Crazy8s math club

Weekly Sessions
Season I

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)

Piece of Cake

No matter how you slice it, learning fractions is fun when you play with cakes!

Grades K-2: Use manipulatives to add fractions with the same/different denominators; Comparing fractions; Finding common factors; Finding equivalent fractions.
Grades 3-5: Use manipulatives to add fractions with the same/different denominators; Comparing fractions; Finding common factors; Finding equivalent fractions.
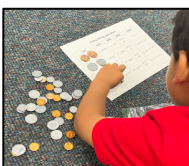
Daring Darts

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

Glow-in-the-Dark Geometry
Grades K-2

The Big Idea
This week you'll make geometric shapes using glowsticks. First, you'll build 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: 1 bag
★ Glowsticks: 150
★ Parents' Page postcards: 16 (packed separately)

You provide:
★ Nothing this week!

Key Prep
★ 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 geometric shapes
★ Counting
★ Pattern recognition
★ 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!

Kickoff

"Today we're going to use glowsticks to make mathematical shapes that glow!"

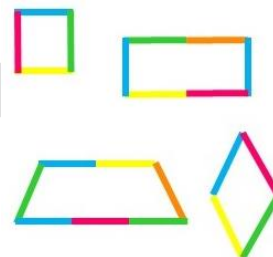# Introducing...the Glow Stick (15 minutes)

- **?** "What do you call a shape with 3 straight sides?" **Discuss.** The answer is triangle.
- **?** "Can you name some other shapes? Which ones have 4 sides?" **Discuss.** The answer is squares and rectangles – also, parallelograms and trapezoids, if they know them!
- **?** "How about 5 or 6 sides?" **Discuss.** The answer is pentagons and hexagons.
1. Hand out 8 glowsticks to each kid. Explain to the kids they shouldn't bend the sticks too far or they'll crack and leak!
2. Invite the kids to make any kind of triangle. Model different examples of triangles for the group – some have 3 equal sides, and some have no equal sides!
   - **?** "How many kinds of triangles can we come up with?" **Discuss.** Talk about length of each side and number of sticks as kids make their shapes.
3. Flick off the lights briefly to show off the shapes!
4. Now invite the kids to make 4-sided shapes, like squares, rectangles, trapezoids or rhombuses (diamonds).
   - **?** "How many sizes and kinds of 4-sided shapes did we make?" **Discuss.** Talk about length and width and number of sticks as you compare shapes.

Hit the Floor (15 minutes)

"Flat shapes with straight sides like the ones we just made are called **polygons**. 'Poly' means 'many' and 'gon' means 'angled.' Let's cover the floor with repeating polygons. Can you figure out which shapes fit together with no gaps or overlaps?"

1. Let the kids experiment to see what shapes fit together.
2. If needed, guide them to discover that triangles, squares (or any rhombuses) and hexagons (a honeycomb shape) are the only regular polygons that work.
3. Have the whole group arrange the glowsticks to cover the floor with a big lattice of squares.
4. Flick off the lights to see it glow!
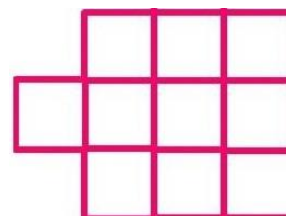
5. Now the kids clear the floor of glowsticks and arrange them in a new lattice of equilateral triangles. You can turn the lights back on while they work, then do the reveal, or leave them off.
    - **?** "How many triangles did you make to create your glowing math pattern?" **Discuss**. Watch how kids count – tiptoeing works!
    - **?** Once they've started, ask: "What size triangles are you counting?" **Discuss**. Help kids consider bigger triangles!
    - **?** "How many sticks did you need to use each time you added one more triangle to the pattern? Show me an example." **Discuss**. Let the kids count! Did they need a total of 3 sticks for every triangle? Why not? Kids will need only 1 or 2 sticks since many triangles borrowed a side from their neighbors.
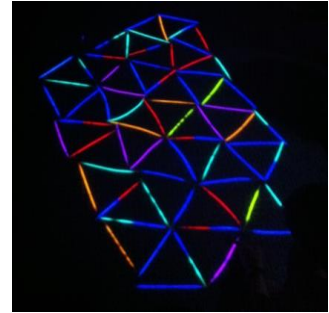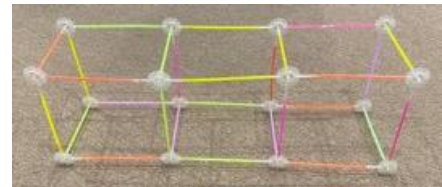
Do Me a Solid: Build a Cube (20-25 minutes)

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

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.
3. Once every pair has assembled 1 cube, ask every pair of kids to join another pair of kids to connect their 2 cubes using 4 extra glowsticks.
    - **?** "How many cubes does your new creation have?" **Discuss**. The answer is 3.
    - **?** "How many sticks and balls did we use to make our new creation?" **Discuss**. Count together to find that the trio doesn't use 8 balls or 12 sticks per cube, 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!

Extra Challenge (optional)
    - **?** "How many cubes does your new building have?"
    - **?** "How many sticks and balls did your building use in total?"
    - **?** "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!

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!

Curriculum Standards

K.G.A.2   Correctly name shapes regardless of their orientations or overall size.

K.G.A.3   Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").

K.G.B.4   Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length).

K.G.B.5   Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.

K.G.B.6   Compose simple shapes to form larger shapes. *For example, "Can you join these two triangles with full sides touching to make a rectangle*?"

1.G.A.2   Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.

2.G.A.2   Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.

MP.1   Make sense of problems and persevere in solving them.

MP.4   Model with mathematics.