

Coach's Message from Dr. Del

Motivation and Learning Techniques

Motivation Intrinsic vs. Extrinsic

Intrinsic Motivation

. . . is when a student studies and learns math simply for the internal satisfaction and enjoyment. It is what motivates any person to play a game or sport.

Once a student starts to learn math and gain confidence and self-esteem Intrinsic Motivation often sets in.

This is what we want as a Coach and Teacher.

However, for many students this takes some time. In the meantime, a Coach can use Extrinsic motivators.

Extrinsic Motivation

. . . is when a student wants something that the study of math will provide. That "something" is an extrinsic motivator.

For example, if a student wants to study any STEM subject then that is an extrinsic motivator since Math is necessary for virtually any STEM subject.

If a student wants to enter any technical field in industry or the military, then Practical Math is necessary and that is an Extrinsic motivator.

Triad Math's Tiers 1 and 2 provide this necessary math and also are a great foundation for future math studies.

However, the Standard Math Curriculum (SMC) IS NOT necessary for this goal.

If a student wants to excel on the SAT, then Triad Math's Tier 3 program will satisfy this need. Again, this is quite different, and easier, than the SMC.

Of course other extrinsic motivators can include any type of reward. This can include grades, praise, privileges, money or many other things the student might want including the avoidance of some type of punishment.

However, we find that usually when the proper Content and Pedagogy are utilized by the Teacher, then usually the student becomes intrinsically motivated since most of us enjoy anything that is challenging that we succeed at.

OK, let's assume that your student is motivated enough to study math. It is imperative that the math be taught in such a way that the student is successful. Only that will lead to intrinsic motivation.

Learning Techniques.

To successfully learn math a Coach should teach the student to engage in certain practices.

This is different than teaching the math itself. That is why a Coach and Teacher are two different necessary components of a good math learning experience.

I recommend Dr. Barbara Oakley's great book, "*A Mind for Numbers – How to excel at math and science, even if you Flunked Algebra.*" for an elaboration on what I am going to recommend to you as a Coach and to any student.

There is a “theory” behind these recommendations which should help you understand these recommendations.

But, the real “proof” will be your students’ success.

Coach’s Responsibilities

- 1. Be sure your student is studying math topics in a sequence so that s/he has already learned the necessary prerequisite topics for the topic at hand.**
- 2. Apply both Focused and Diffuse Learning Modalities.**
- 3. Establish appropriate Habits to avoid Procrastination.**
- 4. DO NOT try to “Cram” a lot of math too quickly.**
- 5. Be sure your student has a very good teacher teaching the appropriate math topics content with appropriate pedagogy.**
- 6. Provide Extrinsic motivators until the Intrinsic Motivators kick in.**

1. Be sure your student is studying math topics in a sequence so that s/he has already learned the necessary prerequisite topics for the topic at hand.

Learning Math is sort of like climbing a ladder.

If you precede one step at a time it is easy.

If you skip some steps for any reason it can be very difficult or impossible.

Each topic in math will depend on previous topics and be easy to understand for the properly prepared student and difficult or impossible otherwise.

This is why math needs to be taught in a self-paced manner. There are many reasons a student may need more time for a specific topic.

And, it is very important for the student to be able to review any previous topics.

Indeed, a student should spend much of his or her time simply reviewing and practicing previous material's exercises.

Mastery and retention requires practice like any game.

A Coach's responsibility is to be sure this is what is happening with the student.

2. Apply both Focused and Diffuse Learning Modalities.

Focused Learning is having the student focus on a lesson for up to 30 minutes with no distractions.

This is when the student is “rationally” thinking about the topic of the lesson by watching the video explanation by the teacher and working on relevant exercises or taking a quiz when s/he thinks s/he understands the topic.

Back and forth between video and exercises until the student thinks s/he understands the topic.

This is the conscious mind working.

The important thing is the conscious process of thinking about the topic. Trying various things and making mistakes is common here.

The reward should be for the focused effort, and not the “product” of the session. How much a student actually learns or achieves will vary from session to session.

Sometimes understanding comes quickly, and sometimes slowly.

Sometimes a session ends in frustration and not understanding the topic. This is common for all of us.

That is why we need to practice Diffuse Learning which is something many students do not understand until they experience it.

Diffuse Learning occurs by having the student do something else unrelated. Something that requires little conscious thinking is very good. Washing dishes, cooking, mowing the lawn, walking, driving, playing, etc.

The subconscious mind will now “think” about the topic too, especially if the student is relaxed.

This mode of learning the topic is called the Diffuse Learning Mode. It can seem almost “magical” and must be experienced to be believed.

Then when one returns to the topic later in the Focused Mode usually it is clarified and seems easier to understand.

Sometimes the solution to a problem will just pop into one’s mind when least expected.

Dr. Barbara Oakley explains the Diffuse Learning Mode in depth in her book I recommend to all Coaches. “*A Mind for Numbers –How to excel at Math and Science – Even IF You Flunked Algebra*”

I can testify that this is how I learn new topics in any subject. Many experts agree with this too.

A Coach needs to understand this and encourage the student to practice both Focused and Diffuse Learning.

For Math two or three such sessions per day should be a maximum. One per day is OK if you aren’t in a hurry.

3. Establish appropriate Habits to avoid Procrastination.

It is often best to get the student into a Habit of studying math in this way, especially in the beginning with a student who doesn't like math or is afraid of it.

But, even experts find the Focused – Diffuse Modes very effective. Often the longer you focus the more confused you can become. Often it is in the Diffuse Mode where the mind sorts things out.

How this works is really a mystery.

So called “Aha” moments and inspiration or revelations come after a long series of Focused moments.

Dr. Oakley explains how the brain works and how this works as well as anyone I have run across.

So far as the Habit part of it goes, a Habit is a result of first a Cue, then the Action or Routine, then a Reward, and ultimately your Belief in the Habit and its results.

So try to get your student to engage in a Focused Study session (no more than 30 minutes), i.e. Action, at least once per day as a result of some Cue like a time or event.

Then find a “reward” for your student after the Focused session. It can be material, or a privilege, or just a praise and recognition of success.

Note: the Success is to have engaged in a Focused Lesson and not necessarily the result or “product” of the Lesson.

Indeed, the result of the 30 minute session might be frustration. Nothing seems to work. But, that is how we learn. And, why we now need the Diffuse learning time.

Once a student gets practiced at this s/he should begin to feel a “Flow” feeling when in a focused session.

Flow happens when one sort of forgets oneself and other things and concentrates on the task at hand which is studying and thinking about the topic. In a sport we call it “being in the zone”.

Flow is very enjoyable. It leads to intrinsic motivation.

Then the student will Believe in the Habit and find it easier and easier to engage it.

Again, I refer you to Dr. Oakley for elaboration on this.

But, I can tell you that this is what I “discovered” somehow on my own many decades ago.

It is why I was able to get a Ph.D. in math after a great struggle in high school where I did not do well in algebra and in fact disliked it very much.

Ironically, when I finally had a good teacher and coach who taught me the way I am describing for you, I really caught on.

I believe virtually any student can learn math if it is properly taught, and coached.

I can help you as the Teacher, but only a Coach can do it one on one in person. That is your role.

4. DO NOT try to “Cram” a lot of math too quickly.

Successful learning requires appropriate time which varies from student to student.

Cramming for a math exam would be like waiting to the night before a race to practice. It just doesn’t work, and, in fact, has many negative consequences.

Any Coach knows this and discourages cramming.

5. Be sure your student has a very good teacher teaching the appropriate math topics content with appropriate pedagogy, i.e. teaching techniques.

I refer you to the Syllabi for the six Tiers in Triad Math’s program to see one set of content that works for virtually all students.

This is a very complex subject and for elaboration you may read my 2011 book, *Teaching Math*, where I explain this, and tell why the current Standard Math Curriculum is failing our children in a very big way. It is available for free in PDF format at www.TriadMathInc.com

Pedagogy is very important too. Learning should be Self-paced and Interactive with appropriate exercises and proper Learning Modes.

If you cannot find a really good teacher for your student, then I suggest you try Triad Math’s program and let me be your students’ Teacher, and you be the Coach.

It will cost you and your students very little to try it and see if it works for you.

You have nothing to lose, and much to gain.

6. Find Extrinsic motivators (Coach's job) until the Intrinsic Motivators kick in (Teacher's job).

Only the Coach can decide on the Extrinsic motivators.

Each student is different and will require different "carrots and sticks".

If the Teacher does his or her job then soon the student should be enjoying learning math and the intrinsic motivators should begin to kick in.

Most students enjoy a subject once they begin to succeed and get satisfaction with their progress.

Also, they begin to find it "fun" like any game or sport.

It takes some time in the beginning for some students, especially if they are afraid of math due to some previous "bad" experience(s).

I hated algebra after two years of it in high school at Greencastle High School in Indiana.

Then I was very fortunate to get a really good teacher (Dr. Clint Gass) at DePauw University when I was a senior in high school and soon really liked algebra.

I ultimately went on and got a Ph.D. in modern algebra at Indiana University. Believe me, it takes intrinsic motivation to do this.

This can be the experience of any student. I don't mean getting a Ph.D., but in learning the math s/he needs for whatever other subjects s/he is interested in.

This all starts with practical math.

Virtually any student can learn all of the Algebra, Geometry, and Trigonometry, including how to do all arithmetic calculations with a scientific calculator, in less than one year and be ready for a career in industry or the military.

Then, Tier 3 prepares students to excel on the SAT, but no more math than necessary.

Then, those students who are interested in a STEM subject can continue and learn all of the math they will need in Tiers 4,5 & 6 from Pre-calculus through Calculus and Differential Equations, very easily thanks to new 21st Century tools.

We urge you to study the various videos on our Websites and read the four books we will give you in PDF format to fully understand this.

Your job as a Coach is to be sure your students understand the potentialities they can achieve, to give them appropriate guidance and encouragement to achieve them.

If you select me as your students' Teacher, we will work closely together to assure the students' success.

Learning the appropriate Math is a great benefit to any student and will open up many doors of opportunity.

Matheracy may be almost as important as Literacy in this 21st Century. Fortunately, is now easy to achieve thanks to modern tools. Visit: www.TriadMathInc.com for much additional information. Best wishes for you and your students' success.