

According to a National Longitudinal study from the U. S. , seventy five percent of all students with Learning Disabilities were below the mean in math achievement.

Lower math scores are due to cognitive processing deficits such as working memory and self regulation

(Geary, Montague, in Iseman & Nagleieri 2011)

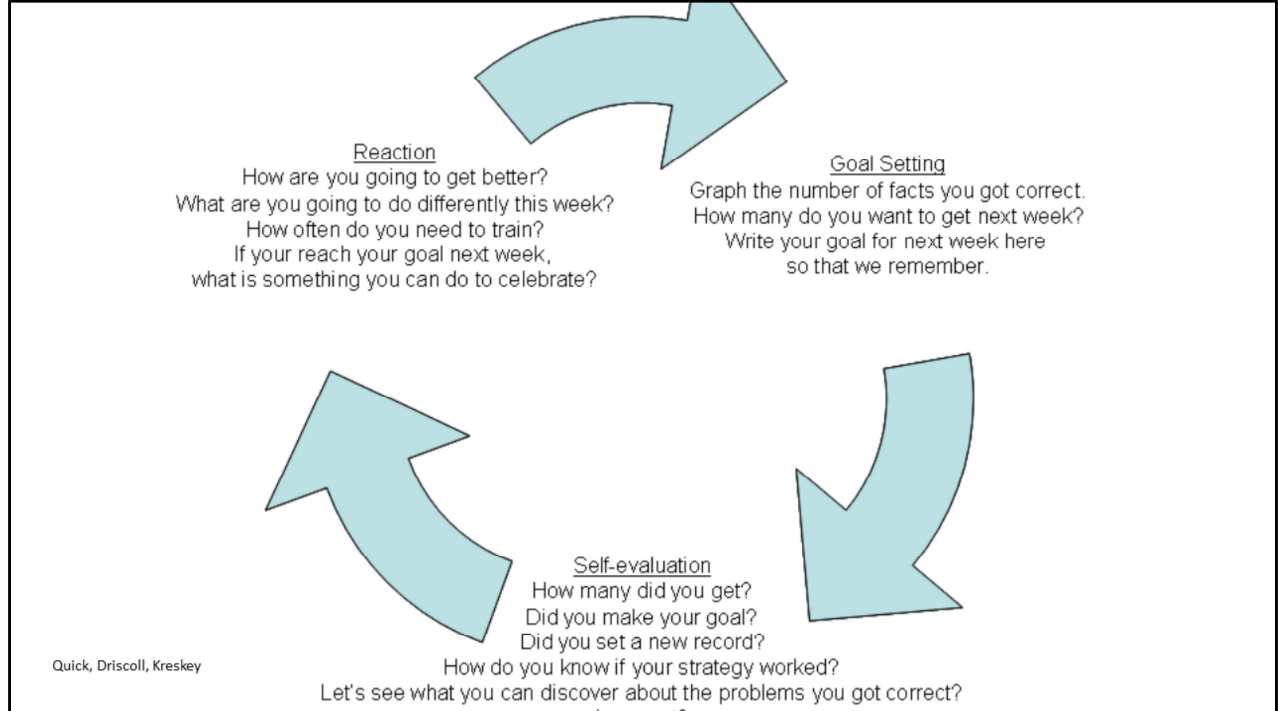
Deficits in aligning numbers and following sequences of steps may be a result of a lack of self monitoring

(Ivrendi, in Iseman & Nagleieri 2011)

Strategy instruction is the most effective instructional approach for problem solving and self regulation is an integral part of strategy instruction.

(Swanson, in Montague, 2008)

Here are several studies that linked aspects of self-regulation with learning disabilities in math. and provide a rationale for us to design interventions employing self regulation strategies and cognitive strategy instruction. The statement about strategy instruction was based on a meta analysis done by Swanson and Swanson that looked at problem solving research that spanned thirty years so I think it is safe to say that using strategies to teach problem solving is an evidence based practice. But self regulation strategies can also be used to teach basic facts like multiplication.



This is a sample of a procedure used in a research study on grade three students and their multiplication fluency. The teacher modelled self talk and hung a chocolate bar from the ceiling to remind the students that she had promised herself a reward and that they needed to promise themselves a reward. Interestingly after this three week intervention their math fluency had improved dramatically but even more importantly the quality of their self-talk had improved to include a wider range of ideas to solve their problems. Also, originally the thought that they reward themselves was foreign to them but once they had it modelled and begun practicing they began setting a wider variety of rewards for themselves.

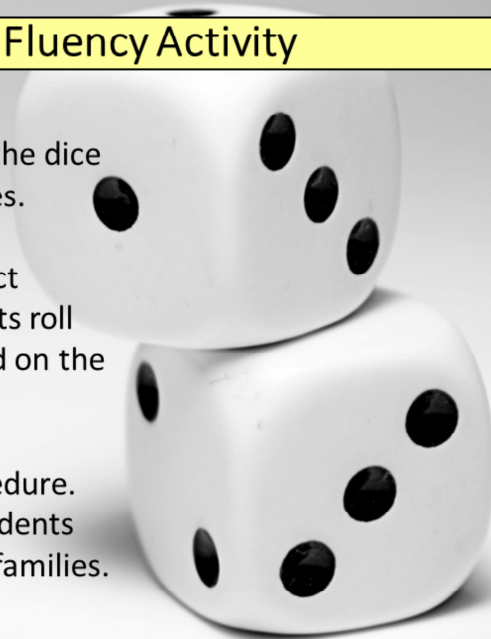
Basic Math Facts Fluency Activity

How many fact families can you do in 3 minutes? Set yourself a goal. I will roll the dice on the screen and you write the families.

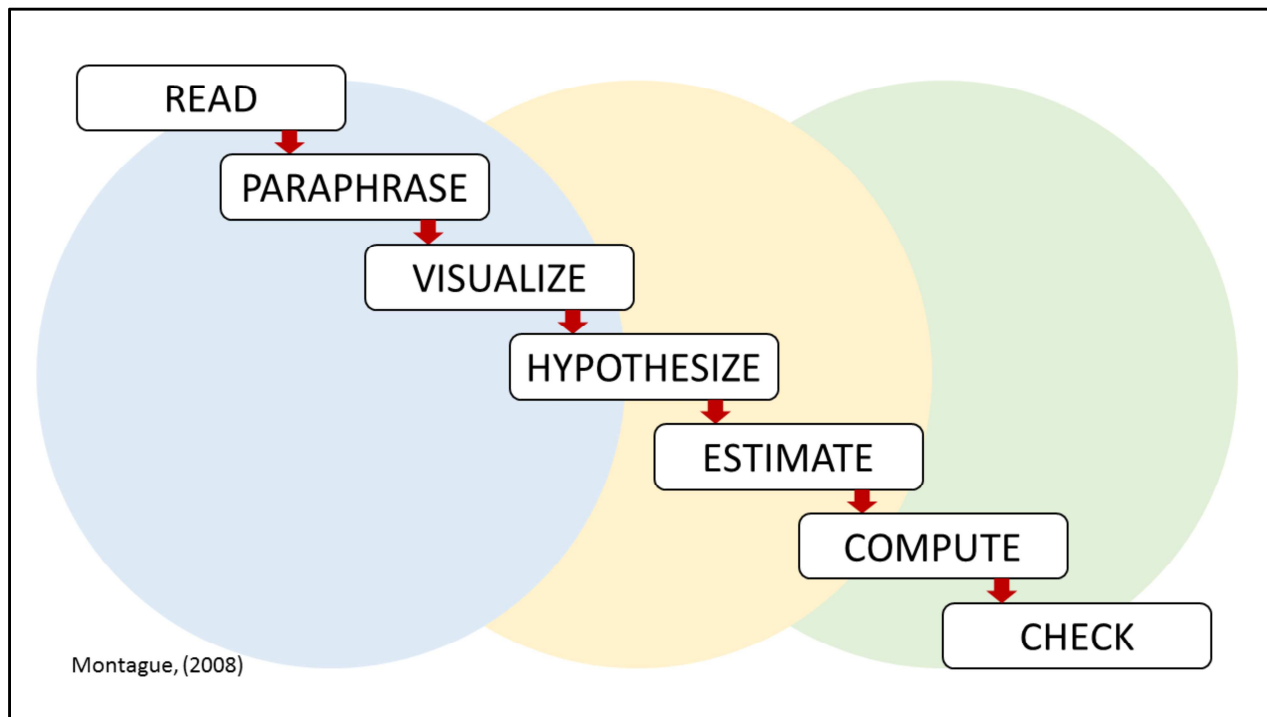
To practice addition and subtraction fact families, use 6 or 10 sided dice. Students roll the dice and write the fact family based on the dice.

Multiplication facts use the same procedure. Once division has been introduced, students can do multiplication and division fact families.

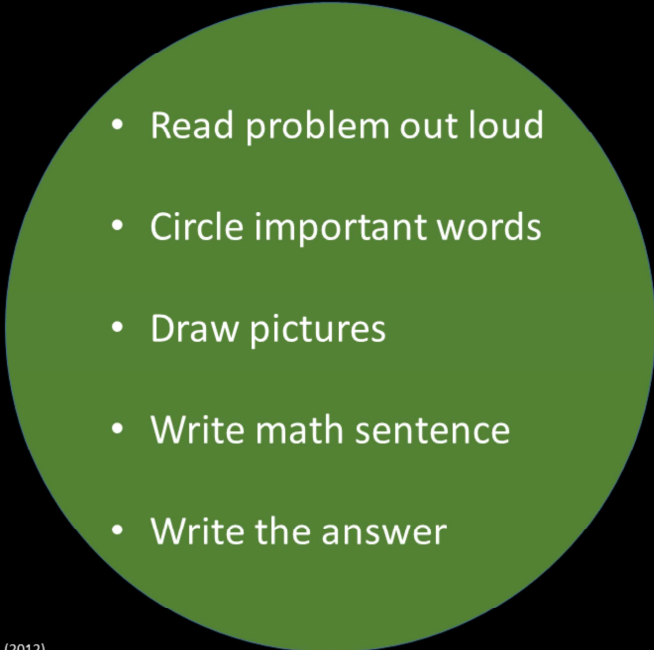
Mason & Graham, (2008)



This is an activity that Julia Henrey developed and is used by the Learning Disabilities Association to develop fast fact fluency. Students graph their results and set goals for themselves. They do this activity three times per week and students are very pumped when they see their results on the graph. It is important for students to know that being able to do math facts fast will help them figure out word problems and do other mathematical activities such as factoring and working with fractions.

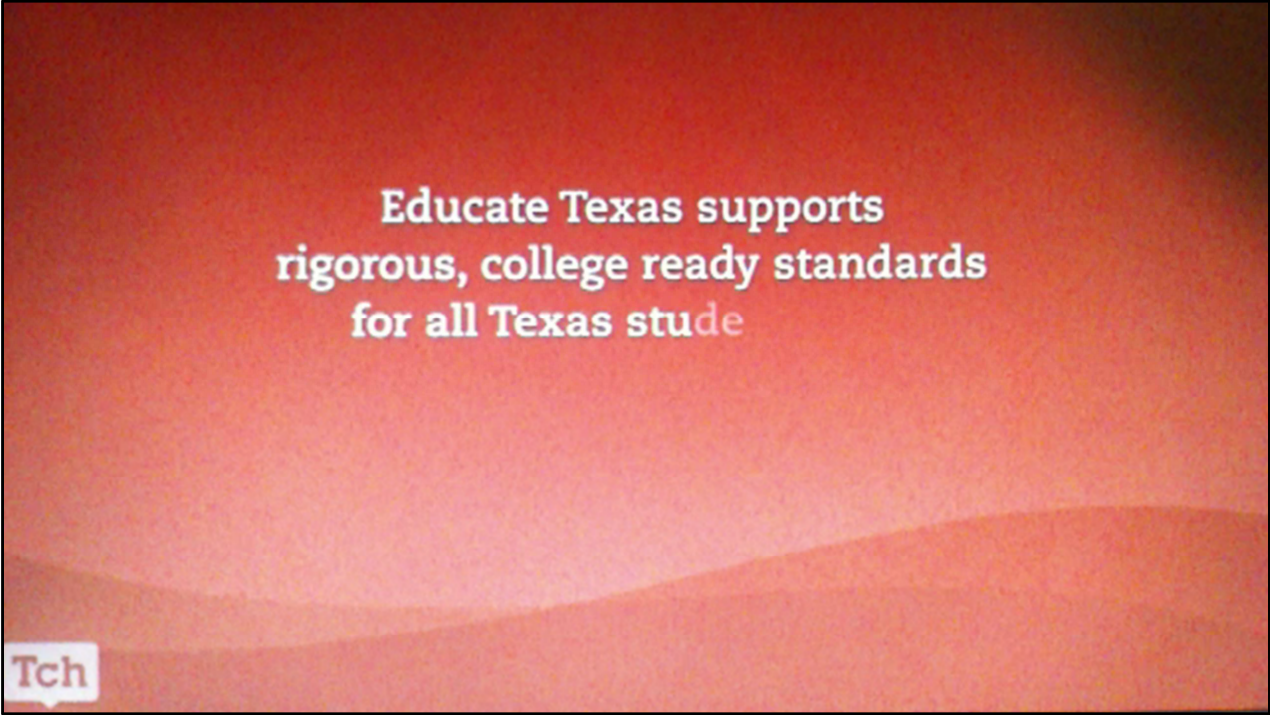


This is an example of a strategy for the higher level thinking in math. Remember, strategic learners already do most of these steps on their own. Montague developed this seven step problem solving model and research has found adaptations of this model to be very effective for problem solving. This model has been used and adapted countless times in many of our common problem solving materials and it is a prototype that can be found on the RTI website, the What works clearing house website, and the Response to Intervention websites. This strategy with examples of how to model the steps is included in your hand-out.

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- Read problem out loud
 - Circle important words
 - Draw pictures
 - Write math sentence
 - Write the answer

Case et al...in Montague (2012)

Here is another example of a problem solving strategy that has had positive results. A Study by Case et al, included pre-skill development, and self regulation components that took the form of conferencing, as well as self-assessment, self-recording, and self-instruction. This strategy was used successfully with students in grades 5 and 6. Another way of encouraging the use of self-regulation in math is self-talk through math journaling. This approach often also includes goal-setting and self-evaluation.

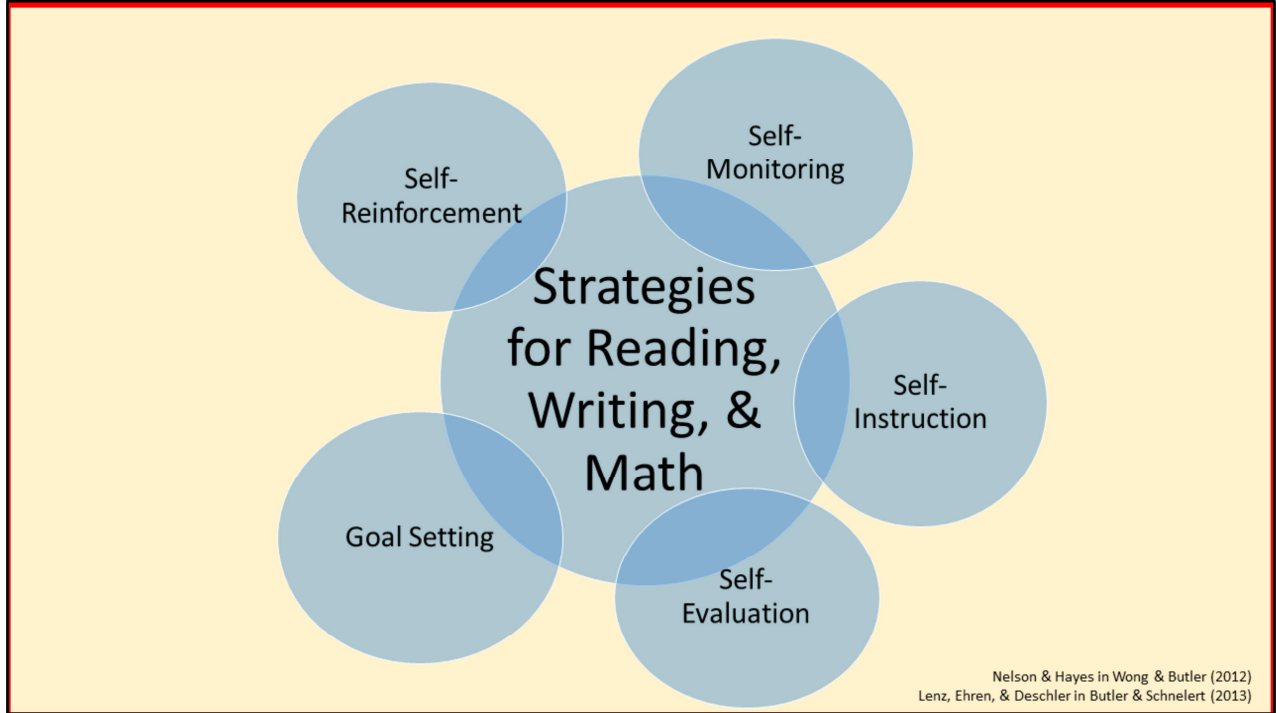


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Here is a video of a teacher teaching a problem solving strategy. (Click on screen to play video).

I liked her technique of dividing up the strategy and having each student do one part.

<https://www.teachingchannel.org/videos/ups-problem-solving-strategy>



And this is one last look at what we have covered in this presentation today. Providing direct teaching of self regulation skills to strategies for reading writing and math can help our students develop the skills that will allow them to deliberately apply strategic control over their emotions, motivation, and learning. Now I am open for questions.