# Incremental Rehearsal with Math Facts

*Brief Description:*
A student is presented with flashcards containing unknown items added in to a group of known items. Presenting known information along with unknown allows for high rates of success and can increase retention of the newly learned items, behavioral momentum and resulting time on task. Research shows that this technique can be used with sight/vocabulary words, simple math facts, letter names, and survival words/signs. In addition, this technique could be used for other facts, such as state capitals or the meanings of prefixes or suffixes, etc.

*What "common problems" does this address?*
Incremental Rehearsal increases fluency

*Procedures*:*

1. Introduce a series of math facts on instructional level.
2. From these, identify at least 9 facts that the child can read or answer correctly within 2 seconds. These are "knowns" and go into a stack.
3. Also, identify 10 facts that the child cannot answer correctly within 2 seconds. These are 'unknowns" and go into a different stack.
4. Take 9 cards from the known stack and 1 from the unknown stack.
5. Present the first known card and have the student read and answer the fact aloud.
6. Present the unknown card and read the fact aloud, having the student repeat the fact.
7. Present the next known card, followed by the unknown. If the student commits an error on any card or hesitates for longer than two seconds, the tutor reads the card aloud, then prompts the student to read the fact. The rotation between a new known and the unknown fact continues until the student answers all cards within two seconds without errors.
8. If the first unknown is now a known, it now replaces a previous known, which is then removed from the stack . Begin the procedure again at number 4 using a different unknown.
9. Repeat until all unknowns become knowns.

*Critical Components that must be implemented for the intervention to be successful:*

- There must be a clear understanding of the student's skill level. (Does the student have the skills necessary to use the flashcards?)
- Student is presented with material on a 90% known to 10% unknown ratio during trials. This ratio helps to produce *behavioral momentum,* which occurs when high rates of initial reinforcement 'get the ball rolling' so that when the student is presented with challenging material they are more likely to persevere. Allowing the student to produce high rates of success increases motivation to work through material that is unknown.
- Student is provided with the answer to unknown material during trials. The manner in which this is done can be customized to the student's needs.
- It assumes that the child has acquired the skill and needs to use the skill more quickly. If the child has not yet acquired the skill, then more remedial instruction will be required .

*Materials:*
Instructional materials, including flashcards of facts that child is expected to know
You can customize your own flashcards at this website:
http://www.aplusmath.com/Flashcards/Flashcard_Creator.html

*References:*
This intervention has a substantial literature base supporting its effectiveness for enhancing fluency.

Burns, M. K. (2005). Using incremental rehearsal to increase fluency of single-digit multiplication facts with children identified as learning disabled in mathematics computation. *Education and Treatment of Children, 28*, 237-249.

Joseph, L.M. (2006). Incremental rehearsal: A flashcard drill technique for increasing retention of reading words. *The Reading Teacher, 59,* 803-807.

Tucker, J. A. (1989). *Basic flashcard technique when vocabulary is the goal.* Unpublished teaching materials. University of Tennessee at Chattanooga. Chattanooga, TN: Author.