Math Explorations Topics

[Choosing the Class's Favorite Dessert](#) (i.e. voting systems)
How do you decide what a *group* wants?

[Finding the Sum of the Angles of Polygons](#)
What is the sum of the angles of a 33-sided polygon?

[Equilateral triangles, Regular Hexagons, Dodecagons, and Flowers](#)
Use a compass to lay out geometric figures and artistic patterns.

Learning to use a Chinese Abacus for Adding and Subtracting
(See [abacus tutorial](#) and [downloadable virtual abacus](#))

Knots / Shoe Tying
Have you ever looked at the knot that results if you pull out the bows?

Treasure Hunt
Hunt for treasure with a map and compass.

So You Want to Be a Billionaire?
Visualizing big numbers.

On Beyond Billions
Writing and computing with numbers of *any* size.

[Solar System Walk](#)
Getting the sizes and distances right.

Construct Squares, Parallelograms, Rhombuses, and Parallel and Perpendicular Lines
Find more than one way to construct a square

Cut out Paper Dolls
How about alternating skirts and pants? How about a ring of paper dolls?

Perspective Drawing: I
1-Point Perspective

Perspective Drawing: II
2-Point Perspective

Real-world Perspective
Finding vanishing points in photographs

Isometric Drawing
Do quick sketches of 3-dimensional objects.

3-D Photography
Have fun using twice as much film on your vacations (or break down and get a digital camera)!

3-D Drawing
You can draw stereo pairs in 3-D if you know the principle.

3-D Videos
Regular camera + neutral density filter = 3-D video

Permutations
How many ways can you ABCDEFG?

20 Guesses
Think of any word in the dictionary. Learn to guess it in under 20 guesses.

Binomial Distribution
If you toss five coins together, what is the probability of getting 1 tail and 4 heads?

Dice Probabilities
Why do 7's come up more often than 12's when rolling a pair of dice?

Population Growth Simulation
Why does population growth keep getting faster and faster?

Radioactive Half-lives
Why not just talk about whole lives?

Real Lives Simulation
The *Real Lives* simulation game is driven by real-life statistics and has spinoffs for students in understanding data, graph reading, and probabilities.

Adding Up
What is the sum of all the numbers from 1 to 1000?

Film Break
Donald in Mathmagic Land

Fibonacci Numbers
How many spirals are there in sunflowers and pine cones?

Fibonacci Rectangles & The Golden Rectangle
Perfection and approximate perfection.

Model Polyhedra
Fold Models of the Platonic Solids

Constructing Pentagrams
Golden Rectangles and 5-Pointed Stars with Compass and Straightedge

Cat's Cradle
String figures and how to make them.

Mathematical Origami
Fold Equilateral Triangles, Hexagons, and Pentagons

Ellipse with String and Pins
Really cool curves!

Ellipse, Parabola, and Hyperbola by Paper Folding
Cooler still.

Phases of the Moon
What causes the phases of the moon?

Constructing the Phases of the Moon
What will the moon look like 3 days after first quarter?

Twisted Geometry
One-sided surfaces and their children

Making Small Jobs out of Big Ones

How to draw complex pictures easily and lay out murals.

Photomosaics
Create your portrait using your vacation pictures

[Funhouse Mirrors](#)
Distorted picture + distorted mirror = undistorted image!

Deriving the Distortion
How to lay out the grid for the funhouse mirror activity.

Through the Looking Glass
Why mirror images aren't "on" the mirror.

Raise Your Right Hand
Are images in mirrors always mirror images? Why left-right reversed? Why not up-down reversed?

Right-Right vs. Left-Left
What two people inhabit your body?

How Tall Does a Full-Length Mirror Need To Be?
Less than you think!

Where Do They All Come From?
How many images will you see in mirrors forming a 45° or 60° wedge?

Amazing Mazes
Working out maze strategies

Maze Creation
Weave your own mazes

[Sudoku](#)
It's not the numbers--it's the logic

Rectified Globe
Model the earth under your feet

Sun Dials
Sun dials can be simple (and approximate) or complex (and accurate)

Times and Seasons
You can better understand the motions of the earth, moon, and sun, by acting them out