



Using Test Cards for Paediatric Visual Acuity

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WHAT IS VISUAL ACUITY:

Visual Acuity (VA) is a measurement of how well the patient is able to see with their central vision only (when spectacles are worn if they are needed). This is also called *Best Corrected Visual Acuity (BCVA)*.

Other measurements of vision can also be clinically useful:

- *Uncorrected Vision (Un)* - with no spectacles or contact lenses
- *Habitual Vision (Hab)* - wearing the patient's current prescription

Visual acuity can be measured for both distance and near vision. The standard assessment is *Distance Visual Acuity*, but the *Near Visual Acuity* becomes especially relevant of vocational and recreational tasks.

The concept of Visual Acuity is to tell us how well the patient sees at a certain distance when compared to how well somebody with normal sight sees at that same distance.

TEST CARDS FOR YOUNG CHILDREN:

The *Hanks Paediatric Test Cards* provide a convenient and accurate way to assess the visual performance of young children.

The most common tests for visual acuity are line charts consisting of letters or numbers. Symbols on these charts are known as "optotypes" and they are usually separated by a distance that is equal to the width of the symbols.

The symbols used in these test-cards have been developed for infants and children who are unable to read. They use simplified illustrations that have been



tested for recognition by children and calibrated so that the strokes and separations correspond to the visual acuity measurements shown.

TESTING DISTANCE:

Distance visual acuity is normally measured with tests positioned at 6 metres (20 feet) from the patient. For infants and children this distance may not be practical and the cards can be effectively used at 3 metres. While they use a visual acuity notation for 6 metres, this can easily be converted to any other testing distance.

CROWDED OR UNCROWDED:

There is a difference in the visual acuity when measured with single symbols (flash-cards) and when measured with crowded symbols (line charts).

The second set of symbols in the *Hanks Paediatric Test Cards* is more difficult because red Contour Interaction Bars (Crowding Bars) have been added.



These will produce results that are more comparable to a standard line chart and are generally up to two lines worse than the measurements taken with single (uncrowded) symbols.

PRESENTATION TO THE CHILD:

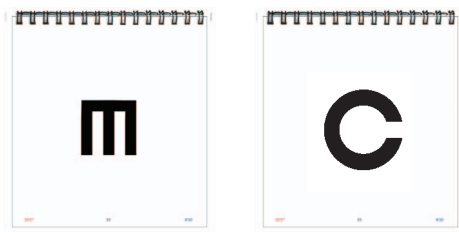
The flash-cards can be presented in random order to prevent memorising. If using the *Illiterate E* or *Landolt C* targets, the book can be rotated for the alternative orientations. (Note that these targets are also printed in a variety of orientations so that the spine of the book cannot be used as a clue to the direction of the target).

- First ask the child to identify “your drawings” in a large size to confirm that they recognise them.
- Cover one eye with either a patch or the child’s own hand (using the palm, not the fingers).
- Continue to present smaller targets until they can no longer be seen accurately.
- Record the size that was last seen correctly.
- Repeat for the other eye.

ILLITERATE E OR LANDOLT C:

These two tests of visual acuity have been in use for many years (since the 19th Century). They work by asking the patient to identify the direction of the E, or the gap in the C.

The *Illiterate E* is also called the *Tumbling E Chart*. The *Landolt C* is also called the *Landolt Ring Chart*.



CONVERTING THE RESULTS - IF NECESSARY:

If the test was conducted at a distance shorter than 6 metres, this can easily be converted to the standard 6 metre (20 feet) notation.

Converting the Measured VA for the Testing Distance

Distance visual acuity (VA) is normally tested at a distance of 6 metres (20 feet), so “normal vision” is 6/6 metric (or 20/20 in feet).

If a shorter distance is used, the result can still be converted to the equivalent visual acuity at 6 metres.

As shown in the table below, if the flash-card labelled 6/20 is the best result at 3 metres, then the VA is 3/20 and this is the equivalent of 6/40.

VA Label	6M	3M	1.5M	1M	0.75M	0.5M
6/5	6/5	6/7.5	6/10	6/15	6/20	6/30
6/6	6/6	6/9	6/12	6/18	6/24	6/36
6/7.5	6/7.5	6/11.25	6/15	6/22.5	6/30	6/45
6/9	6/9	6/13.5	6/18	6/27	6/36	6/54
6/10	6/10	6/15	6/20	6/30	6/40	6/60
6/12	6/12	6/18	6/24	6/36	6/48	6/72
6/15	6/15	6/22.5	6/30	6/45	6/60	6/90
6/18	6/18	6/27	6/36	6/54	6/72	6/108
6/20	6/20	6/30	6/40	6/60	6/80	6/120
6/24	6/24	6/36	6/48	6/72	6/96	6/144
6/30	6/30	6/45	6/60	6/90	6/120	6/180
6/36	6/36	6/54	6/72	6/108	6/144	6/216
6/40	6/40	6/60	6/80	6/120	6/160	6/240
6/45	6/45	6/67.5	6/90	6/135	6/180	6/270
6/54	6/54	6/81	6/108	6/162	6/216	6/324
6/60	6/60	6/90	6/120	6/180	6/240	6/360
6/72	6/72	6/108	6/144	6/216	6/288	6/432
6/90	6/90	6/135	6/180	6/270	6/360	6/540
6/108	6/108	6/162	6/216	6/324	6/432	6/648
6/120	6/120	6/180	6/240	6/360	6/480	6/720
6/150	6/150	6/225	6/300	6/450	6/600	6/900
6/180	6/180	6/270	6/360	6/540	6/720	6/1080
6/200	6/200	6/300	6/400	6/600	6/800	6/1200
6/240	6/240	6/360	6/480	6/720	6/960	6/1440
6/300	6/300	6/450	6/600	6/900	6/1200	6/1800
6/360	6/360	6/540	6/720	6/1080	6/1440	6/2160
6/400	6/400	6/600	6/800	6/1200	6/1600	6/2400
6/450	6/450	6/675	6/900	6/1350	6/1800	6/2700
6/540	6/540	6/810	6/1080	6/1620	6/2160	6/3240
6/600	6/600	6/900	6/1200	6/1800	6/2400	6/3600
6/720	6/720	6/1080	6/1440	6/2160	6/2880	6/4320
6/900	6/900	6/1350	6/1800	6/2700	6/3600	6/5400
6/1080	6/1080	6/1620	6/2160	6/3240	6/4320	6/6480
6/1200	6/1200	6/1800	6/2400	6/3600	6/4800	6/7200

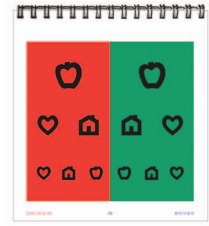
• For those who prefer to work with the 20/20 notation, an equivalent table is available for download from www.hankseycharts.com.au

For example, if visual acuity is tested at 3 metres and the result is the 6/10 symbol. This is a measurement of 3/10 at 3 metres; equivalent to 6/20 at 6 metres. (See the conversion table at the back of the book).

DUOCHROME:

This is a test for refractive error that is based upon chromatic aberration, whereby the different wavelengths of light (corresponding to different colours) are bent to different extents.

A clearer green target indicates that the subject’s eye is hyperopic (long-sighted), while a clearer red target indicates that the eye is myopic (short-sighted).



Note that results for this test can also be affected by the subject’s accommodative effort and that this is especially relevant for children (unless a cycloplegic has been used).










WORTH 4 DOT (WFD):



This is a test for binocularity and is conducted with the subject wearing cyan/red anaglyph filters (cyan on the right eye).

- With both eyes open and the anaglyph filters being worn, ask the child to identify what they can see on the card.
- Ask “how many symbols?”, “what shape are they?” and “what colours are they?”.
- From these answers binocularity can be confirmed or suppression can be identified as being of the right or left eye.



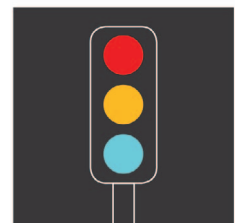
WORTH 4 DOT		
Binocular	   	4
Right Eye Suppression	  	3
Left Eye Suppression	 	2

TRAFFIC LIGHTS (TL):



This is an alternative test for binocularity and suppression. It is also conducted with the subject wearing cyan/red anaglyph filters (cyan on the right eye).

- With both eyes open and the anaglyph filters being worn, ask the child to identify what they can see on the card.
- Ask “how many lights are there?” and “what colours are they?”.
- From these answers binocularity can be confirmed or suppression can be identified as being of the right or left eye.



- See the table following . . .

TRAFFIC LIGHTS		
Binocular		3
Right Eye Suppression		2
Left Eye Suppression		2

FIXATION DISPARITY (FD):

This is a test for misalignment during binocular vision and is conducted with the subject wearing cyan/red anaglyph filters (cyan on the right eye).

- First confirm that there is binocularity (no suppression) with the WFD or TL test.
- With both eyes open and the anaglyph filters being worn, ask the child whether the coloured vertical bars are above one another or over to the toward the sides.
- Ask about the direction away from one another.
- From these answers the type of fixation disparity can be determined.

FIXATION DISPARITY			
Result			
Associated Phoria		Exophoria	Esophoria
Prism to Reduce FD		Base In	Base Out

- For particularly cooperative children the amount of fixation disparity can be measured by using prisms to align the two vertical bars. This is called the associated phoria.