**Ideas from Cognitive Science to Improve Learning**  Rita Sayre, 2014

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| Planning | Daily Routines | Classroom Culture |
| * Define a problem for students to solve
* Develop a key question to guide
* Give factual knowledge before asking students to think critically
* Identify what is just beyond what students know; explain questions that lead to it.
* Identify which knowledge is so critical, students must know it.
* Plan sufficient practice. Mix known items with new items.
* Knowledge before problem solving, decision making, or creativity.
* Background knowledge is the most powerful prerequisite for comprehension.
* Add multisensory elements (especially movement) to improve memory.
* When reading in class, overtly show students how you preview, use background knowledge, set a purpose, visualize, question, repair misunderstandings.
* Teach question generation techniques.
* Teach how to identify patterns & variations.
* Identify which method of deep thinking will be used. Make it an objective.
 | * Change cognitive style (see list)
* Pay attention to what students are thinking about, not just doing.
* Make deep thinking routines explicit.
* Match questions, assessments, and assignments to deep thinking routines.
* Talk about successes and failures in terms of effort.
* Remind students why practices works (automaticity, makes memory long lasting, improves transfer to new situations)
* Space out practice sessions
* Ask students to memorize when they need to recall quickly and APPLY knowledge elsewhere.
* Students reteach concepts using multisensory elements.
* Explore data systematically, not randomly; directly teach this.
* Zoom in -- reveal only a small portion at a time for students to examine.
* Ask: “What makes you say that?”
* Ask: “What do you see, think, justify, wonder?”
* Use notes and homework as tools in class. Everything has meaning.
* Teach sustained effort.
 | * Practice means continuing to work at something you’ve already mastered.
* Let students take on the heavy cognitive load—don’t do the thinking for them.
* Thinking is the curriculum.
* Rehearse positive behaviors.
* Have students work in pairs rather than larger groups.
* Reduce teacher talk.
* Handouts do not equal deep thinking.
* Plan and label tasks. Teach planning behaviors, accurate labels, organizing space.
* Cultivate joyful rigor.
* Move rapidly but give opportunity to practice.
* Focus your energies on what you can change about a student’s life this minute.
* Model a positive attitude. Teach coping skills, problem solving.
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