GED Math Graphics:
Illustrated Guide to Self-Confidence

www.gedmathgraphics.net

Program Notes for Nonprofit Agencies

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Purpose: Test Preparation for Small Groups

The multi-volume Math Guide specifically targets small groups of disadvantaged students, both teens and adults, in resource-constrained programs typical of nonprofit agencies.

Successful GED Test Preparation

Colorful graphics with brief captions are visually accessible to a wide spectrum of learners, emphasizing conceptual understanding over tedious detail. They focus on key fundamentals, which when grasped with confidence will lead to success on the GED math exam.

- A real goal in real time

  Students may have only a few weeks or months to work intensively on a range of life skills, among which math is not always the highest priority. So the Math Guide targets a specific goal that is realistically achievable within a limited time horizon.

- "Less is more," so the charts focus on essentials.

  This point dates back to my first day as math supervisor in an urban vocational high school district. Basic skills resources included storage rooms full of last year's test prep books—and another set from the year before that, and then even more shelves and yet more dust.

  Clearly if more books and materials were the whole answer, schools and publishers would have long since and quite successfully buried the problem of basic skills math instruction!

  But really—how much baggage must we carry? The Math Guide briefly and effectively presents the basics for success on typical GED test questions.

- Accessibility and "Doing not Drilling"

  As charts and captions draw students into interactive learning, they ***solve simple problems*** taken ***directly from their own experience***. They begin to feel successful, grow confident, and on that key foundation are soon ready to master the rest of GED math.

  The next step is to guide students through test prep problems from selected pages in a standard GED text. Help them with each problem, and also encourage them to study detailed explanations in the back. Spanish-speaking ELLs often benefit from Spanish texts.

The final mode is practice tests under actual conditions, with self-responsible use of answer guides. Such self teaching is both important and effective in successful test preparation.

Bilingual Option for Latino English Language Learners (ELLs)

Companion Math Guide units use identical graphics, but include both English and Spanish language captions for Latino ELLs. Such students cannot afford to delay their math until after they learn English. They need to progress in both areas simultaneously.

The bilingual units facilitate such dual-track progress. Teacher proficiency in Spanish need not be an issue. Instead, focus ELLs on the charts and Spanish story lines. Math study begins without delay, as the bilingual story lines reinforce students' progress in English.

Customizing GED Test Prep in Your Agency

Your educational program may need to differ significantly from mainstream schooling, because it must function within institutional policies, counseling activities, and priorities for client development that may at times reach well beyond the scope of a typical school.

Within such program structures, you can be most effective when you adapt your curriculum and instructional delivery in sometimes novel ways. Don't assume that you must mimic a conventional school, since your program not only differs from mainstream schooling but is most likely smaller and thus inherently much more flexible. To best meet the needs of individual students in your particular setting, try a "blank sheet" approach to basics such as:

Learning Groups versus Math Teaching Time

The frontier model of the one room school house—with all grade levels, and one teacher for all students in all subjects—might be a relic of the past. But is your program really so different?

Of course you can make a paper plan for learning groups focused within specific grade levels, but the key issue is math teaching time. For consistency and continuity, you need to specify:

- What is your students' range of math achievement levels, based on an assessment such as the TABE test or last grade regularly attended?
- How many students do you have within a few potential grade level groupings: for example, 1-4 (basic math skills), 5-7 (pre-GED), 8-11 (GED), or maybe even 12+ (college prep).
- Within your total available minutes per week of *specifically math* teaching time, how many and what size learning groups can you actually accommodate, at 4-5 classes per week?

Though small programs might in theory offer individual tutoring, it is usually more efficient for both teachers and students to schedule math teaching time for achievement-based learning groups. It might be ideal to meet regularly with four or more grade level ranges, but just two groups can also be effective: (a.), **pre-GED** (Math Guide Units 1-2), and (b.), **GED** (Units 3-4).

Class Size: Key to Flexibility

While math teacher time will probably be the determining factor for the number of your class groupings, class size will be a function of the number of your students. The key point is that ***your instructional dynamic can and should be quite different for various class sizes:***

(1.) tutoring of 1-2 students,
(2.) small groups or 3-5 or even up to 6-8,
(3.) whole class instruction for 25 mainstream students or up to 15 Special Needs students.

The key difference with small class size is enhanced flexibility. You can depart from typical practice (what "everybody knows" school is supposed to look like) and establish a classroom dynamic that is informal, interactive, exciting, highly effective, and even fun. Toward these ends, the graphics and dynamic instructional approaches of the Math Guide can be invaluable. It is useful for tutoring, but works particularly well in the informal interaction of small groups.

However, approaches in the guide become less practical with increasing class size. Thus the Math Guide and Teacher Notes assume a small group class size. If you do have large classes, you might look first for instructional models to mainstream schools with recognized records of superior results with disadvantaged students, such as your state's Title I Distinguished Schools.

Attendance Patterns

Attendance in your GED classes will most likely differ significantly from mainstream education, with its grade level cadres progressing together from year to year. Thus typical assumptions about "the way school works" may not apply in your setting. Your instructional planning must take into account how much time you can count on with specific groups of students.

- Will each student attend the educational program for a similar and predictable time?
- Or will time in the program vary with each individual?
- Will the class consist of the same group, who attend consistently?
- Or will class members come and go at random intervals?

Key Implications. Lack of class continuity is a serious disruption to a pre-set lesson schedule, particularly when math skills acquired in early lessons need to be applied subsequently. That can work well if regular attendance is the norm, but becomes problematic if attendance is irregular, new class members appear randomly, or some are absent intermittently.

If that describes your attendance pattern, there is no need to fault the program or students if standard curricula and sequential lesson planning approaches are too rigid to work well for you. The Math Guide can help you incorporate badly needed flexibility into your program.

Student Motivation and Readiness to Learn

As part of pre-assessment, talk to your students and closely observe attitudes and behaviors. There's no need to feel surprised if many of them do not feel optimistic about participating in what they may perceive as "school" or "math class."

In such cases you need to replace negative perceptions with engaging learning experiences. So avoid simply presenting a canned math curriculum from page 1 to the end. Most students have "been there, done that" and if traditional schooling had worked they might not be here now.

The Math Guide offers alternatives to tired old approaches. In concept, it's not very complicated. Involve students in learning activities that show them success, and keep it fun. As you guide students through basic word problems in Unit 1, also use the Top 10 Charts to introduce Unit 2. See the approach detailed in the Teacher Notes, pp. 10-13. *It's fun and it works!*

Classroom Design

"Everybody knows" what a classroom is supposed to look like. Rows if individual seats face the front, where a teacher dispenses knowledge as the class listens silently.

But while the traditional classroom may work just fine for some, it is by no means ideal for all. And some of those who have not been well served by mainstream education are very likely to be represented in your program, carrying with them negative perceptions about school.

Although the old "factory model" of mass production schooling has few defenders, alternatives are still rare—particularly in schools that must serve classes of traditional size. *But with small groups, it doesn't have to be that way!*

So seize the flexibility that small classes give you. Break the mold of endless "teacher talk" in favor of a more informal, interactive classroom dynamic. Group exercises where students can interact with the teacher and each other will work far better for many students—including yours!

To achieve this enhanced group dynamic, you must rearrange the classroom.

- First, get rid of individual seats in favor of work tables for 2-3 students.
- Place chalk boards or white boards on all sides, for students to use in group exercises.
- Don't fill the room with furniture; leave space for movement and displays.
- Provide one or more portable easels.
    - For teacher-made posters or displays, including Math Guide illustrations.
    - And don't forget student-made posters—really effective to add engagement!
- Provide storage space for manipulatives, and space between tables to hand them out.
    - Pencils and scratch paper for classroom exercises.
    - Classroom set of calculators—the test currently specifies the Casio *fx*-260.
    - Sets of fraction manipulatives—must haves! (see www.eaieducation.com)
    - "The Master Ruler." A simple and effective teaching tool—same source.
    - Rulers for measuring and scissors (blunt) for cutting out geometric shapes.
    - Bottle caps and thermometer diagrams for adding + and – integers (Unit 4).
    - Grid paper and rulers for basic algebra exercises.
    - Grid paper and squares such as cardboard cut-outs for geometric area.
    - Small cubes or blocks for geometric volume.
    - Supplementary texts and teacher-made exercises (don't depend on "the book").
    - Store and provide blank posters and markers for student-made displays.
    - Simple supplies for activities and games, from resources such as Family Math.
    - And Family Math also has a very useful Spanish edition, if needed.

In summary, set up the classroom to support and encourage an environment where students ***do*** math activities and discuss them with work partners. Don't fill up the room with so many individual seats that students can only sit quietly and somehow absorb math ability while the teacher talks about it. If that's the way the room looks now, your first task is to change it.

Texts and How to Use Them

It should be no surprise that many texts and other instructional materials are primarily oriented to their biggest customers. *But that is not you!* Though your program may be resource-poor, small size gives you flexibility far beyond the scope of larger institutions.

So welcome any texts and materials that you can get, even if they seem a little worn or dated. They are not outmoded—percents and geometry go back over 2000 years! Just be sure to use mainstream materials as *resources and not the centerpiece of instructional planning!*

Start by taking control. Don't allow texts or supplements to drive your program. Specifically, an essential resource is a GED text such as McGraw Hill or Steck-Vaughan. You need it, but don't just start in on Chapter 1 and slog page by page through the whole thing.

First of all, you may not actually have enough student contact time to complete it—better take this factor carefully into account before you simply launch into day-to-day teaching. Also, students may drift in and out so frequently that you can't be sure how much they are really learning. And with the same lesson format day after day, boredom can easily set in.

If you follow a canned approach, you class will look and feel like it—and you can do better. The Math Guide has some alternative approaches and a few new ideas, but don't depend exclusively on it, either. Your first step to engaging your students is to be engaged yourself, so plan and deliver creative lessons. For a small group environment, it's easy and fun. So enjoy!