Snellens Chart

Visual Acuity Is the ability of the eye to resolve two different stimuli in space.

- The degree of sharpness to which the details and contours of objects are perceived

Explanation—Light from a distant source without the lens system of eye would be indefinitely small on retina.

Retinal spot has a diameter of about 11 micrometer even with maximum resolution of optical centre. It is brightest in its centre and shades away towards the periphery. The diameter of cone in fovea is 1.5 micrometer as it is about 1/7 th of the spot of light.As the image is bright at the centre and shades at the edge so a person can distinguish two separate points if placed at a distance of at least 2 micrometer as only this would stimulate more then one cone.

Explanation

- The normal visual acuity of a person eye for discriminating between two point sources of light rays from two separate points strike the eye with an angle of at least 45 seconds, then would be recognized as two separate points.

Nodal point

- The centre of lens is called as the Nodal point of the eye

MINUTE THEORY

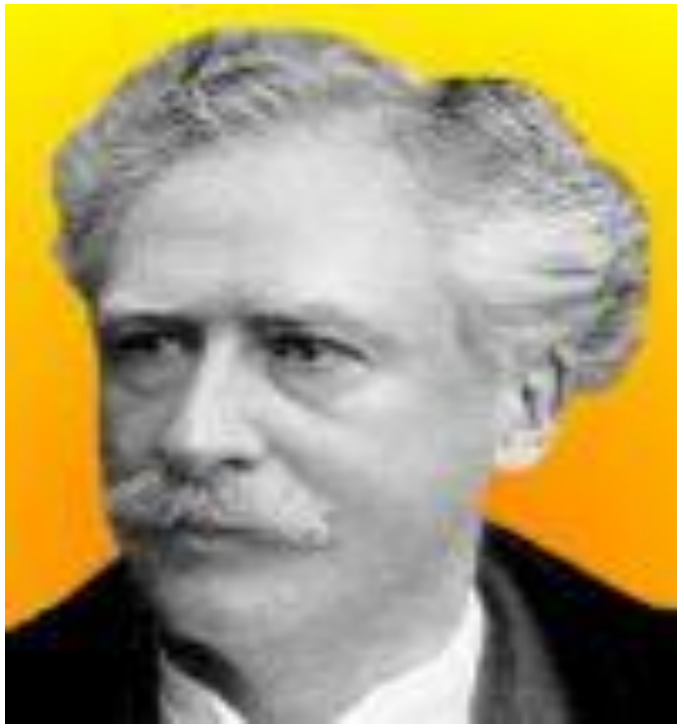
full arc, around the centre of eye—360 degrees

Any thing less then one degree is not considered as degree but denoted as minute.

So one degree, contain 60 parts or 60 minutes and one minute contain 60 parts denoted as seconds

Test distance vision using a Snellen chart

Dutch ophthalmologist Hermann Snellen who developed the chart in 1862.

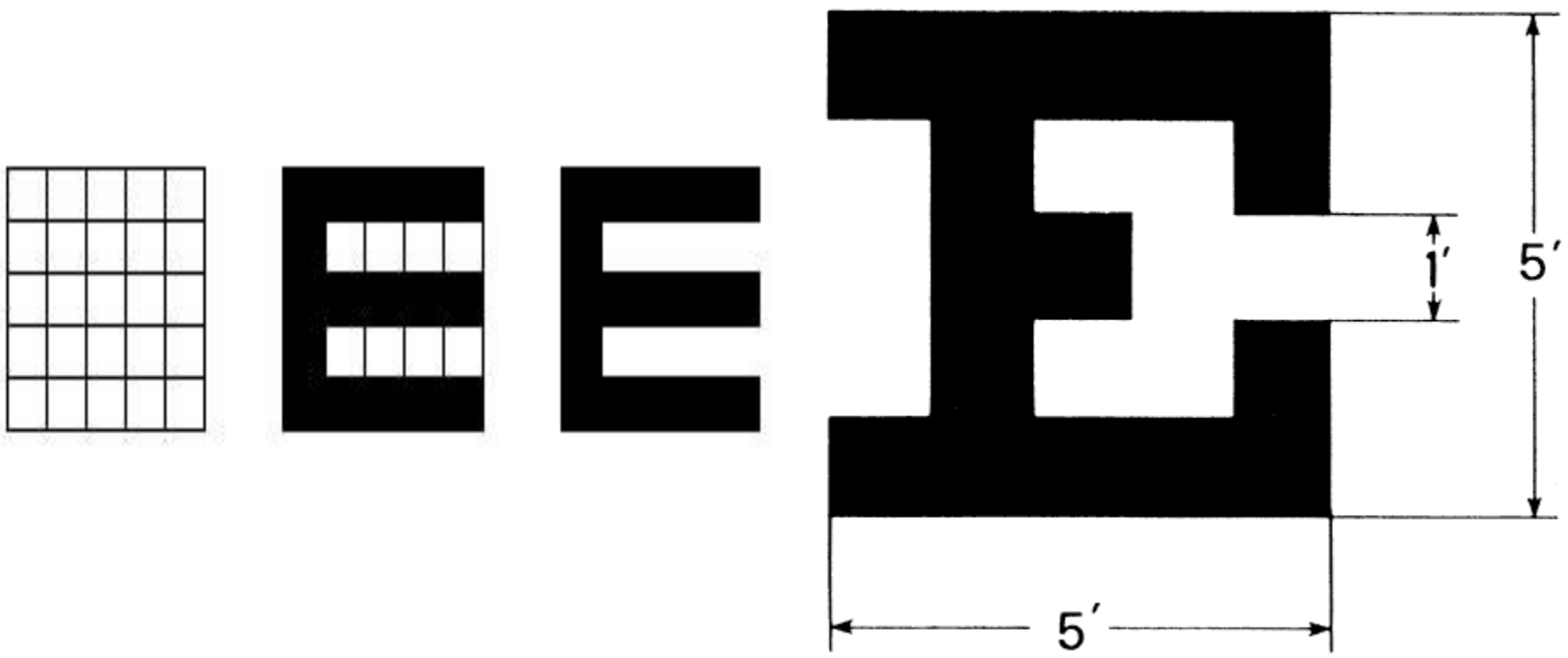


"**Indications**

- To provide a baseline recording of visual acuity (VA)
- To aid examination and diagnosis of eye disease or refractive error
- For medico-legal reasons

Snellens chart

- For routine evaluation of visual acuity, the snellens chart is used.
- It consist of alphabatical letters(usually) of various sizes printed on white board.
- They are arranged equally in 7 or 8 rows or lines. The symbols on an acuity chart are formally known as "optotypes". In the case of the traditional Snellen chart, the optotypes have the appearance of block letters, and are intended to be seen and read as letters. They are not, however, letters from any ordinary typographer's font. They have a particular, simple geometry in which:
- the thickness of the lines equals the thickness of the white spaces between lines and the thickness of the gap in the letter "C"
- the height and width of the optotype (letter) is five times the thickness of the line.
- The top letter is largest which is visible to normal eye at a distance of 60 meters and subsequent In snellens chart, the largest letter will subtend an angle of 5 min at the nodal point if it is 60 meters from the eye.
- Those in the subsequent lines will subtend 5 minutes if they are 36,24,18,12,9 and 6 meter from the eye.


1′
5′
5′

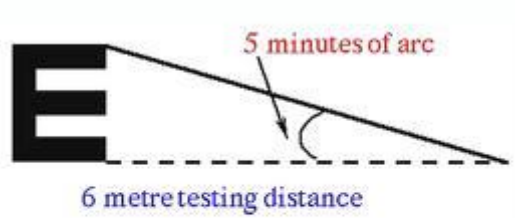


Figure 4. For a visual acuity of 6/6 (20/20), the whole letter subtends an angle of 5 minutes of arc at the eye, and is viewed at 6 metres (20 feet).

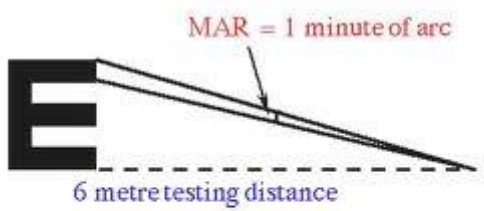
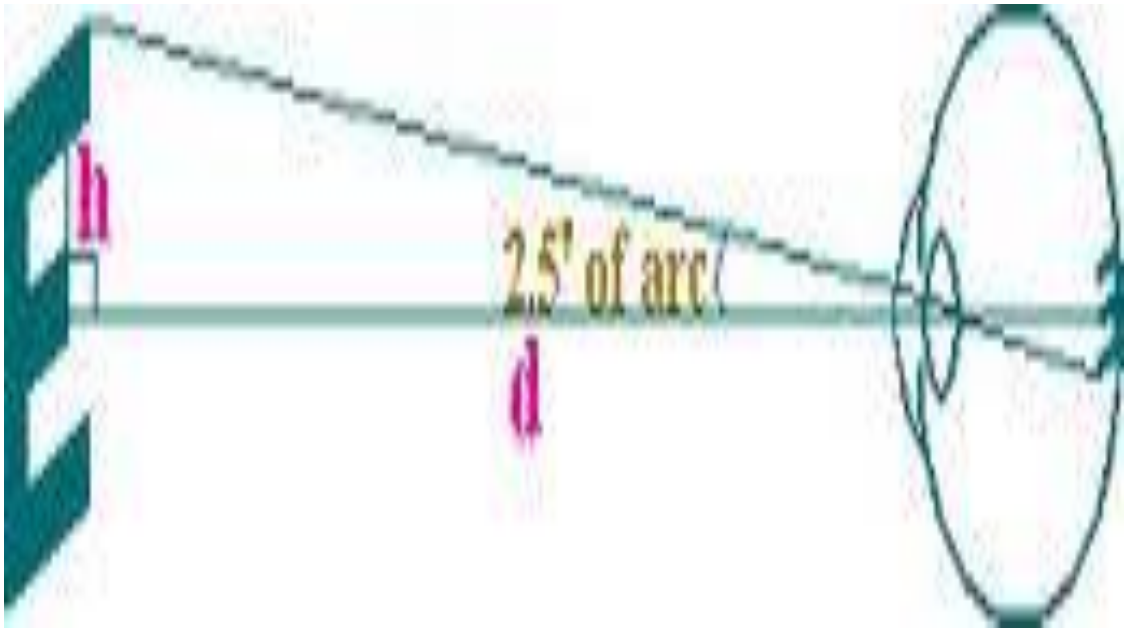


Figure 5. For a visual acuity of 6/6 (20/20), one of the strokes of the letter subtends one minute of arc at the eye. Therefore, the minimum angle of resolution (MAR) is one minute of arc and the logMAR is 0.

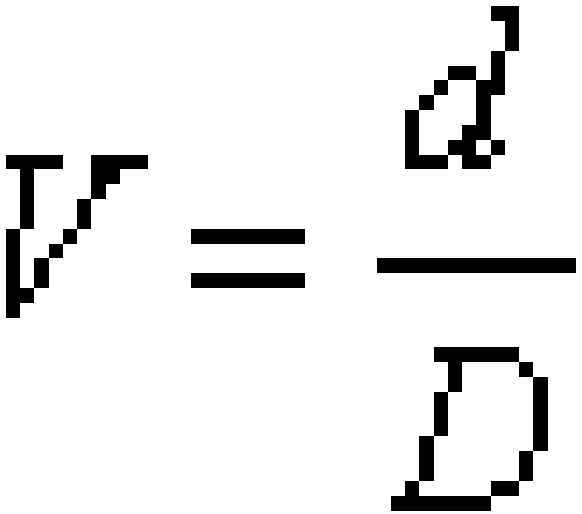

h
2.5' of arc
d

Procedure

- **Equipment**
- Multi-letter Snellen chart
- E or C Snellen chart or a chart with illustrations for patients who cannot read or speak
- Torch or flashlight
- **Procedure**
- Ensure good natural light or illumination on the chart
- Explain the procedure to the patient
- Test each eye separately – the 'bad' eye first
- Position the patient, sitting or standing, at a distance of 6 metres from the chart
- A person taking the test covers one eye, and reads aloud the letters of each row, beginning at the top.
- Ask the patient to wear any current distance spectacles, to cover one eye with his/her hand.
- The traditional Snellen chart is printed with eleven lines of block letters. The first line consists of one very large letter, which may be one of several letters, for example E, H, or N..

Procedure

- Subsequent rows have increasing numbers of letters that decrease in size The smallest line he/she can read (the VA) will be expressed as a fraction, e.g. 6/18 or 6/24 (usually written on the chart).
- The formula=d/D The upper d refers to the distance the chart is from the patient (6 metres) and the lower number D distance in metres at which a person with no impairment should be able to see the chart
- The smallest row that can be read accurately indicates the visual acuity in that eye.



Procedure

- In the patient's documentation, record the VA for each eye, stating whether it is with or without correction (spectacles), for example:
- If the patient cannot read the largest (top) letter at 6 metres, move him/her closer, one metre at a time, until the top letter can be seen – the VA will then be recorded as 5/60 or 4/60, etc.

Procedure

- If the top letter cannot be read at 1 metre (1/60), hold up your fingers at varying distances of less than 1 metre and check whether the patient can count them. This is recorded as counting fingers (CF). Record as: VA = CF
- If the patient cannot count fingers, wave your hand and check if he/she can see this. This is recorded as hand movements (HM). Record as: VA = HM
- If the patient cannot see hand movements, shine a flashlight toward his/her eye from four directions of a quadrant. Record this in the documentation, in the relevant quadrant, as perception of light (PL or √), or no perception of light (NPL or X). Record as:
- If 6/6 (normal vision) is not achieved, test one eye with any current spectacles and repeat the above procedure at 6 meters only.
- If the vision improves, it indicates the visual impairment is due to a refractive error, which is correctable with spectacles or a new prescription
- Repeat the whole procedure for the second eye
- Summarize the VA of both eyes in the documentation, for example:

Wall-mounted Snellen charts are inexpensive

- A person with average acuity of vision should be able to read the top letter at 60 meters, the second at 36meters,the third at 24 and so on.
- **The patient is kept at a distance of 6m from the types because rays incident on the eye from a distance of 6 meters or more can be considered parallel and do not focus on retina, they need to bend or refract to get focused on retina, to form a clear image of the outside world. This refraction is done by cornea, aqueous,lens and vitreous, which are denser than air.**

The Snellen Chart provides a standardized test of visual acuity. The chart is placed 6 m - 20 feet - from the subject.

Q. What is the meaning of 6/6.

- 6/6 vision signifies normal vision i.e. a patient can read a line of symbols at six meters that a person with 'normal visual acuity' would be able to read at six meters.

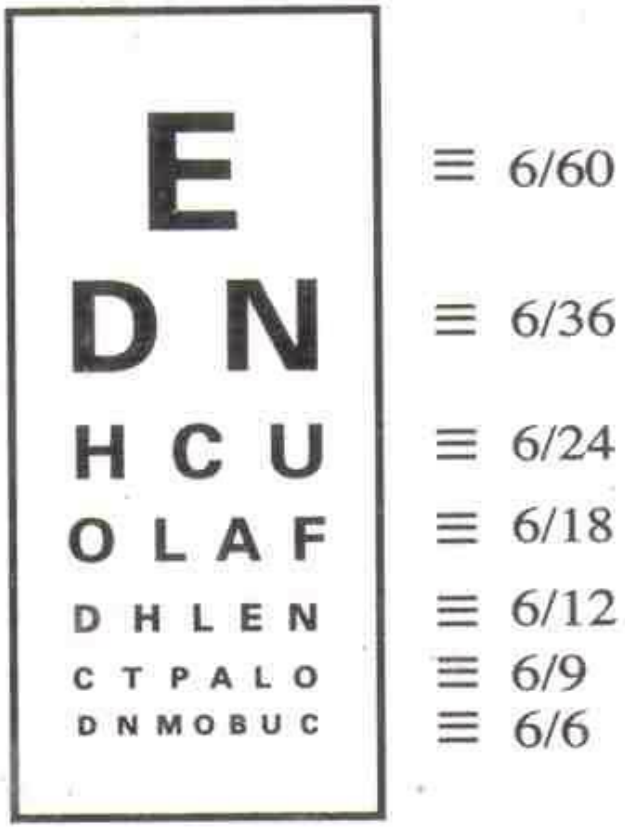
Q. What is the meaning of 6/10.

- A person with poor vision may have e.g. 6/10 vision i.e. they are able to read at 6 meters what a person with normal vision can read at 10 meters.

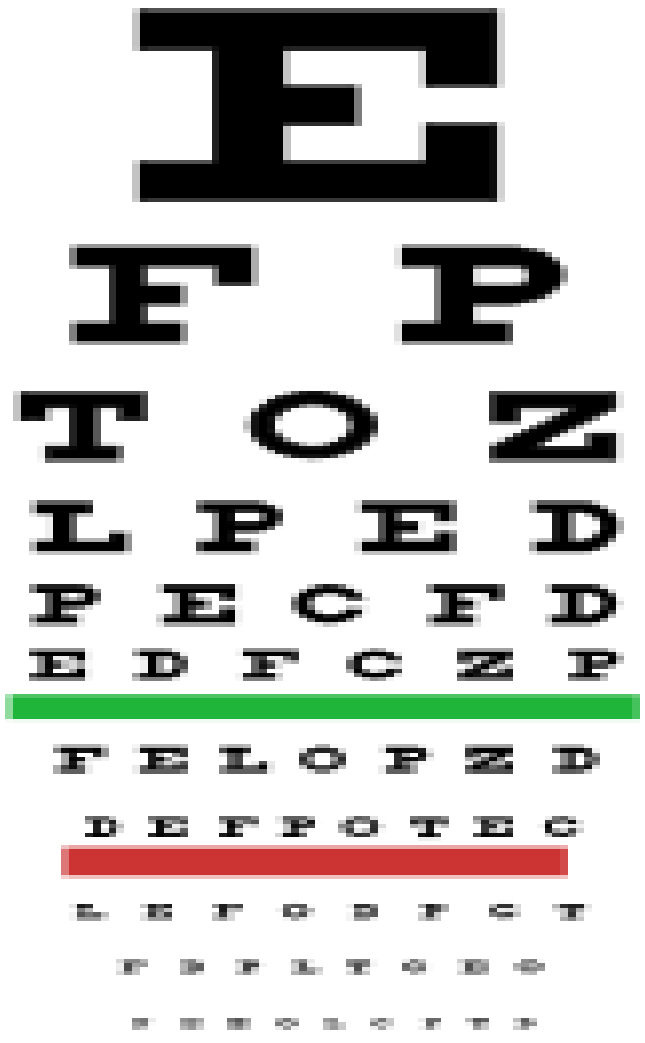
Q. What is the meaning of 6/5.

- A person with better than normal vision will have a denominator that is less than 6 e.g. 6/5 i.e. a person with this grading of visual acuity can read at six meters what a person with normal visual acuity can only read at 5 meters.

- A normal subject 6 meters from the types ought to be able to read every letter from the top to the end of the 6 meter line
- If the patient can only read the 18 meter line(fourth line), his /her distant vision is recorded as V=6/18.It means the subject has error of refraction. As the fourth line is normally read from 18 meters by the normal subjects but the patient can read it from 6 meters.
- A normal subjects vision will be V=6/6



Snellen's test types

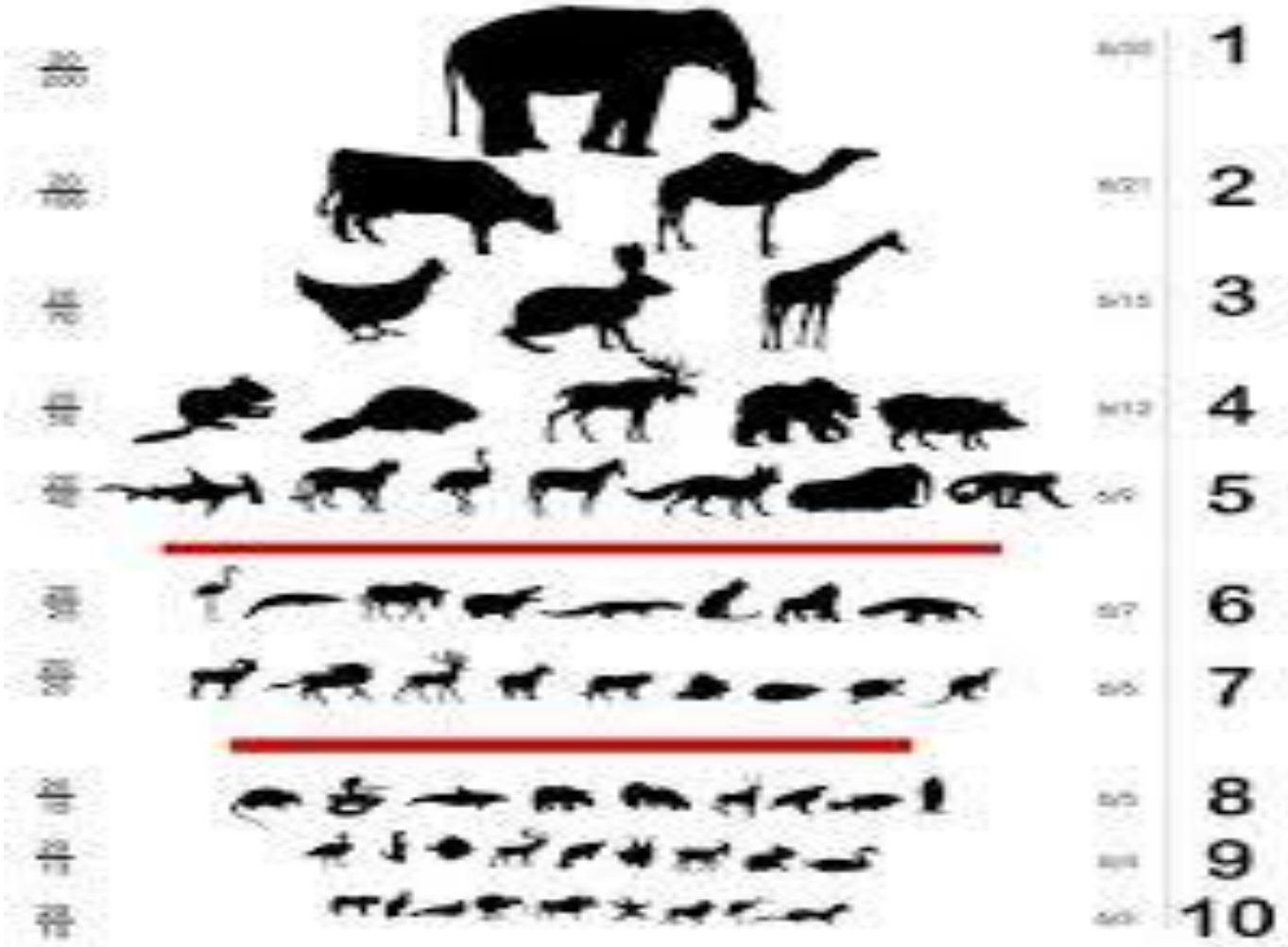


1	20/200
2	20/100
3	20/70
4	20/50
5	20/40
6	20/30
7	20/25
8	20/20

Snellens chart

- First line--------D=60 or 200 feet
- Sec line----------D=36 or 100 feet
- Third line--------D=24 or70 feet
- Fourth line—--D=18 or 50 feet
- Fifth line--------D=12 or 40 feet
- Sixth line--------D=9 or 30 feet
- Seventh line----D=6 or 25 feet
- Eighth line------D=5 or 20 feet

Snellens chart



Snellens chart

Fig.1: Snellen Letter Components