Make After-School Count!

Bedtime Math presents Crazy 8s, an after-school program to help schools launch recreational math clubs. We offer up to 16 activities for Grades K-2 and 3-5. Unlike competitive clubs that appeal to a select few, our activities – like Glow-in-the-Dark Geometry and Beach Ball Party – can appeal to any kid. We're making math club the cool thing to do after school!

Our goal with Crazy 8s is nothing short of overhauling our country's culture around math. While many Americans dislike or even fear math, we hope to raise a next generation who loves numbers.

Here's how Crazy 8s fulfills that mission:

- ★ It's collaborative: The activities get kids working together, building together, running and jumping together, so they can bond over math in a whole new way.
- ★ It's hands-on: Our lively get-up-and-move activities explore the math behind kids' favorite things, like treasure hunts, card games, puzzles – even secret codes!
- ★ It's proven: A study by Johns Hopkins University found Crazy 8s reduced kids' math anxiety after only 8 weeks in the club. We hear from many of our teacher coaches that students participate more in the classroom because of Crazy 8s.

Celebrating 11 years of over-the-top math fun enjoyed by more than 390,000 kids nationwide.

Start a club today!
crazy8sclub.org

continued...

Cost-Sharing Contribution

As part of our charitable mission, Bedtime Math heavily subsidizes the overall cost of each Crazy 8s kit, valued at more than $400.

We ask our Crazy 8s partners to contribute $180 for one 8-activity kit, $360 for all 16 activities. That's $1.40 per kid per activity. Federal Title I and Title IV funding can be used for this educational resource.

Kit Contents

Our kits provide most of the materials needed to run a club, along with math-y take-home items for the kids. Coaches need to provide a few supplies like scrap paper and scissors. To make Crazy 8s the best it can be, our online Coaches' Area includes step-by-step directions, how-to videos and other resources.

Keys to Success

All Crazy 8s partners must apply online, and follow our Keys to Success:

- ★ Meet before or after school once or twice a week or daily for a 1-week camp.
- ★ Include at least 10 kids, but no more than 16 kids.
- ★ Each club should target Grades K-2, 1-3 or 3-5. Clubs can serve a single grade, a pair of grades or all 3 grades within those ranges.

To apply for a kit, visit crazy8sclub.org!

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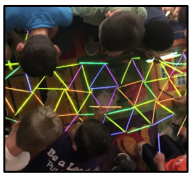
Crazy 8s math club

Weekly Sessions
Season 1



Glow-in-the-Dark Geometry

Glowsticks bring repeating patterns and 3D shapes to life in kids' hands!

Grades K-2: 2-D geometric shapes; Counting; Pattern recognition; Building a cube

Grades 3-5: 2-D, 3-D geometric shapes; Pattern recognition: shapes, numbers

Beach Ball Party

Forget flash cards. Master math facts with our numbered beach ball!

Grades K-2: Addition and subtraction; Comparison of numbers; Logic: thinking ahead multiple steps

Grades 3-5: Addition and subtraction; Multiplication; Logic: thinking ahead multiple steps

Bouncy Dice Explosion

Roll the dice and do the math to capture the winning Bingo square!

Grades K-2: Addition; Counting; Frequency; Subtraction, Strategic thinking

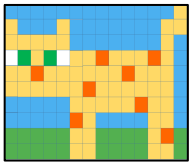
Grades 3-5: Addition; Multiplication; Order of operations; Simple combinatorials; Simple probability

Crazy 8s Race

Teams speed around a figure 8 racetrack to be the first to 8 x 8!

Grades K-2: Addition; Introduction to the concept of multiples of 8; Number recognition

Grades 3-5: Addition; Multiples of 8; Factoring (bonus)



Pixel-palooza

Create giant, pixelated pictures out of sticky notes to explore addition, subtraction and the distributive property!

Grades K-2: Area and perimeter; Fractions and proportions; Graphing; Addition; Subtraction; Scale

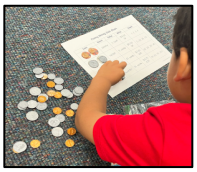
Grades 3-5: Area and perimeter; Distributive Property; Fractions and proportions; Graphing; Addition; Multiplication; Scale

Daring Darts

Supersize the math fun in this game of floor darts!

Grades K-2: Addition; Number recognition; Number value comparison; Subtraction

Grades 3-5: Addition; Subtraction; Multiplication



Funny Money

It's payday! Compare coins, race to earn money, then go shopping for a cool puzzle.

Grades K-2: Addition; Basic financial literacy; Skip counting; Valuing, comparing units of money

Grades 3-5: Addition; Subtraction; financial literacy; Skip counting; Valuing, comparing units of money

Spy Training

Solve math-y codes for clues to unlock the hidden spy gear!

Grades K-2: Association between sets; Adding; Subtracting; Number recognition; Pattern recognition

Grades 3-5: Association between sets; Multiplication; Number recognition; Pattern recognition

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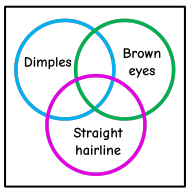
Crazy 8s math club Weekly Activities Season 2

Epic Air Traffic Control

Build a glowing runway and airplanes, then use math to land all the planes safely!

Grades K-2: Skip counting; Understanding and comparing number series

Grades 3-5: Factoring; Understanding and comparing number series



Off the Charts

Jump in and out of giant floor charts to see what makes each of us special!

Grades K-2: Counting; Frequency; Addition; Subtraction; Simple bar charts, matrix, Venn diagrams

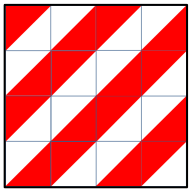
Grades 3-5: Counting; Frequency; Addition, Subtraction; Simple bar charts, matrix, Venn diagrams; Fractions

Crazy Card Club

Crazy 8s isn't just the name of our club – it's also a math-y card game!

Grades K-2: Addition; Categorizing; Number and pattern recognition; Number sequence; Strategy

Grades 3-5: Addition; Categorizing; Number and pattern recognition; Number sequence; Strategy



Super Cube Shuffle

Math and art collide when you use specially colored cubes to create cool designs.

Grades K-2: Pattern recognition; Spatial relations: orientation of triangles and slopes

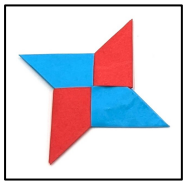
Grades 3-5: Pattern recognition; Reflective and rotational symmetry; Spatial relations: orientation of triangles and slopes

Road Trip

Race across the country, tracking your mileage and fuel along the way!

Grades K-2: Cardinal directions, Simple combinatorials; Optional challenge: addition and subtraction

Grades 3-5: Addition; Subtraction; Cardinal directions; Simple combinatorials

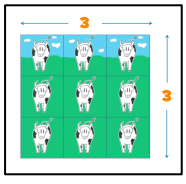


Shooting Stars

Learn to fold symmetrical 4-point origami stars, then measure how far they fly.

Grades K-2: Comparing lengths, Linear measurement, Shapes

Grades 3-5: Comparing lengths, Linear measurement, Proportion, Symmetry

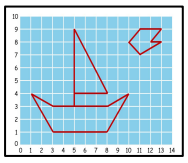


Cowabunga

Try to wrangle all your cows into fields with fences of different shapes.

Grades K-2: Area; Perimeter; Number patterns; Properties of rectangles

Grades 3-5: Area; Perimeter; Number patterns; Properties of rectangles



Pirate Treasure Hunt

Plot coordinates to create a secret map, then race to find the buried treasure!

Grades K-2: Counting practice; Plotting coordinates; Strategy; Bonus: probability

Grades 3-5: Plotting coordinates; Strategy; Bonus: probability

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Glow-in-the-Dark Geometry
Grades 3-5

The Big Idea
This week you'll make geometric shapes out of glowsticks. First, make triangles and quadrilaterals in different sizes. Then lay the sticks in mystical repeating patterns. Certain shapes work perfectly!

Supplies
In your kit:
- ★ Craft foam balls: 120+
- ★ Glowsticks: 150
- ★ Parents' Page postcards: 16

You provide:
- ★ Nothing this week!

Key Prep
- ★ Make a sample tetrahedron and a sample octahedron (see page 3).
- ★ To save club time, you can unwrap the glowstick tubes before the meeting, but don't crack the sticks until right when you begin the session, for maximum glow. We've provided extra glowsticks in case some are duds.

Room Set-up
- ★ You'll need a room that can get fairly dark. If you're in a space that can't be darkened, don't crack the sticks! Let the kids take home uncracked sticks at the end so they can continue Glow-in-the-Dark Geometry in a dark room or outside at night.

What's the Math?
- ★ 2-D, 3-D geometric shapes
- ★ Pattern recognition: shapes, numbers
- ★ Bonus: ratios
- ★ See last page for Curriculum Standards

Please keep in mind...
We've found that it's good to give kids time to figure out solutions on their own, rather than jumping in and "saving" them. It's more fun for them to wrangle with challenges, and it builds confidence. We'll also be introducing kids to new vocabulary that they may not absorb at first, but they'll make the connection in the classroom!

SAMPLE

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Kickoff

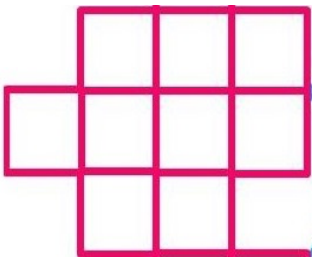
"There are lots of shapes out there, with different names and looks. The study of shapes is called **geometry**, and we use it every day to help us move through and understand our physical surroundings, to do things like estimate distance and size of objects. We see geometry in art, in nature, in the buildings and machines all around us."

Hip to Be Square (15-20 minutes)

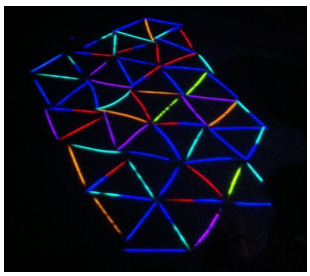
"Flat shapes with straight sides are called **polygons**. 'Poly' means 'many' and 'gon' means 'angled.' If all sides and angles are the same length, the shape is called a **regular polygon**. Now we're going to cover the floor with regular polygons. Can you figure out which shapes fit together with no gaps or overlaps?"

1. Invite the kids to spread out on the floor. Distribute the glowsticks evenly among the kids.
2. Let the kids work together to see what shapes fit together. While the kids are working, ask:
   - ? "How many 4-sided shapes can you name?" **Discuss.** See if kids know the following shapes:
     - **Trapezoid:** 4-sided figure with only 1 pair of parallel sides
     - **Parallelogram:** 4-sided figure with 2 pairs of parallel sides
       - **Rectangle:** parallelogram with all right angles, not necessarily all equal sides
       - **Square:** parallelogram with all right angles, all equal sides
       - **Rhombus (diamond):** parallelogram with no right angles, all equal sides

3. Have the whole group arrange the glowsticks on the floor in a big lattice of squares, like this:



4. Flick off the lights to see it glow!
5. Now the kids clear the floor of sticks. You can turn the lights back on while they work, then do the reveal, or leave them off.
6. Invite the kids to make any kind of triangle.
   - ? "How many sizes and kinds of triangles can you make?"
   - ? "How many can you name?" **Discuss.** Have the kids compare equilateral triangles where all sides are the same length vs. isosceles where just 2 sides match.
7. Now have the kids make a lattice of equilateral triangles.



   - ? "How many triangles did you make?" **Discuss.** Watch how kids count – tiptoeing works!
   - ? Once they've started counting, ask: "What size triangles are you counting?" **Discuss.** Help kids to consider bigger triangles!
   - ? "How many sticks did you need to use each time you added 1 more triangle to the pattern? Show me an example." **Discuss.** Kids may realize that they need only 1 or 2 additional glowsticks to add triangles to the lattice since some new triangles share sides with existing triangles. Mathematically speaking, that's 1½ glowsticks per triangle as you go to infinity.

SAMPLE

"We just learned that flat shapes with straight sides and sharp corners are called polygons. A shape that's not flat is 3-dimensional (3-D), like a cube. Those shapes are called **polyhedrons**. 'Poly' means 'many' and 'hedron' means 'surface.' Let's explore 3-D shapes."

1. Group the kids in pairs.
2. Make a few piles of craft foam balls on the floor within reach of all the kids.
   - ? "What shapes can you make with equal edges, angles and faces (flat sides)? **Party Fun Fact**: There are only 5 and they're called **Platonic solids**. They include 1. tetrahedron (4 faces), 2. hexahedron (6 faces), 3. octahedron (8 faces), 4. dodecahedron (12 faces) and 5. icosahedron (20 faces)!" *You can hold up this page to show the kids:*

1 2 3 4 5

3. Hold up **tetrahedron** sample.
   - ? "What shape do we have here and how many triangle faces does it have?" **Discuss.** "It's a tetrahedron. Tetra- means 4 in Greek, and it has 4 triangle faces!"
4. Invite each pair of kids to build a tetrahedron. Let each pair figure out that they'll need 4 balls and 6 glowsticks.

Be sure to leave 20 minutes to make the cubes and buildings on the next page. If you're running out of time, you can skip making the octahedrons.

5. Once kids are done with their tetrahedrons, hold up the **octahedron** sample.
   - ? "What shape do we have here?" **Discuss.**
   - ? "It's an octahedron. It looks like 2 pyramids together, but what do you notice that's different from the tetrahedron?" **Discuss.** Let them spot that 4 triangles come together at each tip, not 3 – and the octahedron has a square center as a result!

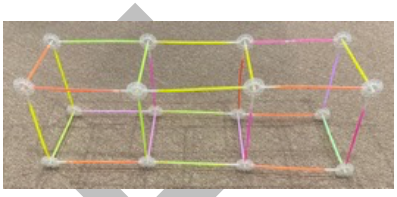
6. Invite kids to make an octahedron. Let kids wrangle a bit to make the shape. If they're stuck, tell them to start by making a square with 4 balls and 4 glowsticks then build pyramids on the top and bottom.

SAMPLE

Do Me a Solid: Build a Cube (20-25 minutes)

"Let's build a Platonic solid that may be more familiar: a cube! Why do you think a cube is also called a hexahedron?" **Discuss.** "A cube has 6 faces. 'Hexa-' is Greek for 6 and, we now know that 'hedron' means 'face' or 'surface.' Let's make some hexahedrons!"

1. Give each pair of kids 12 glowsticks.
2. Ask each pair of kids to build a cube, using the craft foam balls as corners or vertices. Disassemble the octahedrons if you need extra balls.
3. Once every pair has assembled 1 cube, ask every pair to connect to another pair's cubes using 4 extra glowsticks.



   - ? "How many cubes does your new creation have?" **Discuss**. Kids should get the answer 3.
   - ? "How many sticks and balls does that whole thing use?" **Discuss.** "Is it still 8 balls and 12 sticks per cube?" "How many sticks and balls did we use to make our structure?" **Discuss.** Since the cubes share sides and corners, the 3-cube structure uses just 28 sticks and 16 balls!
4. Now the kids can attach all their cubes to make a giant building using more glowsticks. Be sure to dim the lights to see your structure glow! Be creative with your designs!

   - ? "How many cubes does your new building have?"
   - ? "How many sticks and balls did your building use?"
   - ? "What happens to the number of balls and sticks used per cube as you make more cubes?" **Discuss.** The number of sticks and balls per cube drops since many cubes are sharing balls and sides. This is called economies of scale. This is why big buildings cost less money per square foot to build than smaller buildings!

Extra Challenge (optional)

- ? "How many cubes share each glowstick edge if you have cubes built in every direction?" **Discuss**. Kids should get the answer 4.
- ? "How many cubes share each ball if the ball is part of cubes in every direction?" **Discuss**. Kids should get the answer 8.
- ? "If you built to infinity, how many sticks and balls would you use per cube? How can we figure that out?" **Discuss.** After discussion, show kids one way to find the answer: If they divide the number of glowsticks (or balls) by the number of cubes sharing, they should find that at infinity each cube needs only 3 new glowsticks and 1 new ball.

A Touch of Class

"People who design and make buildings, like architects, carpenters, construction workers and engineers, use math like this in their jobs every day. One day you might, too!"

Wrap Up

Give each kid several balls and glowsticks along with a **Parents' Page** postcard, which encourages parents to visit our website for more activities to keep the math fun going at home!

SAMPLE

Plan Ahead

Be sure to read "How to DIY Refill Your Kit" before next week's activity. The letter is posted at the bottom of the Season 1 resources in your Coaches' Area.

Curriculum Standards

3.G.A.1	Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.
5.G.B.3	Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.
5.G.B.4	Classify two-dimensional figures in a hierarchy based on properties.
MP.1	Make sense of problems and persevere in solving them.
MP.4	Model with mathematics.

SAMPLE

Bouncy Dice Explosion
Grades K-2

The Big Idea
It's your big chance to throw things! We'll work in teams to roll the winning number in a radical take on Bingo, then play a fast-paced game of Give & Get.

Supplies
In your kit:

- ★ Bouncy rubber dice: 20
- ★ Radical Bingo sheets: 4
- ★ Star-shaped Bingo chips: 64

You provide:

- ★ Nothing this week!

Key Prep
- ★ Open the packet of Radical Bingo sheets. You'll notice that the sheets are double-sided. Use the side marked "2 DICE." Feel free to use the "3 DICE" side for clubs that are ready for higher-level math.

Room Set-up
- ★ You'll need open space on the floor to toss the bouncy dice. Give & Get and Radical Bingo can be played on the floor or at desks and tables.
- ★ If you have time, pre-set the Radical Bingo boards with 8 blue and 8 orange star-shaped Bingo chips.

What's the Math?
- ★ Addition
- ★ Counting
- ★ Frequency
- ★ Subtraction
- ★ See last page for Curriculum Standards

SAMPLE

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Kickoff

"Dice don't really roll, do they? Since they're cubes, with straight lines and angled corners, they bounce and tumble instead of rolling like balls. Today we have some really bouncy dice to toss!"

Going Airborne (10-15 minutes)

"First let's see what dice look like, and how far these dice can fly."

1. Invite the kids to sit in a circle. Hand 1 die to each kid.
2. Ask the kids to look at the sides and edges on the die.
   - ? "What's the smallest number of dots on one side? The largest?"
   - ? "What do you notice about the numbers on opposite sides of the dice?" **Discuss**. **Party Fun Fact**: See if they notice that opposite sides of dice always add to 7!
3. Ask the kids to toss the dice into the center of the circle.
4. Once the dice stop bouncing, have each kid find a die, pick it up and count the dots on the top side.
5. Group kids by the number on their dice. Count the number of kids in each group to see how many times each number was rolled.
   - ? "Which number showed up most?"
   - ? "Which number showed up least?"

Extra Challenge (optional)

- ? "How often should each number show up?" **Discuss**. You can explain probability: Each side of a die has a 1 in 6 chance of facing up. So, each number should show up on about 1/6th of the dice. For example, if you're at a birthday party where the adults are serving apple juice, water and fruit punch, and you're given one of those drinks at random, there's a 1 in 3 chance that you'll get fruit punch!

Radical Bingo (15-20 minutes)

"We are going to play a new version of the game Bingo! Who here knows how to play Bingo? **Discuss**. In our Radical Bingo game, 2 teams of 2 will be battling each other on one Bingo board! A team wins by capturing the last square to make 5 in a row – up/down, across or diagonally – even if the other team has captured other squares in that row!"

GAME RULES

Gather kids around 1 board to demonstrate the rules:

1. The first team rolls two dice, then adds or subtracts the 2 numbers to find a matching Bingo square.
2. If the sum (or difference) doesn't match an open square, the team can pick one of the numbers shown on either die. For example: If you roll a 6 and a 2, the sum is 8 and the difference is 4. If those numbers aren't available on the board, you can put your star-shaped Bingo chip on a 6 or a 2. If that still doesn't lead to an open square, the team can roll 1 more time.

SAMPLE

3. Unlike regular Bingo where everyone gets their own board and must place all 5 of the same color chips in a row to win, your team can place its star on any open number in ANY row, even if the other team has captured other squares in that row.
4. The center square is a FREE SPACE, which counts as a captured square for both teams.
5. The first team to capture the last square in a row – up, down or diagonally – wins the game!
6. If needed, show kids a sample board with both colors of stars on 4 squares in a row. The team that can produce the number in the final square with their dice roll wins the game.

PLAY THE GAME

1. Divide kids into teams of 2. It's okay to have a team of 3.
2. Give each team 2 dice.
3. Send 2 teams to each Bingo board.
4. One team plays with 8 blue stars and the other plays with 8 orange stars.
5. Repeat the game as time and interest allow.

Extra Challenge (optional)

- ★ Kids can also try multiplying the numbers on the dice to find a square.
- ★ Kids can play with the 3-DICE board. Teams roll 3 dice, then add, subtract, multiply and/or divide the numbers to get the desired Bingo square.

Adjustments for Young Clubs (optional)

- ★ Kids can add the numbers on both dice by counting the dots on each one.

Give & Get (10-15 minutes)

"Next, let's play Give & Get! The object of the game is to collect the most stars after 3 rounds."

1. Divide the kids into groups of 3 or 4.
2. Ask each group to sit in a circle.
3. Give each group 2 dice and 4 Bingo stars, any color, that they put in the center of the circle.
4. Give each kid 3 Bingo stars, any color.

GAME RULES

1. Player 1 rolls both dice, then slides the dice to be side by side.
2. If the die on the left is an odd number, Player 1 gives 1 star to the player on his/her left. If the number is even, Player 1 gets 1 star from the player on his/her left.
3. If the die on the right is an odd number, Player 1 gives 1 star to the player on his/her right. If the number is even, Player 1 gets 1 star from the player on his/her right.
4. BONUS: If Player 1 rolled a sum of 8, s/he gets 1 star from the center pile! The player should take the bonus star first and then continue with his/her turn. **Discuss.** What rolls add up to 8!
5. If a player has only 1 star remaining, and both dice roll odd, the players to the left and right each roll 1 die. The player with the higher roll wins the star!

SAMPLE

6. After Player 1 has completed his/her turn, the dice go to the next player on the left.
7. The player with the most stars after 3 rounds wins!
8. Ties between 2 players are settled by having each player roll 1 die. The player with the higher roll wins.
9. Play as many rounds as time and interest allow.

A Touch of Class

"Not only did we practice our addition skills, but we also learned about the math behind probability, which is used to forecast weather and help coaches make decisions on game day!"

Plan Ahead

Collect the following supplies and save in the bag where you'll use it next: dice in **Crazy 8s Race**, and star-shaped erasers in **Funny Money**. Keep the Radical Bingo boards for future use.

Curriculum Standards

K.CC.B.4	Understand the relationship between numbers and quantities; connect counting to cardinality.
K.OA.A.5	Fluently add and subtract within 5.
K.MD.B.3	Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.
1.OA.C.6	Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 - 4 = 13 - 3 - 1 = 10 - 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 - 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).
2.OA.B.2	Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.
2.OA.C.3	Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.
MP.8	Look for and express regularity in repeated reasoning.

SAMPLE