

SAN DIEGO MATH CIRCLE BACKGROUND

Steps to meet challenges

Summer 2017

Growth

- SDMC was founded in 2003 with an initial group of only 6-8 students.
- SDMC's registered base during the 2011-2012 school year exceeded 400.
- That's an average compounded growth rate of roughly 50% per year!

Accommodating Growth

- SDMC has attempted to absorb this growth by
 - subdividing ability groups (now 4 math, 1 STEM)
 - maximizing the number of active Saturdays
 - scheduling the STEM activities on Sunday
 - scheduling movable events at “off peak” times
 - utilizing larger classrooms
 - promoting in-home options for younger students
 - growing the instructor pool
 - providing opportunities for student service

Limits to Growth

- There are both physical and philosophical limits on math circle size – generally speaking, smaller is better.
- SDMC has been bumping against the philosophical limits for some years now, but ...
- ... growth has been so substantial managing the size of our student groups has become essential.

Current Ability Group Structure

- SDMC subdivides into four core ability groups:
 - Cauchy grades 11-12
 - Gauss grades 9-10
 - Euler grades 7-8
 - Fermat grades 5-6
- Grade levels here can be misleading; the “math level” of each group is generally above its nominal grade levels.
- Being “ready” for a higher-level group is not simply a matter of being “ready” for next-year school math. When warranted by experience, younger students can be considered for higher challenge on a case-by-case basis.

Guiding Principles

- We must ...
- ... maintain our ability groups at sizes compatible with good order and coherent learning.
- ... exercise selectivity in admission to assure that we are populating our groups with students having the intended levels of ability and motivation.
- ... make continuing membership contingent upon students demonstrating track records of successful participation.
- ... sustain broad parent support commensurate with the spectrum of activities that comprise the SDMC program.

The SDMC Student Profile

- Both original application and ongoing participation are based on a “Student Profile” document maintained by the student’s family in collaboration with SDMC.
- The Student Profile contains essential student and family information (names, addresses, contact info, etc.), but ...
- ... also contains an academic resumé comprised of a variety of information relating to school and independent accomplishment.

How much information is necessary?

- There is no simple answer to this question.
- The Student Profile has been designed to anticipate a variety of student experiences common to SDMC students and with flexibility to allow students' individuality to be expressed.
- *Ultimately, how much information to provide is the amount that tells each student's own story.*

Three Phases of SDMC Experience

- New Students – students with no prior SDMC experience, admitted on the basis of the initial student profile.
- Transitional Students – admitted students with some SDMC experience who are in the process of developing a record.
- Experienced Students – admitted students with substantial SDMC experience and substantial records of independent accomplishment.

New Students

- New students usually have strong scholarship but may not yet have a history of independent learning or accomplishment in mathematics; thus ...
- ... all acceptances of new students are considered to be provisional for their first, “get acquainted” year.
- During that first year, new students are expected to participate substantially and develop a record that will support continuing participation.

Transitional Students

- It is not uncommon for students and families to require some time to discover how to open up the full value of the math circle experience, including intangibles such as independent motivation, problem-solving learning styles, peer interactivity, social integration, family cooperation, etc.
- Thus, if a student continues into a second year, we look for that year to confirm that he/she has adjusted successfully and ...
- ... we look for the student's record to show evidence of independent accomplishment that validates continued participation.

Experienced Students

- Students who have demonstrated both successful adjustment and a significant record of independent accomplishment as can be considered to be experienced students.
- Many students will have met this standard by the end of a transitional year.
- The main exceptions have to do with maturity and discipline –

Maturity and Discipline

- SDMC can only put forward successful programs if student conduct supports it.
- Part of becoming an experienced student, therefore, is demonstrating maturity consistent with one's ability group and exercising appropriate discipline at all times.
- Students who are very young (e.g., 5th and 6th grade or strongly accelerated) will often need extended time to grow into the needed blend of academics, maturity, and discipline and may spend longer time as transitional students; this is *normal*.

The Importance of the Euler Group

- The Euler group is an important place for advancing students to demonstrate the maturity and focus it takes to participate successfully in an ongoing manner.
- For many 8th graders, the Euler group presents an important evaluation period right before high school, to consider whether continuing with SDMC is their most sound choice, or whether the student's time might be better directed toward the many new opportunities open to high school students.

PREEMPTIVE PROBLEM SOLVING

Some notes on avoidable problems

Some Mistakes We Encounter

- Some of the problems we encounter in SDMC arise from mistakes of perception or action, *sometimes more by parents than by students*. Some significant ones are:
 - Scholastic perspective
 - Forcing
 - Looking good
 - Dropping off
 - Maturity and discipline
 - Unrealistic expectations

Scholastic Perspective

- It is natural to expect that high achievement in school may translate into successful SDMC experience; this is very possible, but is not automatic.
- A rewarding SDMC experience does not flow directly from impressive school grades or GATE/AP participation or impressive standardized test scores.
- It has more to do with individual motivation, positive peer interaction, a creative, problem-solving learning style, and a genuine passion for mathematics.

Forcing

- One of the biggest errors parents can make is forcing students to participate in SDMC when they lack independent motivation of their own.
- Certainly, children of all ages need parental guidance that sometimes includes a push of the guiding hand ...
- ... but if that pushing is more than an occasional feature of a student's SDMC experience, the key motivation is the parents', not the student's; this makes for an unsatisfying student experience and generates difficulties for SDMC.

Looking Good

- It is understandable that exhibiting SDMC participation on resumés or college applications might be desirable.
- This is fine, of course, provided students participate in a substantial and constructive manner.
- However, participating in a limited, technical sense just to claim membership, is not what we intend for our students.
- Our admissions and annual review processes aim to curb this practice.

Dropping Off

- Some parents view SDMC as a “drop off” activity for their students only.
- However, hands-on parent participation is crucial in almost every corner of SDMC activities.
- Active parent participation is a key element of SDMC’s success – we can’t function without you.
- We also find that student success is correlated with the quality of family support.
- SDMC views student participation as a family matter and we look to parents to do their part.

Maturity and Discipline

- Parents' dedication to providing for students' educational needs may sometimes obscure their awareness of difficulties related to maturity and discipline.
- Parents of high ability students can find it difficult to accept that such concerns may be relevant to their child; however, these can arise quite naturally among students who are intellectually advanced.
- We must be clear that successful SDMC participation depends on students displaying maturity and discipline that is as exceptional as their intellectual abilities.
- We rely upon parents to assure appropriate conduct.

Unrealistic Expectations

- Parents or students themselves can set expectations that may be unrealistic despite everyone's best intentions and the students' exceptional abilities.
- At SDMC, it is as true as anywhere else that half of all students will be below the median on any given day; thus, it is more than likely that most students will sometimes encounter humbling experiences – *this does not warrant concern in itself*.
- On the other hand, if a student's learning style or motivations are not aligned with the math circle approach, SDMC may not be their best choice of activity no matter how exceptional the student. There are many exceptional students who thrive more productively through other kinds of activities or approaches to learning.