



## CPM Statement about Learners who Sometimes Struggle

*“Effective teaching of mathematics consistently provides students, individually and collectively, with opportunities and supports to engage in productive struggle as they grapple with mathematical ideas and relationships.”* (NCTM, 2014, 48)

In keeping with NCTM’s Principles to Actions, CPM embraces productive struggle as a way to help students think and reason about mathematics. However, there is a distinct difference between *productive* struggle and *unproductive* struggle. Learners who are struggling productively are able to enter into a task or problem on some level, and view the experience as an opportunity to understand mathematics more deeply. Unproductive struggle results when the learner makes no sense of a task and has no way to proceed – no entry point -- and cannot make any progress forward with learning. Teachers need strategies to support students engaging in either of these types of struggle.

For students to successfully engage in productive struggle, certain key foundational components must be present in the classroom. A first step for any teacher is to consider the following questions:

- Are study teams used as a method of support for students?
- Have students been provided with ample opportunities and feedback to learn how to effectively work in teams?
- Does the classroom environment support productive struggle and celebrate mistakes as an opportunity to learn?
- Do students feel safe to engage in mathematical discourse?
- Are students struggling because of a learning gap or an instructional gap?
- Are lessons delivered as described in the teacher notes (i.e. using study team strategies, utilizing core problems)?
- Am I providing ongoing instructional feedback to students on a regular basis?
- Are students given processing time, both oral and written, to consolidate ideas?
- Is closure used daily to ensure all students are developing important mathematical connections?

All too often, in an attempt to give students access to challenging content, scaffolds are provided that effectively diminish the cognitive demand of the original task or problem. To successfully support students, the teacher must provide just enough intervention to help students move beyond their area of impasse, but not so much that the cognitive demand is diminished. It is also critical that students see each other as a resource, and support one another during times when they struggle.

### Unproductive Struggle

Although every effort may be made by the teacher to set the stage for productive struggle, there may still be students whose struggle becomes unproductive. This often results in frustration and an unwillingness to engage with the mathematics on any level. Students struggle unproductively for a variety of reasons, many of which are briefly outlined below. A teacher who is able to identify the root causes of unproductive struggle can then take steps to support

students by addressing the underlying factors. The following is a partial list of common root causes of unproductive struggle along with a question the teacher might consider asking themselves to support students.

### **Lack of mathematical confidence**

A student who lacks the ability to produce the desired result or perceives they lack the ability to do so, will be less likely to try when failure is certain. (Does the student have a fixed mindset or in rare cases a significant learning disability? Are there a variety of opportunities and methods for students to demonstrate their mathematical understanding?)

### **Gaps in Understanding/Learning**

Students who understand the bigger picture of the mathematics but have gaps in the skills necessary to complete the task, or students who possess discrete skills but do not understand how to put their skills to use, will struggle to progress. (Does the student need additional learning opportunities to fill in learning gaps?)

### **Cognitive delays in processing**

Students who have the ability to engage with the mathematics but need more time and supports, may struggle to keep up. (Can assignments be extended or modified to allow more time? Are there opportunities for extra help available?)

### **Lack of number sense**

Students who may have a good grasp of procedural mathematics, but are less successful when reasoning about numbers and quantities, may struggle to make connections or change representations. (Are there ways to incorporate simple number sense activities into daily routines?)

### **Students with Fixed Mindset**

Students who are convinced they are not good at math and therefore do not try, will not be open to challenge. (How can I use the research and resources available to help the student move to a growth mindset?)

### **Lack of motivation**

Students may appear to be unmotivated when one or more of the root causes listed above apply to them. Additionally, a student's priorities may lead to lack of motivation in class. (What matters to this student? Is there a way to relate the problem to something he or she cares about, or allow them to use their talent/interest in a way that benefits the team?)

## **CPM Statement on Intervention**

All students should have the opportunity to successfully engage in the mathematics classroom and learn challenging mathematics. "A coherent and viable core curriculum that embeds ongoing monitoring for all students is considered high quality Tier One instruction." (Buffum, Mattos, & Weber, 2009, 9)

For students where high quality tier one instruction is not sufficient, intervention may be necessary to ensure they have the support necessary to maximize their success in the math classroom. Unproductive struggle may occur when these students do not receive this much needed support.

When developing an intervention, keep the following considerations in mind:

- In a well implemented CPM classroom students should have the opportunity to work in heterogeneous teams on challenging lessons. The intervention should not be a replacement for this approach to instruction, but **in addition to** the lessons students are already doing as part of the regular CPM curriculum.
- The intervention time should be led or facilitated by a high-quality educator who has a passion for supporting learners and who also has the ability to influence student mindsets.
- If more than 20% of students are requiring intervention, it may be necessary to examine the Tier One instruction.
- The learning should be the constant and the amount of time it takes to master the content should be the variable. Leaders who design intervention time need to think flexibly about the amount of time students are engaging in learning mathematics.
- As much as possible, the intervention should not be a “track” that stifles students’ long-term progress in mathematics. Support courses used as intervention should be in addition to regular math courses so that students can continue to learn alongside their classmates..
- Intervention lessons should be grounded in rich mathematical tasks with multiple entry points, and with a variety of opportunities for students to discuss their thinking.
- Intervention class size should be kept to a small number of students to allow for maximum support.

#### References

Boaler, J. *Youcubed*. Stanford University, n.d. Web. <[www.youcubed.org](http://www.youcubed.org)>.

Buffum, A., M. Mattos, and C. Weber. *Pyramid Response to Intervention*. Bloomington, IN: Solution Tree, 2009. Print.

Buffum, A., M. Mattos, and C. Weber. *Simplifying response to intervention: four essential guiding principles*. Bloomington, IN: Solution Tree Press, 2012. Print.

Gersten, R., S. Beckmann, B. Clark, A. Foegen, L. Marsh, J. R. Star, and B. Witzel. *Assisting students struggling with mathematics: Response to Intervention (RTI) for elementary and middle schools (NCEE 2009-4060)*. . Washington DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education., 2009. PDF. Retrieved from <http://ies.ed.gov/ncee/wwc/publications/practiceguides/>.

NCTM. *Students with Difficulties Clip*. Reston, VA: National Council of Teachers of Mathematics, 2007. PDF. Retrieved from [http://www.nctm.org/uploadedFiles/Research\\_and\\_Advocacy/research\\_brief\\_and\\_clips/Student\\_with\\_Difficulties\\_Clip.pdf](http://www.nctm.org/uploadedFiles/Research_and_Advocacy/research_brief_and_clips/Student_with_Difficulties_Clip.pdf)

NCTM. *Effective Strategies for Teaching Students with Difficulties in Mathematics*. Reston, VA: National Council of Teachers of Mathematics, 2007. PDF. Retrieved from [http://www.nctm.org/uploadedFiles/Research\\_and\\_Advocacy/research\\_brief\\_and\\_clips/Research\\_brief\\_02\\_-\\_Effective\\_Strategies.pdf](http://www.nctm.org/uploadedFiles/Research_and_Advocacy/research_brief_and_clips/Research_brief_02_-_Effective_Strategies.pdf)

NCTM. *Principles to Action*. Reston: National Council of Teacher of Mathematics, 2014. Print.