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TOOLKIT

Catapults, Bouncy Dice, and Glowsticks: Coaching a Crazy 8s Club

— Liza Bondurant and Lee Dean

A kindergartner makes triangles and squares on the floor using glowsticks, then turns off the lights to see them glow. A third grader rolls dice and uses multiplication to pick the winning number on a Bingo board. A fifth grader builds a catapult using popsicle sticks and rubber bands, then measures how far their fuzzy pom-pom flew. Not your typical math club, right?

Bedtime Math's Crazy 8s Club is based on a simple idea: kids need to develop an understanding of how to apply math to real-world problems—and what better way to learn than through play? The club offers high-energy activities that reinforce key math skills and help elementary school kids develop confidence in their ability to succeed at math, all while having a great time with their friends.

How It All Started

Bedtime Math was founded by Laura Overdeck to make math a fun part of kids' everyday lives. She created the nonprofit after parents started asking her to share the math problems she gave to her kids at night. "As a mom, it was only natural for me to give my kids math problems along with their bedtime story," said Overdeck. "I started small with 'Let's count the ears on your stuffed animals.' That nightly ritual grew—and the math got more complex—as my children got older."

Bedtime Math delivers daily math problems on a wide range of topics for parents and kids to solve together by email, on the website, and on its app. It's a free, simple tool that has been proven to boost kids' math skills an extra three months in one school year. "Many adults are uncomfortable with math, even scared of it, and that's contagious to the kids. Hence, our decades of having a whole third of adults unable to do fourth-grade math confidently," said Overdeck. "By incorporating math into the family nightly routine, we encourage a dialogue between parents and children about real-world math, not just what they learn in school."

Not Your Usual Math Club

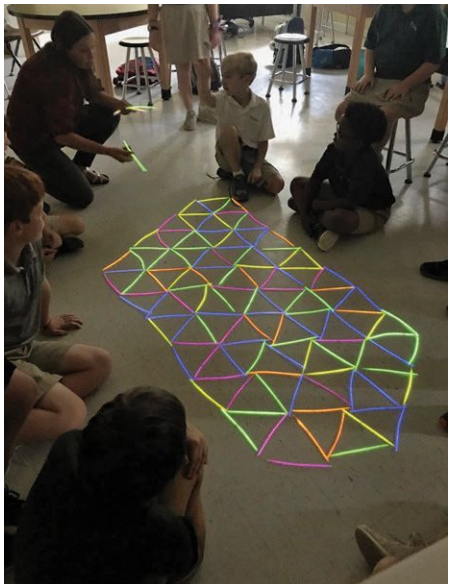
In 2014, Bedtime Math launched Crazy 8s, the nation's largest recreational after-school math club for elementary-age kids. Unlike competitive, test-oriented clubs, Crazy 8s offers high-energy activities that appeal to kids of all math abilities. "We've heard from many of our coaches that kids have 'a-ha' moments where they realize what they're doing in the club is what they're learning in the classroom," said Overdeck. "Not only do they see that math can be fun, but they understand the math concepts better—and that's a big win." In fact, Crazy 8s has been shown to help kids overcome their anxiety around math and build confidence. Researchers at Johns Hopkins University found Crazy 8s significantly reduced children's feelings of math anxiety after just eight weeks.

Launching a Club

We each had positive past experiences planning and running extracurricular math programs, but these initiatives required significant time and monetary resources. When we learned that Crazy 8s is a free program funded by Bedtime Math and coaches are provided with all the resources, activity plans, and training needed to run a club, we decided to start our own club in Cleveland, Mississippi.

Starting a Crazy 8s Club involves a few simple steps. First, potential coaches are asked to complete a short online application where they agree to an Honor Code:

1. Offer Crazy 8s as a recreational math club for kids of all math abilities.
2. Register a minimum of 12–16 kids who volunteer to join the club.
3. Group kids together by grades K–2nd or 3rd–5th.
4. Run the club outside regular school hours.



Students Created Glowstick Tessellations in "Neon Geometry," Season 1, Week 1.

Solving Puzzles for "Super Cube Shuffle," Season 2, Week 4.

5. Run the club one hour weekly over eight consecutive weeks so kids appreciate math as a regular part of their lives.

Next, coaches are asked to schedule an introductory call with a member of the Bedtime Math team to get an overview of how to run the club and answer any questions. If approved, coaches are sent a free kit of supplies and provided access to the Coaches Area, an online portal for coaches that includes activity instructions and how-to videos.

Crazy 8s offers three eight-week sessions or "seasons" of hands-on math activities. We coached all three seasons and hosted our club meetings from 3–4 PM once a week at an elementary school. The students who participated included:

- Season 1: 16 third through fifth graders
- Season 2: 12 fourth and fifth graders
- Season 3: 12 fifth graders

We made a conscious decision after coaching Season 1 to limit the number of students to 12. Many of the activities are hands-on and require one-on-one assistance from a coach. We found 16 students to be too large of a group to effectively facilitate. Twelve students seated at four round tables with three students per table proved more effective. We also decided to exclude third graders. We found this age group lacked the prerequisite skills (e.g., multiplication and division) needed to participate in many of the activities. Additionally, we found that the cognitive and social development differences between third and fifth graders were too large for the students to effectively collaborate.

Where Math Meets Mischief

Crazy 8s offers dynamic activities like Toilet Paper Olympics and Spy Training. Each activity starts with the fun, then rolls in the math. While the activities are recreational and not "schoolwork," they do align with the Common Core Standards. With 24 activities offered over the course of three eight-week seasons, we found Crazy 8s offers a range of materials to handle a wide range of abilities, even among kids in the same grade. Each session also includes bonus activities so kids who are ahead of the curve stay engaged.

In this section, we highlight some of our favorite activities:

Season 1: Neon Geometry

In "Neon Geometry" students used glowsticks to make mathematical shapes that glow. They first explored 2-dimensional geometric shapes, then they hit the floor to see what repeating patterns they could build with their glowsticks. Finally, we grouped the kids in pairs to build 3-dimensional cubes. Once they finished, we had them attach all their cubes to make a giant building and flicked off the lights to see it glow!

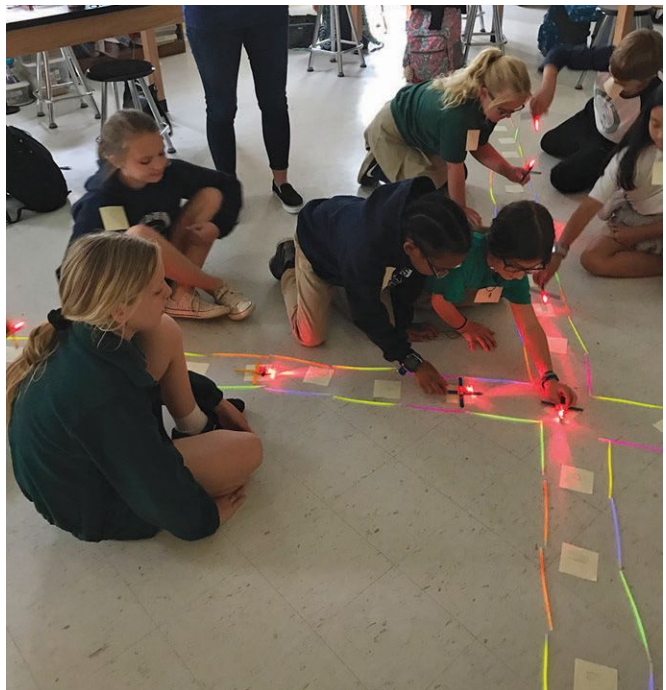
Season 2: Super Cube Shuffle

Students put their spatial skills to the test in "Super Cube Shuffle" using red and white colored cubes. They recreated different puzzle designs, and then leveled up and worked in small teams as they raced against a timer to complete as many puzzles as they could. This was not only a great activity for students to use symmetry and spatial skills to see how shapes fit together, but it was also collaborative and promoted teamwork.

Season 3: Light the Runway

In "Light the Runway," students developed an understanding of number series, factoring, and modular arithmetic. They built their own mini airplanes using popsicle sticks, rubber bands, and an LED light. Then, they built the runways to fly their planes using numbers and patterns. We divided the students into two teams, and they each landed their planes using math to figure out which number kept them from crashing into each other.

Building an Airplane Runway for "Light the Runway," Season 3, Week 8.



Get More

Bedtime Math: bedtimemath.org/

Fun Factor: funfactor.org

Bedtime Math boosts kids' math skills: science.org/content/article/bedtime-problems-boost-kids-math-performance

U.S. Skills Map: State and County Indicators of Adult Literacy and Numeracy: nces.ed.gov/surveys/piaac/skillsmap/

Johns Hopkins University report: s39684.pcdn.co/wp-content/uploads/2023/04/Crazy8sFinalReport_revised.pdf

Impact

Crazy 8s has served more than 200,000 kids and has been growing since its start, making a positive impact on the way kids think and learn about math. On the heels of its success, Bedtime Math is now offering Fun Factor, a suite of similar activities that are standards-aligned for the K–5 classroom.

We thoroughly enjoyed coaching Crazy 8s and received positive feedback from parents, teachers, and students. Students were eager to participate each week and displayed curiosity and an eagerness to learn throughout the activities. Teachers told us that participating in the club helped improve students' math skills and boosted their confidence. Parents reported that their children loved that they were able to take the materials home and used the materials to demonstrate the activities to their family members. We hope the experiences have a lasting positive impact on the students and that they are inspired to pursue post-secondary mathematics education and STEM careers.

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