

Extra Resources that can be used in a district where you know the cognitive demand is being altered

Cognitive Demand: (how content interacts with process)

NCTM

<http://www.nctm.org/Publications/Teaching-Children-Mathematics/Blog/Tasks,-Questions,-and-Practices/>

Tasks Matter

The cognitive demand of a task is the level of cognitive engagement needed to complete the task (Stein et al. 2009). You could think of a problem that requires only memorization as being at the low end of cognitive demand, whereas a task that requires students to make connections between and among mathematical ideas in new ways is a high cognitive demand task. Research has shown that using high cognitive demand tasks in ways that support that rigor will lead to increases in student learning.

Questions Matter

To maintain the level of cognitive demand written into a question, a teacher must ask good questions. A high cognitive demand question is one that invites students to explain their thinking, make new connections, describe their process, or critique other ideas. Questions that maintain high cognitive demand engage students in making more sense of the mathematics, whereas questions that lower the cognitive demand focus on correct answers and correct answer paths.

	Lower Cognitive Demand	Higher Cognitive Demand
Task	On a double decker bus, 9 people are on the first level and 10 are on the second level. How many people are on the bus?	There are 19 people on a double decker bus. How many people might be on each level of the bus?
Questions	What is your answer? Where is your work? How did you get 19?	Have you found all the possible combinations? How do you know? I had this student last year who told me that there were only 9 possible combinations. Was my student right? How do you know?
Make Sense and Persevere	Students have to take two numbers and add them.	Students have to add a lot of combinations. Students have to determine whether they have found all the combinations. Students have to figure out what it means to have 19 people on a double decker bus.
Make Viable Arguments and Critique Others	Some opportunity to explain how the student knows the answer.	Opportunity to hear about strategies for calculating and strategies for deciding whether all possible answers have been found.
Attend to Precision	Opportunity to make sense of symbols in $9 + 10 = 19$ Opportunity to talk about 19 what (using labels).	Opportunity to make sense of a variety of representations likely to have been developed in solving this task. Opportunity to use labels.