**Human Biology Unit 3**

**Practical Activity – CNS Integration and Discrimination**

*\*Note, the validation test for this practical activity is TASK 1, and forms 5% of your School Mark for Human Biology. This practical activity is background for TASK 1. It is not marked but provides background information for the validation test.   
  
Please Note: The validation test will also require you to link detailed understandings of nervous system function to the results seen.*

**Introduction:**

The brain receives input from the sensory nervous system, and must then process and integrate this information. Some tasks require ***discrimination*** – the conscious processes of identifying something and then choosing what to do with it.   
  
In this activity, cards will be sorted. In each task with the cards, the level of discrimination required to complete the task will increase. The tasks will be timed to see whether level of discrimination required to complete the task affects how long the task takes to complete.

**Materials Required: (per pair of students)**

* A deck of playing cards
* Laboratory timer or stop watch

**Procedure:**

1: Remove all non-number cards from the deck and put to one side (eg K, Q, J, joker)

2: Choose one member of the pair to complete the tasks (the subject). The other observes and records the time taken to complete the tasks in the table below.

3: Once the first member of the pair has completed all the tasks, swap roles.

**Task A:**

Shuffle the cards.

Observer gets ready with timer.

Holding the deck face down, the subject deals all of the cards into one pile, face up as quickly as possible.

Record the time taken

**Task B:**

Shuffle the cards.

Observer gets ready with timer.

Holding the deck face down, the subject deals all of the cards into two piles, one containing the red suits and one containing the black suits, face up, as quickly as possible.

Record the time taken

**Task C:**

Shuffle the cards.

Observer gets ready with timer.

Holding the deck face down, the subject deals all of the cards into four piles, each containing one suit, face up, as quickly as possible.

Record the time taken

**Task D:**

Shuffle the cards.

Observer gets ready with timer.

Holding the deck face down, the subject deals all of the cards into four piles, each containing one suit, face up, with the even numbers in all suits turned face down, as quickly as possible.

Record the time taken

**Results**

***The effect of increasing discrimination requirements on the time taken to complete a task.***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Student Name** | **Time Taken to Complete Task (s)** | | | |
|  | **Task A** | **Task B** | **Task C** | **Task D** |
|  |  |  |  |  |
|  |  |  |  |  |
| *Class Average*  *(this will be calculated as a class, later)* |  |  |  |  |

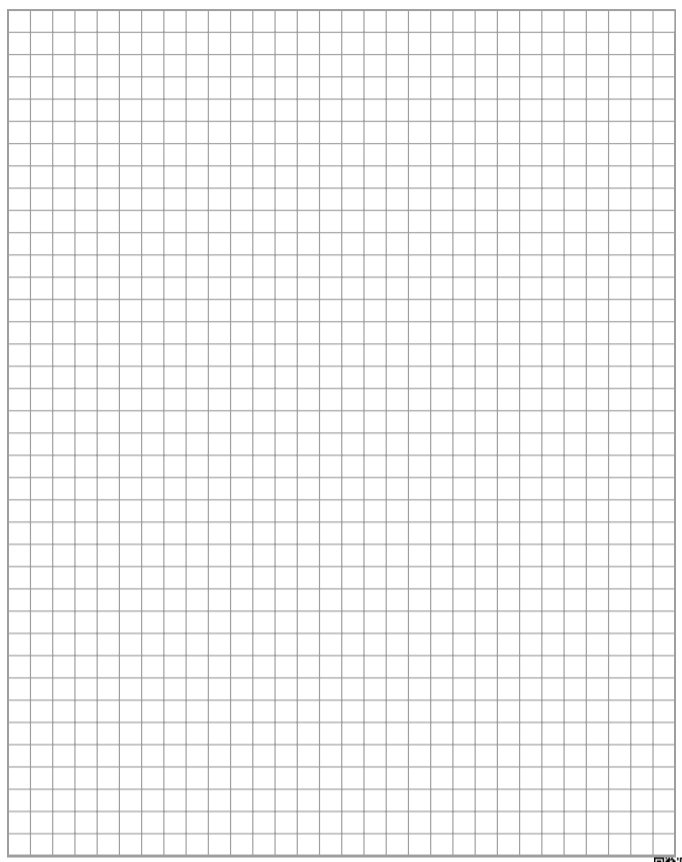
The class average discrimination time can be calculated by subtracting the time taken for Task A from each

other Task time.

**Class average discrimination time for each task**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Discrimination Times (s)** | | |
| Task B: by colour | Task C: by suit | Task D: by suit, evens face down |
| **Class Average** |  |  |  |

Graph the Class Average Discrimination Time on the grid below:



**Discussion Questions:**

1: Task A is used as a control.

1. What is a control?

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1. Why was task A used as a control in this case?

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2: What trends were seen in the data as the discrimination requirements of the tasks increased?

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3: Why did Task D required greater discrimination compared to Task C?

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5: Using your understanding of the nervous system, relate discrimination time to the probable number of neural connections involved in completing the task.

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6: Which area and lobe of the cerebral cortex is involved in each of the functions listed below?

|  |  |  |
| --- | --- | --- |
| **Function** | **Lobe** | **Area** |
| Receiving sensory input from the eyes |  |  |
| Processing sensory input form the eyes |  |  |
| Making conscious decisions on the actions required |  |  |
| Processing and sequencing the motor movements required |  |  |
| Sending motor output to the peripheral nervous system |  |  |

7: In which lobe and area of the cerebrum is the majority of the discrimination happening?

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8: Which part of the brain is involved in smoothing the motor output so that fine motor control is achieved when sorting the cards?

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