**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. |