be downloaded from the URL given below.

Using Puzzles to Teach Problem Solving: Teacher's Guide to Rush Hour
URL: http://education.puzzles.com/plans/rushhourguide.pdf

An on-line version of Rush Hour (not connected to the makers of Rush Hour) can be play by visiting the following website.

URL: http://www.freegames.ws/games/freegames/cargames/rushhour.htm

Abalone
URL: http://uk.abalonegames.com, Grades 4-12

Abalone is another game that has been quite popular with my students. It is played on a hexagonal board and the game involves moving balls according to a simple set of rules. I have connected the game to cartesian coordinates and to vectors, other connections are certainly possible.

Additional information and on-line versions of the game can be found at the following websites.

URL: http://users.skynet.be/glu/abalone.htm
URL: http://www.clickhere.nl/abalone/

Other popular games

Blokus
URL: http://www.blokus.com/index.htm, Grades 4-12

Gobblet!
URL: http://www.blueorangegames.com/gobblet.php, Grades 4-12

Pylos, Quarto and Quixo (three great games)
URL: http://www.gigamic.com/uk/index.php, Grades 4-12

Books about games

Names, authors and publishers

The Mathematics of Games, John Beasley
Oxford University Press, ISBN 0-19-286107-7, Grades 9-12

Oval Track and other permutation puzzles (software included), John O. Kiltinen
Mathematical Association of America, ISBN 0-88385-725-1, Grades 9-12
www.maa.org

Play Marbles!, Shar Levine and Vicki Scudamore
Sterling Publishing. ISBN 1-4027-1108-5, Grades 4-12

Mathematical Solitaires and Games, Edited by Benjamin Schwartz
Baywood Publishing, ISBN 0-89503-017-9, Grades 7-12

Your Move: Logic, Math and Word Puzzles for Enthusiasts, David L. Silverman
Dover Books, 0-486-26731-8, Grades 7-12

Books about origami and paper folding

I really like the art of folding paper and enjoy viewing it from a mathematical perspective. Like many other teachers, I have found that it is possible to teach a great deal of mathematics, especially topics from geometry, through origami.

The books Unit Origami Multidimensional Transformations and Origami Omnibus Paper Folding for Everybody are extraordinary. The directions are for the most part pretty simple, the diagrams and photos add clarity and the final products are beautiful.

I have enjoyed making models from the Buck Book and The Guide to Hawaiian-Style Money Folds. All of the folds are done with paper money and the results are really neat.

I also belong to Origami USA, a club for paper folders. Members receive a newsletter along with an extensive listing of resources for books and origami paper. The organization also runs a conference held in Manhattan in early June.

Origami Books

Paper Capers, Jack Botermans
Henry Holt & Company (An Owl Book), ISBN 0-8050-0139-5

Easy Origami, Didier Boursin
Firefly Books, ISBN 1-55297-939-3

The Guide to Hawaiian-Style Money Folds, Jodi Fukumoto
Island Heritage, ISBN 0-89610-414-1

Origami Boxes, Tomoko Fusè
Japan Publications, ISBN 0-87040-821-6

Unit Origami Multidimensional Transformations, Tomoko Fusè
Japan Publications, ISBN 0-87040-852-6

The Origami Workshop, Gay Merrill Gross
Friedman/Fairfax Publishers, ISBN 1-56799-148-3

The Buck Book, Anne Akers Johnson
Klutz Press, ISBN 1-878257-51-X

Origami Omnibus Paper Folding for Everybody, Kunihiko Kasahara
Japan Publications, ISBN 0-87040-696-5 (Grades 4-12)

Amazing Origami, Kunihiko Kasahara
Sterling Publishers, 0-8069-5821-9

Complete Origami, Eric Kenneway
St. Martin's Griffin, ISBN 0-312-00898-8

Origami for Parties, Kazuo Kobayashi
Kodansha International, ISBN 4--7700-1297-7

Sticky Note Origami: 25 Designs to Make at Your Desk, David Mitchell
Collins & Brown, ISBN 1-84340-227-0

Flexagons inside and out, Les Pook
Cambridge University Press, ISBN 0-521-52574-8

Origami Organization

Origami USA
URL: www.origami-usa.org

Beautiful books about mathematics

All of these books have been important to me at various times throughout my teaching career. Mathematics: A Human Endeavor is one of my all time favourite books. The three books by Eli Maor include a great deal of historical information. On one occasion I used his book e The Story of a Number as a supplementary textbook for my Calculus course. Symmetry: A Unifying Concept is a beautiful book and it contains hundreds of photographs of symmetry taken by two photographers in countries throughout the world. The accompanying text material is well written and describes every form of symmetry imaginable. Mathematics and Optimal Form is a great resource book to have on hand when dealing with optimization problems (max/min problems) and it too is a beautiful book. Speaking of max/min problems, the book When Least is Best is a must-have-book for every high school mathematics teacher. Taxi Cab Geometry is really cool and it looks at what happens when we measure the distance between two points by making use of the path that a cab would travel to go from one point to the other. Neat!

In Code was written by Sarah Flannery, a young woman from Ireland, who become famous for her science fair project on encryption methods and cryptography. Sarah won a number of major prizes at Science Fairs in Europe and the United States. In the book Sarah writes about her project and she gives a very good explanation of the methods used to encrypt data. The best part of the book however is Sarah's discussion of how and why she became interested in mathematics. Sarah tells the story of how from an early age her father, David Flannery, wrote puzzles on a blackboard that was hung on a kitchen wall. Many of these puzzles appear in the book and Sarah has included a good discussion of each puzzle along with solutions written in her own voice.

The Number Devil is a lovely book with great art work and is geared towards students in grades 6-8. The story line is quite simple, but very engaging and funny. A young boy begins to have regular visits from the Number Devil while he sleeps. The Number Devil teaches him an incredible amount of mathematics at the middle and high school level.

Names, authors and publishers

Flaws and Fallacies in Statistical Thinking, Stephen K. Campbell
Dover Publications, ISBN 0-486-43598-9, Grades 9-12

Mathematical Mysteries - The Beauty and Magic of Numbers, Calvin C. Clawson
Plenum Press, ISBN 0-306-45404-1, Grades 7-12

Prime Obsession, John Derbeyshire
Penguin Books, ISBN 0-452-28525-9, Grades 9-12

Mathematics The Science of Patterns, Keith Devlin
W. H. Freeman and Company, ISBN 0-7167-6022-3, Grades 9-12

All The Math That's Fit to Print - Articles from the Manchester Guardian, Keith Devlin
Mathematical Association of America, ISBN 0-88385-515-1, Grades 9-12
www.maa.org

The Number Devil, A Mathematical Adventure, Hans Magnus Enzensberger
Metropolitan Books, ISBN 0-8050-5770-6, Grades 4-12

In Code, Sarah and David Flannery
Workman Publishing, ISBN 0-7611-2384-9, Grades 7-12

the 85 ways to tie a tie, Thomas Fink and Yong Mao
Fourth Estate, ISBN 1-84115-568-3, Grades 7-12

Symmetry: A Unifying Concept, István and Magdolna Hargittai
Shelter Publications, ISBN 0-89815-590-8, Grades 7-12

Mathematics and Optimal Form, Stefan Hildebrandt and Anthony Tromba
W. H. Freeman and Company, ISBN 0-7167-5009-0, Grades 9-12, gifted

Mathematics: A Human Endeavor, Harold Jacobs
W. H. Freeman and Company, ISBN 0-7167-2426-X, Grades 7-12

Taxi Cab Geometry, Eugene S. Krause
Dover Publications, ISBN 0-486-25202-7, Grades 9-12, gifted

To Infinity and Beyond - A Cultural History of the Infinite, Eli Maor
Princeton University Press, ISBN 0-691-02511-8, Grades 9-12

e The Story of a Number, Eli Maor
Princeton University Press, ISBN 0-691-03390-0, Grades 9-12

Trigonometric Delights, Eli Maor
Princeton University Press, ISBN 0-691-05754-0, Grades 9-12

Curve Stitching, Jon Millington
Tarquin Publications, ISBN 0-906212-65-0, Grades 9-12

When Least is Best, Paul J. Nahin
Princeton University Press, ISBN 0-691-07078-4, Grades 9-12

The Jungles of Randomness: A Mathematical Safari, Ivars Peterson
Wiley, ISBN 0-471-29587-6, Grades 9-12

Fragments of Infinity: A Kaleidescope of Math and Art, Ivars Peterson
Wiley, ISBN 0-471-16558-1, Grades 9-12

Innumeracy: Mathematical Illiteracy and its Consequences, John Allen Paulos
Vintage, 0-679-72601-2, Grades 9-12

A Mathematician Reads the Newspaper, John Allen Paulos
Basic Books, ISBN 0-465-04362-3, Grades 9-12

The Golden Section and Related Curiosa, Garth E. Runion
Dale Seymour Publications, ISBN 0-8665-1510-0, Grades 7-12

The Most Beautiful Mathematical Formulas, Lionel Salem, Frédérick Testard and Coralie Salem
John Wiley & Sons, ISBN 0-471-55276-3, Grades 9-12

The Music of the Primes, Marcus du Sautoy
Harper Collins, ISBN 0-06-621070-4, Grades 9-12

Strength in Numbers - Discovering the Joy and Power of Mathematics in Everyday Life, Sherman K. Stein
John Wiley and Sons, ISBN 0-471-32974-6, Grades 9-12

The Penguin Dictionary of Curious and Interesting Mathematics, David Wells
Penguin Books, ISBN 014-02-3603-1, Grades 7-12

Books with collections of problems and activities

You will not be disappointed with these books. They are well worth buying and will give you a life long supply of good material. I particularly like the books in this list published by Cambridge Press. They contain a gold mine of good problems and activities. The Math Kit is an extraordinary collection of pop-ups, interactive mechanics, pullouts and other cool stuff. I often show the Kit to parents and suggest they buy this kit as a gift for their child (particularly suitable for students in grades 6-8). Toys and Tales With Everyday Materials will show you and your students how to make a number of dynamic toys from different parts of India. This is a lovely book!

Names, authors and publishers

Math and Science Across Cultures, Maurice Bazin, Modesto Tamez and the Exploratorium Teacher Institute
The New Press, ISBN 1-56584-541-2, Grades 7-12

Mathematical Activities - A Resource Book for Teachers, Brian Bolt
Cambridge University Press, ISBN 0-521-28518-6, Grades 6-12

Mathematical FunFair, Brian Bolt
Cambridge University Press, ISBN 0-521-37743-9, Grades 6-12

The Amazing Mathematical Amusement Arcade, Brian Bolt
Cambridge University Press, ISBN 0-521-26980-6, Grades 6-12

What's Your Game - A Resource Book for Mathematical Activities, Michael Cornelius and Alan Parr
Cambridge University Press, ISBN 0-521-38625-X, Grades 6-12

Toys and Tales With Everyday Materials, Sudarshan Khanna, Gita Wolf and Anushka Ravishankar
Tara Publishing and the National Institute of Design, ISBN 81-86211-42-X, Grades 9-12

The Math Explorer: Games and Activities for Middle School Youth Groups, Pat Murphy, Lori Lambertson, Pearl Tessler and the Explorartorium Staff
Key Curriculum Press, ISBN 1-55953-540-7, Grades 6-12

Index to Mathematical Problems 1980-1984, Stanley Rabinowitz (editor)
MathPro Press, ISBN 0-9626401-1-5, Grades 9-12, gifted
URL: http://www.mathpropress.com

Triangles: Shapes in Math, Science and Nature, Catherine Sheldrick Ross
Kids Can Press, ISBN 1-55074-194-2, Grades 7-12

Solve This: Math Activities for Students and Clubs, James Tanton
Mathematical Association of America, ISBN 0-88385-717-0, Grades 7-12
URL: www.maa.org

Problems for Senior High School Math, Peter Taylor (privately published)
This book contains an outstanding collection of interesting problems. Peter is a Professor of Mathematics at Queen's University in Kingston, Ontario. Copies can be obtained by writing to Peter at taylorp@post.queensu.ca

The Math Kit: A Three-Dimensional Tour Through Mathematics, Ron van der Meer and Bob Gardner
Charles Scribner's Sons, ISBN 0-02-621535-7, Grades 6-12

Mathematics dictionaries, books and websites that contain definitions and origins of words

Names, authors and publishers

Mathematics Dictionary, James and James
Van Nostrand Reinhold, ISBN 0-442-24091-0, Grades 9-12

The Words of Mathematics - An Etymological Dictionary of Mathematical Terms Used in English, Steven Schwartzman
Mathematical Association of America, ISBN 0-88385-511-9, Grades 9-12
URL: www.maa.org

Mathwords
URL: http://www.mathwords.com, Grades 9-12

Books that connect mathematics and science with sports

The Physics of Baseball, Robert K. Adair
Harper & Row, ISBN 0-06-096461-8, Grades 9-12

What Makes a Boomerang Come Back: The Science of Sports, Sharon L. Blanding and John J. Monteleone
Longmeadow, ISBN 0-681-41195-3, Grades 9-12

The Mathematics of Projectiles in Sports, Neville De Mestre
Cambridge University Press, ISBN 0-521-39857-6, Grades 9-12

Mathematician at the Ballpark: Odds and Probabilities for Baseball Fans, Ken Ross
Pi Press, ISBN 0-13-147990-3, Grades 9-12

Roundabout: The Physics of Rotation in the Everyday World, Jearl Walker
W. H. Freeman and Company, ISBN 0-7167-1725-5, Grades 9-12

Books about geometry

Any students or teacher wanting to improve their knowledge in geometry would do well to obtain a copy of the book by Weeks and Adkins. Geometry books do not get much better than this. Equally outstanding is the book by Harold Jacobs. The book by Wells is a dictionary of terms from geometry.

Names, authors and publishers

A Course in Geometry Plane and Solid, Arthur W. Weeks and Jackson B. Adkins
Bates Pub Company, ISBN 1-8817-6406-0, Grades 9-12

The Penguin Dictionary of Curious and Interesting Geometry, David Wells
Penguin Books, ISBN 014-01-1813-6, Grades 9-12

Geometry, Harold R. Jacobs
W. H. Freeman, ISBN 0-7167-0456-0, Grades 9-12

Books about proof

"Proofs without words" (see the example given below) is a regular feature in the Mathematics Magazine and the College Mathematics Journal, two journals published by the Mathematical Association of America (MAA). These proofs without words are diagrams that help an observer see why a particular statement may be true and also to see how one might prove that it is true. The MAA has published two books (details given below) using the proofs without words from their journals. They are well worth purchasing, especially for meeting the needs of gifted students at the high school level who have an intrinsic interest in mathematics.
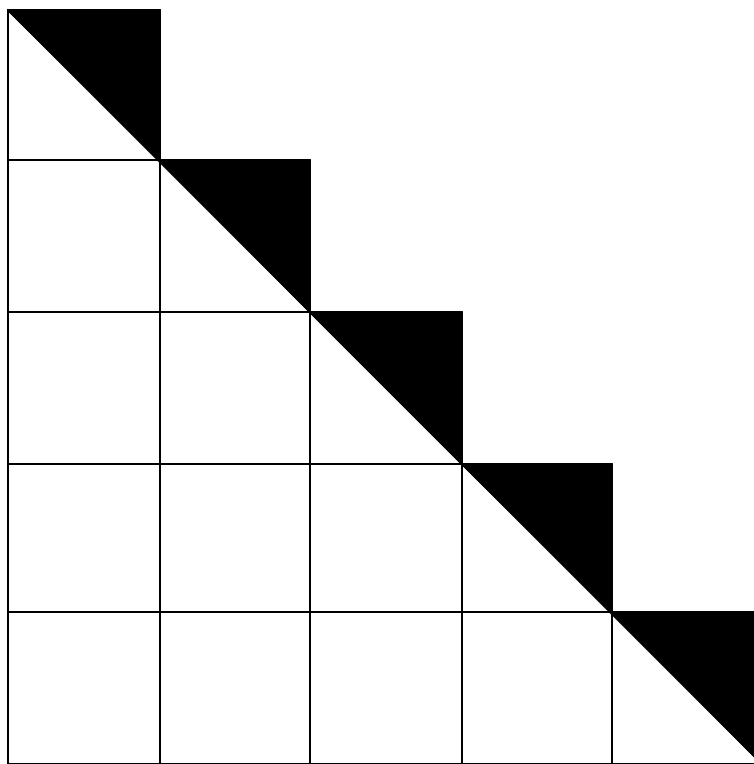
$$1 + 2 + 3 + ... + n = \frac{n^2}{2} + \frac{n}{2}$$

Names, authors and publishers

Proof Without Words: Exercises in Visual Thinking, Roger B. Nelsen
The Mathematical Association of America, ISBN 0-88385-700-6, Grades 9-12, gifted

Proof Without Words II: Exercises in Visual Thinking, Roger B. Nelsen
The Mathematical Association of America, ISBN 0-88385-721-9, Grades 9-12, gifted

Books by Martin Gardner

Martin Gardner has been at the centre of the world of recreational mathematics for almost 50 years. His writings have provided me with interesting and engaging material for my students. I don't own every book written by Gardner, but the ones that I do possess have been well used. His material will surprise, entertain and educate your students.

The Mathematical Association of America sells a CD-ROM that contains 15 (fifteen!) of Gardner's books along with the entire collection of his columns ("Mathematical Games") from Scientific American (from 1956 to 1986). This incredible collection is searchable and sells for less than USD $60. For information go to www.maa.org

Names and publishers

The Unexpected Hanging and Other Mathematical Diversions, Martin Gardner
University of Chicago Press, ISBN 0226282562, Grades 7-12

Hexaflexagons and Other Mathematical Diversions : The First Scientific American Book of Puzzles and Games, Martin Gardner
University of Chicago Press, ISBN 0-226-28254-6, Grades 7-12

Second Scientific American Book of Mathematical Puzzles and Diversions, Martin Gardner
University of Chicago Press, ISBN 0-226-28253-8, Grades 7-12

Martin Gardner's New Mathematical Diversions from Scientific American, Martin Gardner
University of Chicago Press, ISBN 0-226-28247-3, Grades 7-12

Mathematical Magic Show, Martin Gardner
Mathematical Association of America, ISBN 0-88385-702-2, Grades 7-12
www.maa.org

Magic Numbers of Dr Matrix, Martin Gardner
Prometheus Books, ISBN 0-879-75282-3, Grades 7-12

Aha! Gotcha : Paradoxes to Puzzle and Delight, Martin Gardner
W H Freeman & Co, ISBN 0-716-71361-6, Grades 7-12

Aha! Insight, Martin Gardner
W H Freeman & Co, ISBN 0-716-71017-X, Grades 7-12

Wheels, Life, and Other Mathematical Amusements, Martin Gardner
W H Freeman & Co, ISBN 0-716-71589-9, Grades 7-12

Time Travel and Other Mathematical Bewilderments, Martin Gardner
W H Freeman & Co, ISBN 0-716-71925-8, Grades 7-12

Fractal Music, Hypercards and More: Mathematical Recreations from Scientific American Magazine, Martin Gardner
W H Freeman & Co, ISBN 0-716-72189-9, Grades 7-12

The Last Recreations: Hydras, Eggs, and Other Mathematical Mystifications, Martin Gardner
Copernicus Books, ISBN 0-387-94929-1, Grades 7-12

Cross out one letter so that the remaining letters (in the same order) spell out a very familiar word.

ORNELEMEATINTIENRG

a classic Martin Gardner puzzle

Books by Ross Honsberger

Ross Honsberger is now Professor Emeritus at the University of Waterloo. His teaching style was highly unique, his sense of humour was wacky and his passion for mathematics was and continues to be infectious. This passion comes through in the many books that he has written. The books contains various topics from recreational mathematics, a huge collection of interesting and unusual problems along with detailed discussions of problems from mathematics competitions.

Ingenuity in Mathematics, Ross Honsberger
Mathematical Association of America, ISBN 0-88385-623-9, Grades 7-12

Math Chestnuts from Around the World, Ross Honsberger
Mathematical Association of America, ISBN 0-88385-330-2, Grades 9-12, gifted

Mathematical Delights, Ross Honsberger
Mathematical Association of America, ISBN 0-88385-314-0, Grades 9-12, gifted

Mathematical Diamonds, Ross Honsberger
Mathematical Association of America, ISBN 0-88385-332-9, Grades 9-12, gifted

Mathematical Gems 1, Ross Honsberger
Mathematical Association of America, ISBN 0-88385-301-9, Grades 9-12, gifted

Mathematical Gems 2, Ross Honsberger
Mathematical Association of America, ISBN 0-88385-302-7, Grades 9-12, gifted

Mathematical Morsels, Ross Honsberger
Mathematical Association of America, ISBN 0-88385-303-5, Grades 9-12, gifted

More Mathematical Morsels, Ross Honsberger
Mathematical Association of America, ISBN 0-88385-334-5, Grades 9-12, gifted

Lovely math books from Tarquin

Tarquin Publications, a company located in the United Kingdom, produces some of the most beautiful, creative and engaging books in the world. Titles include Mathematical Curiosities; The Magic of Flexagons; Geometric Patterns from Islamic Art and Architecture; Be A Code Breaker; Mind's Eye Geometry; Mathematical Treasure Hunts; mathematical Snacks, Images of Infinity and a Puzzle A Day (this is a small sampling of the many books that are available). They are lovely books and highly recommended.

Contact Information:
URL: www.tarquin-books.demon.co.uk

Puzzle books

Names, authors and publishers

The Tokyo Puzzles, Kobon
Frederick Muller, ISBN 0-584-10357-3, Grades 7-12

Have Some Sums To Solve: The Compleat Alphametics Book, Steven Kahan
Baywood Publishing, 0-89503-007-1, Grades 7-12

Matchstick Puzzles, Tricks and Games, Gilbert Obermair
Sterling Publishing, ISBN 0-8069-8934-3, Grades 4-12

The Penguin Dictionary of Curious and Interesting Puzzles, David Wells
Penguin Books, ISBN 0-14-014875-2, Grades 7-12

Speaking of puzzles, here is lovely one for you to play with. To obtain the solution send a stamped self-addressed envelope along with **$7.11** to me and I will reveal the answer.

> **I recently bought four non-taxable items at a 7-11 store and was surprised that the total cost was $7.11! Later during the day when I got home I was astonished to find that when I multiplied the four prices together I again arrived at an answer of $7.11! What were the prices of these four items?**

Recreational math books from Dover

Dover Books publishes a huge collection of very inexpensive books on topics from mathematics that tend to be considered recreational in nature. It is rather difficult to define what is and what is not a topic from recreational mathematics, but the general idea is that this field includes puzzles, games, mathematical magic tricks, magic squares and so on. The list of books available can be viewed by going to their website located at http://store.doverpublications.com and clicking on the link for Science and Mathematics, then Mathematics and finally the link for General and Popular Mathematics.

A short list of some of my favourite books from Dover is given below.

Names and authors

Flatland: A Romance of Many Dimensions, Edwin A. Abbot
Dover Books, ISBN 0-486-27263-X, Grades 7-12

Mathematical Recreations and Essays, W. W. Rouse Ball
Dover Books, ISBN 0-486-25357-0, Grades 9-12

Recreations in the Theory of Numbers, Albert H. Beiler, gifted
Dover Books, 0-486-21096-0, Grades 9-12

Tricks, Games and Puzzles With Matches, Maxey Brooke
Dover Books, 0-486-20178-3, Grades 4-12

Coin Games and Puzzles, Maxey Brooke
Dover Books, 0-486-22893-2, Grades 4-12

Amusements in Mathematics, H. E. Dudeney
Dover Books, 0-486-20473-1, Grades 7-12

Mathematical Bafflers, Angela Dunn
Dover Books, ISBN 0-486-23961-6, Grades 7-12

Second Book of Mathematical Bafflers, Angela Dunn
Dover Books, ISBN 0-486-24352-4, Grades 7-12

Mathematical Puzzles of Sam Loyd, Edited by Martin Gardner
Dover Books, 0-486-20498-7, Grades 7-12

More Mathematical Puzzles of Sam Loyd, Edited by Martin Gardner
Dover Books, 0-486-20498-7, Grades 7-12

The Moscow Puzzles, Boris A. Kordemsky
Dover Books, ISBN 0-486-20709-9, Grades 9-12

Mathematical Diversions, J. A. Hunter and Joseph S. Madachy
Dover Books, 0-486-23110-0, Grades 7-12

Mathematical Recreations, Maurice Kraitchhik
Dover Books, 0-486-20163-5, Grades 9-12

Mathematical Snapshots, Hugo Steinhaus
Dover Books, 0-486-40914-7, Grades 9-12

Mathematical Quickies, Charles Trigg
Dover Books, ISBN 0-486-24949-2, Grades 9-12

The Puzzler from Car Talk on NPR

Car Talk is a weekly show on National Public Radio (NPR) that features the Click and Clack (Tom and Ray) Brothers. Each week car owners from across America call the show with questions about their vehicles. In the end, the answers that Tom and Ray provide are useful, but along the way there is a tremendous amount of good humour and fun. If you have never listened to this show, go the NPR website and either listen on line or use the site to locate an NPR station close to your home.

The Puzzler is a very popular feature each week. The puzzles are engaging and often involve mathematics. Teachers may want to have their students tune in to the show, solve the puzzle and then submit their work or present their solution in class. Alternatively teachers could go on line during class and listen in to past puzzlers from shows that have been archived.

URL: http://www.cartalk.com/content/puzzler/

Puzzle books by Ivan Moscovich

Ivan Moscovich has written a number of books that contain puzzles that he has created over a period of almost 50 years. The design of these books is spectacular and the vibrant colours add a whole new dimension to his outstanding puzzles. His books will provide you with a lifetime of material that you can use with middle and high school students.

Names and publishers

1000 Puzzles, Paradoxes, Illusions and Games, Ivan Moscovich
Workman Publishing, ISBN 0-7611-1826-8, Grades 4-12

The Hinged Square & Other Puzzles, Ivan Moscovich
Sterling Publications, ISBN 1-4027-1666-4, Grades 4-12

Leonardo's Mirror and Other Puzzles, Ivan Moscovich
Sterling Publications, ISBN 1-4027-1667-2, Grades 4-12

The Monty Hall Problem and Other Puzzles, Ivan Moscovich
Sterling Publications, ISBN 1-4027-1668-0, Grades 4-12

The Shoelace Problem and Other Puzzles, Ivan Moscovich
Sterling Publications, ISBN 1-4027-1669-9, Grades 4-12

Books about mathematical chess puzzles

It is not necessary to know how to play chess to do these puzzles.

Names, authors and publishers

Mathematics and Chess: 110 Entertaining Problems and Solutions, Miodrag Petkovic
Dover Publications, ISBN: 0-486-29432-3, Grades 7-12

Across The Board, John J. Watkins
Princeton University Press, ISBN 0-691-11503-6, Grades 7-12

1	24	13	18	7
14	19	8	23	12
9	2	25	6	17
20	15	4	11	22
3	10	21	16	5
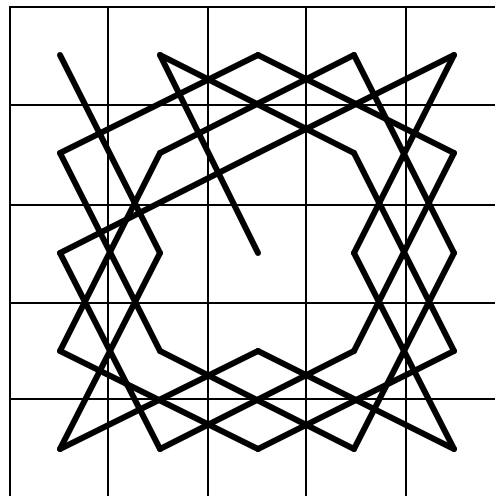
This is a Knight's Tour on a 5 x 5 chessboard. A path has been laid out in which the knight has visited every square once. Can you make one on an 8 x 8 chessboard?
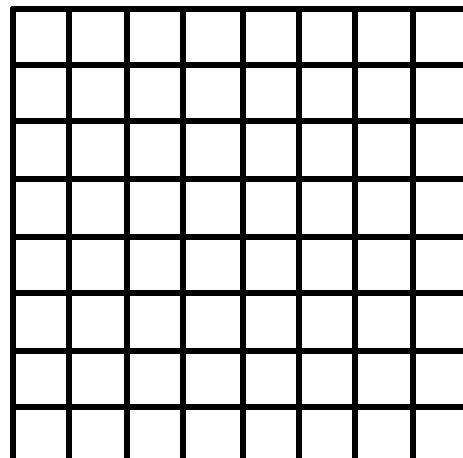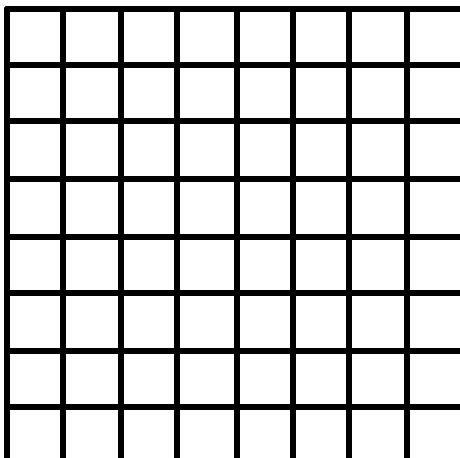
The Rubik's Cube

The Rubik's Cube can be used to teach inverse functions and many other mathematical topics. The two books by David Singmaster contain a wealth of information that can be used in any course that involves topics from discrete mathematics.

Many books have been written that contain solutions to the cube, my favourite is the one that was written by Jeffery Varasano who at the time of writing the book was 14 years old. His solution is markedly different in that he gets all the corners in place first.

Names, authors and publishers

Handbook of Cubik Math, Alexander H, Frey and David Singmaster
Enslow Publishers, ISBN 0-89490-058-7, Grades 9-12

Rubik's Cubik Compendium, Edited by David Singmaster
Oxford University Press. ISBN 0-19-853202-4, Grades 9-12

Jeff Conquers the Cube in 45 Seconds and You Can Too, Jeffery Varasano
Day Books, ISBN 0-8128-7097-2, Grades 4-12

Articles

Inverse Functions, Rubik's Cube and Algebra, Brian Garman
The Mathematics Teacher, January 1985

Websites

Mark Longridge is well known for his interest and passion for the Rubik's Cube. His website contains a wealth of information as well as links to other sites.

Mark Longridge's Rubik's Cube Site
URL: http://cubeman.org/

I give workshops on the Rubiks Cube for mathematics teachers and one of the major results that we develop is that the total number of combinations for a cube is equal to 43,252,003,274,489,858,000

$$\frac{3^8 \cdot 8! \cdot 2^{12} \cdot 12!}{12}$$

$$= 43,252,003,274,489,856,000$$

Books about magic squares

During my first year in university I became fascinated with magic squares from reading the books Magic Squares and Cubes by W. S. Andrews and New Recreations with Magic Squares by William H. Benson and Oswald Jacoby (bridge players will probably recognize these names). These are great books. I also like the book Wonders of Magic Squares by Jim Moran, particularly because It contains questions and worksheets.

Names, authors and publishers

Magic Squares and Cubes, W. S. Andrews
Dover Publications, ISBN 0-486-20658-0, Grades 7-12

New Recreations with Magic Squares, William H. Benson and Oswald Jacoby
Dover Publications, ISBN 0-486-23236-0, Grades 7-12

Magic Cubes: New Recreations, William H. Benson and Oswald Jacoby
Dover Publications, ISBN 0-486-24140-8, Grades 7-12

Magic Squares, John Lee Fults
Open Court Publishing, ISBN 0-87548-197-3, Grades 7-12

The Wonders of Magic Squares, Jim Moran
Vintage Books, ISBN 0-394-74798-4, Grades 4-12

The Zen of Magic Squares, Circles and Stars, Clifford Pickover
Princeton University Press, ISBN 0-691-07041-5, Grades 7-12

llll	888l	88l8	ll88
8l88	l8l8	l88l	8lll
l888	8ll8	8l8l	l8ll
88ll	ll8l	lll8	8888

A beautiful magic square that remains magic when held upside down
or when viewed in a mirror. The magic sum is always 19,998.

Suduko Puzzles

Are you one of the millions of people around the world who has become addicted to solving Suduko puzzles? Around May 2005 these puzzles swept into Canada from England where for quite sometime they have been the rage. The puzzles are so popular that the Globe and Mail, the Toronto Star, many other Canadian newspapers and over half of the newspapers in the US carry a Suduko puzzle every day. It is not clear if these puzzles will be around for a long time, but so far the craze does not seem to be slowing down whatsoever. The number of books on the subject now exceeds one hundred and there are hundreds of websites devoted to the topic.

In case you are one of the few people left on the planet who has not seen these puzzles, here is the what they are about. Suduko puzzles consist of a 9 by 9 grid with certain numbers filled in. The goal is fill in the empty cells, one number in each, so that every column, row, and 3 by 3 box contains the numbers 1 through 9 exactly once. A Suduko is given below for you to enjoy.

		1				9		
	5			6			2	
2			8		5			3
		7		8		4		
	4		6		1		7	
		2				8		
1			7		2			5
	2			9			6	
		8				2		

The puzzle London is mad about, Globe and Mail, May 21, 2005

Names, authors and publishers (a short list)

Sudoku for Dummies, Andrew Heron (volumes 2 and 3 available)
John Wiley & Sons, ISBN 0-47001892-5

Sudoku for Kids, Andrew Heron
Macmillan UK-Trade, ISBN 0-33044339-9

Times Sudoku Book 1, Wayne Gould (volumes 2 and 3 available)
Harper Collins Canada, ISBN 0-007-20732-8

Suduko Book, Sam Griffeths Jones
Harriman House, ISBN 1-89759764-9

Sudoku Day to Day 2006, Andrews McMeel
Andrews McMeel Publishing, ISBN: 0-7407-4159-4

Penguin Book of Sudoku, Michael Mepham (volume 2 available)
Penguin Books, ISBN, 0-143055-08-9

Sudoku: More Than 200 Fun and Challenging Japanese Number Puzzles, Tammy Seto
Gramercy, ISBN 0-51722827-0

Sudoku Easy Vol 1: Presented by Will Shortz, Will Shortz (volumes 2 and 3 available)
H.B. Fenn & Company, ISBN 0-312355-02-5

Sudoku Easy to Hard: 100 Wordless Crossword Puzzles, Will Shortz
H.B. Fenn & Company, ISBN 0-312355-03-3

How to Solve Sudoku: A Step-By-Step Guide, Robin Wilson
Sterling Publishing, ISBN 1-90490262-6

The Official Book of Sudoku: Book 1
Plume Books, ISBN 0-45228720-0

Websites

suduko: one of the puzzles by Pappocum
URL: www.suduko.com

Sudoku Zone
URL: http://www.just60.com/xq/ASP/ID.375/x.sudoku/qx/zone.htm

Web Suduko: Billions of free suduko puzzles
URL: www.websudoku.com

Top 9 reasons for using Suduko puzzles with students

(9)   they provide students with an opportunity to sharpen their logical skills.

(8)   there are various ways of solving a Suduko puzzle and this can lead to great discussions between students about their attempts to find the solution.

(7)   they give students a problem in which you have to take risks from time to time and then learn from mistakes that are made.

(6)   they tie in with curriculums that see problem solving as a central and essential activity.

(5)   they are part of the popular culture.

(4)   these puzzles can be used as a way of introducing students to latin squares, Leonhard Euler and the history of mathematics.

(3)   many parents have worked on these puzzles which provides a setting in which they can work with their children on a puzzle together.

(2)   there is a beautiful sense of satisfaction that people experience when the last number is filled in.

(1)   Sudukos are fun to do.

Suduko advice for elementary teachers

Teachers at the elementary level might try these puzzles out by using colours instead of numbers. Also, instead of doing them on a piece of paper, use the tiles on your classroom floor and have your students act out the puzzle. Most classrooms seem to have tiles that are one foot by one foot and all that you will need to do is to block off a 9 by 9 set of these tiles. Students can place coloured squares on the tiles. You could also have the students select and draw nine objects and then photocopy nine sets of these nine pictures. These sheets can be placed on the tiles on the floor. Or you could use nine actual objects (popsicle stick, sticker, toy car etc.). For each object, you will need 9 of them. Whatever you use, keep in mind that the main task for students is to continually check if the item they are placing on a tile (or cell on a piece of paper) appears in the same row, column or box.

One final note. Teachers at the elementary level can make the puzzles easier by providing extra numbers (or colour or objects). To do this teachers can simply look at the solution to a puzzle and then erase some numbers.

Suduko advice for high school teachers

Your average to better abled students should be able to at least try and probably solve the easier puzzles as they appear in a newspaper or on a website. For weaker students you may want to add in some numbers particularly in positions where students can use this new number to determine a bunch of other numbers.

Here are some questions to ask your students. Some will not be easy to resolve, but even so, having a discussion about these points is worthwhile.

Question 1

Study the given numbers for various Suduko puzzles. Is there any type of symmetry that occurs in the initial state of these puzzles?

Question 2

Google the expression "latin square" and write a report that describes what they are, when they were invented, how they are used in agriculture and how they are connected to Suduko puzzles.

Question 3

Download the article posted at the website given below, read the article and write a report about how the authors together with their two children painted their double garage door using two orthogonal latin squares. In your report be sure to include a definition of the term orthogonal latin square.

URL: http://ww2.lafayette.edu/~math/Gary/Doors.pdf

Question 4

Suppose that you are in charge of labeling Suduko puzzles for a newspaper as being easy, medium or hard. What criteria would you use to classify these puzzles? Try to find out what criteria is actually used by a newspaper or by the people running a website that provides Suduko puzzles.

Books on wordplay

Palindromes (I prefer pi), anagrams (Lancaster = ancestral) and other forms of wordplay are intrinsically interesting to many people. I am particularly fond of these things because they provide students with examples of what it means to be creative, curious and playful. I also like them because it is possible to connect wordplay to mathematics.

The book Making the Alphabet Dance by Ross Eckler is a wonderful source for wordplay along with mathematical content that teachers of a finite mathematics course can use with their students.

The Inversions book by Scott Kim (www.scottkim.com)is stunning and it contains a collection of ambigrams (words that are written so that they read the same when turned upside down) and other unusual ways of displaying words. This is a great book to show students when they are studying transformations (especially rotations). If you have read or looked at the cover of Dan Brown's book Angels and Demons, you have seen an ambigram. This one was created by John Langdon, (www.JohnLangdon.net) one of the best ambigram artists in the world.

Univers Revolved is a highly creative book that contains hundreds of images of the letters of the alphabet and numbers rotated to form three-dimensional objects.

Eunoia is a highly creative book that can best be described an intellectual achievement of the highest order. The book opens with Chapter A and readers will find that the only vowel used in this chapter is a. Then there is Chapter E, I O, U followed by other material. Eunoia is the shortest English word that contains all five vowels and it means beautiful thinking. This would be a great book to discuss when you are teaching a lesson on say the frequency of the letters of the alphabet.

For many years I have given Wacky Wordies to my students to solve and have found that they are a perfect tool for helping my students to become more creative and to look at things from a different perspective. In case you are not familiar with these puzzles, some examples are given below. Each wacky wordy represents an English word or expression and the goal is to figure out what it means. For example, the first wacky wordy represents the expression scrambled eggs while the second one stands for the word water. Can you solve the other two wacky wordies? If you want more of these, buy the books Word Winks and More Word Winks or try to buy a game called Whatzit.

gegs	**hijklmno**
milonelion	**just144ice**

Names, authors and publishers

Eunoia. Christian Bok
Coach House Books, ISBN 1-55245-092-9, gifted

Making the Alphabet Dance: Recreational Wordplay, Ross Eckler
St. Martin's Press, ISBN 0-312-14032-0, gifted

Wanted Words, Jane Farrow
Stoddart, ISBN 0-7737-6175-6

Anagrams Dictionary, Samuel C. Hunter
Cassell, ISBN 0-304-34258-0

Inversions, Scott Kim
Key Curriculum Press, ISBN 0-7167-2044-2
URL: www.keypress.com

Wordplay: The Philosophy, Art, and Science of Ambigrams, John Langdon
Broadway Books, 0-76792075-9

Univers Revolved: A Three-Dimensional Alphabet, Ji Lee
Harry N. Abrams, ISBN 0-8109-4349-2

Dictionary of Wordplay, David Morice
Teachers & Writers Collaborative, ISBN 0-915-92497-8

Alphabet Avenue: Wordplay in the Fast Lane, David Morice
Chicago Review Press, ISBN 1-5565-2304-1

Word Winks: Over 300 Visual Verbal Puzzles
Mindware, ISBN 1-892069-75-X

More Word Winks: Over 300 Visual Verbal Puzzles
Mindware, ISBN 1-892069-76-8

Two beautiful anagrams for mathematics teachers
Gosh, see that triangle?   A decimal point
It has got three angles.   I'm a dot in place

A license to do math

Licence plates can be used to introduce students, even at a young age, to important mathematical concepts from the study of permutations and combinations. For states and provinces that identify their plates with a structure that involves three single digit numbers followed by three letters of the alphabet (see the example given below), a fundamental question that can be asked is how many licence plates can be made. For younger students in particular, the involvement of plates from around the world can be used to integrate geography with mathematics. The following books contain images of licence plates along with historical information about the designs that were used. The Internet can also be used to obtain information of this nature.

Names, authors and publishers

License Plates of the United States: A Pictorial History, James K. Fox
Interstate Directory Publishing Company, ISBN 0-9629962-5-4

License Plate Book: Current Plates of the United States and Canada, Thomson C. Murray
Interstate Directory Publishing Company, ISBN 0-9629962-9-7

Question 1

(a)   If non-personalized licence plates in Ontario have the type of structure shown in the photograph, how many different plates can be issued? Find the population of Ontario and decide if this number of plates is adequate.

(c)   What famous mathematics educator owned this car? He now works for Texas Instruments.

Question 2

(a) If all licence plates in this country use the structure shown in the photograph, how many different plates can be issued?

(b) In what country would you find this plate?

(d) If this car were involved in an accident, why would every mathematics teacher in the world provide the police with the wrong plate number?

Using personalized licence plates to help students become more CR8IVE

Figuring out the meaning of a personalized (vanity) licence plate is a terrific exercise in creativity. With the increasing availability of digital cameras, teachers may want to ask their students to take photos of personalized plates and figure out their meaning.

My licence plate: Does this give me a Licence to speed?

Books about anamorphic art

Students spend a great deal of time studying transformations and their effect on regions and curves, yet rarely do they see any dramatic results or surprises. The transformations used to form anamorphic art are wild - line segments turn into arcs of circles, arcs of circles turn into line segments and the regions become unrecognizable unless you know the secret. For many years my students have enjoyed studying this topic through the books listed below and it has given them an opportunity to make connections between art and mathematics. Additional information can be found in the article **The Secret of Anamorphic Art** by Art Johnson and Joan D. Martin in the January 1998 issue of the Mathematics Teacher.

Names, authors and publishers

The Magic Mirror An Antique Optical Toy
Dover Books, ISBN 0-486-23847-4

Anno's Magical ABC an anamorphic alphabet, Mitsumasa Anno and Masaichiro Anna
The Bodley Head Ltd., 0-370-30405-5

Anamorphic Art**,** Jurgis Baltrusaitis
Harry N. Abrams Inc., ISBN 0-8109-0662-7

Hidden Pictures, Linda Bolton
Dial Books, 0-8037-1378-9

Time Travels and Other Mathematical Bewilderments (Chapter 8), Martin Gardner
W. H. Freeman and Company, ISBN 0-7167-1925-8

The Magic Cylinder, Ivan Moscovich
Tarquin Publications, ISBN 0-906212-67-7

Arithmetic, Ted Rand
Harcourt Brace Jovanovich, Publishers, ISBN 0-15-203865-5

Videos

The Films of Charles and Ray Eames

For many years I have used the film Powers of Ten and the accompanying book when I am teaching exponents.   This engaging film was created by Charles and Ray Eames (www.eamesoffice.com) a husband-wife team famous for their highly innovative designs and inventions. In all they created over 75 films some of which involve mathematics. In Volume 2 of this series you will find Powers of Ten and Volume 4 contains a series of short films called the IBM Mathematics Peep Shows.

I highly recommend the book Eames Design, The Work of the Office of Charles and Ray Eames. I have this book and enjoy looking at their creative designs, many of which are related to mathematics. I also have their House of Cards and my students enjoy creating structures from these interlocking cards. I bought this book, the cards and the videos from the San Francisco Museum of Modern Art (www.sfmoma.org). SFMOMA bought the contents of the office used by Charles and Ray Eames after Ray died and from time to time they display items from the collection.

The Boston Museum of Science has a permanent display of the works of Charles and Ray Eames called Mathematica and my favourite part is a train that runs around a Moebius strip.

The Films of Charles and Ray Eames, Volumes 1, 2, 3 and 4, Pyramid Home Video
1-800-421-2304

Powers of Ten, Philip and Phyllis Morrison and the Office of Charles and Ray Eames
Scientific American Library, ISBN 0-7167-6003-7

Eames Design, The Work of the Office of Charles and Ray Eames
Harry N. Abrams, ISBN 0-8109-0879-4

The Fantastic World of M. C. Escher

Escher is of course very well known for his fantastic works of art and I would imagine that most math teachers are familiar with his unique tesselations. This video will give you and your students some insight into the world of Escher and is quite informative. In addition to this video I highly recommend the book Visions of Symmetry - M. C. Escher.

The Fantastic World of M. C. Escher, Distributed exclusively by Atlas Videos Inc.
ISBN 1-56938--051-1

Visions of Symmetry - M. C. Escher, Doris Schattschneider
W. H. Freeman, ISBN 0-7167-2126-0

Mathematics videos from the Foundation for Advancements in Science and Education

This organization has produced a number of award-winning videos that can be used with students or for staff development purposes. Support material is available for each video. A partial list of the videos created to date is given below.

The Eddie Files (grades 3-6)
The Kay Toliver Files (grades 3-6)
Futures with Jaime Escalante (grades 9-12)
Interactions: Real Math-Real Careers (grades 6-9)
Teacher Talk
Good Morning Miss Toliver
Math: Who Needs It?!

Contact Information:
Foundation for Advancements in Science and Education
4801 Wilshire Boulevard, Suite 215, Los Angeles, CA 90010
URL: http://www.fasenet.org/, 323-937-9911

The Proof

This is a wonderful video that tells the fascinating story of how Andrew Wiles developed a proof of Fermat's Last Theorem, a result that has taken over 300 years to resolve. The video captures the highs and lows that Wiles experienced as he developed his proof.

Contact Information:
URL: http://www.pbs.org/wgbh/nova/proof/

Project MATHEMATICS!

Project Mathematics! has produced a number of award-winning videos (a partial list is given below) that are well worth owning. Workbooks are available for each video.

The Theorem of Pythagoras	Sines and Cosines Part 1 (Periodic Functions)
The Story of Pi	Sines and Cosines Part 2 (Trigonometry)
Similarity	Sines and Cosines Part 3 (Addition Formulas)
Polynomials	Sines and Cosines Part 4 (Angles and Slope)
The Tunnel of Samos	

Contact Information:
Project MATHEMATICS!
California Institute of Technology, Pasadena, California
URL: www.projmath.caltech.edu
Telephone: 800-541-2665

Educational supplies and publishers

There are dozens of excellent companies that sell educational supplies and books to teachers. You will get to see the leading companies when you attend conferences organized by the National Council of Teachers of Mathematics or other mathematics associations.

The following companies are based in Ontario near where I live and they sell products to teachers in North America and countries overseas.

Exclusive Educational Supplies

Exclusive sells hundreds of exciting, high-quality products for elementary teachers of mathematics, science and literacy. For mathematics teachers, the products available for purchase include manipulatives, calculators and a very long list of excellent resource binders. These resource binders have been written by classroom teachers and they contain ready to use activities related to curriculum topics and manipulatives.

Contact Information:
Address: 243 Saunders Road, Barrie, Ontario, L4N 9A3
URL: www.exclusiveeducational.ca
Telephone: 800-563-1166

Spectrum Educational Supplies

Spectrum Educational Supplies has a huge product line of educational materials and resources for elementary and secondary teachers. From the time the company started in the late 1960s, Spectrum specialized in products for early childhood educators and mathematics teachers in particular. Spectrum has business links to Nasco, a major US distributor, and they offer a wide range of products for teachers of many subject areas.

Contact Information:
Address: 50 Pony Drive, Newmarket, ON, L3Y 7B6
URL: www.spectrumed.com
Telephone: 800-668-0600

Tree House Press

Trees House Press publishes workbooks, books and teacher guides that address the needs of the reluctant learner, particularly young boys. Topics include Assessment And Evaluation; Career Education; Mathematics; Ontario Grade 10 Literacy Testing; Oral And Visual Communication; Reading And Literature; Spelling and Writing. The authors are Julian D'Angela, George Fawcett and Paul Lessard, all well known educators.

Contact Information:
Address: 110 Lancing Drive, Unit 2, Hamilton, ON, L8W 3A1
URL: www.treehousepress.com
Telephone: 800-776-8733

CCS Educational Inc.

CCS specializes in the sale of handheld devices. They are the Canadian representative of Vernier Software, they are an educational dealer for Texas Instruments and they are a distributor for W. K. Bradford Publishing. The company has also created and patented a number of unique products for teachers including a locking device for the battery compartment of calculators.

Contact Information:
Address: 24 Rogate Place, Scarborough, ON, M1M 3C3
URL: http://home.ican.net/~ccs/
Email: Don@CCSEducational.com
Telephone: 416-267-8844 or 877-227-3382

Mathematics posters for your classroom

Posters in the London Underground
Distributed by the Isaac Newton Institute for Mathematical Sciences

During World Mathematical Year 2000, a set of posters designed at the Isaac Newton Institute for Mathematical Sciences were displayed month by month in the London Underground. The posters are stunning and they will give your students a new and richer appreciation for mathematics.

Contact Information:
URL: http://www.newton.cam.ac.uk/wmy2kposters/

Multicultural posters for math classrooms
Distributed by Key Curriculum Press

There are 16 posters in this series that celebrate and showcase the math of China, Japan, the Maya, Africa, the Navajo, Arabia, Europe, India, Russia, Korea, the United States, Egypt, Ireland, the Aztecs, Babylon and the Inca. They also have available posters dealing with quilts and origami.

Contact Information:
URL: http://www.keypress.com/catalog/products/posters/

Illusion and Math posters
Distributed by Archimedes' Laboratory

The posters available from this company are highly creative. The combination of optical illusions and mathematics will grab the attention of anyone.

Contact Information:
URL: http://www.cafepress.com/mariejo2/221806

Can You See the Math? table-top posters
Distributed by Tree House Press

These unique posters have been designed so that pattern blocks and dominoes fit perfectly on them. This design allows elementary students to work directly on them and display solutions to problems from accompanying workbooks. These large posters are very colourful and each one comes with a teacher guide.

Contact Information:
Address: 110 Lancing Drive, Unit 2, Hamilton, ON, L8W 3A1
URL: www.treehousepress.com
Telephone: 800-776-8733

Posters from Tarquin Publications

The mathematical posters available from Tarquin are highly artistic and delightful to look at. I wish the walls of every mathematics classroom could be decorated with posters from their collection. Many of the posters can be used as the basis of an activity or as a way of showing students that there is a great deal of beauty in mathematics. A partial list of their posters is given below.

Aspects of Infinity	Curve Stitching
Which Number Comes Next?	Curves of Pursuit
Fibonacci Numbers	The Power of Coordinates
The Golden Ratio	Spirals & Helices
Fermat's Last Theorem	Impossible Geometry
Fractions	Impossible Kennel
Pascal's Triangle	Knot Mathematics
Number Patterns	The Circle Poster
Prime Numbers	Looking at Quadrilaterals
Fractions	Exploring the Triangle
Pascal's Triangle	Polyhedra Poster
Euler's Theorem	Solids of Revolution
Equal Parts	Mystic Roses
Theorem of Pythagoras	Reflections & Rotations
Who Did It?	Nets and Solids
One Million	Tessellations
Animal Tilings	Sliceform Surfaces
Sea-Life Tilings	Spiral Spiders' Webs
Symmetry in Cities	Area & Perimeter
Symmetry in Nature	Polygons and Quadrilaterals
Celtic Knots	Escher Posters

Contact Information:
URL: http://www.tarquin-books.demon.co.uk/
Email: orders@tarquin-books.demon.co.uk

Posters from The National Women's History Project

The National Women's History Project, formed in 1980, is an educational nonprofit organization. Their mission is to recognize and celebrate the diverse and historic accomplishments of women by providing information, educational materials and programs. The organization sells a number of posters that deal with women in science and mathematics. A list of some of their posters is given below. I have two favourite posters, one titled Women in Science and Mathematics and the other titled Women Putting Our Stamp on America. The Stamp on America Poster features a huge collection of actual stamps of women who have played a significant role in women's issues, civil rights and social justice issues.

Outstanding Women in Math and Science: Photo Display Set
12 Colorful Posters: Celebrate Women Inventors
Exemplary Achievers: Scientific Women Poster
Science is Women's Work
Women in Science and Math Poster (my favourite)
Which Great Woman Was Born On Your Birthday?
Women Putting Our Stamp on America

Contact Information:
URL: http://www.nwhp.org/new-catalog/science/science1.html

Posters from the Syracuse Cultural Workers

The Syracuse Cultural Workers is an educational and cultural organization founded in 1982. Their mission is to help sustain a culture that honors diversity and celebrates community; that inspires and nurtures justice, equality and freedom; that respects our fragile Earth and all its beings; that encourages and supports all forms of creative expression. They sell posters and while none of them involve mathematics directly, they do carry important messages about education and world issues. One of my absolute favourite posters in their collection is titled Celebrate The Whole Boy. The poster is actually a photograph of five boys gathered together in the middle of a football field. Four of them are dressed to play the game, a fifth is sitting on the ground playing a violin. It is a stunning image. Another favourite is The Alternative Alphabet Poster for Little and Big People (A is for Africa, B is for bicycle, C is for compost, ...).

Contact Information:
URL: http://www.syrculturalworkers.com/

Computer software

Autograph: The Dynamic Classroom Software
Company: The Learning Team

Developed in England by Douglas Butler, Autograph is one of the very best pieces of software on the market. The software is incredibly easy to use and produces dynamic results that are stunningly beautiful. Autograph can be used to support the teaching of most high school topics including coordinate geometry, conics, vectors, 3-D graphing, statistics, curve fitting, probability, calculus and discrete mathematics.

Contact Information:
URL: http://www.learningteam.org

Cabri Geometry
Company: Cabrilog: Innovative Math Tools, France

This dynamic geometry software was developed in France. It is powerful and incredibly easy to use. Cabri can be used to teach many mathematical topics beyond geometry. Visit their website for details about support materials for teachers.

Contact Information:
URL: http://www.cabri.com/web/nsite/html/home.html

Computer Algebra Systems (CAS)
Derive, Maple and Mathematica

These three pieces of software can be used to perform literally every basic algebraic skill taught at the secondary level along with all of the basic skills of the differential and integral Calculus. Using CAS, it is possible to calculate the exact value of say 1000!, it is possible to expand say

$(x + 1)^{100}$ and it is possible to differentiate say $\dfrac{e^x \sin x}{x^5}$.

Name of software: Derive 6
Company: Texas Instruments, USA
URL: http://education.ti.com/us/product/software/tii/features/features.html

Name of software: Maple 9.5
Company: Maplesoft, a division of Waterloo Maple, Canada
URL: http://www.maplesoft.com/

Name of software: Mathematica 5
Company: Wolfram Research, USA
URL: http://www.wolfram.com/

Fathom
Company: Key Curriculum Press

Fathom can be used to explore data, plot functions, and create animated simulations. Users can type in their own data, they can also access hundreds of data files that come with Fathom and they can import data from text files or directly from the Internet.

Contact Information:
URL: www.keypress.com/fathom

The Geometer's Sketchpad
Company: Key Curriculum Press

When this software first came out it was primarily used for teaching geometry. New features have been added and the software is now being used to teach concepts in algebra and Calculus and even topics from the elementary level. Key Curriculum publishes resource books and they run summer conferences to support the use of Sketchpad.

Contact Information:
URL: www.keypress.com/sketchpad

Halomda Mathematics and Physics Software
Company: Halomda Educational Software, Israel

Halomda has specialized in software for physics and mathematics teachers. Their software is excellent and very easy to use. It can be used to teach an incredibly wide range of topics, from fractions to Calculus.

Contact Information:
URL: http://www.halomda.com

Mathematix, Pythagoras, Math Solver and Math Editor
Company: Dalin Educational Software Publishing, Israel

Dalin has created a vast collection of excellent software for all grade levels. The software can be used to teach geometry, algebra, statistics, calculus and more. Dalin is currently offering teachers free and unlimited use of the software for six months.

Contact Information:
URL: http://www.mathematix.com

Math Type
Company: Design Science

Math Type is the most popular software used by math teachers and students to create mathematical expressions (see the sample given below). The software is very easy to use and once typed, the mathematical expressions can be pasted into any word processor.

Contact Information:
URL: http://www.mathtype.com

$$(\sin x)^3 \;+\; (\cos x)^3$$

$$= \;\; \frac{\sqrt{13}\,\sin\!\left(x + \tan^{-1}\!\left(\frac{2}{3}\right)\right) + \sqrt{2}\,\cos\!\left(3x + \frac{\pi}{4}\right) + \cos x}{4}$$

SimCalc software for computers and graphing calculators
Company: SimCalc Technologies

SimCalc is a partnership between the University of Massachusetts Dartmouth and the NSF-funded SimCalc Project. Jim Kaput, a professor at U Mass, created the SimCalc Project, initially as a research project that eventually lead to the development of software for computers and graphing calculators. The software is available for Mac and PC users and for graphing calculators from Texas Instruments.

The mission of SimCalc is to provide students from grade 6 and up with early access to powerful mathematics through the study of change. This is accomplished through activities that involve a number of wonderful animations. Visit their website for details.

Contact Information:
URL: http://www.simcalc.com/

TI Connect and TI Connectivity Cable
Company: Texas Instruments

TI Connect software, available for Mac and PC users, allows teachers and students to transfer files between a graphing calculator and a computer. Users can also obtain screen shots from their graphing calculators and then paste the image into a word processor. In addition to the software which is available for free from the TI website, users will also need a TI Connectivity Cable. In Canada the cable can be purchased form Grand and Toy and Business Depot/Staples. Outside of Canada, consult the TI website for a list of stores where the cable can be bought.

Contact Information:
URL: http://education.ti.com/educationportal/

> TI InterActive!
> Company: Texas Instruments

TI InterActive! is an all-in-one piece of software that consists of a word processor, a spreadsheet, a graphing utility, an Internet browser, software for typing mathematical expressions and a symbolic manipulator. The software can be used to interface with all of TI's graphing calculators and data collection devices.

Contact Information:
URL: http://education.ti.com/educationportal/

> TI Navigator Classroom Learning System
> Company: Texas Instruments

Navigator is a wireless system that allows teachers to communicate with all of the graphing calculators in their classroom all at the same time or individually. Teachers can send and receive from files using their computer. Multiple choice and free response tests can be created, transferred, retrieved and marked using Navigator. Data files, programs and Apps can also be transferred. Information about how teachers are using Navigator along with resource documents can be found at the TI website.

Contact Information:
URL: http://education.ti.com/educationportal/

> Understanding Mathematics
> Company: Neufeld Learning Systems, Canada

Neufeld has produced superb software for mathematics teachers at the elementary and secondary levels. Their software is engaging, easy to use and very supportive of students as they learn new material. The software can be used to teach topics from algebra, exponents, graphing, measurement and geometry, probability, equations, fractions, integers, percent.

Contact Information:
URL: http://www.neufeldmath.com

Handheld technology

Texas Instruments

For many years, Texas Instruments has dominated the world-wide market for handheld devices such as basic calculators, graphing calculators and data collection devices.

At the elementary level, teachers and students use The Math Mate, The Math Explorer, The TI10 and the TI15 Explorer. At the middle school level, the TI73 Plus is fast becoming the calculator of choice. High school teachers and their students mainly use the TI83 Plus graphing calculator, although growing numbers are using the TI89. Texas Instruments recently introduced the TI84 Plus which will eventually replace the TI83. The TI84 is very similar to the TI83 but there are several major differences including a clock and a USB port. The TI89 has CAS (Computer Algebra System) and it can be used to manipulate algebraic expressions and determine derivatives and integrals. The TI83, TI73, TI89 and TI84 all have flash memory and their operating systems can be upgraded via the Internet using TI Connect software (see the section on software).

Apps (Applications) are also available for these graphing calculators. For a complete listing of available Apps visit the TI website. Data collection devices and scientific probes are also available and this equipment is being used by math and science teachers.

```
WINDOW
 Xmin=-2
 Xmax=2
 Xscl=1
 Ymin=-2
 Ymax=2
 Yscl=1
 Xres=1
```

```
Shade(abs(X)-√(1
-X²),abs(X)+√(1-
X²))
```
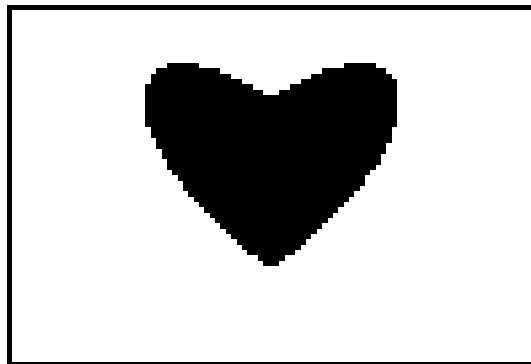
Contact Information:
URL: http://education.ti.com/educationportal/

Vernier Software & Technology

Since 1981 Vernier has been a world leader in the development of data collection tools and sensors. In the beginning the use of a computer was an essential component to collecting data. Today all of Vernier's equipment can still be used in conjunction with a computer (Mac or PC) but many teachers are now using a graphing calculator instead of a computer. Vernier and Texas Instruments have developed applications that make it possible for teachers and students to connect their TI83s to a data collection tool which in turn is connected to a sensor. Vernier currently manufacturers over 40 sensors, many of which are very low in cost and can be used by both science and mathematics teachers. Visit the Vernier website for more information.

Contact Information:
URL: http://vernier.com/

Graphing calculator books

Brendan Kelly Publishing

Brendan Kelly is the leading publisher of books on graphing calculators (books are available for the TI83 Plus and the TI89). Kelly has also published other books including an outstanding series for middle school teachers that is closely aligned with the NCTM Standards.

Books available from Brendan Kelly include the following:

Functions with the TI-83 Plus & TI-83 Plus 83
Algebra with the TI-83 Plus & TI-83 Plus 83
Statistics with the TI-83 Plus & TI-83 Plus 83
Advanced Algebra with the TI-89
Statistics with the TI-89
Calculus with the TI-89

Authentic Learning Activities in Middle School Mathematics
Book 1 Number and Operation
Book 2 Measurement
Book 3 Patterns, Functions and Algebra
Book 4 Data Analysis, Statistics and Probability
Book 5 Geometry and Spatial Sense

Contact Information:
Brendan Kelly Publishing, Burlington, Ontario, Canada
URL: http://www.brendankellypublishing.com
Email: mail@brendankellypublishing.com
Telephone: 905-335-3359

Websites for mathematics teachers

The number of websites for mathematics teachers at any level is approaching infinity. The following list contains a small selection of websites that I have found to be useful. Additional sites can of course be obtained via Google using keywords such as mathematics, projects, activities, puzzles and so on.

> Activities from the Shodor Education Foundation
> URL: http://www.shodor.org/interactivate/activities/

This website contains a wealth of activities and Java Applets for teaching mathematics at the elementary and secondary levels. The material is organized in these sections: Number and Operation Concepts; Geometry and Measurement Concepts; Function and Algebra Concepts; Probability and Data Analysis Concepts.

> Ask Dr. Math
> URL: http://mathforum.org/dr.math/

Websites do not get much better than this one. The information posted here is incredibly rich and very helpful to mathematics teachers at all levels. I particularly like the Selected Answers to Common Questions section. The discussions are wonderful and there is something here for every mathematics teacher.

When you visit the Dr. Math website be sure to read about the three wonderful books that have been written by the staff of the Math Forum. These books are particularly useful for new teachers. The names of the three books are Dr. Math Gets You Ready for Algebra; Dr. Math Explains Algebra and Dr. Math Introduces Geometry.

Dr. Math is hosted by the Math Forum and you should make sure that you visit their site located at http://mathforum.org/ Click on the link for Discussions to obtain a rich collection of strategies for and thoughts about teaching various mathematics topics.

> Awesome Library - Elementary, Middle and High School Math
> URL: http://www.awesomelibrary.org/Classroom/Mathematics/Mathematics.html

This website contains an excellent list of websites for mathematics teachers at all levels.

> Classroom Activities for elementary and secondary mathematics using The Geometer's Sketchpad
> URL: www.keypress.com/sketchpad/general_resources/classroom_activities/index.php

The Geometer's Sketchpad (see the section on software in this document) started off as a great tool for teaching geometry at the secondary level. The software is now being used to teach many other mathematical topics including those at the elementary level.

Education in Physics and Mathematics: Welcome to Zona Land
URL: http://id.mind.net/~zona/mmts/mmts.html

This website will help your students visualize a wide range of mathematical topics. It will also help students develop a solid background in the words used in mathematics.

Elementary Geometry Mathematics
URL: http://www.bcps.org/offices/lis/curric/elem/elemgeo.html

Mathematical activities for students in grades 1-5 are posted at this website. Be sure to follow the origami links and learn how to make a dollar bill valentine.

Geometry Junkyard by David Eppstein
URL: http://www.ics.uci.edu/~eppstein/junkyard/

David Eppstein has put together a massive collection of highly interesting material related to geometry. The site is a geometrical gold mine not a junkyard.

Hands-on Math: Activities for the Elementary Classroom
URL: http://www.dpgraph.com/janine/mathpage/handson.html

This website contains a collection of excellent lesson plans and activities developed by a teacher. The material involves geometry, number patterns and topology.

High School Mathematics
URL: http://wneo.org/hotlists/highschoolmathematics.htm

The content of this website is organized under the following categories: Basic Skills, General Topics; High School Topics (Algebra, Geometry, Trigonometry, Calculus); History of Mathematics; Hotlists; Measurement; Organizations, Puzzles, Games, and Problems; Spreadsheets; Statistics and Teacher Resources.

isbn.nu search for books
URL: http://www.isbn.nu/sisbn/mathematics%20study%20teaching%20elementary

The isbn.nu website can be used for search for mathematics books at all levels. This is a terrific way of finding the names of books that are not well know.

Visualization of Elementary Math
URL: http://www2.dsu.nodak.edu/users/edkluk/public_html/ViElMath/ViElMath.html

This website contains easy to use applets created to help students develop a better understanding meanings of elementary math operations.

Jim Loy's Mathematics Page
URL: http://www.jimloy.com/math/math.htm

Jim Loy has created one of the very best websites for teachers. At his site you will find hundreds of links to other websites. The links are organized under the following categories: Algebra; Geometry; Calculus and Pre-Calculus; Arithmetic, Roman Numerals; Calendars; Number Theory; Fractals & Chaos; Other Topics; Book Reviews; Other Links

Mathematics Archives K-12 Internet Sites
URL: http://archives.math.utk.edu/k12.html

The Internet sites posted at this website are organized by the following categories: Lesson Plans; Software; Topics in Mathematics; Contests and Competitions; Professional Societies and Other

MEGA-Mathematics!
URL: http://www.c3.lanl.gov/mega-math/

Teachers and students at the elementary and secondary level will enjoy the activities posted at this site. Be sure to visit Hotel Infinity!

Middle School and Elementary Mathematics
URL: http://wneo.org/hotlists/msandelemmath.htm

The content of this website is organized under the following categories: Flash Cards, Games, Activities; General Topics; History of Mathematics; Hotlists; Measurement and Geometry; Money; Puzzles and Problems; Spreadsheets and Teacher Resources

Middle School Mathematics Websites
URL: http://www.itrc.ucf.edu/mssites/math.html

This website contains links to a large number of other sites.

Nick's Mathematical Puzzles
URL: http://www.qbyte.org/puzzles/

This website contains a collection of lovely puzzles, some old, some new and many not well known. The puzzles are related to geometry, probability, number theory, algebra, calculus, trigonometry, and logic. Nick continues to post new puzzles on a regular basis.

Online mathematics columns

Mathematics Association of America
URL: http://www.maa.org/

The homepage of the Mathematical Association of America has links that lead to a number of wonderful online mathematics columns (see the list below). The content of these columns covers a wide range of grade levels and all teachers will be able to find something that they can use with their students. Past issues for each column are archived and available for teachers to freely use.

The columns by Ivars Peterson will delight and amaze teachers and students. His writing style is engaging and accessible to the average reader. The Cut the Knot by Alex Bogomolny column will literally take your breath away. Additional material by Bogomolny can be found at http://www.cut-the-knot.org/front.shtml

Ivars Peterson's Math Trek from Science News
Devlin's Angle by Keith Devlin
Cut the Knot by Alex Bogomolny
Math Games by Ed Pegg Jr.
How Euler Did It by Ed Sandifer
Math News from Science News
Ivars Peterson's Math Muse from Science News for Kids

Mathematical Sciences Digital Library
URL: http://www.mathdl.org/jsp/index.jsp

The Mathematical Sciences Digital Library provides online resources for teachers and students. Resources include an online journal about the history of mathematics; Java Applets and tools and learning materials that can be used to teach concepts. This material is available through the following sections.

Convergence
Journal of Online Mathematics and its Applications (JOMA)
Digital Classroom Resources
Osslets

Professional associations for teachers

Association for Women in Mathematics (AWM)

This is an excellent organization for all teachers to join. Members receive the AWM Newsletter six times throughout the year and each issue has a wonderful mix of articles, news items and profiles of women mathematicians. The content is suitable for teachers at all levels. Memberships support a number of initiatives conducted by the AWM throughout the year to promote a strong interest in mathematics among young women.

Contact Information:
Email: awm@math.umd.edu
Telephone: 301-405-7892

Consortium for Mathematics and Its Applications (COMAP)

COMAP's core vision is to improve mathematics education for elementary and secondary students. This organization has developed curriculum materials and teacher programs that are multidisciplinary and highly enjoyable to use. I have used a number of modules from COMAP. My students have particularly enjoyed the following ones:

The Design of Honeycombs; The Windchill Index; The Mathematics of Focusing a Camera; The Relationship Between Directional Heading of an Automobile and Steering Deflection; Glottochronology: An Application of calculus to Linguistics; The Statistical Evaluation of Burn Care; The Consumer Price Index: What Does It Mean

Materials are available in print and video formats and are available on-line.

Contact Information:
URL: www.comap.com
Telephone: 781-862-7878

Mathematical Association of America (MAA)

I have benefited a great deal from my membership in the MAA. I receive two bimonthly journals from the MAA, the Mathematics Magazine and the College Mathematics Journal. These journals are intended for teachers at the College level but I have often found articles that can be used with senior high school students. The MAA publishes many books which can be used by high school teachers. One of my favourites is the Hitchhiker's Guide to Calculus (ISBN 0-914098-23-3) by Michael Spivak.

Contact Information:
URL: www.maa.org
Telephone: 800-331-1622

National Council of Teachers of Mathematics (NCTM)

The NCTM publishes three journals for teachers; Teaching Children Mathematics (TCM) for Pre-K and elementary grades, Mathematics Teaching in the Middle School (MTMS) for middle grades and the Mathematics Teacher (MT) for secondary grades. The NCTM organizes regional conferences throughout the year as well as a huge annual conference that typically attracts about 20,000 mathematics teachers from North America and other parts of the world.

Contact Information:
URL: www.nctm.org
Telephone: 703-620-9840

National Council of Supervisors of Mathematics

You do not need to be a supervisor of mathematics to belong to this organization and they welcome teachers at all grade levels to join. The cost of a one year membership is USD $75 and for this you will receive the NCSM Journal of Mathematics Education Leadership four times a year. The Journal contains a wealth of information related to what is happening in mathematics education across the United States and Canada. You will also receive various resources free of charge from time to time.

Contact Information:
URL: www.ncsmonline.org

Ontario Association for Mathematics Education (OAME)

The cost of a one year membership is $45 and includes a subscription to the Ontario Mathematics Gazette. The Gazette is a terrific journal and each issue contains material for elementary and secondary teachers. The OAME runs an annual conference for teachers at all levels as well as numerous local conferences throughout Ontario. They advise the Provincial government on educational issues and work hand-in-hand with the government to develop curriculum. This is an important organization that deserves the support of teachers in Ontario.

Contact Information:
URL: www.oame.on.ca
Telephone: 519-471-6324

Conferences for teachers

Most of the organizations listed in the section on Professional Associations have annual conferences and information can be obtained directly from them. The Ontario Association for Mathematics Education (OAME) has their annual conference in late April or early May and chapters of the OAME hold fall and spring conferences throughout Ontario. The National Council of Teachers of Mathematics (NCTM) holds its annual conference in April and it takes place immediately after the annual conference of the National Council of Supervisors of Mathematics (NCSM). The NCTM also organizes numerous regional conferences throughout the year, one of which is always held in Canada. A number of companies, including Texas Instruments, organize conferences throughout the year, particularly in the summer.

> The Anja S. Greer Conference on Mathematics, Science and Technology
> Phillips Exeter Academy, Exeter, New Hampshire

For the past seventeen years I have been fortunate to be a participant and a Leader at the Exeter Conference. This week-long conference for high school teachers is held during the last week in June. During the week participants take two ten-hour courses and when they are not in classes, they can attend hour-long sessions, they can work in a software library or they can spend time talking about mathematics with keen teachers. At some point in your career make sure that you get to attend this conference. Professional development does not get any better than this.

Contact Information:
URL: http://mathconf.exeter.edu
Email: tseidenberg@exeter.edu (Tom Seidenberg, Conference Director)

> Discovery Institute Summer Technology Conference for Middle School Teachers
> College of Staten Island (CSI), Staten Island, NY

From 2000 to 2005, Irina Lyublinskaya organized and directed an Exeter-style conference for middle school teachers. The week long conference was held in August at the Peddie School in Hightstown, New Jersey where Irina was a mathematics teacher. I was a Leader for four of those years and I was impressed with the outstanding effort that Irina made to provide middle school teachers with a high quality professional development experience. Irina now teaches at the Discovery Institute on Staten Island and she has moved the conference to this location. My advice for middle school mathematics teachers can be summarized in one word: Go!

Contact Information:
URL: http://discovery.csi.cuny.edu/conferences/sumtechconf/index.html
Email: ilyublin@comcast.net (Dr. Irina Lyublinskaya, Conference Director)

> Week-long summer conferences on the use of the Geometer's Sketchpad

Each summer Key Curriculum Press organizes week-long courses on Sketchpad for middle and high school teachers at all levels of expertise, from beginners to experts. A number of courses are offered each year with different themes. In 2004 I attended the Master Class on Sketchpad and it was an amazing experience.

Contact Information:
URL: http://www.keypress.com/pdc/institutes/course_schedules.html

> Teaching Contemporary Mathematics Conference at the North Carolina School of Science and Mathematics (NCSSM)

This two-day conference is held annually in late January or early February and is organized by the Mathematics Department of NCSSM. I have attended this conference on several occasions and enjoyed the opportunity to hear talks and attend workshops given by some of the best known educators in the world. My advice for mathematics teachers can be summarized in three words: Go every year!

Contact Information:
URL: http://courses.ncssm.edu/math/
Click on the link for TCM Conference

Journals and magazines for teachers

Chance
Published by the American Statistical Association (AMS)

Chance is an outstanding magazine about statistics and its use in society. It is intended for anyone who has an interest in the analysis of data and is published quarterly.

Contact Information:
URL: http://www.stat.duke.edu/chance/
URL: https://www.amstat.org/publications/pubs_individual.pdf

Consortium
Published by the Consortium for Mathematics and Its Applications (COMAP)

Each issue of the Consortium is filled with a mix of ready-to-use projects for high school students and articles that deal with practical applications of mathematics. A subscription to the Consortium includes on-line access to a huge collection of modules and materials.

Contact Information:
URL: www.comap.com
Telephone: 781-862-7878

Crux Mathematicorum and Mathematical Mayhem
Published by the Canadian Mathematical Society (CMS)

This Canadian publication has long enjoyed a reputation for being one of the best problem solving journals in the world for secondary and undergraduate students. Each issue contains dozens of challenging problems with solutions.

Contact Information:
Email: subscriptions@cms.math.ca
URL: http://www.journals.cms.math.ca/CRUX/
Telephone: 613-562-5702

Parabola: a mathematics magazine for secondary schools
Published by AMT Publishing, (Australian Mathematics Trust)

Parabola publishes articles and problems on applied mathematics, mathematical modeling, statistics and pure mathematics for teachers and students at the secondary school level.

Contact Information:
URL: www.maths.unsw.edu.au/Parabola

GAMES Magazine
Published by Games Publications Inc.

I have had a subscription to GAMES magazine since the first issue was put out in September 1977 and have found it to be a very good source of problems and puzzles for my students and myself. You can buy it at a newsstand but it tends to sell out very quickly. Get a subscription and you will be sure to get every issue. You can also buy back issues of the magazine. I cannot imagine teaching without my collection of GAMES magazines.

Contact Information:
Mailing address: PO Box 2031, Marion, OH, 43305-2031
Telephone: 800-425-4600

Journal of Recreational Mathematics (JRM)
Published by Baywood Publishing Company

When I was an undergraduate at McMaster University, a professor of mine suggested that I read this journal to satisfy my interest in magic squares, puzzles and games. The JRM has had a profound influence on my teaching. The articles, problems and puzzles are great and high school mathematics teachers will be able to make use of the content.

Contact Information:
Email: info@baywood.com
Telephone: 631-691-1270

Math Horizons
Published by the Mathematical Association of America (MAA)

Math Horizons is one of my favourite journals. It is intended primarily for undergraduates in mathematics, but I have used many articles with my middle and high school students. Martin Gardner has written columns for Math Horizons and other writers have focused on math in the movies, profiles of mathematicians and applications of mathematics.

Contact Information:
URL: http://www.maa.org/mathhorizons/
Telephone: 800-331-1622

Mathematical Intelligencer
Published by Springer-Verlag

I look forward to every issue of this great journal. The content is mostly advanced, but some of the material can be adapted for students of average ability. I particularly like three regular Departments: Mathematical Entertainments, The Mathematical Tourist and The Stamp Corner.

Contact Information:
Email: journals@springer-ny.com
Telephone: 800-SPRINGER or 212-460-1500

Quantum
Published by Springer-Verlag

Quantum was a great journal for secondary mathematics and science teachers. It is no longer published, but it would be worth trying to track down back issues. The first issue was published in January 1990 and publication ended with the July/August 2001 issue. I have every issue of QUANTUM and have used a great deal of the content as the basis for projects, reading assignments and activities.

Teaching Children Mathematics (TCM) for Pre-K and elementary grades
Mathematics Teaching in the Middle School (MTMS) for middle grades
The Mathematics Teacher (MT) for secondary grades
Published by the National Council of Teachers of Mathematics (NCTM)

These three journals are outstanding resources for classroom teachers. Depending on the grade levels you teach you may want to subscribe to one, two or maybe even all three them. Each journal contains articles about teaching, hands-on, ready-to-use activities and information about new products, initiatives and opportunities.

Contact Information:
URL: www.nctm.org
Telephone: 703-620-9840

Magic resources for teachers and students

Doug Henning was huge in the 1970s and millions of people throughout the world enjoyed his unique style of magic. Through his many NBC specials and Broadway shows, he created a strong interest in magic. Many people, including myself, took up an interest in magic because of his amazing ability to entertain. For a few years I worked as a professional magician beginning with stage magic and eventually specializing in close-up magic, a form of magic that uses small objects such as cards, coins and sponge balls.

I am currently interested in magic tricks that involve mathematics, a field commonly called mathemagic. I have found these tricks to be very useful in the classroom, either as a way of explaining a concept or as a vehicle for introducing a topic. I have also used a number of magic tricks that make use of store-bought props to make a point in class.

One of the more popular workshops that I conduct is on the topic of shuffling a deck of cards and how mathematics can be used to analyze what happens to the cards as they are mixed up. One of the shuffles I discuss at length is called the Perfect or Faro Shuffle. It takes years to master but it can be used to perform some incredible card tricks. Brent Morris has written a fascinating book about this shuffle. The material is advanced, but it can be used with secondary students who are interested in mathematics or who are in need of some material that will ignite sparks of enthusiasm for mathematics. Morris is the only person in the world with a doctorate in card shuffling.

Magic organizations

International Brotherhood of Magicians
URL: www.magician.org

Society of American Magicians
URL: www.magicsam.com

Magic magazines

Genii Magazine
URL: www.geniimagazine.com

Magic Magazine
URL: www.magicmagazine.com

Magic article

Ten Amazing Tricks from the Amazing Martin Gardner
Math Horizons, September 1998
Mathematical Association of America
URL: www.maa.org

Magic books

Self-Working Number Magic, Karl Fulves
Dover Publications, ISBN 0-486-24391-5

Self-Working Card Tricks, Karl Fulves
Dover Publications, ISBN 0-486-23334-0

More Self-Working Card Tricks, Karl Fulves
Dover Publications, ISBN 0-486-24580-2

New Self-Working Card Tricks, Karl Fulves
Dover Publications, ISBN 0-486-41371-3

Self-Working Paper Magic, Karl Fulves
Dover Publications, ISBN 0-486-24847-X

Self-Working Table Magic, Karl Fulves
Dover Publications, ISBN 0-486-24116-5

Mathematics, Magic and Mystery, Martin Gardner, Dover Publications
ISBN 0-486-20335-2

Magic Tricks, Card Shuffling and Dynamic Computer Memories, S. Brent Morris
Mathematical Association of America, ISBN 0-88385-527-5

Now you see it, now you don't!, Bill Tarr
Vintage Books, ISBN 0-394-72202-7

Magic stores

The Browser's Den of Magic, Toronto
Telephone: 4416-783-7022

Morrisey Magic, Toronto
Telephone: 416-782-1393 or 888-202-2122

Louis Tannen Inc,. New York
URL: www.tannenmagic.com

Magic Inc., Chicago
URL: www.magicinc.net

Mathematics competitions for students

Mathematics contests provide students, particularly those who are mathematically gifted, with an opportunity to improve their problem solving abilities and with exposure to mathematical ideas and content that goes beyond the standard curriculum. The website given below contains links to competitions throughout the world. Many of these competitions allow foreign students to enter and teachers may want to encourage students with an intrinsic interest in mathematics to enter them.

Links to mathematics competitions around the world
URL: http://donut.math.toronto.edu/~naoki/math-comp.htm

Since the 1960s the University of Waterloo's Faculty of Mathematics has been a strong supporter of school mathematics activities, through the creation and organization of mathematics competitions for students in grades 7-12 along with other initiatives including workshops for teachers and students and competitions for computer science students. Students from outside of Canada are permitted and encouraged to enter the University of Waterloo competitions. For more information visit the website given below.

Centre for Education in Mathematics and Computing, Faculty of Mathematics, University of Waterloo.
URL: http://www.cemc.uwaterloo.ca/

Mathematics camps for students

Math Camp USA/Canada

URL: http://mathcamp.org
Email: camp@mathcamp.org
Telephone: 617-864-8887

Math Camp USA/Canada is designed for mathematically talented high school students from around the world. Students with a strong background in mathematics and an intrinsic interest in the subject will thoroughly enjoy this intensive five-week-long summer program.

SummerMath: four-week program for young women

Organized by Char and Jim Morrow
Email: summermath@mtholyoke.edu
URL: http://www.mtholyoke.edu/proj/summermath/

SummerMath is a nationally acclaimed four-week program for young women entering ninth through twelfth grades. I first became familiar with this conference during the 1980s when three of my students from Oakville Trafalgar High School attended SummerMath. They spoke highly of the program and they particularly valued the connections they established with other young woman.

At SummerMath, students take courses on a wide range of topics, including architecture and math, origami, and robotics. Students from outside the United States are permitted and encouraged to apply to be accepted into the program.

Two restaurants, a coffee shop and a subway station that math teachers will love

Montreal is a great city to visit and if you find yourself there while on vacation or to attend a conference, be sure to go to Cafe p. The owner loves math and sells p t-shirts and mugs. People play chess in the restaurant all day long and it is fun to either play or just watch.

When in San Francisco be sure to visit Palindrome Coffee located appropriately enough at 131 Steuart Street. The owner loves palindromes.

In Toronto, be sure to take the subway to the Downsview Station. Go inside and study the thousands of small coloured tiles on the walls throughout the station. The colours of these tiles were selected by using the decimal expansion of p. Arlene Stamp, an artist from Calgary and a former mathematics teacher, created this art work and called it Sliding Pi. This is a perfect place to take students on a field trip, especially on Pi Day (March 14).

Finally, if you happen to be in Bristol, England you must go visit a restaurant called Ellipse. In July 2005, I spoke at a conference in Bristol and had the pleasure of spending a week with my old friend Vince Delisi, from Texas Instruments. He had arrived with his wife Michele a day before me and upon my arrival the first thing they did was to take me to Ellipse. Later that night we had dinner there and along with a group of other mathematics educators we spent an hour uncovering numerous examples of mathematics within the restaurant. A non-math person might have thought the scene of these math teachers crawling around looking for math to be quite conical, but we had a great time.

Cafe p
4127 Boul. St. Laurent, Montreal, Quebec
Telephone: 514-286-4828

Palindrome: serious coffee on steuart street
131 Steuart Street, San Francisco, California
Telephone: 415-357-0753 (without the area code, a palindrome)

Sliding Pi
Downsview Subway Station, Toronto

Ellipse Restaurant (in the Brigstow Hotel)
Welsh Back, Bristol
Telephone: 0117-929-1030
URL: http://www.brigstowhotel.com/

Palindrome: serious coffee at 131 steuart street, San Francisco

two ellipses found in the Ellipse Restaurant in Bristol, England