



Visual field and colour vision

Definition of visual field

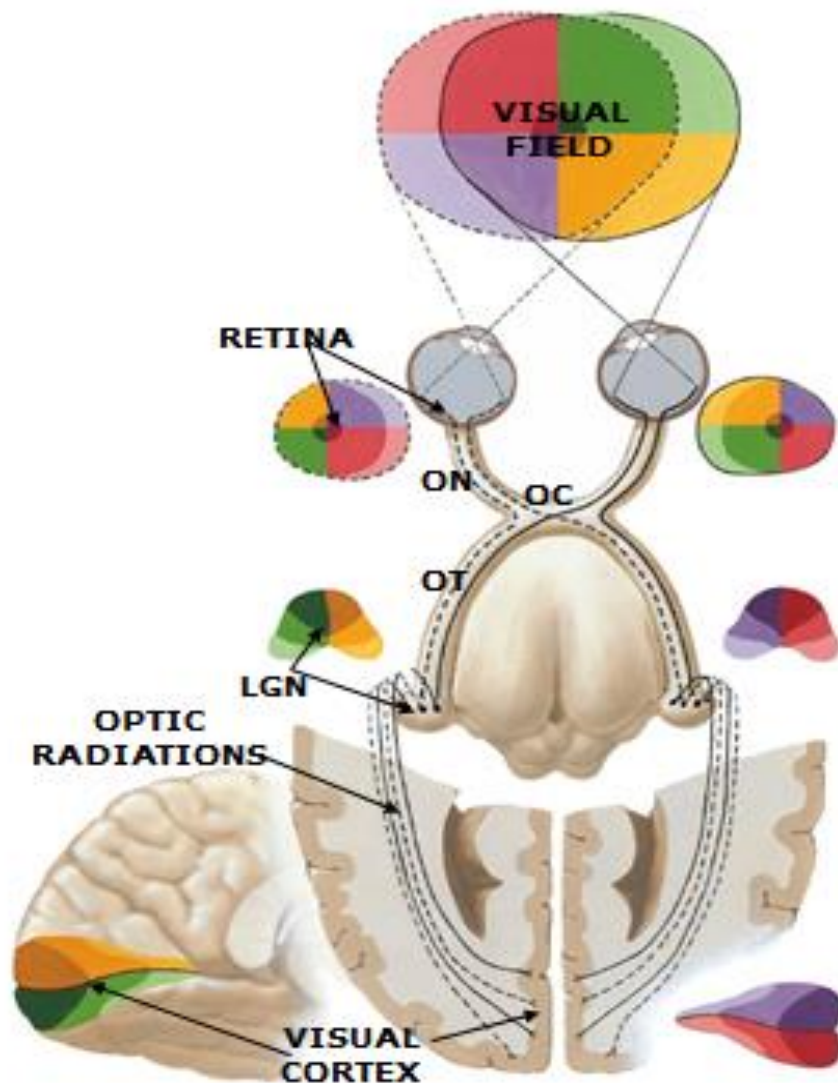
- The entire area that can be “seen” by the subject without movement of the head and with the eyes fixed on a single spot.**



- **The area seen to the nasal side is called nasal field of vision and area seen to the lateral side is called the temporal field of vision.**



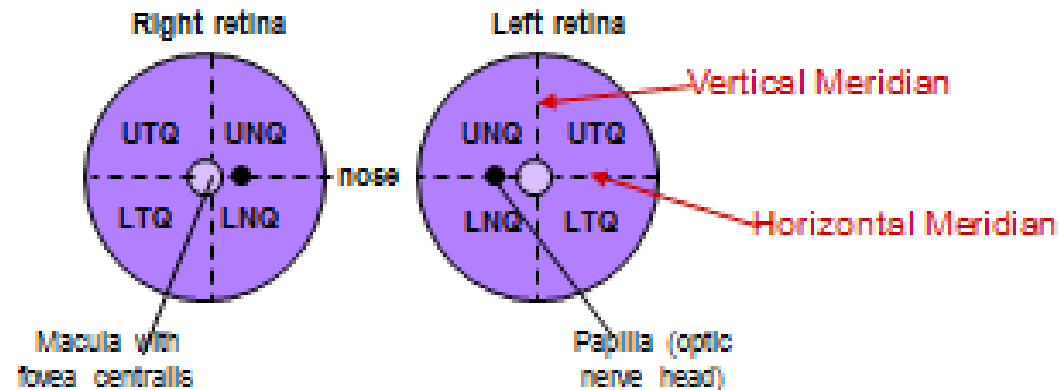
The Visual Pathway



The following slides begin with the visual fields and then follow the pathway from the retina to the visual cortex.

ON = Optic Nerve
OC = Optic Chiasm
OT = Optic Tract
LGN = Lateral Geniculate Nucleus of Thalamus

Retinal Quadrants



Temporal Hemiretina

UTQ = upper temporal quadrant

LTQ = lower temporal quadrant

Nasal Hemiretina

UNQ = upper nasal quadrant

LNQ = lower nasal quadrant

Blind Spot

- **The small, circular, insensitive region in the retina where fibers of the optic nerve emerge from the eyeball. It has no rods or cones. Also called optic disk and physiological scotoma.**
- **It 15° to the temporal side of the visual field of each eye On the horizontal meridian.**



Objective:

To examine visual field of eyes.

Materials and instruments:

Perimetry.



Methods of Measurements of visual fields



1. Direct confrontation method (bed side method.)

- ☐ **Sit or stand in front of subject about 1 meter away.**
- ☐ **First both you and pt ..Should keep your eyes open.**
- ☐ **Test both Lt and Rt fields at the same ime.**
- ☐ **Then the subject covers one eye and fixes his gaze on your eye. Bring your finger slowly into view from out of the subject view.**
- ☐ **The finger should be kept more than midway between you and subject.**
- ☐ **Each of upper and lower temporal, upper and lower nasal quadrant are tested separately.**

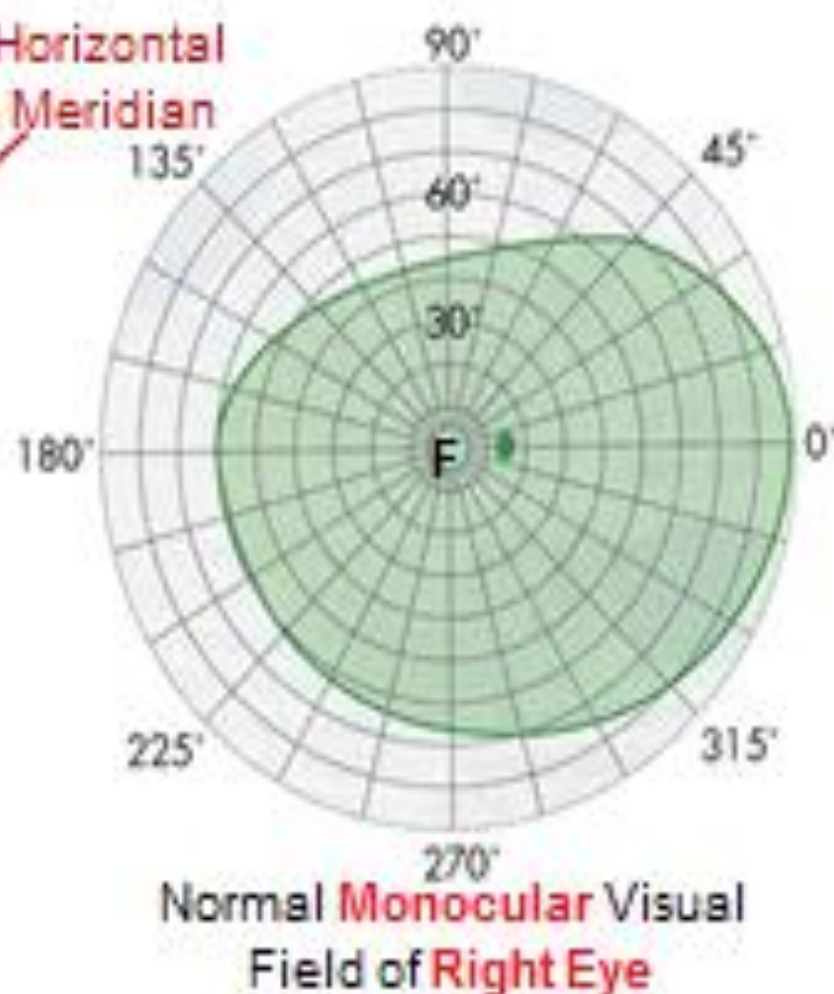
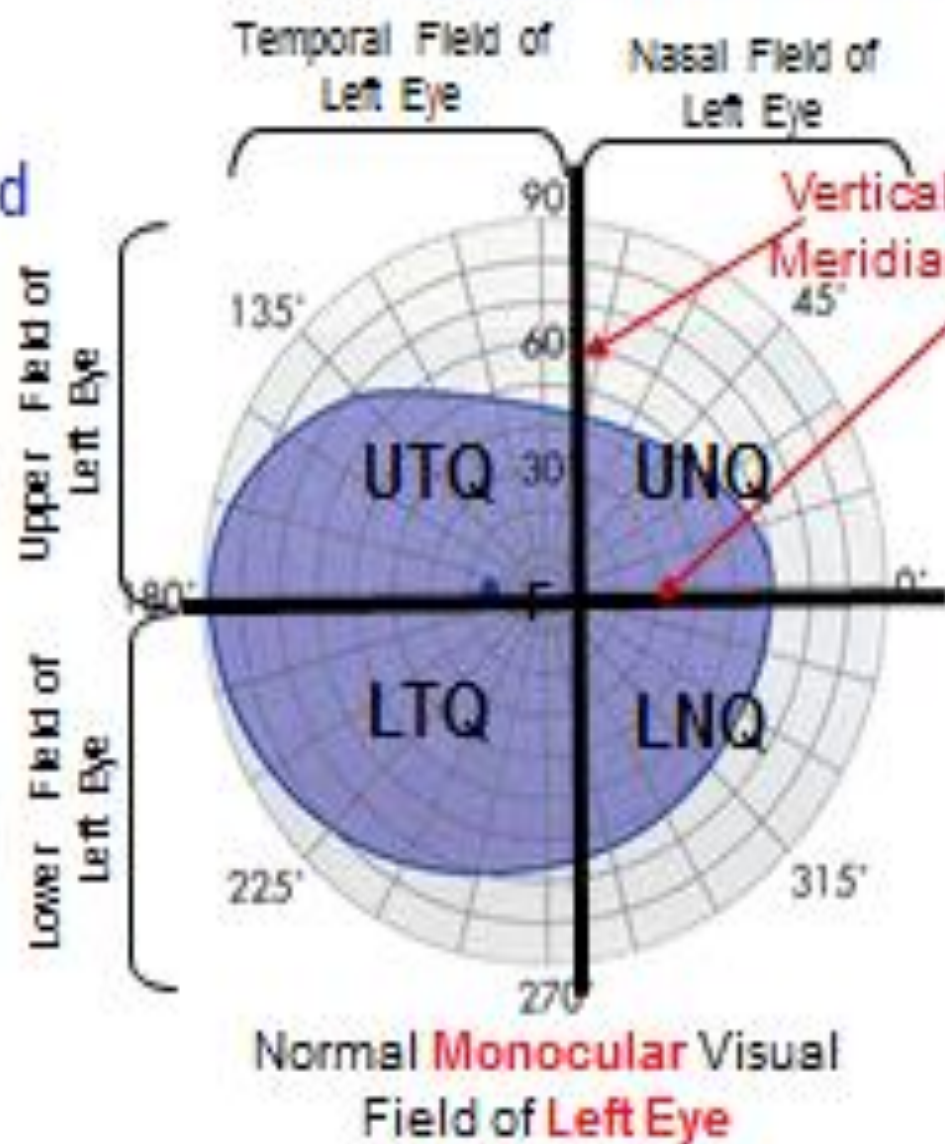
2. Perimetry

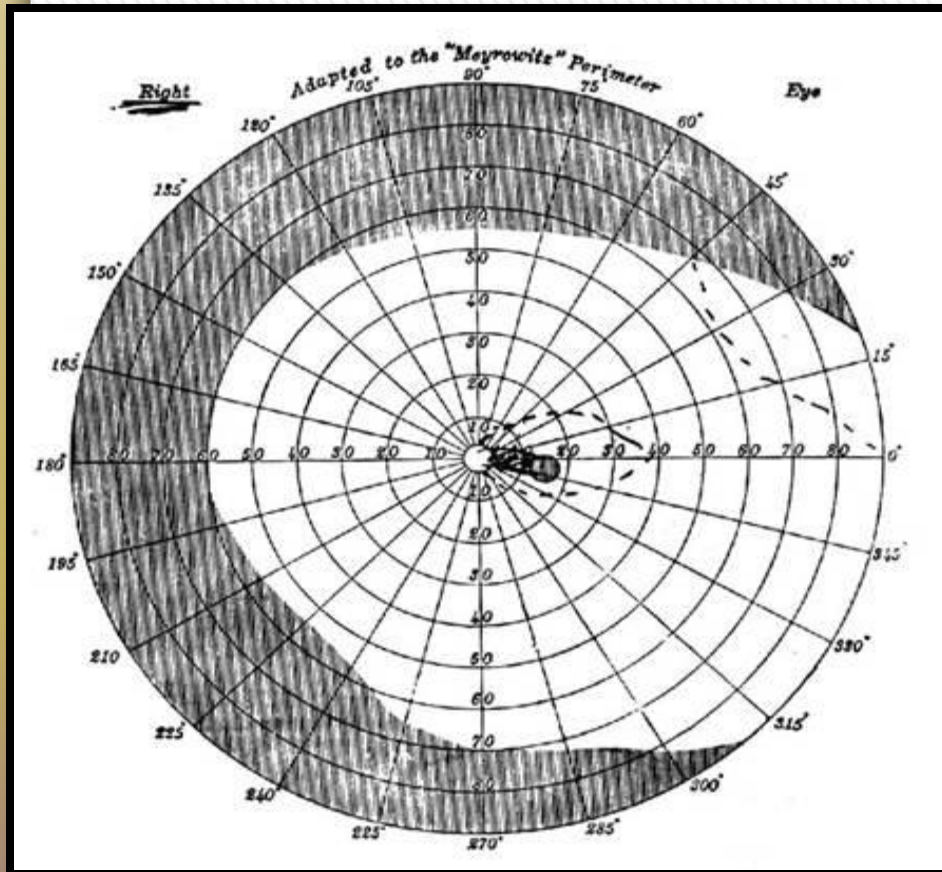
- » **Subject looks with one eye toward a central spot in perimetry chart directly in front of eye then small dot of light is moved in all area of field of vision. The person indicates when the spot of light can be seen or not.**



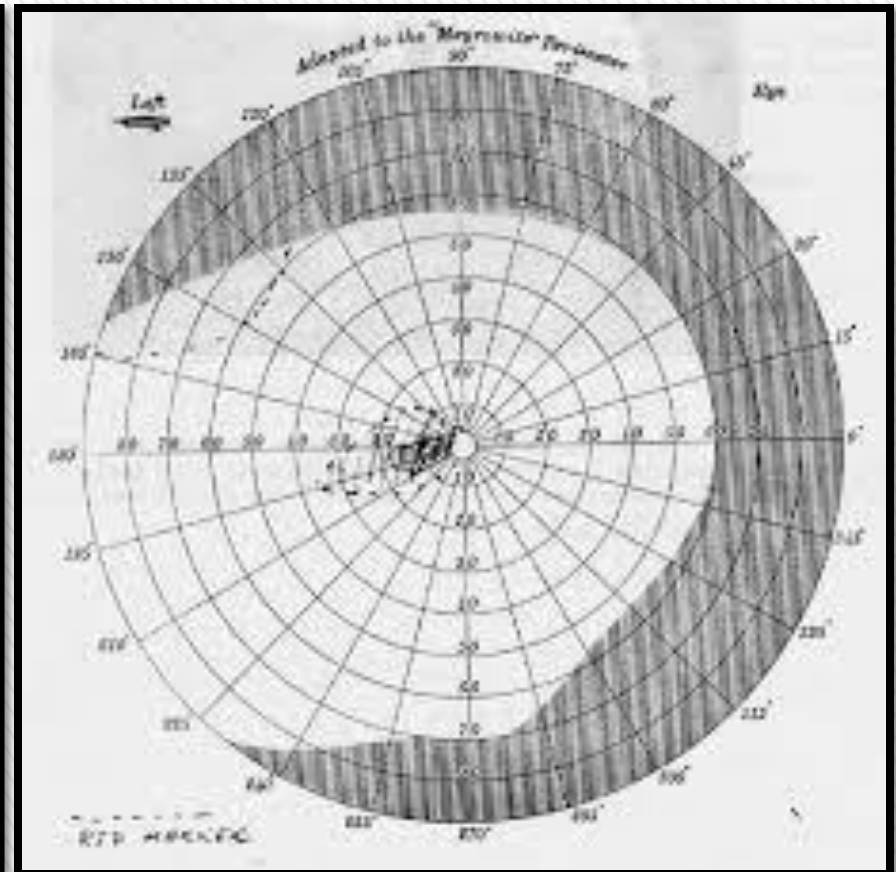
Monocular Visual Fields

id





Visual field of Rt eye



Visual field of Lt eye

Perimetry

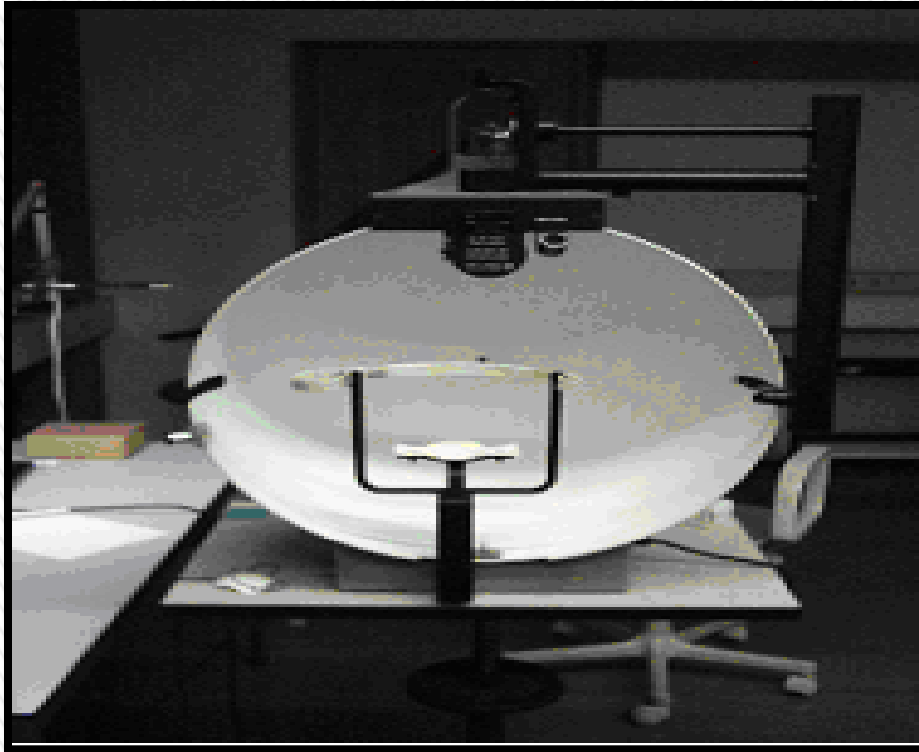


Automated perimetry

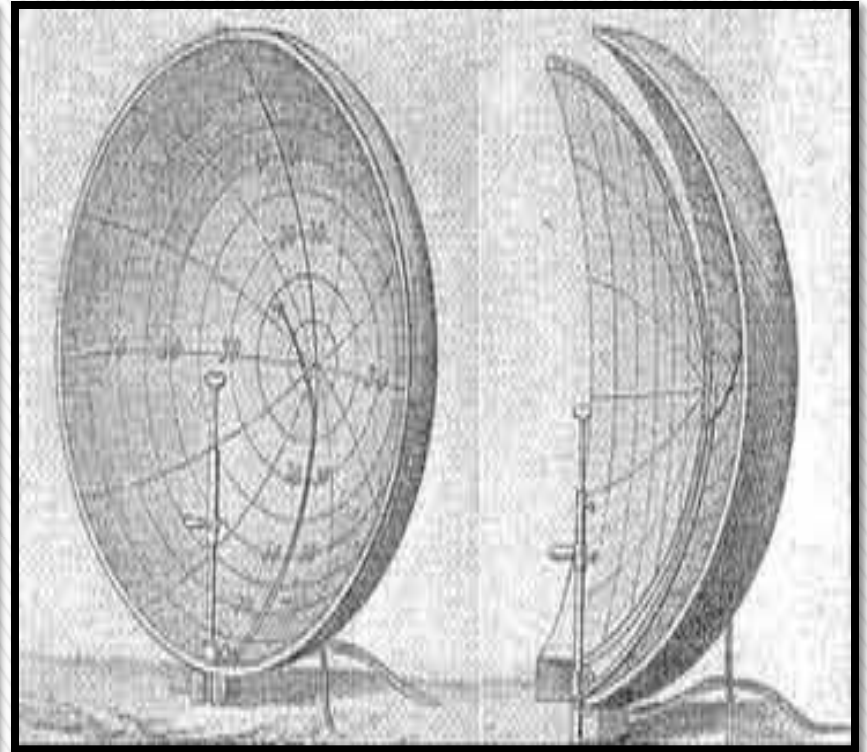


Automated perimetry





Kinetic perimetry



perimetry



**Normal visual field of both
eyes**

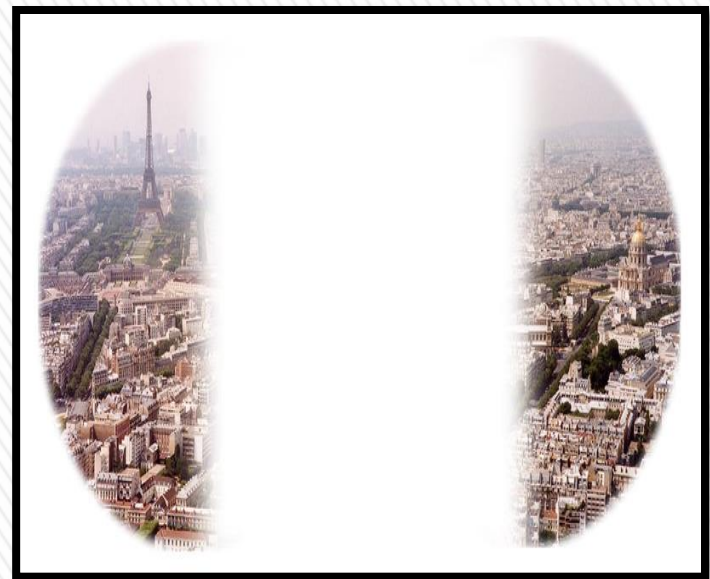


Abnormalities in field of vision:

- ❑ **Hemianopia** : binocular visual defect in each eye's hemifield.
- **Bitemporal hemianopia or binasal hemianopia**



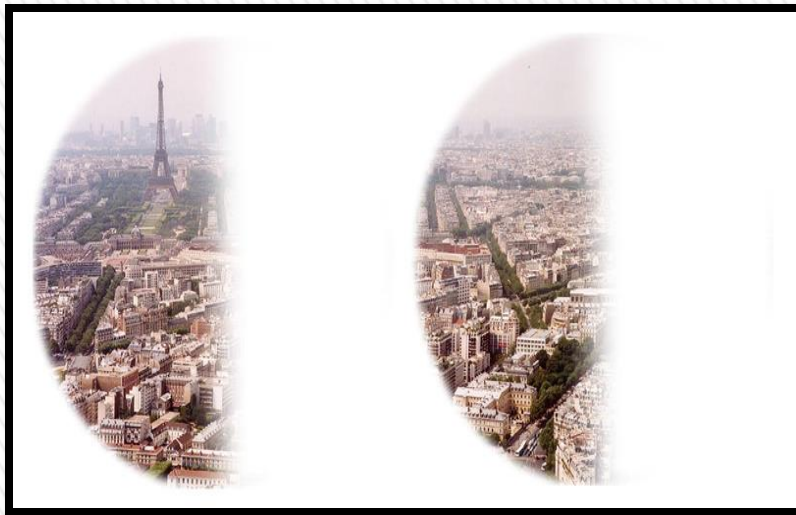
Bitemporal hemianopia



binasal hemianopia



□ Homonymous hemianopia - the two halves lost are on the corresponding area of visual field in both eyes, i.e. either the left or the right half of the visual field (Rt or Lt **Homonymous hemianopia**).

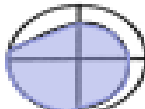
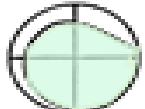
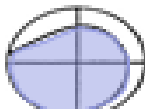
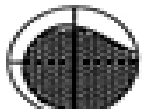

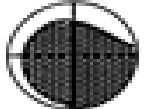
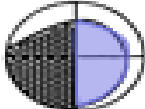
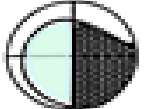
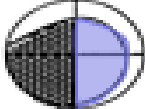
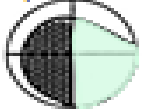


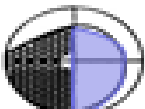
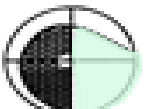


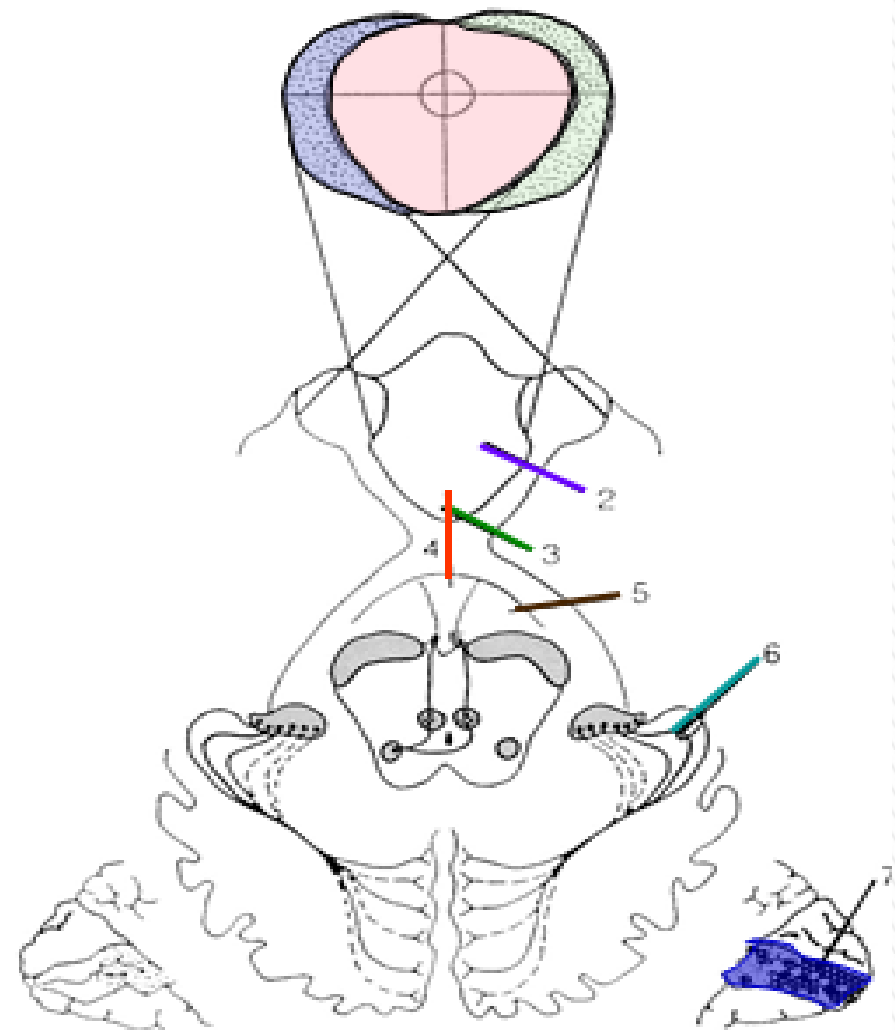
**Right Homonymous
hemianopia**



**Left Homonymous
hemianopia**

Lesions of the Visual Pathway

- | | Left | Right |
|---|---|---|
| 1. Normal visual fields |  |  |
| 2. Blindness of the right eye |  |  |
| 3. Blindness of right eye + contralateral left upper quadrantanopia |  |  |
| 4. Bitemporal heteronymous hemianopsia |  |  |
| 5. Left homonymous hemianopsia |  |  |
| 6. Left upper homonymous quadrantanopia |  |  |
| 7. Left homonymous hemianopsia with macular sparing |  |  |



» **Scotoma (darkness)** :is an area of partial alteration in the field of vision



Normal visual field



Peripheral scotoma



Central scotoma

Colour

Vision



❖ **Cone cells, or cones, are one of the two types of photoreceptor cells that are in the retina of the eye which are responsible for color vision .**

❖ **Cone cells are densely packed in the fovea centralis.**



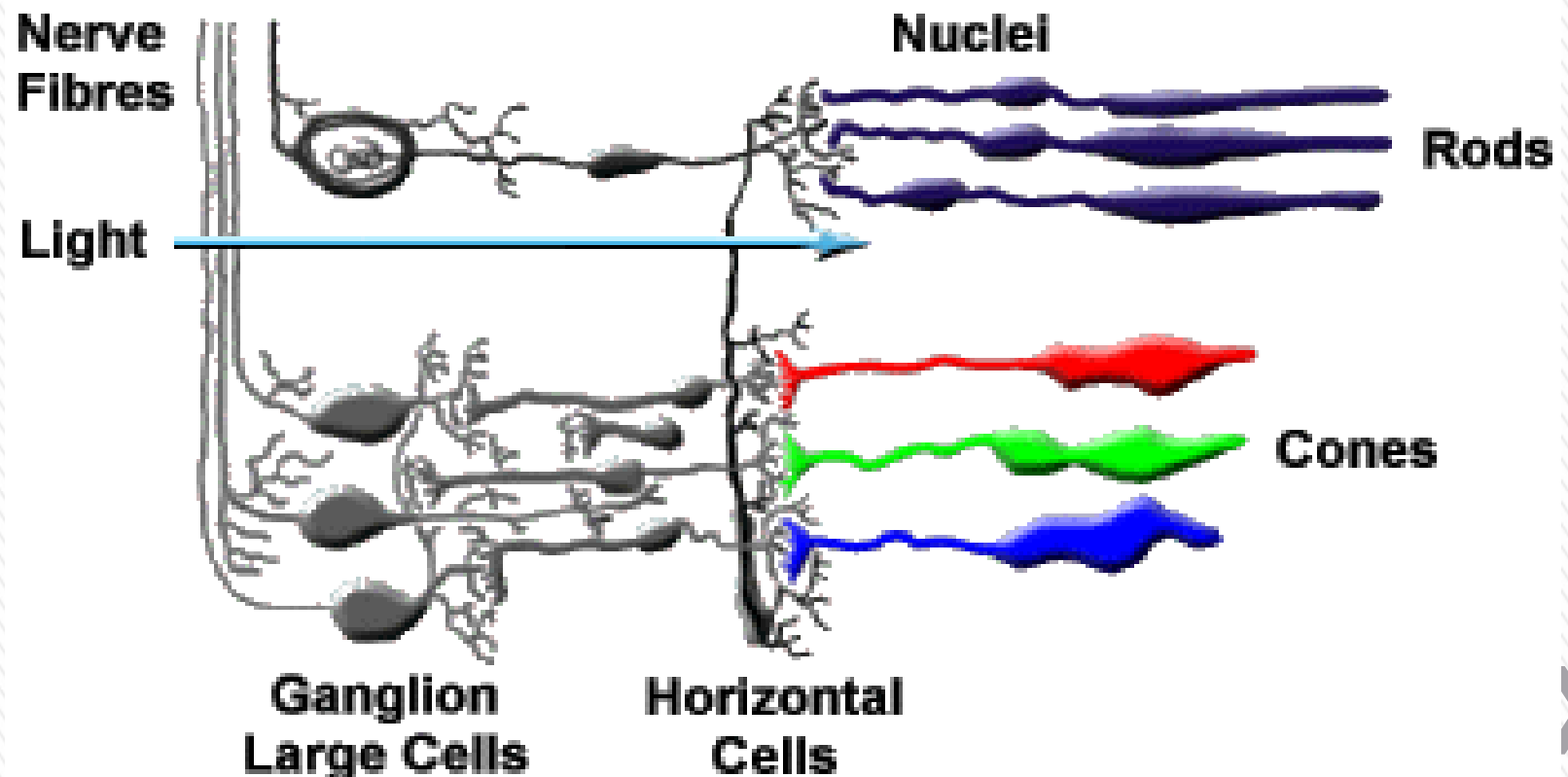
❖ In humans, there are three types of cones sensitive to three different spectra, resulting in trichromatic color vision.

❖ **Trianopia** = color blindness; refer to defect of red, green and blue cone system



Cone and Rods

The Retina



Objective:

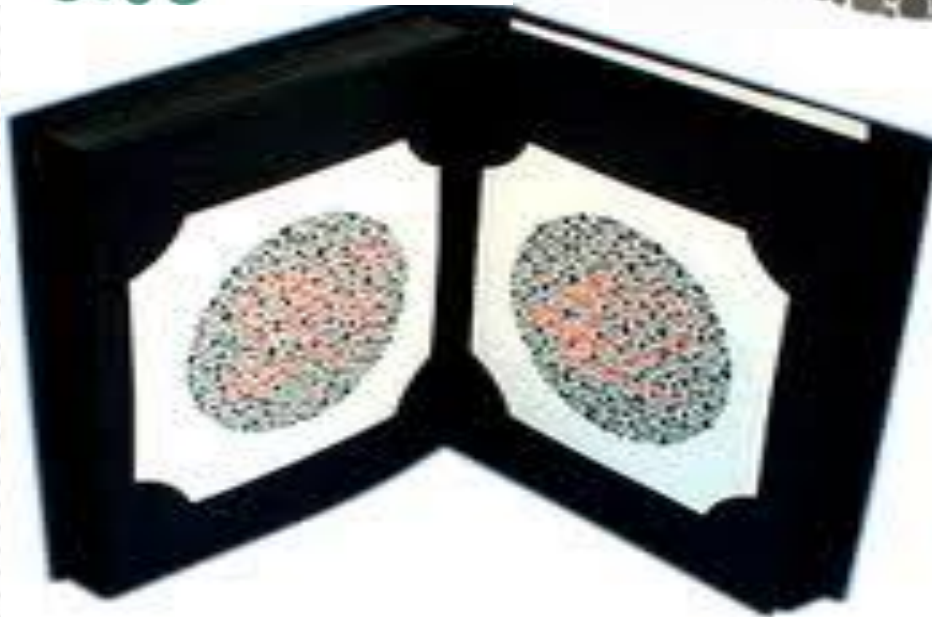
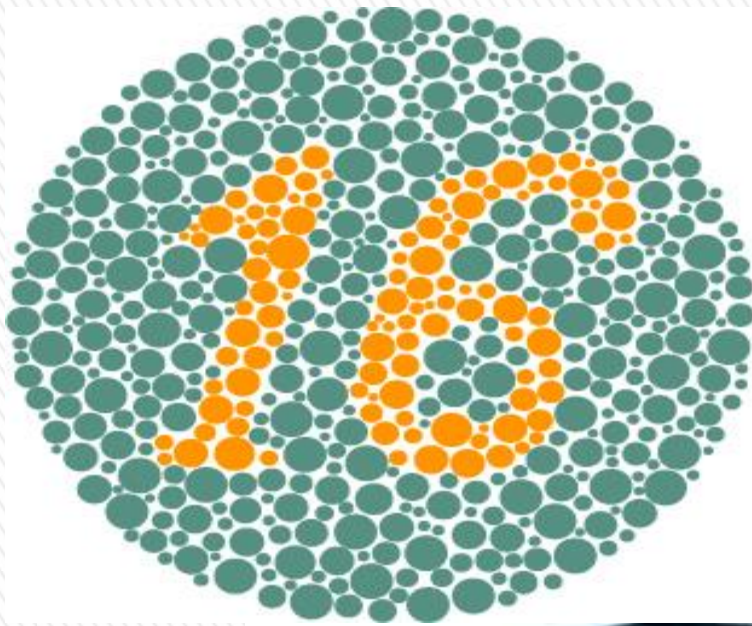
To differentiate between subjects with normal and abnormal color vision.

Materials:

1- Subjects.

2- Ishihara pseudo isochromatic plates(These are coloured spots forming numbers or pictures).

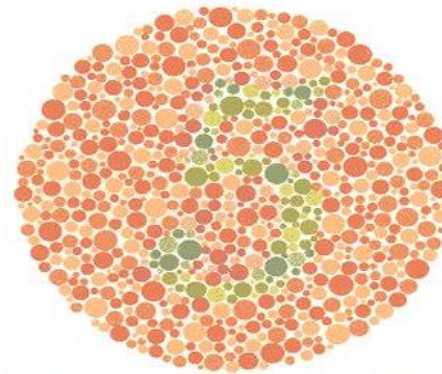
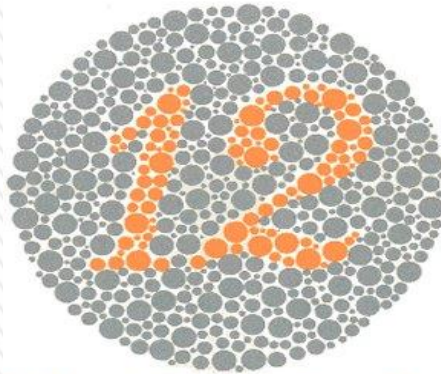




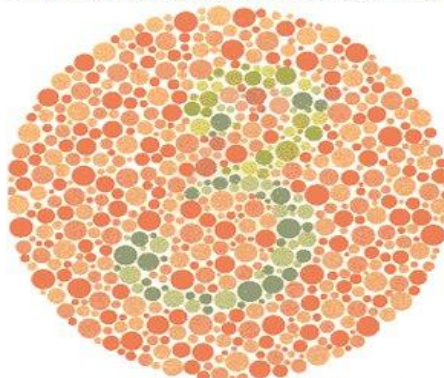
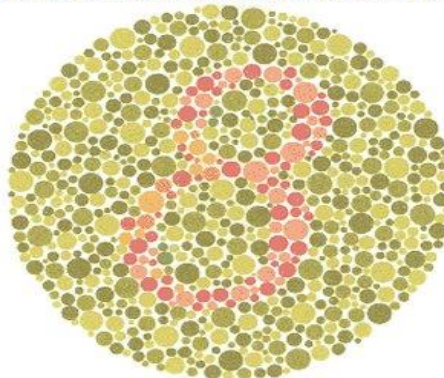
Ishihara plate



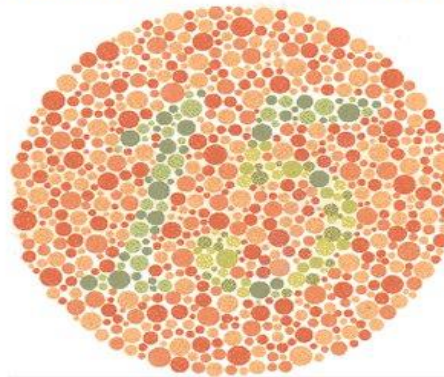
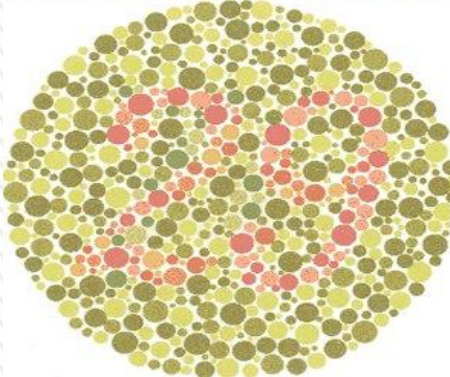
Ishihara Color Blindness Test Plate 1 Ishihara Color Blindness Test Plate 4



Ishihara Color Blindness Test Plate 2 Ishihara Color Blindness Test Plate 5



Ishihara Color Blindness Test Plate 3 Ishihara Color Blindness Test Plate 6



Ishihara plate



Abnormal findings

- ❑ The color blindness is an inherited sex-linked recessive condition which occurs in 8% of male Caucasian population. The most common anomalies of color vision are various types of red-green deficiency.
- ❑ People with blue-yellow deficiency and total color blindness are rare. These abnormalities are due to abnormal gene on the X chromosome.





BittyAnimations