Math Teachers’ Circles: What Makes a Good One?

by Angie Hodge

Math Teachers’ Circles (MTCs) bring together middle school math teachers and professional mathematicians to enrich the teachers’ experience of mathematical problem solving and to build mathematical community. Free math club-like events, MTCs give teachers the chance to have fun doing math three or four times per semester.

MTCs strive to:

1. increase the confidence of middle school math teachers in their problem-solving ability;
2. deepen teachers’ content knowledge through exploring mathematically rich problems and developing an arsenal of techniques for solving unfamiliar and challenging problems;
3. form long-term professional relationships between teachers and mathematicians through regular, highly interactive meetings; and
4. provide support for teachers who want to bring richer mathematical experiences to their students.

Teams interested in starting a Math Teachers’ Circle in their area should contact AIM at circles@aimath.org. Six teams of four or five teachers attended workshops on How to Run a Math Teachers’ Circle in 2014. At the 2014 workshop in Washington, D.C., the teams were asked to answer two questions:

1. What makes a good Math Teachers’ Circle session?
2. What makes a good Math Teachers’ Circle problem?

Workshoppers were asked to brainstorm with a focus on “quantity versus quality,” and they came up with quite a list. Just perusing it gives even someone unfamiliar with MTCs a pretty good idea of what they’re all about:

What makes a good Math Teachers’ Circle session?

- Snack break
- Good snacks
- Engaging problems
- Aha! Moment
- Leader ready to scaffold/backfill/support
- Leader ready to give next challenge
- Focus on math
- Out of comfort zone
- All participants feel comfortable with math and other participants
- Safe environment for failure
- Discussion and collaboration
- Entertaining/enjoyable
- Buy-in for participants
- Community
- Group of common professionals
- Relaxed, non-threatening atmosphere
- Classroom connections without focus on classroom
- Interesting presentation of problems
- All levels of mathematics
- Overplanning
- All participants are involved

What makes a good Math Teachers’ Circle problem?

- People areate involved
- Multiple perspectives
- Cheeky challenge
- Solution is not obvious
- Challenge is open-ended
- Solution is accessible
- Solution is both open and closed
- Pedagogy is integrated
- Emphasizes nice mathematics
- Challenges (not problems)
- Future connections
- Aha! Experience
Generate enthusiasm
 Participants explain and present
 Variety of participant backgrounds
 Pacing good
 Memorable
 Wine
 No whine
 Different presenter personalities
 Appropriate amount of room
 Good number of participants
 Humor/laughter
 Make friends
 Noncompetitive
 Supportive
 Multiple strategies
 Include failure
 Hook
 Not lecture-y
 Celebrate discovery
 Good flow
 Participants sharing discoveries
 End loving/wanting more
 SWAG (Sell your MTC by advertising it!)
 Climate of respect
 Knowledgeable leaders
 Focus
 Critiquing mathematics/solutions (safe for people)
 Providing resources to learn more
 Inter-workshop closure, info, etc.
 Leader's love of math is transmitted
 Plenty of time
 Time flies
 T-shirts
 Time to explore
 Time to fail before seeing solution
 Good entry/exit
 Freedom to digress/follow tangents/not too fixed a goal
 Individualized closure

What makes a good Math Teachers' Circle problem?

Hands on
 Engaging
 Knobbifiable (problems can be made harder or easier)
 Low-level entry
 Multisensory/multimodal
 Mystery
 Leads to more questions
 Out of the box
 Initially simple
 Folkloric
 Variety of strategy and/or tactics
 Minimal lecture
 Lets participants get to board
 Novelty to participants
 Not textbook
 Good lead-in
 More than an hour to solve
 Interesting to different groups
 Some element of fun
 Joy of math
 Physical/"crafty"
 Abstract/thoughtful
 Has a hook
 Clear parameters
 Real world
 Not too intimidating
 Challenging
 Easy to generate data
 Strategies embedded
 Associated with a lesson
 Moral to the story
 Cognitive dissonance
 Surprise
Some closure
Some open endedness
Group or individual
Multilayered problems
Opportunities for discussion
Little intro prep/setup
Patterns
Connections within mathematics
Multiple pathways
Gives participants something to bring home

Reasoning/argumentation
Memorable problems
Spatial
Games
Intro fun
Not too much tedium
Aha! moment

For the MTC veterans out there, do the items on the lists above square with your experience of what makes a good Math Teachers’ Circle?

Note: This exercise was given as a way to create closure for the How to Run a Math Teachers’ Circle workshop. Participants had been working problems in MTC sessions all week and this gave them a chance to reflect on the experience. I think this exercise of thinking about good problems and a good class session could also be used in other mathematics courses. Imagine your own classes generating lists about what makes a good student, a good teacher, a good exam, a good problem set, etc. The possibilities are endless! Happy list generating!!!

Posted by Mathematical Association of America at 6:18 AM