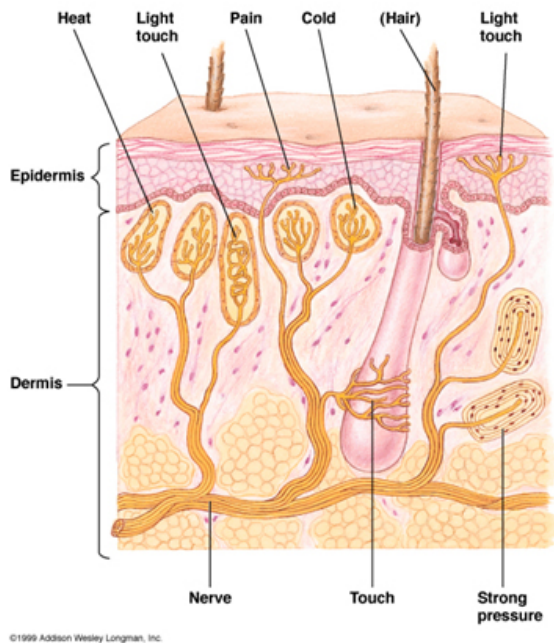


Lab 6 - Nervous System: Special Senses

In today's lab you will investigate the behavior of the human nervous system and the special senses.

Scientific Method Connection: Observation of the functions of the human nervous system and special senses. Asking questions about the nature of the nervous system.

Activity 1: Touch Receptors



1. Locate your touch receptors

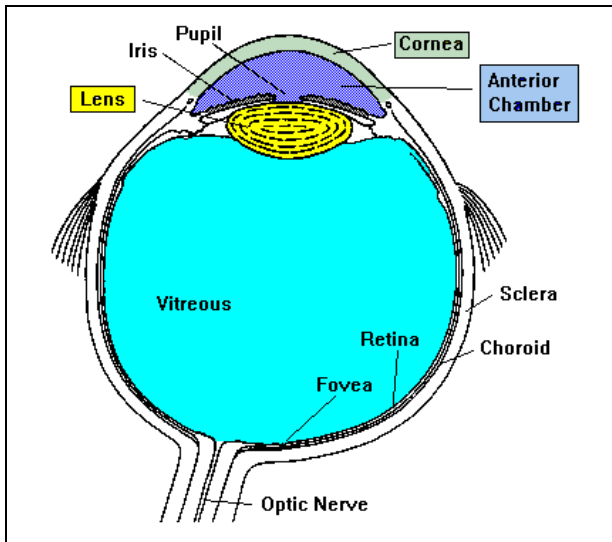
- a. Work with a partner and use a set of dividers to see if your partner can feel one point or two points at various places on their skin. If a person only feels one point it means that one receptor is sending impulses to their brain. Complete the table in the handout.

2. Next, go to the three containers of water on the counter.

- a. Put your right hand in the cold water and your left hand in the warm water until you no longer feel the temperature of the water (about 3-4 minutes)
- b. Remove your left hand from the warm water and place it into the room temp water. Have your partner record your results.
- c. Remove your right hand from the cold water and place it into the room temperature water. Have your partner record your results.

3. Answer the questions in your lab.

Activity 2: Vision



1. Test your visual acuity using the eye chart.

- a. Stand 20 feet away from the chart
- b. Cover one eye with your hand. (don't press on your covered eye or it will be blurry when you switch)
- c. Have your partner point to one line at a time while you call out the letters.
- d. Record your results.

2. Test the age of your eyes

- a. Hold a pencil or ball point pen vertically at arms length
- b. Close your left eye and focus on the tip
- c. Quickly bring the pencil closer to your eye until it is out of focus
- d. Have your partner measure the distance between your eye and the pencil
- e. Repeat for both eyes.
- f. Try it with and without glasses (if you wear glasses)

Age of your Eyes

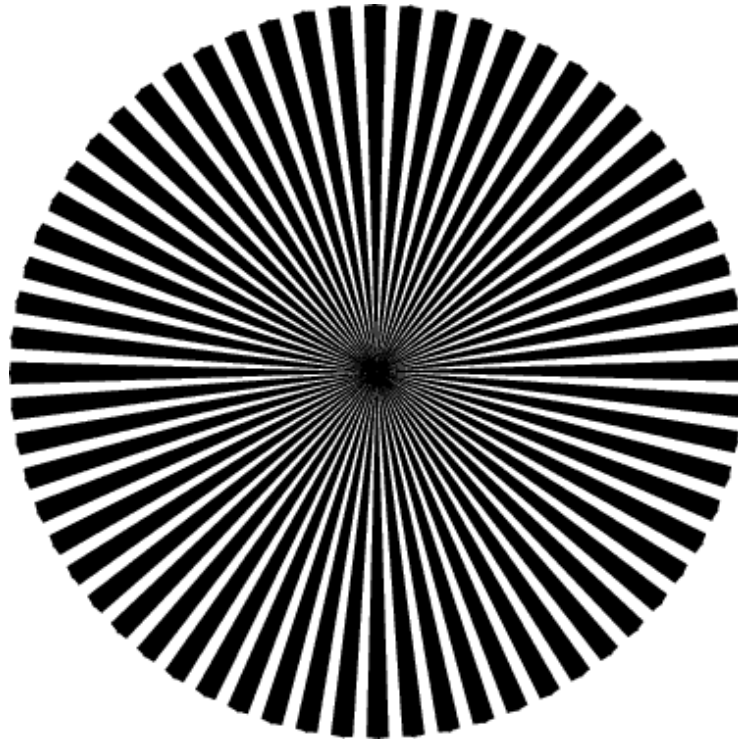
Cm	9	10	13	18	50	83
Age	10	20	30	40	50	60

3. Find your blind spot

- a. Obtain the optic disk card and hold it at arms length
- b. Hold it with the cross on the right and the dot on the left
- c. Close your right eye and stare at the cross with your left eye
- d. Slowly bring the card closer to your face until the dot disappears and then reappears again.

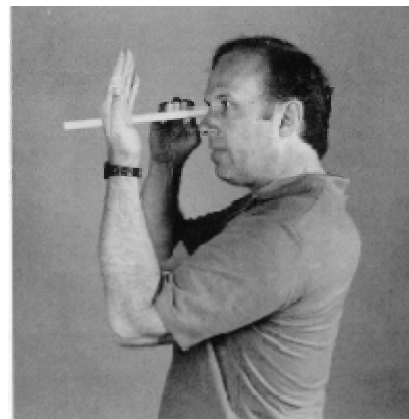
4. Observe the Shimmering Image

- a. The image below appears to shimmer due to small imperceptible motions of your eyes. Normally your brain will “edit” out the motion, but in this case, it does not.
- b. Move your head slightly from side to side while looking at it to increase the shimmering.



5. Find the hole in your hand

- a. Obtain a paper tube
- b. Hold the tube up to one eye
- c. Look at an object across the room through the tube
- d. Keeping both eyes open, bring your hand up next to the tube in front of your “free” eye.
- e. Move your hand towards and away from your face until a hole appears in your hand
- f. Try it again with the other eye looking through the tube



6. Circles or Ovals

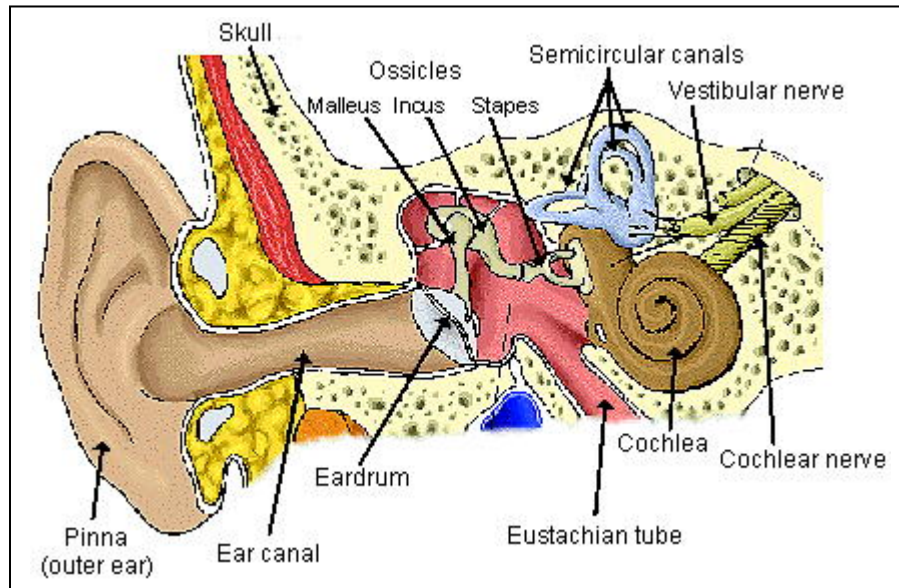
- a. Obtain a slightly flattened paper tube
- b. Hold one of the round tubes up to one eye and the tube that you flattened up to the other eye.
- c. Look through the tubes at the white screen, wall, or paper. Overlap the spots. Do you see the circle or the oval?
- d. Switch the tubes and repeat. If you saw only the circle before, you may see the oval now.
- e. Your eyes and brain have trouble merging the different shapes. Most people have a dominant eye. The brain will choose to see the image that is coming from the dominant eye. Some people do not have a dominant eye, and therefore see the two shapes overlapped.

7. I Though Spelling Was Important

- a. Read the sentence below quickly

I cdnuolt blveiee taht I cluod aulacly uesdnatnrd waht I was rdgnieg. The phaonmneal pweor of the hmuan mnid Aoccdrnig to a rscheearch at Cmabrigde Uinervtisy, it deosn't mtttaer inwaht oredr the ltteers in a wrod are, the olny iprmoatnt tihng is taht the frist and lsat ltteer be in the rghit pclae. The rset can be a taotl mses and you can sitll raed it wouthit a porbelm. Tihs is bcuseae the huamn mnid deos not raed ervey lteter by istlef, but the wrod as a wlohe. Amzanig huh? Yaeh and I awlyas thought slpeling was ipmorantt!

Activity 3: Hearing and Balance



1. The Rinne test for conduction deafness

- a. Make a tuning fork vibrate by striking it with a rubber mallet
- b. Place the handle of the tuning fork against the bone behind your ear
- c. When the sound is no longer heard, bring the tuning fork around and hold it in front of the opening to the ear.
- d. If there has been no damage to the eardrum or ear bones, the sound should reappear

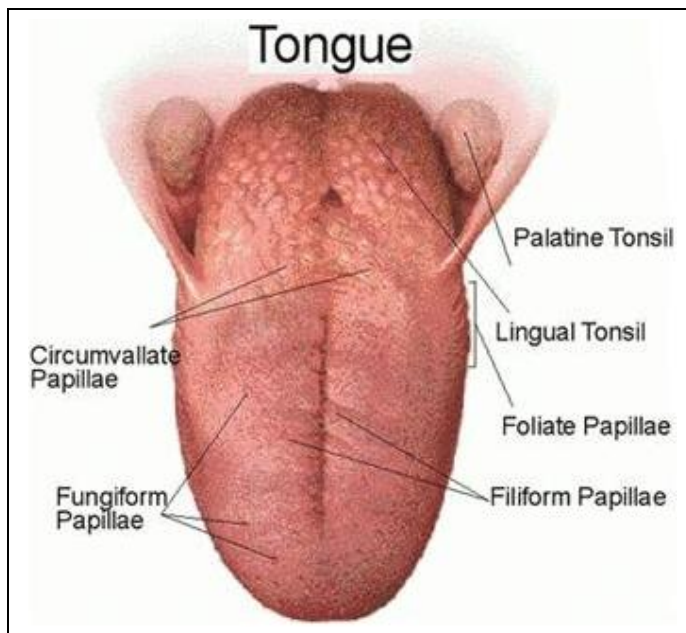
2. Test your sense of balance

- a. Stand upright with your **partner nearby in case you fall.**
- b. Have your partner record the length and quality of your attempts.
- c. Bend your right leg and hold your foot in your right hand
- d. Balance like this as long as you can (minimum 30 secs)
- e. Try the same pose, but close both of your eyes.
- f. Again, have your partner nearby recording your attempts.
- g. Balance for as long as possible
- h. Try the same pose, but close your eyes and tilt your head back slowly
- i. Again, have your partner nearby recording your attempts.
- j. Balance for as long as possible

Activity 4: Taste

Your tongue has a variety of receptors capable of tasting different types of flavors. Use the solutions provided to “map out” your taste buds.

1. Obtain a few sterile swabs
2. Pipet a small amount of each solution into separate test tubes
3. Using one solution at a time dip a swab and run it along your tongue
4. Record where you are able to taste each solution and what it tastes like
5. **NO DOUBLE DIPPING!**



Nervous System: Special Senses

Activity 1: Touch Receptors

Location	Distance when only one point is felt	Rank the concentration of receptors (High:1-Low:5)
Finger tip		
Heel of hand		
Forearm		
Elbow		
Back of neck		

1. What can you conclude about the density of touch receptors in your skin?

Temperature of water according to your left hand? _____

Temperature of water according to your right hand? _____

2. Explain why this occurred? Can't you trust your senses?

Activity 2: Vision

Visual Acuity

Right eye w/o glasses 20/_____ w/glasses 20/_____

Left eye w/o glasses 20/_____ w/glasses 20/_____

1. How would you describe the shape of *your* lenses?

2. Are you nearsighted or farsighted or neither?

Age of Your Eyes

1. What was the “age” of your eyes?

Right w/o glasses _____ w/glasses _____

Left w/o glasses _____ w/glasses _____

2. How does this compare to your actual age?
3. Are they the same? If not, why do you think that could be?

Blind Spot

1. Explain why the dot on the optic disk card disappears. (Hint: Look at the diagram of the eye. How do impulses get to the brain?)

Hole in Your Hand & Circles or Ovals

1. Why does it appear that you have a hole in your hand?
2. Does it work better with one eye or the other? Which one?
3. After completing the “Circle or Oval” exercise, do you think you have a dominant eye?
4. Is it the same eye as the one you answered for #2 above? Why?

Spelling

1. Write out a message (at least two sentences) like the one in the lab:

2. Was it harder to read or write with bad spelling? Why do you suppose that is?

Activity 3: Hearing & Balance

Rinne Test

Results for right ear_____

Results for left ear_____

1. What is the difference between conduction deafness and sensory-neural deafness?

2. Why do you think people with conduction deafness wear hearing aids that sit against the bone behind their ear and not in the ear canal?

3. How could you use the tuning fork to test for sensory-neural deafness?

4. Why do you think people with sensory-neural deafness cannot be helped with a hearing aid?

Balance

Stance	Time (min)	Stability
Standing on one foot		high---moderate---low
One foot, eyes closed		high---moderate---low
One foot, eyes closed, head back		high---moderate---low

1. Which stance made it the hardest to balance? Why do you think that is?

2. How much of an impact does your inner ear have on your sense of balance?

Activity 4: Taste

1. Label where on your tongue, you tasted each of the following:

SALTY **BITTER**
SWEET **SOUR**

2. How do your results compare to your partner's?

