



## Card Sort Challenge

### Expected Outcomes

**In Task #1**, if students are turning over the cards as fast as they can, their times to turn over 52 cards should reflect the time needed for just executing the motor task of handling cards. No cognitive processing, and the time associated with that, should be involved.

**In Tasks #2 and #3**, their total times should reflect motor processing plus the additional time needed for the cognitive processing of sorting cards into 2 piles by very simple rules.

**In Tasks #4 and #5**, times to sort the entire deck should reflect motor processing plus the additional time needed for the cognitive processing of more complex sorting rules.

**In Task #6** (in which the sorting rule changes midstream), times to sort the entire deck should reflect motor processing, the time needed to cognitively process according to a known sorting rule plus the time needed to figure out that the old sorting rule no longer holds and what the new sorting rule actually is. If the sorting rule changes more than once, then the time to accomplish these additional cognitive tasks gets added into the total.

Measuring the times needed for cognitive processing is difficult on a single task. By repeating the task 52 times, cognitive processing time should be measurable.

If student times do not increase from Tasks #1 to #6, then

1. Task #1 wasn't executed fast enough.
2. Learning is taking place on any one task or from one task to another. Students may want to repeat a task. If they do so spontaneously, their times will improve because they already know what to expect and their cognitive processing time will not involve those moments of 'remembering what to do' or 'figuring out the task' or 'knowing what you want me to do' – all of which are part of learning. Once these types of questions are answered, students will spend time on the motor movements of putting down the cards and the mental processing required by the sorting rule. Learning may occur in each of those circuits. If Task #1 was truly as quick as possible, then most of the learning should be on the cognitive processing side.

Some students may have more trouble on Task #6 than on the other tasks, especially at the first rule switch. Task #6 should show the most variation among subjects. This type of variation is normal and expected in biology. Do not equate the shortest cognitive processing times with being the smartest. Sometimes longer processing times indicate a deeper level of thought. Students may be entertaining more possibilities and therefore take longer to guess the new rule by trial and error.

All of these possibilities should be discussed when interpreting class results. Students can brainstorm their own ideas about what this cognitive processing time means, how else one could use this task to measure cognition, and what other measurements could be made from it