Name _____

Stimulus – Response: Reaction Time

Problem: To observe the process of stimulus – response.

Background Information: Your body reacts to your environment because of your ***NERVOUS SYSTEM***.

Any internal or external change that causes a ***RESPONSE*** is called a ***STIMULUS***.

Coordinated movements of the human body do not happen by themselves. Movements are controlled by the ***CENTRAL NERVOUS SYSTEM*** - the brain, spinal column, and nerves. The central nervous system gets information from the outside through special systems called senses. (sight, sound, touch, taste, and smell).

Your body has ***SENSORY RECEPTORS*** that produce electrical impulses and respond to stimuli, such as changes in temperature, sound, pressure, and taste.

The basic units of the nervous system are nerve cells, or ***NEURONS***. A neuron is made up of a ***CELL BODY*** and branches called ***DENDRITES*** and ***AXONS***.

Dendrites receive messages from other neurons and send them to the cell body.

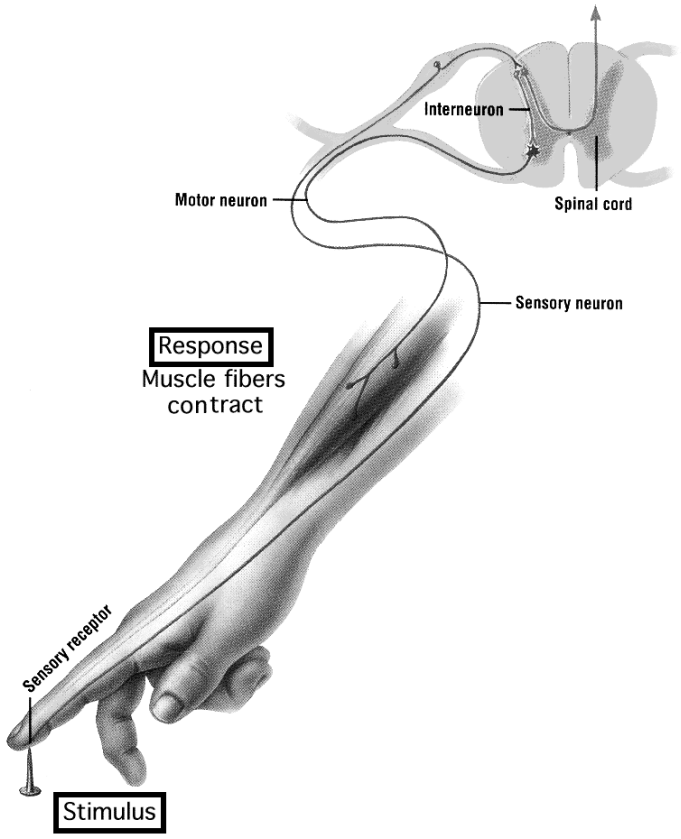
Axons carry messages away from the cell body.

Any message carried by a neuron is called an ***IMPULSE***.

There are three types of neurons — ***SENSORY NEURONS***, ***MOTOR NEURONS***, and ***INTERNEURONS***—that transport impulses.

- Sensory neurons receive information and send impulses to the brain or spinal cord.
- Interneurons relay these impulses to motor neurons.
- Motor neurons then move impulses from the brain or spinal cord to muscles or glands throughout your body.

REACTION TIME is a measure of how quickly you can respond to a given stimulus.



1. A sensory neuron receives stimuli through the dendrites.
2. The impulse is sent through cell body, through the axon to other neurons to the brain.
3. The brain sends a message back to the body through motor neurons.
4. The body responds according to message from the brain.
5. The time between the stimulus and the response is the reaction time.

Materials:

Reaction Time Card with fractions of seconds printed on it

The numbers on the edge of the card are fractions of a second as the card falls from bottom to top.

Procedure:

1. Work with a partner.
2. Hold the card at the top.
3. Have your partner place the thumb and forefinger just below the either side of the bottom of the card.
4. Drop the card.
5. Have your partner catch the card as fast as possible.
6. Record the reaction time
7. Repeat 9 times, for a total of 10 times. Do not average the data.

Data:

Reaction Time (Seconds)	
Trial	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Analyze Data:
Use graph paper to construct a *line graph* of this data. Staple the graph to this lab.

What relationship does this data show? (What does the number of trials have to do with reaction time?)

Questions:

1. What is the independent variable in this investigation?

2. What is the dependent variable in this investigation?

3. Why is a line graph the best choice to display this data?

4. You probably did not get the exact same reaction time for each of your ten trials. What factors might cause this?

5. If you wanted to know how long it might take you to react to any given stimuli, would it be better to consider your fastest, slowest, or average reaction time? Why?

6. List at least 3 factors that might affect reaction time. That is, what might make one person have a faster or slower reaction time then another person?

7. What had to happen in your body for you to catch the ruler?

Conclusion:
Write a ***paragraph*** explaining what happened in this investigation. Do not explain what you did; explain your results and why you got the results you did. Make sure to include these terms: *brain*, *neuron, axon*, *dendrite*, *stimulus*, *sensory neuron*, *motor neuron*, *interneuron*, *response*, and *reaction time*.