Student Guide
Card Sort Activity

Introduction:
Today's lesson is all about data collection and you. You are going to collect data and learn about how your brain works. You will do this by performing various card sorting tasks and recording the time it takes you to complete them. Let's just say that learning is *in the cards* for you today. Good luck, have fun, and learn a great deal about yourself!

This lab consists of groups of three students performing a series of six card-sorting tasks. Each person in the group will complete three trials of each task. NOTE: To keep everyone involved, let each person in the group do a trial of an activity before anyone does a second trial. After all the trials are done, each student will graph his/her data and we will see what we can learn from it.

1. Number off in your group (someone is #1, the next person is #2, the next is #3). Record the names of each student on the data tables.
2. Get a deck of cards and a stopwatch for your group.
3. Complete 3 trials each of tasks #1-5 for each person.

   During Trial 1, student #1 is the Sorter and handles the cards.

   Student #2, the Timer, uses the stopwatch and announces the time it took to finish each task.

   Student #3, the Recorder, writes the time on the data sheet.

   At the end of each trial, rotate jobs.
4. See your teacher for special instructions for task #6. Again, you'll do 3 trials of this task and rotate jobs at the end of each trial.

The Tasks - In each task, you must handle each card individually and record your time on the appropriate data table.

Task #1: Sorting into One Pile
Sort the cards into one pile. You must handle each card individually -- no putting the whole deck down at once!

Task # 2: Sorting the Cards into Two Equal-Sized Piles
Sort the cards into two equal-sized piles.

Task #3: Sorting the Cards by Color
Sort the cards by color into 2 piles.

Task #4: Sorting the Cards by Suit
Sort the cards by suit into 4 piles (hearts, diamonds, spades, and clubs).

Task #5: Sorting the Cards by Type
Sort the cards by type into 13 piles (aces, twos, threes ….. all the way up to Kings).

Task #6: The Feedback Sort
Sort the cards into 2 piles following hidden rules that only the Recorder knows. Start by placing two cards in separate piles; the Recorder will only say "Yes" or "No."

- If the Recorder says "Yes," the Sorter is right and s/he should continue sorting.
- If the Recorder says "No," the Sorter needs to take the card back and sort it differently.

Throughout this whole task, there will only be 2 piles of cards.

Student #1: _____

Task Number	Trial 1	Trial 2	Trial 3	Mean
1. one pile	seconds	seconds	seconds	seconds
2. two equal piles	seconds	seconds	seconds	seconds
3. sort by color	seconds	seconds	seconds	seconds
4. sort by suit	seconds	seconds	seconds	seconds
5. 13 piles	seconds	seconds	seconds	seconds
6. feedback sort	seconds	seconds	seconds	seconds

Student #2: _____

Task Number	Trial 1	Trial 2	Trial 3	Mean
1. one pile	seconds	seconds	seconds	seconds
2. two equal piles	seconds	seconds	seconds	seconds
3. sort by color	seconds	seconds	seconds	seconds
4. sort by suit	seconds	seconds	seconds	seconds
5. 13 piles	seconds	seconds	seconds	seconds
6. feedback sort	seconds	seconds	seconds	seconds

Student #3: _____

Task Number	Trial 1	Trial 2	Trial 3	Mean
1. one pile	seconds	seconds	seconds	seconds
2. two equal piles	seconds	seconds	seconds	seconds
3. sort by color	seconds	seconds	seconds	seconds
4. sort by suit	seconds	seconds	seconds	seconds
5. 13 piles	seconds	seconds	seconds	seconds
6. feedback sort	seconds	seconds	seconds	seconds

1. For this question you will need your **Anatomy of the Brain** handout. On the table below, fill in what your brain had to do for each of the six tasks. The first one has been done for you.

Task #	What my brain had to do…
1	Information travelled from my eyes to the occipital lobe of my brain. From there, the information was sent to my frontal lobe where I decided what to do. Information was then sent to my cerebellum and, from there, messages were sent to my hand muscles telling them to move.
2	
3	
4	
5	
6	

2. When your brain is given something to analyze, think about, or make a decision about, the term for it is *cognitive load*. Look at the answer to question #1. Based on what you see, rank the activities in order from most cognitive load to least cognitive load. Write the task numbers on the line below:

   Most Least

   _____

3. Look at your average times for each of the trials; is there any correlation between your times and the cognitive load? If so, what is it?

Important Learning Point

Look at the backside of your **Anatomy of the Brain** handout. At the top of the page, there is a diagram of a typical neuron and at the bottom is a diagram of a synapse.

Your entire nervous system (your brain, your spinal cord, your nerves) consists of various types of **neurons**. Information enters a neuron at the **dendrite** end and exits at the **axon** terminal end. The information travels down the neuron as an electrical signal (just like electricity through a wire).

When the signal reaches the end of the neuron (the **axon terminal**), it has no place left to go because the neuron ends. Between two different neurons there exists an open space called the **synaptic gap**. When the electrical signal reaches the end of the neuron (the axon terminal), it causes chemicals called **neurotransmitters** to be released into the synaptic gap. These chemicals attach themselves to receptors on the dendrites of the next neuron and, when enough have attached, they cause an electrical signal in the new neuron that travels down to its axon terminal and the whole process just keeps repeating until the desired outcome is reached.

One super cool, incredible thing about your brain is that it is always growing new dendrites. In fact, when you learn something, you cause signals to travel down certain neurons or pathways in your brain. You are actually causing more dendrites to grow and these new dendrites are making more connections (synapses) with other neurons. The more you strengthen these connections, the stronger the signals become and the faster the signals travel.

4. Look at your data for this lab. What evidence exists to show that you were growing new dendrites, strengthening new neural pathways and, basically, changing your brain?
   (Hint: It won't be in the averages.)

5. Being able to change your brain so easily has its good points and its bad points -- or as Spiderman would say "With great power comes great responsibility." List as many good and bad points as you can think of.

Good Points	Bad Points

6. I am sure that you have heard the old saying "practice makes perfect." How would a neurologist, someone who studies the brain, explain this? Use neuroscience terms!