Name_____ Date of Data Collection_____

Class Period _____ Lab Days/Period_____ Teacher_____

Reaction Time and Reflexes

Background: Have you ever had to react to a situation where something was flying at your face? If so, you have used two of our body's mot important – as well as fastest – mechanisms for protecting your eyes: reflexes and reactions. A reflex is an autonomic "response" to a stimulus that helps to protect the body from injury. Other types of reflexes happen all the time. In fact, your last visit to the doctor probably involved one. When you are struck just below the knee your lower leg "kicks" up to protect the ligaments inside the knee "capsule". If you pick up something very hot, you may drop it which prevents a serious burn. All of these are examples of reactions. Reflexes are very rapid and of short duration since they do not rely upon the brain for "decision making". This entire "decision" to react occurs, rather, in the brain stem and spinal cord.

Laboratory Safety Precautions: The following symbols represent the precautions that are required for this lab:

Purpose: the purpose of this laboratory experience is:

-to understand the difference between a reflex and a voluntary action.
-to demonstrate some human reflexes.
-to be able to calculate your reaction time

Materials: The following materials are required to complete this lab experience:

-transparency sheet -meter stick
-calculator (w/ square root) -pens and pencils
-lab sheets

Procedure: The following procedure is utilized to perform this experience:

Reflexes

1. Working in pairs, alternate between "tester" and "subject".
2. The subject is to sit on the edge of the lab table (the ONLY time this is allowed) with the legs able to swing freely.
3. Once the legs are relaxed and swing freely, the tester should use the side of their hand to "tap" the subject just below the kneecap. Observe and record your results.

What happened?

Name_____ Date of Data Collection_____

Class Period _____ Lab Days/Period_____ Teacher_____

4. Now have the person sit with their leg straight out. Tap the knee in the same place. Observe and record your results.

What happened?

5. After the subject has been tested switch places and repeat with the partner. Record your OWN data on your lab paper.
6. Have the subject close his or her eyes for one minute (no peeking). After about one minute, stare into the subject's eyes and tell them to "open" their eyes. Observe and record what happens to the pupil.

What happened?

7. After the subject has been tested switch places and repeat with the partner. Record your OWN data on your lab paper.
8. Have the subject remove one shoe and sock. Using a pen cap or fingernail, the experimenter is to scratch the subject's foot in one smooth stroke motion from toe to heel.

What happened?

9. Describe the response in the toes. This response is a common neurological examination called the "Babinski's sign".
10. After the subject has been tested switch places and repeat with the partner. Record your OWN data on your lab paper.
11. Have the subject hold a sheet of clear plastic (transparency) in front of their face. Crumple up a small piece of paper and GENTLY toss it toward their eyes. Observe what happens and record your data.

What happened?

12. After the subject has been tested switch places and repeat with the partner. Record your OWN data on your lab paper.

Name_____ Date of Data Collection_____

Class Period _____ Lab Days/Period_____ Teacher_____

Reaction Time

1. Have the subject sit comfortably with their forearm resting on a desk. With their index finger and thumb about two inches apart, hold a meter stick or ruler at the "zero" (0 cm) mark.
2. Without warning, release the ruler and have them grasp it as quickly as they can. Record the distance the meter stick traveled where the thumb meets the stick. Repeat the trial three more times and record your data.
3. Switch roles and repeat steps 1 and 2.
4. Determine the average distance that the meter stick fell for all of the trials. Using that average, calculate the TIME it took for you to react and grab the ruler using the equation below.

Data: The following data was collected during this lab experience:

Reflexes

Stimulus	**Response**
Knee Tap (bent leg)	
Knee Tap (straight leg)	
Pupil Response to Light	
Babinski's sign	
Object thrown towards face	

Reaction Time

Trial	Distance (cm) of Fall
1	
2	
3	
4	
Average	

Calculation of Reaction Time

$$t=\sqrt{(2d/a)}$$

t = reaction time
d = average distance of fall
a = acceleration due to gravity = 980 cm/s2

Therefore, calculate your reaction time. Show all work in this space.

Name_____ Date of Data Collection_____

Class Period _____ Lab Days/Period_____ Teacher_____

Conclusion: The following can be concluded from this lab experience:

_____

_____

_____

_____

_____

_____

_____

Analysis Questions: Answer the following questions in the space provided.

1. How does the pupillary response prevent injury? What would happen without it?

   _____

   _____

   _____

   _____

2. Why is the blinking response effective? What kind of job would you have where you used this reflex quite often?

   _____

   _____

   _____

   _____

3. Name three sports or occupations where having a fast reaction time is important.

   _____

   _____

   _____

   _____

Name_____ Date of Data Collection_____

Class Period _____ Lab Days/Period_____ Teacher_____

4. Give three examples of things that could slow down your reaction time or reflexes.

_____

_____

_____

_____

5. Say that a person catches a meter stick very slowly when their hands are cold. If that person was able to average catching the meter stick at 81 cm, what is their reaction time? Show your work below.

Reaction Time_____

Bibliography of Images used:

In Good Health Caduceus Symbol: http://www.wpclipart.com/medical/symbols/Caduceus.png
Possible Allergy Alert: http://www.wpclipart.com/medical/sneeze.png