

Name:

Date:

Period:

Biology: Reaction Time Lab

Background: Reaction time is the amount of time it takes to act upon a stimulus in your environment. A stimulus is something that causes you to respond, like a pinprick or an object moving toward you.

STIMULUS → SENSORY NEURON → SPINAL CORD/ BRAIN → MOTOR NEURON → RESPONSE

Purpose: In this lab, we will measure and calculate our reactions times under simple and distracted conditions. We will then compare the reaction times of females and males.

Hypothesis: Who do you predict will have faster reaction times? Will reaction times be faster in a simple or a distracted environment?

Materials:

Data table, calculator, ruler

Procedure:

Simple Reaction Time

1. The subject, or person who is measuring their reaction time, sits down in a chair or on a stool with thumb and index finger of their dominant hand spread apart 6 cm.
2. The experimenter holds a ruler at the 30 cm end with the 0 cm end held at the level of the subject's thumb.
3. When the experimenter says "go," she/ he drops the ruler, and the subject catches it between the thumb and index finger.
4. Record the number the thumb is on in the data table.
5. If the subject fails to catch the ruler, record this as the maximum ruler length
6. Repeat this procedure 10 times.

Distracted Reaction Time

1. The experimenter and the subject agree on a new starting word that is different from "ready". The subject can only catch the ruler when the correct starting word is used.
2. The experimenter must attempt to trick the subject by using other words. For example, if the starting word is "pickle," then the experimenter may try to trick the subject by using words like "go," "now," "start," or "tickle."
3. Each false start will be recorded at a maximum ruler length.
4. Record in the data table

Data

Name: Gender:	Simple Reaction Lengths cm
Trial 1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Average Length	
Reaction Time:	

Name: Gender:	Distracted Reaction Lengths cm
Trial 1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Average Length	
Reaction Time:	

Class Data			
For your class data table, set up the columns like this, but create enough rows to record data from all of the females and males in the classroom.			
Simple Reaction Time (sec)		Distracted Reaction Time (sec)	
Females	Males	Females	Males
<i>Add more rows!</i>			
Ave:	Ave:	Ave:	Ave:

Calculations

1. Calculate your average ruler length for 'simple' and 'distracted' reaction times. Do this by adding up all of your trial lengths and dividing by 10.
2. Use this average to calculate your reaction speed To figure out how fast a person's reaction time is, we will modify the $d = rt$ formula:

$$\text{Time} = \sqrt{\text{Distance} \div 480 \text{ cm/sec}^2}$$

- Distance is the length measured on your ruler
- For rate we will use the acceleration of a mass falling on planet earth. You will learn more about this number in physics.
- EX: the ruler was caught at 7 cm

$$\text{Time} = \sqrt{7\text{cm} \div 490 \text{ cm/sec}^2}$$

$$\text{Time} = \sqrt{0.01473 \text{ sec}^2}$$

$$\text{Time} = 0.12 \text{ seconds}$$

3. Record the time in your data table under "reaction time."
4. Now, record your results on the class data sheet as your teacher directs.

Graph

Create a bar graph that shows the average reaction time for boys and girls under simple and distracted circumstances.

Analysis

1. Were your reaction times faster in a simple or distracted environment?
2. When you look at the "neural pathway" information takes, where do you think the 'delay' happens place and why?
 STIMULUS → SENSORY NEURON → SPINAL CORD/ BRAIN → MOTOR NEURON → RESPONSE
3. What are some things that can affect a person's reaction time?
4. Do you think the differences in reaction time are genetic (differences in body type and genes), or because of stuff going on in the environment? Why?
5. According to our class results, who has a faster reaction time, females or males? Do you think this is accurate? Why or why not?
6. How would the results of this experiment change if we were to compare reaction times at different ages? Different heights?
7. How would your reaction time change if this was a true reflex? Why?

Conclusion:

Create a well written paragraph that...

1. Restates the background/ purpose or main idea of this lab activity.
2. Summarize the results of this lab. Does the data prove or disprove your hypothesis?
3. What are some sources of human and experimental error in this lab activity?