



# VISUAL ACUITY

## THINK

Our vision lets us see shapes and colours and tells us where an object is. Some people can see things more clearly than other people.

It is important to be able to measure a person's vision to find out how well they see and if their vision is getting better or worse. Knowing how well someone sees helps us to find out if there is something wrong with their eyes.

When we measure a person's vision we call this measuring their visual acuity.

## AIM

This unit teaches you how to measure a person's visual acuity.

## LEARNING OUTCOMES

When you have worked through this unit you should be able to:

- define visual acuity
- understand why measuring visual acuity is important
- describe the different types of visual acuity measurements
- recognise different types of visual acuity charts and know how to use them
- measure and record distance visual acuity
- measure and record near visual acuity.

## VISUAL ACUITY

Visual acuity (VA) is a measure of how clearly a person sees when they are looking directly (straight) at an object. When a person looks directly at an object, they are using the part of the retina called the macula, which is used for central vision. Often VA is simply called vision – but vision actually includes everything that a person sees, not just their central vision.


Common causes of poor VA are:

- **Refractive error:**

In this case a person's eyes may be healthy, but they may not be the correct size and shape to focus light correctly onto the retina. A person who has a refractive error will need to wear spectacles if they want to see clearly.

- **Eye health problem:**

Some eye health problems (like cataracts) can cause poor vision. If a person has poor VA because of an eye health problem, spectacles will not improve their vision (unless they also have a refractive error).

<b>VA TESTING DISTANCE</b>	<p>A person's VA can be different at different distances. Some people see things that are close to them well, but have trouble seeing things that are far away from them. Other people see things that are far away clearly, but they can't see things that are close to them. Some people have problems seeing things at all distances, no matter how far away an object is.</p> <p>This is why VA must be measured at different testing distances.</p> <p>Distance VA is usually measured at a distance of 6 metres (m). Most distance VA charts are designed to be placed 6 m away from a person, but there are some distance VA charts that are specially designed to be used at a distance of 3 m which can be more convenient in some cases.</p> <p>Near VA is usually measured at a distance of 40 centimetres (cm) from a person's eyes.</p>
<b>TYPES OF VA MEASUREMENT</b>	<p>One of the first things that you need to do when a person comes to you for an eye examination is to measure their VA. VA must be measured for the right and left eyes separately, and for both eyes together.</p> <div data-bbox="443 1350 1501 1691">  <p><b>There are two reasons for this:</b></p> <ol style="list-style-type: none"> <li><b>1. To get an accurate VA measurement:</b> Other tests might affect the person's VA, or they might get better at reading the VA chart through practice.</li> <li><b>2. To protect yourself legally:</b> If a person says that their eyes have become worse because of the eye examination you gave them, you will have your initial VA measurement to use as a reference.</li> </ol> </div>
<b>UNAIDED VA</b>	<p>A person's unaided VA is their VA without spectacles.</p>

## VISUAL ACUITY (cont.)

### AIDED VA

A person's aided VA is their VA when they are wearing their spectacles.  
There are different types of spectacles. Spectacles can be for distance vision only, for near vision only, or for both distance and near vision.



#### Usually:

If a person is given spectacles for distance only:

- their vision for distance is clear when they wear their spectacles
- their vision for near could be blurry when they wear their spectacles.

If a person is given spectacles for near only :

- their vision for near is clear when they wear their spectacles
- their vision for distance is blurry when they wear their spectacles.

If a person is given one pair of spectacles for distance and near:

- their vision for distance is clear *and*
- their vision for near is clear.

When you measure aided VA, it is important to make sure that the person is wearing the appropriate spectacles for the distance that you are testing.



Ask the person whether they wear their spectacles:

- all the time
- only for looking at things that are far away (distance only)
- only for looking at things that are close to them (near only).

If they have distance only spectacles:

- measure distance VA with the spectacles
- measure near VA without the spectacles.

If they have near only spectacles:

- measure distance VA without the spectacles
- measure near VA with the spectacles.

### PRESENTING VA

A person's presenting VA is the VA that a person has when they arrive to have their eyes examined.

- If they are wearing spectacles when they arrive, their presenting VA is the same as their aided VA.
- If they are not wearing spectacles, their presenting VA is the same as their unaided VA.

Presenting VA is sometimes called "Entering VA"

### HABITUAL VA

A person's habitual VA is the VA that they usually have. This might be with or without spectacles.

- If a person has spectacles, but does not usually wear them, their habitual VA is the same as their unaided VA.
- If a person has spectacles and usually wears them, their habitual VA is the same as their aided VA.

A person might own spectacles, but they might not wear them very often.

They might tell you that:

- their spectacles do not improve their vision
- their spectacles make their eyes feel tired
- they do not like the way they look when they are wearing their spectacles.



It is important to ask people whether they have worn spectacles in the past.

## VISUAL ACUITY (cont.)

### BEST-CORRECTED VA

The best possible VA that a person can have is their best corrected VA. This will be different for different people.

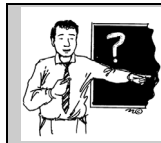
After you have performed a refraction examination to see if a person has a refractive error, you must measure their VA again.

→ The VA that a person has with the spectacle lenses that improve their vision the most is their best corrected VA.

### MONOCULAR AND BINOCULAR VA

Monocular VA is the VA that a person gets when just one eye is open (when the other eye is covered). Binocular VA is the VA that the person gets when both eyes are open and uncovered.

Both monocular VA (for right and left eyes) and binocular VA must be measured for every person. The binocular VA is usually better than either of the monocular VAs.

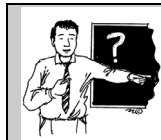


Binocular VA is usually better than monocular VA.

This is because two eyes that work together can usually see better than one eye alone.

Best corrected monocular VA for the right eye and the left eye should always be approximately equal.

If there is more than one line of difference between the two eyes you should suspect an eye health problem.



Best corrected VA for right eye should be about the same as best corrected VA for the left eye.

### DISTANCE VA CHARTS

There are many types of VA charts available. Each type of chart has a special purpose, and a specific distance that it should be used at.

Different types of VA charts have differently sized characters (letters, pictures, numbers or symbols). Some examples are shown in Figure 10.1. VA charts that use pictures or symbols (such as a “tumbling E” chart) are particularly useful for children or for people who cannot read or speak.

VA charts include Snellen and LogMAR charts.

Characters on a VA chart are usually largest at the top of the chart, and gradually get smaller towards the bottom of the chart.

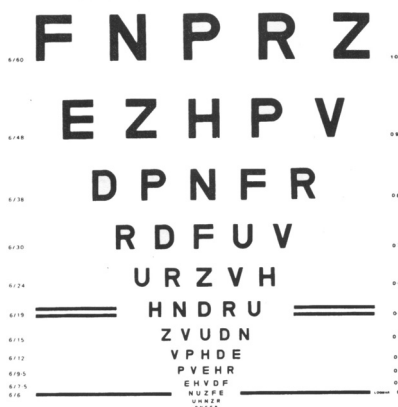


Figure 10.1A: A LogMAR VA chart



Figure 10.1B: A picture VA chart

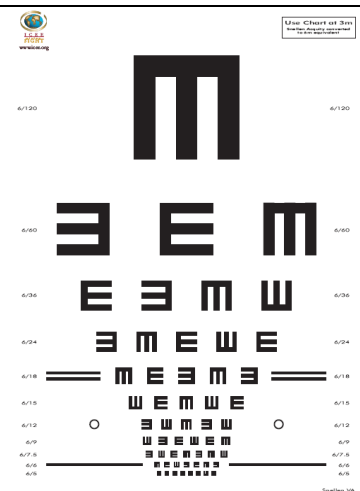




Figure 10.1C: A “tumbling E” VA chart

## VISUAL ACUITY (cont.)

<b>DISTANCE VA CHARTS (cont.)</b>	<p>Special rules must be followed when making a VA chart. The size of the letters or symbols on a VA chart (and the space between them) must be calculated and printed using special techniques. This is so VA measurements are accurate and repeatable (the same each time). Because VA charts are so difficult to make, we usually use readymade VA charts instead of making our own charts.</p>
<b>SNELLEN FRACTIONS</b>	<p>Each line of characters on a VA chart is labelled to tell you what vision a person needs to be able to see that line. Usually the label is a fraction number that is called a Snellen fraction.</p> <p>A Snellen fraction has a number on the top and a number on the bottom:</p> <ul style="list-style-type: none"> <li>The number on the top tells you how far away the chart is from a person (usually a distance chart is 6 m away in which case the top number is 6).</li> <li>The number on the bottom tells you how far away a person with normal vision could be and still see that line of characters.</li> </ul> <div data-bbox="454 824 603 958">  </div> <p><b>TESTING DISTANCE (metres)</b></p> <p>VA = Distance at which someone with normal vision could read the same VA line (metres)</p>
<b>EXAMPLE 1</b>	<p>You measure a boy's VA and find that the smallest line of pictures that he can see is 6/6.</p> <p>→ This means that when the boy is 6 m away from the VA chart he can see what a normal person sees if they were 6 m away from the chart.</p> <p>→ This means that the boy's VA is normal.</p>
<b>EXAMPLE 2</b>	<p>You measure a woman's VA and find that the smallest row of letters that she can read is 6/48.</p> <p>→ This means that when the woman is 6 m away from the VA chart she can only see the letter size that a person with normal vision could see if they were 48 m away from the chart.</p> <p>→ This means the woman has poor vision.</p> <div data-bbox="454 1462 603 1597">  </div> <p>VA of 6/6 is considered normal.</p> <p>If someone has 6/6 vision, their VA is considered to be 100%.</p> <p>The Snellen fraction can also be written in other ways. In some countries people use feet instead of metres to measure distances.</p> <p><b>For example:</b></p> <p>VA charts that are made in these countries usually write VA measurements as 20/20 or 20/200, instead of 6/6 or 6/60.</p> <p>This is because 20 feet is the same distance as 6 m.</p>

## VISUAL ACUITY (cont.)

**Very good vision →**  
(If VA is equal to or better than all the letters on the 6/4.5 line)

**Normal vision →**  
(If VA is equal to or better than all the letters on the 6/6 line)

**Visually impaired →**  
(if VA is less than all the letters on the 6/18 line)

**Blind →**  
(if VA is less than all the letters on the 6/120 line)

SNELLEN FRACTION	
METRES	FEET
6/3	20/10
6/4.5	20/15
6/6	20/20
6/7.5	20/25
6/9	20/30
6/12	20/40
6/15	20/50
6/18	20/60
6/24	20/80
6/30	20/100
6/48	20/160
6/60	20/200
6/120	20/400



A 3 m VA chart (a VA chart that is used to measure VA at a distance of 3 m instead of 6 m) should have Snellen fractions with the number 3 on the top of the fraction (in a 3/\_\_\_ format).

However, the normal way to record VA is in 6/\_\_\_ format.  
This is because most VA charts have been designed to be used at 6 m.

Because 6/\_\_\_ is most common (and most familiar) format, a 3 m chart will sometimes have its Snellen fractions converted to a 6/\_\_\_ format for you.  
This is to make it easier for you to record VA measurements in the 6/\_\_\_ format that you are used to seeing, even when you are using a 3 m VA chart.

If you have a 3 m chart that has already done this conversion for you:

- you only need to look at the Snellen fraction next to the line that the person can read and record this fraction
- you do not need to do any calculations yourself.

If you have a 3 m chart that has *not* done this conversion for you, you may want to convert it to 6/\_\_\_ format yourself. To do this you need to remember that Snellen fractions are just like normal fractions that can be changed into different formats.

**Examples:**

**3/3 = 6/6**

A person who can see the 3/3 line at 3 m will also see the 6/6 line at 6 m

**3/4.5 = 6/9**

A person who can see the 3/4.5 line at 3 m will also see the 6/9 line at 6 m

**3/6 = 6/12**

A person who can see the 3/6 line at 3 m will also see the 6/12 line at 6 m

**3/9 = 6/18**

A person who can see the 3/9 line at 3 m will also see the 6/18 line at 6 m

**3/60 = 6/120**

A person who can see the 3/60 line at 3 m will also see the 6/120 line at 6 m.

## VISUAL ACUITY (cont.)

### WORLD HEALTH ORGANIZATION (WHO)

#### **Classes of Vision:**

The WHO has grouped different levels of VA into special categories.

They have done this because they have decided that people who have vision worse than 6/18 should be given priority if resources are scarce (minimal).

WHO Category	Vision
Normal vision	A person who can see all of the 6/18 line or better. This person sees quite well.
Visually impaired	A person who cannot see all of the 6/18 line. This person does not see well.
Blind	A person who cannot see the 6/120 (or 3/60) line. This person can see very little, or nothing at all.

## DISTANCE VA

### RECORDING DISTANCE VA

Distance VA is usually recorded as a Snellen fraction.

If the person reads all of one line correctly, but cannot read any characters on the next line, VA is recorded as the Snellen Fraction of the line that was read correctly.

For example: If a person reads all of the 6/12 line correctly, but cannot read any characters on the next line, their VA is recorded as 6/12.

If the person reads a line correctly *and* some of the characters on the line below, VA is recorded as the Snellen Fraction of the whole line that was read correctly, *plus* the number of characters that were correct on the next line.

For example: If a person reads all of the 6/12 line correctly, as well as three characters from the next line, their VA is recorded as 6/12+3.



*Remember to record whether the VA you measured was for:*

- Right eye or left eye
- Aided or unaided
- Distance or near.

### MEASURING DISTANCE VA

#### STEP 1

#### SET-UP

Make sure that the VA chart is clean and in good light. The chart should be flat and straight on the wall, and not positioned too high or too low.

Be careful that bright light is not reflecting off the VA chart. Glare on the chart makes it harder to see.

#### STEP 2

#### TESTING DISTANCE

The person should be the correct distance away from the VA chart (usually 6 m, but sometimes 3 m depending on the chart type). Each VA chart is designed to be used at a specific distance – if it is not used at this distance your VA measurement will be incorrect. Measure the correct distance with a tape measure. You can mark the place on the floor if this is practical.

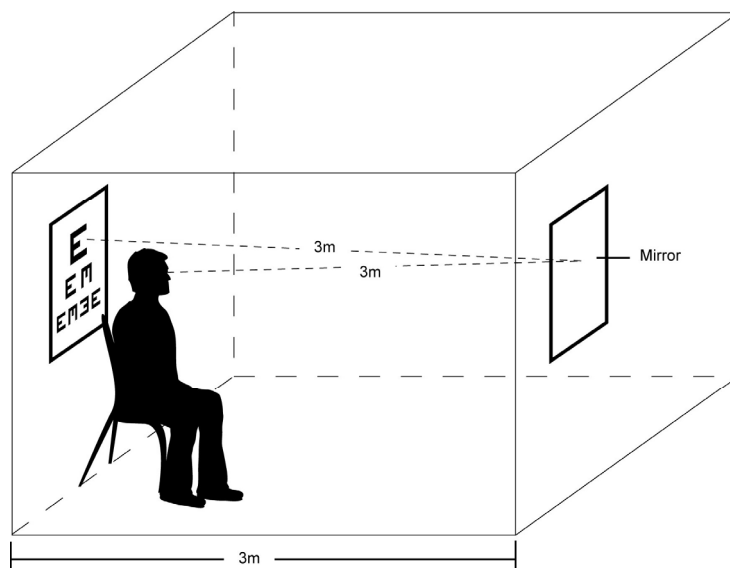


#### USEFUL IDEA:

If you have a 6 m chart, but your room is only 3 m long, you can use a mirror to help you.

Put the mirror on the wall 3 m away from the person and put the VA chart on the wall above the person's head. The person can then look at the mirror and see the chart behind them.

Using a mirror like this you can make a 3 m room have a 6 m viewing distance.



**Figure 10.2:** A mirror lets you use a 6 m VA chart in a room that is only 3 m long. The person looking in the mirror will see the chart as if it is 6 m away (3 m + 3 m = 6 m).



## DISTANCE VA (cont.)

### STEP 3

#### OCCLUDE THE EYE NOT BEING TESTED



**Always test the right eye first (cover the left eye first).**

Cover the person's left eye.

You can cover the eye with an occluder, or you can simply ask the person to use the palm of their hand.



Make sure that the person:

- does not press hard on the eye being covered
- keeps both eyes open (including the eye that is being covered)
- covers the eye with their palm, not their fingers
- does not lean forward or move closer to the chart.



**Figure 10.3:** Man using the palm of his hand to occlude one eye, while the VA of the other eye is being measured

## DISTANCE VA (cont.)

### STEP 4

#### Measure the VA

Start at the top of the chart where the larger letters or symbols are. Point to the characters that you want the person to read or name.

If the person finds the large characters very easy to see, you can just ask them to identify two on each line. When it becomes more difficult (further down the chart), you should ask the person to read the whole line.



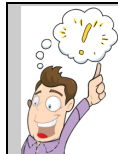
Encourage the person to give you an answer (instead of just telling you they “don’t know”).

Sometimes people:

- are embarrassed that they might make a mistake
- give up easily.

Sometimes it can be helpful if you ask the person to guess – even if they are not sure.

Continue asking them to name smaller characters until the person gets at least half of the line wrong.



#### REMEMBER:

You need to find the smallest line that a person can see.



*Figure 10.4: Measuring distance VA with a tumbling E chart*

### STEP 5

#### Record the VA measurement.

Write down the VA measurement on the record card. Remember to record whether the VA is aided or unaided, and which eye was tested

### STEP 6

#### Repeat for the left eye.

Now cover the person’s right eye and repeat the above five steps for the person’s left eye.

## DISTANCE VA (cont.)

### EXAMPLES OF MEASURING DISTANCE VA

#### EXAMPLE 1

A man has no distance spectacles. You measure his distance VA for each eye.

- Right eye VA (left eye occluded):

The man reads all the lines correctly down to and including all the characters on the 6/6 line. You ask him to try the line below (the 6/4.5 line), but he does not get these characters correct.

→ You write: **VA RE 6/6 unaided.**

- Left eye VA (right eye occluded):

With his left eye, this man can still read the 6/6 line.

You ask him to try the characters on the line below (6/4.5 line), and he gets two of these characters correct.

→ You write: **VA LE 6/6+2 unaided.**

This man has very good unaided distance VA.

He probably does not need distance spectacles.

#### EXAMPLE 2

A woman has distance spectacles that she bought 1 year ago.

You measure her distance VA for each eye.

You ask the woman to put her distance spectacles on.

- Right eye VA (left eye occluded):

The woman reads all the 6/6 line correctly, and can also read five letters on the next line.

→ You write: **VA RE 6/6+5 aided.**

- Left eye VA (right eye occluded):

With her left eye, this woman can only read the 6/12 line and three characters on the line below it.

→ You write: **VA LE 6/12+3 aided.**

Although this woman has distance spectacles, the vision in her right eye is different to the vision in her left eye. There is more than one line difference between her two eyes.

Her problem might be a refractive error, or she may have an eye disease

– further testing will be needed to find the reason.

#### EXAMPLE 3

A man comes to see you for an eye examination. He only has spectacles for reading. You measure his distance VA for each eye.

The man should not wear his spectacles for distance vision testing, because they were prescribed for reading or near vision purposes.

- Right eye VA (left eye occluded):

The man reads the 6/60 letters correctly, and three more letters on the line below correctly.

→ You write: **VA RE 6/60+3 unaided.**

- Left eye VA (right eye occluded):


With his left eye, the man can still read the 6/60, and can also see four more letters on the line below.

→ You write: **VA LE 6/60+4 unaided.**

This man's unaided VA is very poor. This man is visually impaired.

## IF A PERSON CANNOT SEE THE TOP LINE

Sometimes, if a person has very poor vision, they cannot even see the largest characters at the top of the VA chart. If this happens you still need to measure their vision. There are several steps that you can take:

<b>1. DECREASE TEST DISTANCE</b>	<p>Ask the person to move closer to the chart (or bring the chart closer to the person).</p> <p><b>Example 1:</b> A man cannot see the 6/60 line at 6 m, so you decrease the test distance to 3 m. Now he can tell you what the characters on this line are so you record the VA as 3/60.</p> <p><b>Example 2:</b> A woman cannot see the 6/60 line at 6 m or at 3 m, so you decrease the test distance again to 1.5 m. Now she can read the line below 6/60 which is the 6/48 line. So you record the VA as 1.5/48.</p>
<b>2. COUNTING FINGERS (CF)</b>	<p>If you cannot change the test distance between the person and the VA chart, you can use this method instead.</p> <p>Hold up one, two, three or five fingers at a distance of 3 m, 2 m, or 1 m from the person.</p> <p>Firstly, ask the person how many fingers you are showing them from 3 m away. If they can correctly tell you the number of fingers you are showing them, record the VA as CF @ 3 m (meaning that they could “Count Fingers” at 3 m).</p>
<b>3. HAND MOVEMENT (HM):</b>	<p>If the person cannot count fingers, wave your hand 20 cm in front of the person. Ask the person which way you are moving your hand.</p> <p>If the person can see movement, record the VA as HM.</p>
<b>4. LIGHT PERCEPTION (LP)</b>	<p>If the person cannot see HM, shine a light 20 cm from a person’s eyes and ask them to point to where they see the light.</p> <p>If the person can see the light, record the VA as LP.</p>
<b>5. NO LIGHT PERCEPTION (NLP)</b>	<p>If the person cannot see the light (thus they have no light perception), record the VA as NLP.</p> <div data-bbox="443 1285 1501 1487">  <p>Hold the lens so that the lines of the cross that are seen through the lens line up with the lines outside the lens.</p> <p>The lines of the cross should look aligned through the lens and outside the lens edge – then the centre of the cross is at the optical centre of the lens.</p> </div>

## MEASURING NEAR VA

To measure near VA we use a near VA chart or reading card.



Some people (especially older people) have spectacles that they use for near work or reading. The near VA is tested with these spectacles (or reading glasses), and the vision is recorded as “aided”.

Near VA charts have words or paragraphs of different sizes. Usually a near VA chart has the smallest words at the top and the largest words at the bottom. This is opposite to the distance VA chart which usually has the largest characters at the top of the chart.

### ICEE Near Point Testing Card

**N5**

When you first wear your new glasses you may find that the ground looks like it is sloping or a door might look crooked. These distortions will disappear in time because the brain will adapt to the new visual conditions after a few weeks of wearing glasses. It is important to wear your glasses as much as possible so that you can get used to them more quickly.

3 8 2 6 1 9 7 4 5

**N6**

Diabetes is a condition that affects the whole body, including the eyes. Changes may occur at the back of the eye in the retina – especially after someone has had diabetes for a few years, or if they have poor control of their blood sugar levels. These changes are known as diabetic retinopathy. Diabetic retinopathy can make a person blind if it is not treated. In the early stages a diabetic person may not know that they have diabetic retinopathy until they are examined by their eye-care practitioner – that is why it is important to have your eyes examined every year if you have diabetes.

8 5 2 1 3 9 7 4 6

**N8**

Our eyes are very precious so it is important to look after them. There are simple steps we can take to look after our eyes. Every day the eyes should be gently washed in clean water – teaching children to do this is also important. Wearing safety glasses is a must when using tools or working with chemicals. We only have one pair of eyes – so we have to protect them!

5 9 4 2 1 3 7 8 6

**N10**

The strength of the sun can cause not only discomfort from the glare, but also permanent damage. Wearing sunglasses when out in the sun is always recommended. Your eye-care practitioner can talk to you about having prescription sunglasses so that you can see clearly and comfortably outside. Wearing a hat will also help to protect your eyes from the sun.

7 5 1 9 2 4 8 6 3

**N14**

If you have difficulty reading small print, remember that good lighting is important. Your eye-care practitioner can advise you on how to use lighting to improve your vision.

69 4 7 2 8 1 3 5

**N24**

**Cataracts are very common as we age.  
Having cataracts removed is now very simple  
and usually only takes a few hours!**

7 4 5 2 9 1 6 3 8

**Figure 10.5:** An example of a near VA chart used by the Brien Holden Vision Institute Foundation

## MEASURING NEAR VA (cont.)

If a person cannot read, you can also use a near VA chart that has pictures, symbols or numbers on it instead of words.

Some near VA charts use Snellen fractions, but most use the N point scale or the Jaeger scale:

- **N point:**  
Normal near vision is usually N6.  
N5 is very small print, and N8 is approximately the size of normal print in a newspaper.
- **Jaeger “J” scale:**  
J3 is the same as N5  
J6 is the same as N8.



**Near VA is usually measured with both eyes open.**

You only need to measure near VA separately for each eye if there is more than one line of difference between the right and left eye for distance VA.

METHODS	SET-UP
STEP 1	<p>Make sure that the person is seated in a space with good lighting.</p> <p>The person should hold the chart in their hands</p>
STEP 2	<p><b>TESTING DISTANCE</b></p> <p>The near VA chart is usually held at a distance of 40 cm away from the person’s eyes.</p> <p>Sometimes people will tell you that they prefer to hold their reading or near work closer to them or further away from them. The distance that a person likes to hold their reading or near work is called their preferred working distance.</p> <p><b>Example:</b></p> <p>A large man might like to read his newspaper at a distance of 50 cm.</p> <p>A small woman might prefer to hold her sewing 30 cm from her eyes.</p> <p>If the near VA is not measured at 40 cm, you must record the testing distance.</p> <p>N6 @ 50 cm</p> <p>N12 @ 30 cm.</p>
STEP 3	<p>Ask the person which size print is the smallest that they can see.</p> <p>Encourage the person to try the smaller prints.</p> <p>After the person has chosen their preferred working distance, make sure that they do not bring the near VA chart closer to them, or hold it further away from this original position.</p>



## MEASURING NEAR VA (cont.)

### STEP 4

Record the VA measurement.  
Write down the near VA measurement (and the testing distance if needed).  
Remember to record whether the near VA is aided or unaided.

Examples of measuring near VA:  
These examples use the same people who were used as examples for measuring distance VA previously.

#### **Example 1:**

This man has no distance spectacles and no near spectacles.  
You measure his near VA at 40 cm while he keeps both his eyes open.  
You ask the man to read the smallest print that he can see on the reading card. The smallest print that he can read is N12.  
→ You write: **Near VA N12 unaided.**  
This man has good distance VA, but he cannot read a newspaper or see small objects that are close to him.  
He may need spectacles for close work or reading.

#### **Example 2:**

This woman has distance spectacles and near spectacles as well.  
You measure her near VA while she is wearing her near spectacles.



#### **REMEMBER:**

This woman's aided distance VA was worse in her left eye than in her right eye, so she needs to have her near VA measured for each eye separately.

Right eye (left eye occluded)  
You ask the woman to read the smallest print that she can see on the reading card, held at a distance of 40 cm.  
The smallest print that she can read with her right eye is N6.  
→ You write: RE Near VA N6 aided.

Left eye (right eye occluded)  
With her left eye, the smallest print that she can read is N8.  
→ You write: LE Near VA N8 aided.

Just like her distance VA, this woman's near VA is worse in her left eye than in her right eye.

#### **Example 3:**

This man has spectacles for near.  
You measure his near VA while he is wearing his spectacles. He keeps both his eyes open.  
You ask the man to read the smallest print that he can see on the reading card. The smallest print that he can read is N6.  
→ You write: Near VA N6 aided.



#### **REMEMBER:**

This man's distance VA was RE 6/60+3 and LE 6/60+4 unaided – he is visually impaired when he looks in the distance.

With his reading glasses, this man has good near VA.  
Because his near VA is so good, it is unlikely that he has an eye disease.  
We would expect that his distance VA would also improve if he were given appropriate distance spectacles.

## SUMMARY: MEASURING VISUAL ACUITY

### VISUAL ACUITY

There are two ways to measure the power of a lens:

- Visual acuity (VA) is a measure of how clearly a person sees when they are looking directly (straight) at an object.
- Common causes of poor VA are:
  - Refractive error (when a person needs spectacles to see clearly)
  - Eye health problem (when a person has a problem with the health of their eyes).

### VA TESTING DISTANCE

- A person's VA can be different for different distances.
- VA must be measured at both distance and near.
- Most distance VA charts are designed to be used at 6 m, but some distance VA charts are specially designed to be used at a distance of 3 m.
- Near VA is usually measured at a distance of 40 cm from a person's eyes.

### TYPES OF VA MEASUREMENT

- VA measurement is usually one of the first tests that you do for a person when they come to you for an eye examination.
- Distance VA must be measured for the right and left eyes separately (we call these monocular VAs), and for both eyes together (we call this binocular VA).
- Near VA is usually just measured for both eyes together (binocularly).

### UNAIDED VA

VA without the person's spectacles.

### AIDED VA

- VA with the person's spectacles
  - distance spectacles for distance VA testing
  - near spectacles for near VA testing.

### PRESENTING VA

- The person's VA when they arrive to have their eyes examined.  
This will be the same as:
  - aided VA if they arrive wearing their spectacles
  - unaided VA if they arrive not wearing their spectacles.

### HABITUAL VA

- VA that the person usually has.  
This will be the same as:
  - aided VA if they usually wear their spectacles
  - unaided VA if they do not usually wear their spectacles.



## SUMMARY: MEASURING VISUAL ACUITY (cont.)

### BEST CORRECTED VA

- The best possible VA that a person has with their correct spectacle prescription in place
  - at the end of a refraction examination.

### MONOCULAR AND BINOCULAR VA

- Monocular VA is the VA that a person gets when just one eye is used (when the other eye is covered).
- Binocular VA is the VA that a person gets when both eyes are open and uncovered.
- Binocular VA is usually better than monocular VA.

### DISTANCE VA CHARTS

- Different VA charts have specific purposes, and a specific distance that it should be used at.
- VA charts use characters (letters, pictures, numbers or symbols) of different sizes.
- VA chart characters and the spaces between them are carefully calculated and printed. It is very difficult to make a correct VA chart, so we usually use readymade VA charts.

#### Snellen fractions:

- Each line of a VA chart is labelled. Usually the label is a fraction number called a Snellen fraction.
- A Snellen fraction has a number on the top and a number on the bottom:
  - The number on the top tells you how far away the chart is from a person (usually this number is 6 because the chart is 6 m away)
  - the number on the bottom tells you how far away a person with normal vision could be and still see that line of characters.

$$\text{VA} = \frac{\text{Testing distance (metres)}}{\text{Distance at which someone with normal vision could read the same VA line (metres)}}$$

#### World Health Organization (WHO) classes of vision:

- Normal vision → can see the 6/18 line or better.
- Visually impaired → can see the 6/60 line or better, but cannot see all of the 6/18 line.
- Severely visually impaired → can see the 6/120 line or better, but cannot see the 6/60 line.
- Blind → cannot see the 6/120 line.

### RECORDING DISTANCE VA:

- Distance VA is usually recorded as a Snellen fraction.
- VA recording should always include the following information:
  - right eye or left eye
  - aided or unaided
  - the test distance.
- If the person reads a line correctly, but cannot read any characters on the next line, the recorded VA should be the Snellen fraction next to the line that was read correctly.  
Example: 6/12
- If the person reads a line correctly and some of the characters on the next line, the VA is the Snellen fraction next to the line that was read correctly plus the number of characters that are correctly identified on the next line.  
Example: 6/12+3

## SUMMARY: MEASURING VISUAL ACUITY (cont.)

### Method – Distance VA

- Make sure the chart is clean and in good light and that the person is the correct distance from the VA chart.
- Occlude the eye not being tested.
- Start at the top of the chart and ask the person to name the characters you point to. Gradually ask the person to identify smaller characters.
- Encourage the person to try hard to name the characters.
- Continue down the chart until the person gets at least half the line wrong.
- Record all important information about the VA measurement with as much detail as possible (including R or L eye, aided or unaided, and the test distance).
- Repeat for the other eye.

### IF A PERSON CANNOT SEE THE TOP LINE

If the person cannot see even the largest characters on the VA chart (at its normal testing distance):

- **Decrease test distance**  
→ Remember to change the top number of the Snellen fraction to the distance that the person is from the chart.  
Example: If the person cannot see the 6/60 line at 6 m, but can only see that line when they come closer to see it at 3 m, you write VA 3/60.
- **Counting Fingers (CF)**  
For people with severe visual impairment, hold up one, two, three or five fingers at a distance of 3 m, then 2 m, then 1 m.  
Example:  
If the person can only see how many fingers you are showing at 2 m, you record their VA as CF @ 2 m.
- **Hand Movement (HM)**  
For people with severe visual impairment, wave your hand in front of the person's face. If the person can see which way your hand is moving you write VA HM.
- **Light Perception (LP) or No Light Perception (NLP)**  
Another way to measure the VA of somebody with severe visual impairment is to shine a light 20 cm from the person's eyes. If the person can see the light, write VA LP. If the person cannot see the light, write VA NLP.

### MEASURING NEAR VA:

- A near VA chart (or reading card) is used to measure near VA.
- Near VA charts have words or characters of different sizes. Usually the smallest words or characters are at the top and the largest words are at the bottom.
- Most near VA charts use N point measurements:
  - Normal near vision is usually N6.
- Near VA is usually measured with both eyes open.

### Method – Near VA

- Make sure the chart is clean and in good light and ask the person to hold the chart at a distance where their arms feel comfortable.
- Near VA is usually measured binocularly.
- Most people like to hold their reading about 40 cm away from their eyes, but if they like to hold it further away or closer than this you must record their reading distance.
- Ask the person which size words or characters are the smallest that they can read or name. Encourage the person to try the smaller characters.
- Record the VA measurement (and the testing distance if it is not 40 cm). Remember to write down whether the near VA is aided or unaided.

## TEST YOURSELF QUESTIONS

1. **What is visual acuity (VA)?**  
\_\_\_\_\_
2. **What are common causes of poor VA?**  
\_\_\_\_\_
3. **What is the difference between:**
  - **monocular VA and binocular VA?** \_\_\_\_\_  
\_\_\_\_\_
  - **presenting VA and habitual VA?** \_\_\_\_\_  
\_\_\_\_\_
  - **unaided VA and best-corrected VA?** \_\_\_\_\_  
\_\_\_\_\_
4. **What type of VA charts could you use for someone who does not know how to read?**  
\_\_\_\_\_
5. **How do you record the VA of someone who:**
  - sees all of the 6/9 line, but nothing on the 6/7.5 line? \_\_\_\_\_
  - sees all of the 6/24 line and two letters on the 6/18 line? \_\_\_\_\_
  - sees all of the 6/15 line and four letters on the 6/12 line? \_\_\_\_\_
  - sees the N8 print on a near reading card, but not the N6 print? \_\_\_\_\_
6. **Why must you watch the person when you measure their VA?**  
\_\_\_\_\_
7. **If a person cannot see any of the characters on the VA chart, what other VA tests can you do?**  
\_\_\_\_\_
8. **Why should you encourage the person to read the next line on the VA chart even if they seem unsure?**  
\_\_\_\_\_



## NOTES