

Math Circle Guide

A Resource for Starting your own Program

What are math circles?

Math circles are creative learning spaces where students explore mathematics regularly and in depth. Students work alongside professionals in a collegial atmosphere with the goal of exploring the richness and beauty of mathematics through playful and challenging activities that promote reflection, communication, and collaborative work. The emphasis is on play and rigor, modeling the way mathematicians do mathematics.

How do math circles differ from math festivals?

The main difference between math circles and festivals is the frequency with which circles meet, and hence, the depth that students may attain in them. You may read our [Math Festival Guide](#) to learn how to combine these initiatives. A math circle is also an excellent way to extend the experience of a math festival for students who show the most interest.

Overview

Consider the following questions as you organize a math circle program.

- What is my audience?
 - Think about the age range or grade level of students you want to serve.
- How many people do I want to reach?
 - It could be 5 students or hundreds of students. Make a realistic assessment based on your ability to recruit volunteers and students.
- When do I want to do it?
 - Give yourself a year before you open it, unless you've done this before.
- Who's going to help me?
 - Think about how many people your team requires and what roles each will play (session leaders, outreach person, marketing and social media expert, etc.).
- How frequently will we meet and for how long?
 - Many circles meet weekly for a period of one to two hours.
- Where do I want to host it?
 - Consider universities, schools, community centers, churches, and personal residences, as well as different types of environments, like classrooms with many boards, or movable chairs so students can easily change their seating arrangements.
- How much money do I need and how do I find it?
 - We recommend low-cost programs staffed by volunteers.
 - Consider funds for materials and ways to compensate your volunteers.
 - Reach out to business leaders and foundations whose work aligns with that of math circles.

Outreach

The first key for developing community-responsive math circles is to immerse yourself in the communities you intend to serve in order to understand their needs. Focus on building sustainable relationships with school, community, and religious leaders. At the institutional level, include them in the planning phases and allow them to share ownership of the project.

Session Leaders

The second key for developing a successful circle program is to recruit excellent session leaders. Think about teachers, professors, college students, and retired professionals. With appropriate guidance, you may also consider high school students. Read our [Teaching Guide](#) to study our pedagogical approach and learn what qualities to look for when recruiting and training staff. You must also comply with all local laws regarding background checks for adults interacting with minors.

Activities

The third key for developing a successful math circle is to have high-quality activities. We recommend activities that:

- Are “low-threshold/high ceiling,” providing access for younger students while challenging the most advanced.
- Are play-based, discovery-based, and student-centered, giving students the agency to make meaningful choices in a low-risk environment.
- Can include manipulatives that allow students to play with math in a tactile and visual way.

Select activities from pre-existing resources, like those produced by the [AMS-MSRI Mathematical Circles Library](#), [Math Circle Network](#), [Berkeley Math Circle](#), [MathPickle](#), [Natural Math](#), [Global Math Project](#), [Math for Love](#), [Beast Academy Playground](#), [Mathigon](#), [Early Family Math](#), [FUNDAPROMAT](#), [JRME](#), [Círculo da Matemática do Brasil](#), and [CYFEMAT](#). Be flexible in the selection process to accommodate for different teaching and learning styles.

Logistics

- Personnel
 - Build a good team and delegate responsibilities.
 - Invest in their preparation and the development of a common vision.
 - Make a timeline of duties and tasks. (A timeline is provided at the end of this guide.)
- Locale
 - Approach universities, schools, churches, and community centers about using their space free of charge.
- Registration
 - Include a photo/video release waiver.
- Materials
 - Think of making copies or laminates.
 - Always have markers, pencils, and paper available (both white and graph paper).
 - Determine if you need to purchase any manipulatives or games.
- Marketing
 - Make a flier at least one month before the program starts.
 - Approach school and community leaders and ask them to promote your program.
 - Share success stories with the community.
- Rotation of session leaders
 - Set up a rotation of session leaders so that you can learn from each other.
- Assessment
 - Assess your program regularly in a way that might be convincing to potential donors and supporters.

Sustainability

- Build a sense of community among participants and parents.
- Connect with other circles and share your experiences. Reach out to the [Global Math Circle](#), the [Math Circle Network](#), and [CYFEMAT](#).
- Continually identify and recruit students and volunteers by attending or creating educational events in your community.

Budget

- Determine a budget for materials and resources.
- Seek the support/sponsorship/donations of academic institutions and community organizations.
- Decide if your services will be free-of-charge.
- If you charge tuition, offer scholarships and select a non-intrusive way to determine need.
- Decide how to compensate your volunteers (gift cards, merchandise, food, etc.). If you have a tuition-based model, then give a fair honorarium to your session leaders.

Timeline

Tasks	Lead Time
☐ Decide audience, time, duration, and location.	6-12 months
☐ Build a work team.	3-6 months
☐ Determine a budget.	3-4 months
☐ Identify and secure funds for copies and other materials.	3-4 months
☐ Decide if the program will be free or tuition-based.	3-4 months
☐ Select the registration method, along with a release waiver.	2-3 months
☐ Recruit session leaders and other volunteers.	1-2 months
☐ Select activities for the semester/year, but be flexible.	1-2 months
☐ Choose a name/motto/logo for the program.	1-2 months
☐ Design a flier to distribute by email (.pdf) and post on social media (.png).	1-2 months
☐ Comply with local laws regarding background checks.	1-2 months
☐ Train session leaders if they lack experience.	1 month
☐ Make copies or laminates and procure other materials (puzzles, pencils, etc.)	1-2 weeks
☐ Send a reminder to registrants.	1 week & 1 day
☐ Update parents.	After each session

