

The vision sense

Background information on eyes and vision lab

The background information for today's exercise is found in lab 3.5 in your lab manual. But you should use this handout for the procedures. This handout also contains the results tables to record your findings.

a) Procedures:

Procedure A: Visual acuity tests

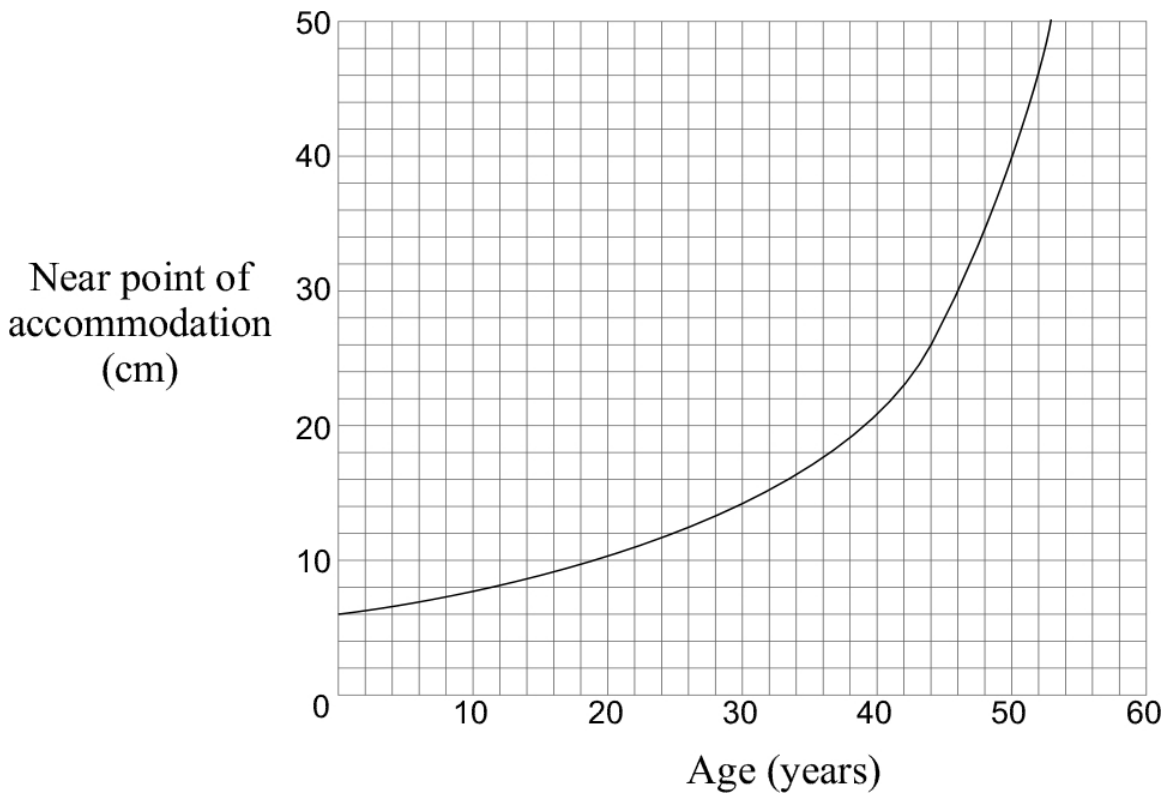
- 1) The test subject should stand 20 feet from the Snellen eye chart. Covering their right eye, the subject should attempt to read each line of the chart, starting at the largest line on top line and working their way downward to smaller lines at the bottom. Another student should stand close to the eye chart to verify that the lines are being read correctly.
- 2) The visual acuity for the subject's left eye is the number (such as 20/20 or 20/30) that appears next to the smallest line that the test subject can correctly read. Enter this in the data table at the end of this handout.
- 3) Repeat steps (1) and (2), except cover the left eye. Enter the result in the results table.
- 4) The test subject should stand 20 feet from the astigmatism eye chart. Covering their right eye, the test subject should look into the exact center of the chart but try to judge if all the radial lines appear the same. If some radial lines are dark and sharp, but other radial lines are blurred and lighter, the test subject has astigmatism in that eye. Repeat the test using the other eye. In the results in the results table, write the numbers of the lines that are blurred and lighter. These lines are in the eye region with the astigmatism.

Procedure B: Pupillary reflex test

- 1) Obtain a penlight. Move the test subject to a very dim room (such as the darkened biology stockroom). Give the test subject a minute for their eyes to adjust to the darkness.
- 2) Shine the light into the subject's left eye. Observe any change in the pupil size of the left eye. Simultaneously, observe any change in the pupil size of the other eye (the eye **not** being illuminated).
- 3) Wait one minute to allow the subject's eyes to readjust to the darkness. Repeat the test on the subject's right eye. Record the results for both eyes.

Procedure C: Near point accommodation test

- 1) Holding a meter stick horizontally, place one end of the meter stick just under the test subject's left eye. A person from the group should place a card with a word on it at the distant end of the meter stick and slowly slide it closer and closer to the test subject's eye.
- 2) Determine the distance at which the word begins to look blurry to the test subject. This is the near point of accommodation for the subject's left eye.
- 3) Repeat this procedure on the subject's right eye. Record the results for both eyes.
- 4) Near point of accommodation usually gets larger with age, as is shown on the graph below.



Procedure D: Test of extrinsic eye muscles

- 1) A person from the subject's group should hold a pencil about 2 feet away from the subject's nose. They should move the pencil left, right, up, and down. Note if the subject's eyes are able to correctly track the movement of the pencil. If one eye does not track the pencil correctly, that eye has nystagmus (involuntary eye movement). Record the results.

Procedure E: Observing the anterior portion of the eye

1) Obtain a concave magnifying mirror. Each person in the group should have a turn of holding the mirror close to their eye (it doesn't matter which eye). Be able to identify and describe the function of the sclera, the cornea, the iris, and the pupil. Most of the smooth muscle fibers that you see in the iris are oriented radial (like spokes coming out of the pupil). These radial smooth muscles dilate the pupil in dim light. Some of the iris smooth muscle fibers are oriented circularly around the pupil. These circular fibers contract the pupil in bright light.

You do not need to record any results for this section.

Procedure F: Blind spot demonstration

- 1) Obtain a blind spot demonstration card (it is a white card with two dots).
- 2) Follow the directions printed on the card. For each eye, determine the location of the blind spot in that eye's field of view, relative to the center of the field of view. For example, if a dot seems to vanish when it is on the left side of the center of the field of view, then the blind spot is located to the left of the field of view. If a dot seems to vanish when it is on the right side of the center of the field of view, then the blind spot is located to the right of the field of view.

Procedure G: After images

- 1) Obtain four different colored afterimage cards (black cards with colored squares on them). Starting with one colored square, try to predict what color the after image will be. After recording your prediction, have the test subject stare at the center of the colored square for one full minute. After one minute, the subject should shift their gaze to a blank white piece of paper. Record the color of the square, the predicted after image color, and the actual after image.
- 2) Repeat the test with each of the other colored test squares.

Procedure H: Color blindness test

- 1) Obtain one of the Ishihara test booklets.
- 2) Have the subject look at all the colored pages in the book, one at a time, and identify any and all numbers on each page. The other group members should take note of any numbers that the subject is not able to see. Record the results.

b) Results tables

Use the tables below to record the results of each procedure. Show your instructor your completed data tables at the end of the laboratory experiment.

Procedure A (Visual acuity and astigmatism tests)

Left eye visual acuity measured using the Snellen eye chart: _____

This visual acuity is better/equal to/worse (circle one of the three) than average.

Right eye visual acuity measured using the Snellen eye chart: _____

This visual acuity is better/equal to/worse (circle one of the three) than average.

Evidence of astigmatism in left eye using the astigmatism chart (yes/no): _____

Evidence of astigmatism in right eye using the astigmatism chart (yes/no): _____

(If there is astigmatism, write the line numbers where it is located)

Procedure B: (Pupillary reflex)

The subject's left pupil contracted/dilated (circle one word) when the light was shone into their left eye.

The subject's **right** pupil contracted/dilated (circle one word) when the light was shone into their **left** eye.

The subject's right pupil contracted/dilated (circle one word) when the light was shone into their right eye.

The subject's **left** pupil contracted/dilated (circle one word) when the light was shone into their **right** eye.

Procedure C (Accommodation tests)

The near point of accommodation for the volunteer's left eye is _____ cm.

This result is better/equal to/worse (circle one of the three) than average for the volunteer's age.

The near point of accommodation for the volunteer's right eye is _____ cm.

This result is better/equal to/worse (circle one of the three) than average for the volunteer's age.

Procedure D (Extrinsic eye muscle tests)

Was there any evidence of nystagmus when tracking a moving pen? (yes/no): _____ . If yes, which eye had nystagmus? _____ (left/right).

Procedure E: (Observing the anterior portion of the eye)

No results are recorded for this activity.

Procedure F: (Blind spot demonstration)

In the left eye, the blind spot is located on the left/right (circle one word) side of the center of that eye's field of view.

In the right eye, the blind spot is located on the left/right (circle one word) side of the center of that eye's field of view.

Procedure G (Afterimages)

For each of the four colored squares that you tested, fill in the information on the table below.

<u>Square color:</u>	<u>Predicted afterimage color:</u>	<u>Actual afterimage color:</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Procedure H (Colorblindness test)

The volunteer did/didn't (circle one word) perceive all the numbers correctly.

This result does/doesn't (circle one word) indicate colorblindness.