

Name: _____

Period: _____

Date: _____

Nervous System Lab

Part A: Reaction Time

Introduction: A child dashes in front of a moving car. The driver sees the child and slams on the brakes. After seeing the child, a half second passes before the driver applies the brakes. This time delay is called reaction time, the time that nerve messages require to travel from the brain and spinal cord throughout the body stimulating muscles to move and glands to secrete hormones. Reaction time can be measured simply with a ruler and a scale to convert distance to time. In this lab you will determine your reaction time by measuring how long it takes for you to catch a falling ruler. You will also measure the reaction time under distracted conditions.

Materials: Metric ruler and scale

Procedure:

- 1) List a **hypothesis** at the top of the page about which do you think will be a longer reaction time – normal conditions or distracted.
- 2) While a classmate holds the top end of a ruler, place your thumb and first finger close to, but not touching, the zero centimeter bottom end of the ruler. You must remain quiet for this part of the experiment.
- 3) As your classmate releases the ruler, try to catch it as quickly as you can using only your thumb and forefinger
- 4) In the data table, record the number of centimeters your ruler fell before you caught it. Use the first column of the data table under normal conditions
- 5) Repeat the experiment 5 more times, recording your results in the data table.
- 6) Then repeat the experiment under distracted conditions (the person holding the ruler will simply talk to the person catching the ruler).
- 7) Switch roles and repeat the experiment.

Time - Distance Scale

Distance the ruler fell (cm)	Time (in seconds)
2-----	0.06
3-----	0.075
4-----	0.09
5-----	0.10
6-----	0.11
7-----	0.12
8-----	0.13
9-----	0.135
10-----	0.14
12-----	0.16
14-----	0.17
16-----	0.18
18-----	0.19
20-----	0.20
22-----	0.21
24-----	0.22
26 and up-----	0.23

Trial number	Normal Conditions		Distracted Conditions	
	CM the Ruler Fell	Time In Seconds	CM the Ruler Fell	Time In Seconds
1				
2				
3				
4				
5				

6				
Total				
Average				

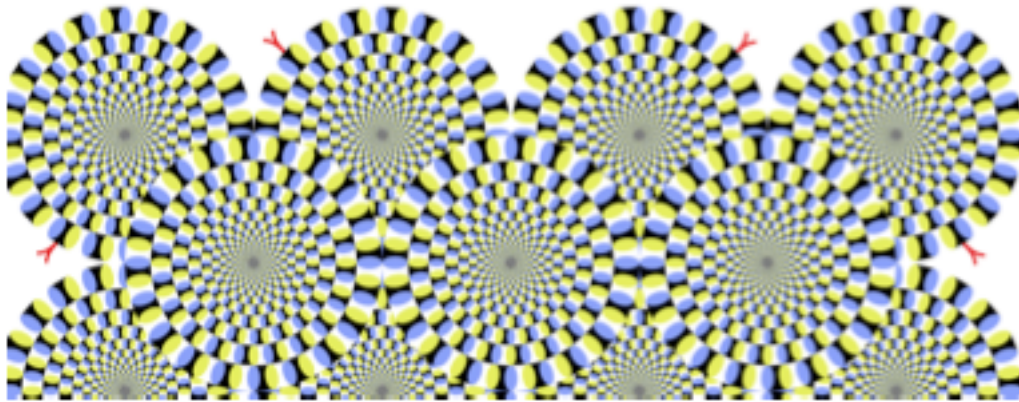
Q: What is meant by reaction time?

Q: What is your average reaction time in seconds under normal and distracted conditions?

Q: Under which condition was your average reaction time shorter? Did it match your original hypothesis?

Part B: Is this picture moving?

Optic Nerve (which creates your blind spot) carries sight messages from the retina of the eye to the brain.



Q: What specific lobe does the optic nerve send information to? (think about which lobe controls vision)

Part C: Cerebellum: Function = balance and coordination

a. 1) Knee Flexion a. Stand straight; hold onto table with one hand b. Slowly bend knee as far as possible, so foot lifts up behind you; hold this position c. Now, use one fingertip to hold onto the table d. Next, no hands. e. Finally, with your eyes closed if you are steady

Q: Why do you think closing your eyes makes this more difficult?

2) Hip Extension a. Stand 12-18 inches from table b. Bend at hips; hold onto table c. Slowly lift one leg backwards (like an ice skater); hold this position d. Now hold onto the table with one fingertip, then no hands, Finally with eyes closed!

Part D: How easy is a task

Purpose: To learn how to make inferences.

Materials: paper pencil penny

Procedure:

1. Trace the outline of a penny in twelve different places on the paper.
2. Number the circles from 1 through 12. Write the numbers randomly, in no particular order.
3. Now pick up the penny again. Put it in each circle, one after another, in numerical order, beginning with 1 and ending with 12.

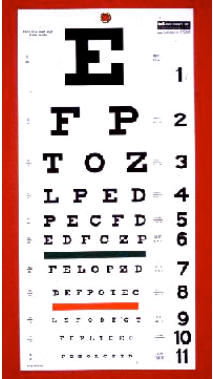
Q: Think It Over: Inferring Make a list of all the sense organs, muscle movements, and thought processes in this activity. Compare your list with your table group's lists. What organ system coordinated all the different processes involved in this task? _____

Part E: Levels of Vision

Visual acuity is usually measured with a Snellen chart. The Snellen chart displays letters of progressively smaller size. "Normal" vision is 20/20. This means that the test subject sees the same line of letters at 20 feet that a typical person sees at 20 feet. 20/40 vision means that the test subject sees at 20 feet what an average person sees at 40 feet. Another

way of saying this is that a person with 20/40 vision has vision that is only half as good as the average, or, objects must be at half the normal distance for her/him to see them. A person with 20/20 vision is able to see letters 1/10th as large as someone with 20/200 vision. However, 20/15 vision is better than 20/20. A person with 20/15 vision can see objects at 20 feet that a person with 20/20 vision can only see at 15 feet.

1. Stand 20 ft. away from the Snellen chart, cover one eye, and read the letters out loud. Have a partner stand next to the chart to verify your reading. The numbers to the left of the last line you read correctly pertain to the vision rating for that eye. If you wear glasses, perform the test both with and without glasses.



2. Repeat for the other eye. Note that the set of numbers to the side of the row of letters always starts with 20. This number simply corresponds to the number of feet you are standing from the chart. The second number refers to the distance that a person with "normal" vision would be standing from the chart if that were the person's last correct line.

3. Record visual acuity for each eye.

4. 20/20 - Normal vision. Fighter pilot minimum. Required to read the stock quotes in the newspaper or numbers in the telephone book.

5. 20/40 - Able to pass Driver's License Test in all 50 States. Most printed material is at this level.

6. 20/80 - Able to read alarm clock at 10 feet. News Headlines are this size.

7. 20/200 - Legal blindness. Able to see STOP sign letters.

Q: Left:

Right:

Part F: Temporal Lobe (part of the cerebral cortex) Function = auditory perception and speech 1)
Tongue Twisters

Six sick slick slim sycamore saplings.
 Red lorry, yellow lorry, red lorry, yellow lorry.
 Toy boat. Toy boat. Toy boat.
 Sam's shop stocks short spotted socks.
 Fat frogs flying past fast.
 Ed had edited it.

A box of biscuits, a batch of mixed biscuits.
 Six thick thistle sticks. Six thick thistles stick.
 What time does the wristwatch strap shop shut?
 Lesser leather never weathered wetter weather better.
 We surely shall see the sun shine soon.
 Are our oars oak?

Q: Which tongue twister was the most difficult? _____ Why? _____