

Title: Laboratory 6/7- Sensory Physiology

Purpose:

The purpose of this lab it's to perform a series of exercises that measure the capabilities of your sensory system. This includes the cutaneous, olfactory, auditory, proprioceptive, and the visual system. These will be examined and observed.

Procedures:

A-1

1. With your partner's eyes closed, apply two caliper pinpoints as closely together as possible on your partner's skin on the palm of his/her hand.
2. Remove the pins and move them 1 millimeter apart. Reapply the caliper points to your partner's skin. Repeat this procedure until your partner can discriminate two distinct points.
3. Record this distance between pins at which your partner can discriminate two separate caliper points.
4. Compare results obtained from the following areas: a. palm of hand back of hand. Finger tipd. outer edge of the lipse. back of neck
5. Have your partner repeat this experiment on your skin.
6. Interpret the results you have obtained

A-2

1. Place your left fingers in 15°C water and your right fingers in warm water (37°C) and record the sensation of each. Keep hands immersed for 2 minutes.
2. After two minutes, describe the sensation in each hand.
3. Remove hands and promptly place them both in 25°C water. Describe the immediate sensation in each hand

6/7-B

1. Block your left nostril. Uncork and hold the bottle of camphor oil under your nose until you can no longer detect the camphor. Do not consciously sniff the contents of the vial! Record the adaptation time.
2. Remove the camphor and place the bottles of cloves, then peppermint oil under your nose. Distinguish the smells of cloves and peppermint oil.
3. Uncork and hold the bottle of camphor under your nose again until the smell is no longer recognized. Record this second adaptation time
4. Unblock your left nostril determine if the camphor is detected. Interpret these results

C-1

1. Plug your left ear with cotton or hold your hand over it and test the right ear.
2. Hold the handle of a vibrating tuning fork to the right mastoid process.
3. When the sound disappears, move the fork near the external auditory canal.
4. Reappearance of the sound indicates no middle ear damage.
5. Repeat the test with your left ear
6. Record the results for each ear
7. Hold the handle of a vibrating tuning fork (512 Hz) to the bridge of your nose

8. Lateralization of sound to one ear indicates deafness. Lateralization to poor ear indicates conduction deafness. Lateralization to better ear indicates nerve deafness

C-2

1. In a quiet room, the instructor will demonstrate the proper method of operating the audiometer.
2. Audiometry tests will be conducted in pairs. Each student will take his/her partner's audiogram.
3. Record your results on the worksheet on page 44.
4. Analyze the audiograms in the following way:
 - a. Average the values obtained for each ear for the frequencies of 500 Hz, 1000 Hz, and 2000 Hz.
 - b. Subtract 26 dB from each average.
 - c. If the difference is greater than 26, multiply this number by 1.5%. This equals the percent impairment of each ear
- 5.

6/7-D

1. A student volunteer will be seated on a swivel stool with his/her head bent 30° forward.
2. The instructor will spin the student rapidly to the right for 10 turns.
3. The instructor will suddenly stop turning the student and have the student look straight ahead.
4. Observe and note the subsequent movement of the student's eyes
5. Explain these eye movements in terms of direction of endolymph movement.
6. These procedures will be repeated with a second student spun to the left

E-1

1. Cover your left eye and focus the right eye on the center of the cross below.
2. Slowly bring the page closer to your eye until the spot disappears.
3. Have your partner measure this distance from your eye to the page.
4. The image of the spot is now superimposed on the optic nerve. Explain the lack of vision at this point

E-2

1. Stand 20 feet away from the Snellen chart. Cover your left eye.
2. Attempt to read the line designated "20".
3. If you cannot read line 20, attempt line 30, 40, 50, 70, 100 or 200 until a line is legible. Perform these attempts with your left eye, covering your right eye.
4. The Snellen chart is analyzed in the following way

E-3

1. Stand approximately 8–10 inches away from the radial astigmatism eye chart so that it fills your field of vision. Cover your left eye.
2. Focus on the lines in the vertical plane with your right eye.
3. If a blur appears in the lateral lines or the lines converge into one, you have an astigmatism in this plane of your eye.
4. Record the results of this test and repeat with the left

E-4

color-blindness test

1. Obtain the Ichikawa color blindness charts.
2. Attempt to read the numbers of each pattern on the testpanels. (There are some “practice” panels before the actual test panels begin.)
3. After the first 10 test panels, if your score indicates color blindness, continue with the next five test panels to determine which color deficiency exists.
4. Record your results on the worksheet on page 46

negative after-image

1. Stare at different colored objects provided by your lab instructor for 30 seconds each, and then shift your glance to a white sheet of paper. These may include but not be limited to colored squares on white paper, stripes of various colors against white paper, colored flags or scenic views.
2. Record the negative after-images seen for each color. Were you able to predict any of these

E-5

1. Seat yourself before the perimeter board with your right eye at the edge of the semicircle. Cover your left eye. Stare at the centerline.
2. Your lab partner will introduce several different colored blocks into your field of vision. Identify these blocks by color. Do not take your eye from the center of the chart or uncover your left eye.
3. Your partner will record the degree at which the colors were discriminated on the perimetry score sheet on page 47.
4. Repeat these procedures for each block for both the horizontal and vertical perimetry charts. Record the data and connect the same colored dots to form an outline of cone placement of your right eye on your data sheet.
5. Explain these results in regards to cone placement in your retina

E-6

1. The room will be darkened for a period of 15 -20 minutes during this exercise.
2. As soon as the lights are extinguished, the instructor will produce an object on the front desk. After your dim-light vision improves, attempt to draw this object in detail.
3. At the end of the darkness period, reexamine your drawings and improve it, if necessary.
4. When the lights are turned on, identify the object on the front desk and compare it to your drawing.
5. Explain any increase in visual sensitivity in terms of rod photochemistry

E-7

1. The instructor will connect EOG electrodes to the head of a student. Diagram the experimental set-up.
2. Once a trace is obtained, the student will perform the following activities:
 - a) Casually glance at a stationary object.
 - b) Follow a moving object.
 - c) Read a few lines.
 - d) Intently stare at an object.

- Record the results of these activity

6/7-F

- Extend your tongue and pat it dry with a paper towel.
- Dip a cotton swab into a 25% salt (NaCl) solution and gently dab the solution onto the surface of the tongue. Diagram the locations where the salt solution is detected.3. Swab the tongue with distilled water and pat it dry.
- Repeat these procedures in order to map the responsive areas for each of the following solutions:a. Sweet (25% sucrose solution)b. Sour (25% vinegar solution)c. Bitter (25% aspirin solution)5. Explain the resultsof this mapping

Results:

A-1

- Palm of hand: **10mm**
- Back of hand: **21mm**
- Fingertips: **4mm**
- Outer edge pf the lips: **8mm**
- Back of neck: **18mm**

A-2

- Describe the immediate sensation in each hand
Left hand was warm and right hand was cold.
It's a phasic receptor cause it was sensitive to change of temperature.

6/7B-1

Left nostril

Camphor oil	10 sec
Peppermint oil	4 sec
Cloves	8 sec

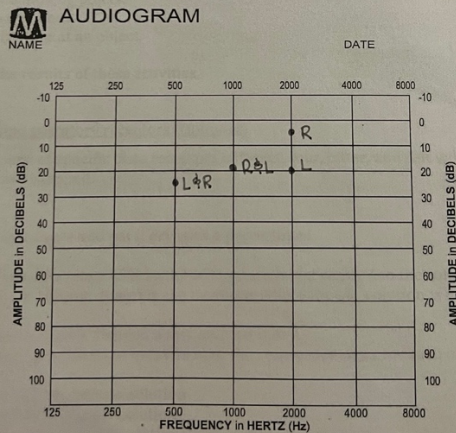
Adaption time under nose: 7 seconds

Unblack left nostril and check if camphor oil is detected: 5 second until detected

C-2

Audiometry Directions

1. Working in pairs, have one partner sit facing away from the other partner.
2. The person undergoing the test will put on the earphones. The red earphone goes on the right ear, the blue earphone goes on the left ear.
3. The person administering the test will randomly select frequencies and the ear to which these frequencies will be applied.
4. At the start of each frequency test, the decibel level will be set to zero and the tone will be applied. The decibel level will be increased one notch at a time until the subject raises his/her hand indicating the ear in which the one was heard.
5. The examiner will then mark the audiogram with a red pen for the right ear and a blue pen for the left ear. Each mark will be made matching the tone frequency and the decibel at which it was first heard.
6. The test will continue until a good sampling of frequencies for each ear has been obtained. At the very least, a test will be conducted at the frequencies of 500, 1000 and 2000 Hz.
7. At the conclusion of the test, the colored marks on the audiogram will be connected to form a line graph of hearing ability for each ear.



6/7-D

The persons eyes moved rapidly even after the chair stopped spinning.

E-1

The distance from my eyes to the page was 13.5cm

E-2

Person 1: 15ft/20ft Hyperopia

Person 2: 20ft/20ft Normal

E-3

8-4 the blurry lines were the cross over lines

E-4

Were you able to predict any of these? We did we were able to predict the negative after image seen for each color.

2.

Directions for Ichikawa (color-blindness) test

1. Plates numbered 1- 4 are demonstration (practice) plates.
2. Circle the number best seen by the subject. If both numbers are seen, circle the one seen most clearly or easily.
3. Count the number of answers in each column. If the number of normal responses is 8 or more, the subject has normal vision. If the number in the R-G Defect column is more, proceed to the next five plates in the test booklet.
4. Classify the subject as protanopia (deficient in red cones) or deutanopia (deficient in green cones).

NOTE: This test does not diagnose tritanopia - deficient in blue cones.

Score Sheet

Name _____

Screening Series

Plate No.	Normal	R-G Defect
5	57 +1	55
6	75 +1	92
7	43 +1	invisible
8	710 +1	417
9	374 +1	721
10	92 +1	invisible
11	216 +1	417
12	797 +1	invisible
13	845 +1	invisible
14	38 +1	6 invisible
Total	10	10

Classification Series

Plate No.	Protan	Deutan
15	7	invisible
16	510	invisible
17	invisible	invisible
18	invisible	55
19	invisible	52
Total	5	5

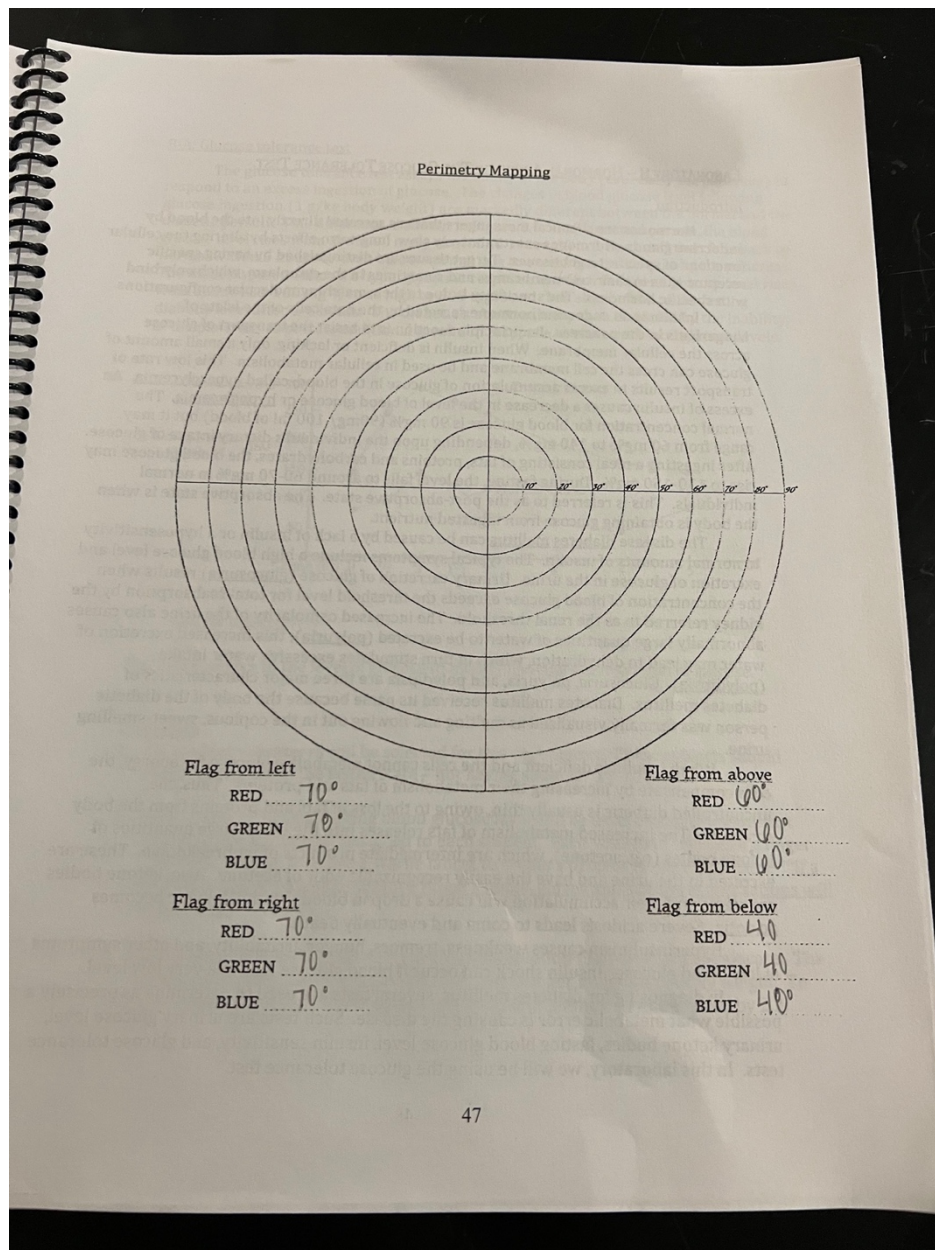
Result :

Normal

Protan

Deutan

Others



Discussion:

A-1

When measuring both me and my partner we were able to see the difference between our measurements.

A-2

When placed in the cold water it hurt where the water ended mainly so where the air and water meet. I also noticed that my hand stayed red even after it was out of the water for a while.

6/7B-1

My olfactory chemoreceptors were able to adapt quickly it took me 4 seconds for the peppermint oil, 10 seconds for the camphor oil, and 8 seconds for the cloves. And then after we smelled it again after a while and the smell was adapted it took 7 seconds. My left nostril it took 4 seconds to adapt.

C-1

We used a machine that makes vibration sounds my partner was more sensitive to the sound than I was.

C-2

We put on some earphones, and we were able to test our hearing by one of us running the machine and doing some beeping noises.

6/7-D

Her eyes keep moving rapidly even after they stopped spinning her.

E-1

At first it took a while to find my blind spot eventually I found it and it was at 13.5cm.

E-2

We were able to figure out that my partner was hyperopia and I was normal.

E-3

The lines that became blurry for my partner were the lines that created a cross and the ones that became blurry for me were the horizontal ones.

E-4

Were you able to predict any of these? We did we were able to predict the negative after image seen for each color.

E-5

We were able to see the lines and color for the images before.

Conclusion:

In conclusion we were able to understand three components of sensation. We used multiple receptors including cutaneous(touch), olfactory(smell), gustatory(taste), photoreceptors(sight), proprioceptors(equilibrium), and phonoreceptors(hearing). We were able to test all of these receptors and see how well they work.