

## LOCATIONS

### Calhan Library

600 Bank St., Calhan  
(719) 531-6333, x7013

### Cheyenne Mountain Library

1785 S. 8<sup>th</sup> St.  
(719) 531-6333, x7001

### East Library

5550 N. Union Blvd.  
(719) 531-6333, x7014

### eLibrary

ppld.org  
Open 24 hours a day, 7 days a week

### Fountain Library

230 S. Main St., Fountain  
(719) 531-6333, x7002

### High Prairie Library

7035 Old Meridian Rd., Peyton  
(719) 531-6333, x7003

### Library 21c

1175 Chapel Hills Dr.  
(719) 531-6333, x7012

### Manitou Springs Library

701 Manitou Ave., Manitou Springs  
(719) 531-6333, x7004

### Mobile Library Services

ppld.org/mobile-library-services  
(719) 531-6333, x7702

### Monument Library

1706 Lake Woodmoor Dr.,  
Monument (719) 531-6333, x7005

### Old Colorado City Library

2418 W. Pikes Peak Ave.  
(719) 531-6333, x7006

### Palmer Lake Library

66 Lower Glenway St.,  
Palmer Lake (719) 531-6333, x7007

### Penrose Library

20 N. Cascade Ave.  
(719) 531-6333, x7015

### Ruth Holley Library

685 N. Murray Blvd.  
(719) 531-6333, x7009

### Sand Creek Library

1821 S. Academy Blvd.  
(719) 531-6333, x7018

### Ute Pass Library

8010 Severy Rd., Cascade  
(719) 531-6333, x7011



## HOMESCHOOL HUB | [ppld.org/homeschool-hub](https://ppld.org/homeschool-hub)

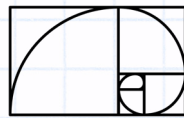
Whether you are a veteran homeschooling family or just getting started, visit the PPLD Homeschool Hub to find Library events and sign up for eNewsletters. Click on the "Resources" tab for information about getting started, Colorado homeschool law, local enrichment programs, tutoring, extracurricular activities, and more.

## MATH IS EVERYWHERE!

People often think of math as an abstract and theoretical subject of numbers and equations. However, from patterns found in snowflakes to the entrancing spirals of seashells, mathematics plays a fundamental role in understanding and explaining the beauty of natural phenomena worldwide.



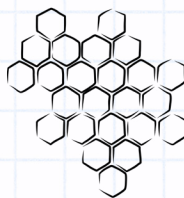
If you have ever looked at the center of a sunflower, you are seeing the **Fibonacci sequence**, a series of numbers where each number is equal to the sum of the two preceding numbers, typically starting with zero and one.



The nautilus shell is a famous symbol of beauty and perfection, with its spiral shape featuring a captivating display of the iconic golden ratio. The **golden ratio** refers to an irrational number, approximately equal to 1.6180339887, and is often denoted by the Greek letter  $\phi$  or phi.

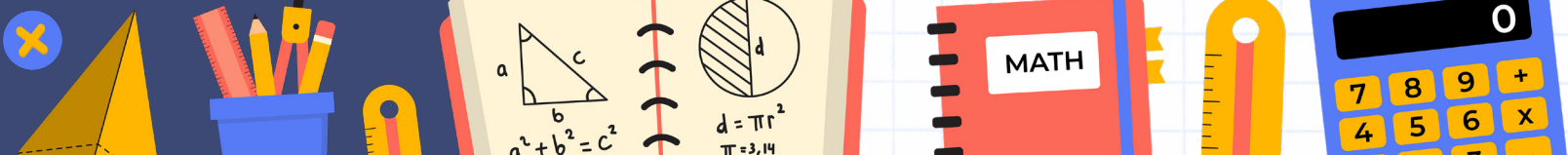


Also found in nature are **fractals**, which refer to intricate, self-replicating patterns that materialize at different scales and repeat the same structure regardless of magnification. An abundance of fractals can be found in nature, from the coastlines of continents to the branching patterns of trees.

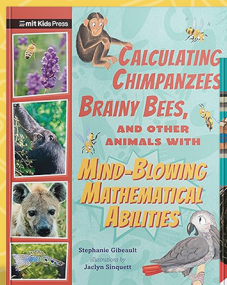


Many consider honeybees to be nature's master architects. The **geometry** of their hexagonal honeycombs serves as testaments to their efficient utilization of space and ingenuity. The hexagonal packing of honeycomb cells enables bees to store the maximum amount of honey while using the least amount of wax.

Next time you are outside, try to find other patterns and designs that look mathematically perfect.



## THE BOOKSHELF

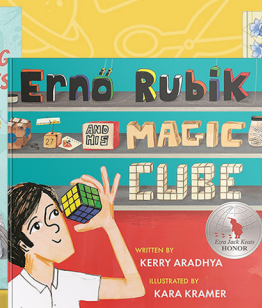


### **Calculating Chimpanzees, Brainy Bees, and Other Animals with Mind-Blowing Mathematical Abilities**

by Stephanie Gibeault;  
illustrated by Jaclyn Sinquett

Did you know animals know a lot about numbers? This book delves into the ways that five different species (and humans) use mathematical concepts and how scientists study them. Each section includes an interview with a researcher working in the field and a related activity for kids. Photos and colorful artwork add interest to the text, and a list of further reading encourages additional exploration.

**Ages 8 – 12; Math; Animals; Scientific Research**



### **Erno Rubik and His Magic Cube**

by Kerry Aradhya;  
illustrated by Kara Kramer

Erno grew up in Budapest, obsessed with books and puzzles, and curious about nature, shapes, and the world around him. Later, as a professor of architecture, his idea for building a 3D model of movable cubes of different sizes eventually resulted in the creation of the most popular puzzle in history. This engaging picture book tells a fascinating story and illustrates the process of invention.

**Ages 4 – 10; Math; Rubik's Cube; Inventors; Puzzles**

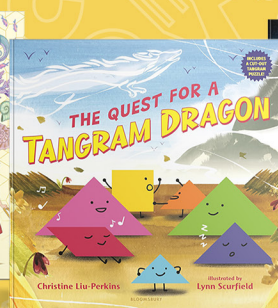


### **The Five Sides of Marjorie Rice: How to Discover a Shape**

by Amy Alznauer;  
illustrated by Anna Bron

As a child in 1930s Oregon, Marjorie enthusiastically explored the outdoors and relished discovering patterns in nature. As an adult (a mother of five who never went to college), her curiosity and keen observation skills led her to solve the age-old “problem of five” – why don’t five-sided shapes fit together the way three-, four-, or six-sided shapes do? This introduction to the life and accomplishments of an amateur mathematician clearly explains underlying math concepts.

**Ages 7 – 10; Math; Shapes; Geometry; Women's History**

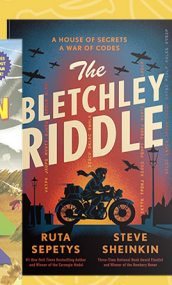


### **The Quest for a Tangram Dragon**

by Christine Liu-Perkins;  
illustrated by Lynn Scurfield

Little Triangle goes in search of a kind dragon to bring rain to the thirsty land. Along the way, it meets other shapes that want to help, and the characters use their tangram magic to fit together to create animal figures (a butterfly, a bat, a bird, etc.) to fulfill their mission. Children can use shapes to create figures that go along with the story. The author includes an introduction to tangrams, their origins in China, and their importance in developing problem-solving skills.

**Ages 4 – 10; Math; Tangrams; Problem-solving Skills; Puzzles; Chinese Culture**



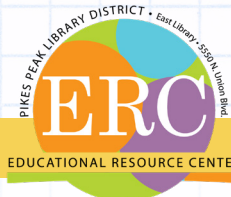
### **The Bletchley Riddle**

by Ruta Sepetys & Steve Sheinkin

It's summer of 1940 in England, and two siblings find themselves at Bletchley Park, secret epicenter for British code breaking. While Jakob, 19, works on cracking the Nazi's Enigma cipher, Lizzie, 14, tries to solve the mystery of their mother's disappearance. Danger is everywhere, and it's unclear just who should be trusted. Well-developed characters, plenty of action, and a story based in fact make this a page-turning read for individuals or families.

**Ages 10+; World War II; Codes and Ciphers; Cryptography; Siblings**

## MATHEMATICS IN THE ERC



The Educational Resource Center (ERC) at East Library encourages families to explore, investigate, discover, and learn about a variety of subjects, including math.

**Pre-K:** Children can practice basic counting skills by stacking ice cream scoops on cones or ordering number-shaped wooden blocks (Mini SumBlox). Use our attribute manipulatives and classification trays for hands-on math learning where kids can place numbers according to their unique features. Practice critical thinking with Mental Blox, a brain-boosting game of matching shapes and colors!

**Primary Students:** Sets of SumBlox provide a playful alternative for learning and practicing math computation by giving physical shape to mathematical problem solving. Hands-on kits like Pizza Fractions, 3D Shapes, and interactive games help students connect math to the

real world of time, money, and place value. The Pixel Art Challenge kit, blending math skills and coding concepts, offers an education-filled activity that feels like art.

**Tweens:** Double Shutter, a compelling game of math knowledge, chance, and strategy, makes practice fun. Look for our Pro Dominoes set and Turing Tumble to explore how physics and computer science intersect with mathematics. Foldology, a fun brain teaser, trains visual-spatial ability and logical reasoning skills!

The Educational Resource Center offers an ever-growing collection of learning resources for families to discover, not only in purposeful play with mathematics, but in all subjects for your 4 - 13-year-olds.

Learn more about this distinctive Library resource and reserve time to visit at [ppld.org/erc](http://ppld.org/erc).

## PPLD RESOURCES: MATH

PPLD has online and in-person resources to help with your students' math learning. Online resources can be found through the Search All Databases page in the Research & Learn menu of our website ([ppld.org/databases](http://ppld.org/databases)). You will need a valid library card and PIN number to access them. Search for each by title.

### TumbleBook Library

This platform is full of fun interactive resources! Search "Math" under the "Puzzles & Games" tab to find a variety of interactive math games. Be sure to explore the animated talking picture books, videos, and other educational content as well!

### HelpNow

In addition to offering no-cost live tutoring, HelpNow helps students assess and develop important academic skills. The SkillSurfer tool presents lessons (including math) by grade level. Here you can access practice tests, lessons, and videos on specific subjects and work your way through the content. LEAP helps you build academic skills through targeted lessons, quizzes, and live online tutoring, creating a learning plan based on a skills assessment that you take at the beginning of the course. You will need to create a free account to use this resource.

### World Almanac for Kids

Geared toward elementary and middle school students, this database provides engaging content from trusted sources. Check out the "Money Matters" tab or the "Scientists, Inventors & Mathematicians" tab. Search "Math" and find articles such as "Fun Facts: Math Brain Teasers" or the video "Multiply and Divide Negatives."

### Math Tutoring at Library 21c

Need math help? Come work with our community volunteer tutors. Help is available for all grade levels and there is no cost to attend. Tutors are available on a first-come, first-served basis. Join us on Wednesdays from 3:30 – 6 p.m. at Library 21c in the Ent Conference Center. *No registration required.*

## DID YOU KNOW?

### Fun Math Facts

- The opposite sides of a 6-sided dice will always add up to seven.
- Meteorologists use supercomputers to analyze numbers data to predict weather patterns.
- Research has shown that honeybees understand the concept of zero.
- The earliest evidence of humans using math is a bone covered in tally marks from around 25,000 years ago (known as the Ishango Bone).
- Physics, geometry, and calculus are all used in video games to create more lifelike worlds and interactions.
- If you built a staircase to the top of Mt. Everest, it would take 3,628 flights of stairs to get to the top. (Mt. Everest is 29,029 feet tall and the average flight of stairs is 8 feet high).

## OTHER COOL RESOURCES: MATH

### AAA Math [aaamath.com](http://aaamath.com)

This site covers math topics for Kindergarten through grade 8 with interactive lessons and plenty of opportunities for practice. Lessons are sorted by subject or grade level, and the site offers a Spanish version.

### Cool Math [coolmath4kids.com](http://coolmath4kids.com)

Geared toward kids in Kindergarten through grade 6, this colorful site is packed full of math games, lessons, quizzes, brain teasers, and more.

### Math Is Fun [mathsisfun.com](http://mathsisfun.com)

Covering Kindergarten through grade 12, this site aims to make math fun! Click on the tabs to explore topics in the areas of algebra, data, geometry, physics, and more on a variety of different comprehension levels. Discover activities, games, puzzles, and even a math dictionary.

### Khan Academy - Math [khanacademy.org/math](http://khanacademy.org/math)

Khan Academy offers practice exercises, instructional videos, and a personalized learning dashboard that empowers learners to study at their own pace in and outside of the classroom. Math skills begin with early math and progress from Kindergarten all the way through college level math. This online resource is free!

## PPLD EDUCATOR CARD

Homeschool parents can apply for PPLD's new Educator Card! Simply bring a copy of your Notice of Intent letter with your child's name and address plus school district involved to any PPLD location. The card is valid for one year before requiring renewal, and allows for 50 checkouts, with a loan period of six weeks and one renewal (if the item is not on hold).



## BOOKS FOR KIDS: J-EASY

***Bake Infinite Pie with  $X + Y$***  by Eugenia Cheng  
***Now What?: A Math Tale*** by Robie H. Harris  
***The Animals Would Not Sleep!*** by Sara Levine  
***How to Count to One: (And Don't Even THINK about Bigger Numbers!)*** by Caspar Salmon  
***SCATtered!: A Story of Estimation***  
by Ann Marie Stephens  
***CATawampus!: A Story of Shapes***  
by Ann Marie Stephens

## BOOKS FOR KIDS: J-FICTION

***Grasping Mysteries: Girls who Loved Math***  
by Jeannine Atkins  
***Numbers Queen*** by Margery Cuyler  
***Talia's Codebook for Mathletes*** by Marissa Moss  
***The Triplet Threat*** by Aaron Starmer

## BOOKS FOR KIDS: J-NONFICTION

***Amazing Math: Numbers and Shapes Are All Around You*** by Lou Abercrombie  
***Children's Encyclopedia of Math*** by Tim Collins  
***How to Be a Math Genius: Your Brilliant Brain and How to Train It*** by Dr. Mike Goldsmith  
***Mammoth Math: (With a Little Help from Some Elephant Shrews)*** by David Macaulay  
***Math for Kids*** by Rebecca Rapoport & Allanna Chung  
***How Much Is a Million?*** by David M. Schwartz  
***Very Bad at Math*** by Hope Larson  
***Molly and the Mathematical Mysteries***  
by Eugenia Cheng  
***Math Curse*** by Jon Scieszka

## TEENS MATH ACTIVITY: CREATE A MATH-BASED ESCAPE ROOM

Teens can use riddles and puzzles to challenge their friends and family. Come up with equations to unlock combination locks, codes that need to be deciphered, or graph coordinates that create a picture of the location of the next clue. These rooms can be either physical or virtual! Search online for directions on creating escape rooms.

## KIDS MATH ACTIVITY: HANDSHAKE PUZZLE

Sometimes it takes more than one, two, or even three people to solve a problem! With pencil and paper in hand, gather a group of two or more friends and family members to solve this puzzle. This multi-stage brain bender gets harder with each challenge!

### Stage 1:

If there are TWO people in a room and each person shakes hands with every other person exactly once, how many total handshakes happen?

### Stage 2:

If there are THREE people in a room and each person shakes hands with every other person exactly once, how many total handshakes happen?

### Stage 3:

If there are FOUR people in a room and each person shakes hands with every other person exactly once, how many total handshakes happen?

### Stage 4:

So ... if there are FIVE people in a room and each person shakes hands with every other person exactly once, how many total handshakes happen? SIX people? SEVEN people? EIGHT people? Depending on your group size, you can go even further. Good luck!

If you get stumped, look for the answers at the bottom of this page.

Activity adapted from [coolmath4kids.com/brain-teasers](https://coolmath4kids.com/brain-teasers). Find an illustrated version of the solution on their website.

## BOOKS FOR TEENS: FICTION

***The Code for Love and Heartbreak*** by Jillian Cantor  
***Figure It Out, Henri Weldon*** by Tanita S. Davis  
***Moonwalking*** by Zetta Elliott & Lyn Miller-Lachmann  
***Long Story Short*** by Serena Kaylor

## BOOKS FOR TEENS: NONFICTION

***Super Simple Math: The Ultimate Bite-size Study Guide***  
by Belle Cottingham et al.

## BOOKS FOR TEENS: BIOGRAPHY

***The Enigma Girls: How Ten Teenagers Broke Ciphers, Kept Secrets, and Helped Win World War II*** by Candace Fleming

(2 people: 1 handshake; 3:3; 4:6; 5:10; 6:15; 7:21; 8:28)  
KidsMath Activity Answers:



Do you have feedback or ideas for a Homeschool Connections issue? Please email Joy at [Jfleishhacker@ppld.org](mailto:Jfleishhacker@ppld.org).