**Peripheral NS and Central NS Activity (Part 1 and 2)**

**Introduction**: The human nervous system is composed of the Central Nervous System, made of the brain and spinal cord (CNS) and the nerves that branch out from the CNS, known as the Peripheral Nervous System (PNS). *Sensory* neurons of the PNS carry information from the environment to the CNS. Signals from the brain are carried to *motor* neurons that signal our muscles to move.

**Purpose**: To explore our nervous system, collect data, and identify differences.

**Part 1:** **Reaction time** (A and B)

**Materials**: Each group will be equipped with a meter stick.

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|  | **Fall distance** | | | | | **Reaction Time** |
|  | **Trial 1** | **Trial 2** | **Trial 3** | **Trial 4** | **Average** |
| **Part A- Arm /Shoulder** |  |  |  |  |  |  |
| **Part B- Thumb/forefinger** |  |  |  |  |  |  |

**Part A** **– Arm and shoulder**

**Select** a partner, and use the same partner for ALL of the following tests in Part 1. Have the partner stand upright, with their arms extended straight out in front of the body, palms of the hands facing each other. The palms should be 10 cm apart. Place the meter stick exactly in the middle of the palms, with the 50 cm mark at the TOP of the index finger. The meter stick should be oriented so that “0” end is down and the “100” end is up.

Once you are organized, another group member will hold the top of the stick, and then let go. The meter stick’s fall should be stopped by bringing the arms together to stop the fall of the meter stick. Record the distance that the stick fell by looking at the measurement lines on the meter stick that align with the index fingers as the palms holding the stick.

**Part B – Thumb and Index finger**

**Select** the same partner as before. Have the person stand upright, with their right arm extended straight out in front of the body, with the thumb and forefinger separated by 10 cm. As before, place the meter stick at the 50 cm mark between the finger and thumb, with the 50 cm mark aligned with the top of the index finger. Release the stick, and record the distance that the meter stick falls before the person catches it. Repeat this process three more times, recording your data in the table you have in your notebooks.

**Convert** distance into reaction time using formulas on BACK. Fill in data table.

**Part 2: Mapping Nerve Endings**

**Materials:** Obtain two pins from your instructor. With these you will try to determine the distance between sensory recetors on several areas of the skin. You will also need a metric ruler.

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|  | **Distance between pins** | | | | |
|  | **Trial 1** | **Trial 2** | **Trial 3** | **Trial 4** | **Average** |
| **Pad of right index finger** |  |  |  |  |  |
| **Back of upper arm** |  |  |  |  |  |
| **Back of neck** |  |  |  |  |  |

**Select**: Have partner sit in a chair with their eyes closed. Touch (gently) the skin in each of the areas (referred to on data table) with the two pins, beginning 1 cm apart. Move the pin heads toward each other, lifting and touching each time, until the person (eyes still closed) reports that they feel the sensation of only one pin touching them. Record the distance between the pins in millimeters at which the person can no longer distinguish that there are two pins touching them, and feel only one. Repeat this three more times for each area of the body that you are to test.

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| Formula 1. | Formula 2. |
| https://faculty.washington.edu/chudler/gif/grav1.gif | https://faculty.washington.edu/chudler/gif/grav2.gif |
| **Formula 1** provides you with the distance an object will fall in a given amount of time. By rearranging Formula 1 into **Formula 2**, you can get the amount of time it takes an object to fall a certain distance...that's what you want to find out. Plug in the distance (in either centimeters or inches) that the ruler fell into Formula 2 - this will give you the reaction time.  In the formulas, t = time (in seconds); y = distance (in cm); g = 980 cm/sec2 (acceleration due to gravity).  [Note: you can also use inches in your distance measurement, but you must change g to equal 385.8 in/sec2.] | |