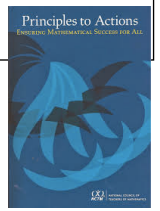
Lower-level demands (memorization): • reproducing previously learned facts, rules, formulas, definitions or committing them to memory • Cannot be solved with a procedure • Have no connection to concepts or meaning that underlie the facts rules, formulas, or definitions	**Lower-level demands (procedures without connections):** • are algorithmic • require limited cognitive demand • have no connection to the concepts or meaning that underlie the procedure • focus on producing correct answers instead of understanding • require no explanations
Higher-level demands (procedures with connections): • use procedure for deeper understanding of concepts • broad procedures connected to ideas instead narrow algorithms • usually represented in different ways • require some degree of cognitive effort; procedures may be used but not mindlessly	**Higher-level demands (doing mathematics):** • require complex non-algorithmic thinking • require students to explore and understand the mathematics • demand self-monitoring of one's cognitive process • require considerable cognitive effort and may involve some level of anxiety b/c solution path isn't clear



Leinwand, S., D. Brahier, and D. Huinker . *Principles to Action. Reston, VA*: National Council of Teachers of Mathematics, 2014 (pg 18)

Strategies for Modifying Tasks

Increasing the cognitive demands of tasks.

- Ask students to **create real-world stories** for "naked number" problems.
- Include a prompt that asks students to **represent the information another way** (with a picture, in a table, a graph, an equation, with a context).
- Use a task "out of sequence" **before students have memorized a rule** or have practiced a procedure that can be routinely applied.
- **Eliminate components** of the task that confine student thinking or provide too much scaffolding.
- Create opportunities for **repeated reasoning or pattern finding**
- Create a prompt that asks students to **write about the meaning** of the mathematics concept.
- Add a prompt that asks students to make **note of a pattern** or to **make a mathematical conjecture** and to test their conjecture.
- Include a prompt that requires students to **make a generalization**.
- Include a prompt that requires students to **compare solution paths** or mathematical relationships and write about the relationship between strategies or concepts.
- Select numbers carefully so students are more inclined to **note relationships between quantitie**s (e.g., two tables can be used to think about the solutions to the four, six, or eight tables).