ASSESSMENT OF LOW VISION
IN DEVELOPING COUNTRIES

BOOK 2

ASSESSMENT OF FUNCTIONAL VISION

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This set comprises 2 books:

Book 1: Screening for Impaired Vision
A basic introduction to testing visual acuity and visual fields

Book 2: Assessment of Functional Vision
This book contains:
- observations of the effects of low vision for use in the community
- comprehensive assessment of functional vision
- suggestions for training effective use of vision

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INTRODUCTION

It is necessary to find out how low vision affects a person's ability to join in everyday activities. *People can have the same amount of vision, but how they act varies according to the eye condition, their learning experiences and their environment.* Some of the reasons why people function differently are explained in the section on low vision on pages 3 and 4.

People need to know how to make best use of their vision. Changes in the size, distance and contrast of objects, and the use or control of light can affect how well objects can be seen; low vision devices may be helpful. The information needed about each person with low vision is:

- the amount of vision, as measured by near and distance visual acuity
- whether the visual field is full or restricted
- the effects of light and glare
- if colours can be recognised and named
- how contrast affects visual functioning
- how the person is able to use vision for particular purposes.

Testing distance and near vision and visual fields is outlined in Book 1, "Screening for Impaired Vision".

This book is about functional vision - how a person uses vision. It explains how to observe the effects of low vision and to assess the visual skills used for functional vision. Activities for training the visual skills used for functional vision and suggestions for effective use of vision are included.

A neutral position has been adopted where possible on the issue of gender by using the word "person". Where either the masculine or feminine is used, the statement applies to both.
DEFINITIONS

Vision can be classified in two ways. One is by using the results of standard measurements and tests such as those recommended by the World Health Organization (WHO) - see Book 1. The second is from assessment and observation of a person's functional vision. In this book the terms low vision and total blindness are used to describe how a person functions visually.

"Normal vision". A person is able to perform all close and distant visual tasks that are normally expected in his community. Refractive correction, for example spectacles, may be needed to give "normal" vision.

Visual impairment. It is the reduced vision caused by eye disease, accident or eye condition present from birth. Some conditions can be treated or corrected to improve vision. Most people (about 80%) who are visually impaired have some vision, that is, they have low vision.

Low vision. There is significantly reduced vision, that is, visual acuity is less (worse) than 6/18 or visual fields are less than 20 degrees in diameter. After treatment or with refractive correction, vision cannot be corrected to "normal". Visual performance may be affected. A person with low vision can use her reduced vision for learning about the world and for planning and doing tasks that need vision.

Total blindness. A person is unable to see light.

Functional vision. This refers to the use of vision for a particular purpose. Even small amounts of vision can be useful, for example, to recognise a person close up, or to avoid objects. The use made of vision depends on a person's experiences and can vary with different conditions. Functional vision may be improved with refractive correction, low vision devices or instruction in the use of vision.

Visual acuity. It is a measure of the ability of the eye to see detail.

Visual field. The whole area that is seen when looking straight ahead when the eyes, head and body are still. The peripheral visual field is the outer edges of the field.

Contrast. It is the difference in lightness and darkness between objects. Things are easier to see when contrast is greater, such as a white mug on a black table.

Glare. This is the effect of too much bright light. It can be uncomfortable and harder to see when there is too much light entering the eye.

Environment. This refers to the world around us. The environment includes the amount of natural light and distant things such as mountains and rivers. Other aspects of the environment are the things that people have made such as buildings. The environment varies according to where we live. Changes in the environment such as the amount of light can affect vision.
Low vision devices. These are optical or non-optical devices. Optical devices magnify the size of objects for distance and near tasks. Optical devices may be called magnifiers or magnifying glasses. Non-optical devices such as a reading stand help to make objects easier to see.

Attention. This means that the person knows that an object is present to look at and deliberately looks at it.

Fixation. This means directing the eyes to a particular object or part of it. A fixation can be very short or it can be long (staring). Fixation may be central (straight ahead viewing) or off-centre.

Tracking. It is following the movement of an object with eye or head movement.

Scanning. It is searching for one or more objects from a background of other objects.

Discrimination. This means seeing differences between objects. The more different objects are, the easier it is to discriminate between them. People with low vision may need to be taught which features to take note of, to be able to see the differences between objects. For most people it is easier to discriminate between large, simple objects than smaller detailed objects.

Perception. This is giving meaning to what is seen. To know what objects and symbols are, a person needs to have seen and remembered many similar things.

LOW VISION

The effects of low vision are not the same for all people. Differences occur in:
- the amount of vision for distant and near objects
- the visual field
- the ability to see print or objects which have poor contrast
- colour vision
- the effects of light on vision.

Factors that affect how well a person can see and recognise objects include:
- whether objects are familiar or strange
- distance of objects
- size of objects
- detail or simplicity of the object
- amount of light on the object
- contrast against the background
- colour of the object
- whether objects are still or moving
- how easy the object is to find
- position of the object
- time available for looking.
A person may have low vision from birth. Some conditions which result in low vision begin during childhood or later.

It is important to encourage people with low vision to use vision. They may not be aware that useful information can be gained from looking. This often happens when a person has a great change in vision or when children have low vision from birth.

Children with low vision from birth or a very early age are sometimes not aware that their vision is limited and different from other people's vision.

During early childhood most learning occurs through the use of vision. When vision is impaired, learning and communication may be affected.

Over time the level of low vision may stay the same. Sometimes the condition may get worse, but it does not always end in total blindness.

It may take some time to get used to an improvement or decrease in vision. Provide assistance and encouragement when vision changes.

Reactions to losing vision vary. Some people try to make no changes to how and what they do. Other people withdraw from all activities completely.

People react differently to a person with low vision. It is important to try to understand the effects of low vision for each person and what to expect them to be able to do.

With some eye conditions, a person sees better in the shade, out of bright light. With other eye conditions, the person needs bright light to see better.

People with low vision often need more time to do activities than people with normal vision.

When using vision for long periods, the person with low vision may become tired more quickly than other people. Suggest that the person takes short rests and then continues with the activity.

Some people with low vision see larger objects better and find it useful to use large print for reading. However, larger objects are not always the best for some people.

The size of objects is not always the most important factor. Other factors such as the distance to the object, amount of light, colour and contrast make objects easier to see.

The eyes cannot be damaged by using vision or holding things close to the eyes. The more vision is used, the better is the chance of improving visual functioning.

Low vision is not the only reason for differences in how people progress and develop. Other disabilities, intelligence and different learning experiences affect how each person performs. It is important to know what each person can do and how he uses his vision in different activities and situations.
FUNCTIONAL VISION

What is ‘functional vision’? It is the use of vision for particular purposes. Functional visual skills are required to carry out everyday activities.

Why assess functional vision? The differences in how people use vision are usually not related to the measures of distance visual acuity or near vision. A person may have very poor vision, not good enough for detailed work such as weaving, carving or reading but may be able to see and avoid objects so that he can move around safely. Functional vision may be improved with training. Many people can learn to make better use of their low vision and can function efficiently with only small amounts of visual information. Objects and print can be recognised when they are blurry or when only parts of them can be seen.

What is the assessment? No special materials are needed. The assessment procedures and training activities in this book have been written so that they are suitable for use in developing countries. Instructions are given so that easily found objects can be used. The assessment is in two parts. First is the observations on the effects of low vision. The second part is the assessment of visual skills used for functional vision.

What is obtained from the assessment? The results give an understanding of the effects of low vision for each person and how vision is used. The results show the importance of distance, size, contrast and light, for each person.

What is done with the results? The results from the assessment show how vision is being used and which skills have been learnt. The skills that need to be trained can be identified in order to plan a training program. The information from the assessment should be discussed with the person with low vision, his family and others such as teachers.
OBSERVATIONS OF THE EFFECTS OF LOW VISION

The aim of observing the behaviour of people with low vision is to examine the effects of low vision for each person. The areas to be observed for each person are:
- how the person feels about his vision
- how vision is used
- the understanding of low vision and the special needs of the person
- the need for modifications to the environment such as lighting, contrast and use of colour.

The effects of low vision for learning, activities of daily living, mobility and social interaction may be different for each person. It is important to understand what a person can do for himself, when he needs some help or what changes can be made in the environment.

This section lists questions to help you make observations to understand the effects of low vision for each person. The observations are listed under headings. There are suggestions which you can use to explain the effects of low vision to the person and his family.

It is important to record your observations and suggestions you have made. A record form is supplied with the kit.

1. **Knowledge and feelings about vision.** Does the person think of herself as:
   - being blind
   - having some, but not normal vision (low vision)
   - having normal vision?

Does the person experience some of the common problems of people with low vision - feelings of frustration at not being able to do things or lack of confidence in herself?

How does what other people expect affect what the person does or can do? Do they expect her to act as a person with normal vision or is she expected not to see anything and so not take part in community activities?

Is the person aware of the important factors of distance, size, contrast, lighting and how to make changes to improve her visual functioning?

Is the person aware of whether her vision could be improved with treatment or whether it will get worse?

Is the person interested in learning ways to improve her visual functioning?

Would the person wear spectacles if they were prescribed?

_Suggestions_

Explain what is meant by normal or low vision and blindness using the functional definitions in this book.
Tell the person and family the results of the vision assessment. Is vision within the normal range, that is distance vision better than 6/18, or is the person able to see the smallest symbols on the near vision test card?

Does the person have poor but useable vision? Explain the effects of poor near and distance vision in relation to the activities that normally take place in her community. What are the important effects on activities such as finding food or water, finding her way around the village or learning from watching other people?

If necessary also explain the implications of a restricted visual field, the effects of poor contrast or a problem with colour vision.

Suggest ways that visual functioning can be improved:
- working in the best light
- moving closer to objects to see them better
- using objects with good contrast
- allowing plenty of time for looking.

2. Use of vision for obtaining information. Is vision used to find out about the environment and what activities are happening or does the person wait to be told what to do?

Are other senses such as hearing and touch used instead of, or with vision? Which sense is used first to get information - vision, hearing or touch?

Are objects inspected as a whole object or in small parts or sections?

Does the person move around the community by himself or does he use the help of other people?

Does he use vision to find objects or people and then find his way using vision?

Check that he knows where to find places and objects in the village. Observe how the person moves to different places and watch how he finds his way.

Suggestions
Encourage the use of vision to be aware of what is happening and to find people or objects. Attract and direct the person’s attention to watch activities.

Don’t always place objects in the person’s hand. The person should be encouraged to look for the object and reach out for it.

Use vision with other senses, for example, listen for what is happening to find where to look. Use touch to feel whole object, then look at parts.

Show how the use of contrast and knowing the position of objects can be used to help the person move safely around the community.
3. **Awareness of the environment.** By observing behaviour and asking questions you can find out if vision has been used to explore and learn about the common objects used by people in the community.

Does the person watch activities happening close and far away and can the actions or activities be imitated?

Can all common objects in the environment be recognised by looking at them?

Can all necessary objects be located and found immediately? The objects could be for cooking, eating, working or for play. Can all the objects and how they are used be described?

Does the person move in a restricted, small area or move freely throughout the whole area of the village or town?

*Suggestions*
Ask sighted people to explain and describe objects and things happening.

Encourage the person to look closely at objects in the environment. Describe the objects while the person is looking at them. For objects that are too far away, too big or dangerous that cannot be looked at closely, describe these things in words that the person can understand from what he has seen before and already understands.

Show the person where things are kept at home, in the school, in the church (mosque, temple) and in shops. Explain and demonstrate the best object or tool to use for different activities.

4. **Independence.** Observe if the person can use vision to do some or all the things that other people do without special help. How is hearing and touch used to help?

At home, does she look after all her own things?

Can she take care of her personal hygiene?

Does she take part in all family activities?

At school, is she aware of what other people are doing so that she can join in? Can she use the same materials as the other children do?

At work, can she do all the jobs people are expected to do? Does poor vision affect her ability to complete jobs?

Can she join in games and entertainment activities?

*Suggestions*
Encourage the person to take part in all family and community activities. Make sure that the person will be safe and have help from others only when necessary.
Describe what you are doing or are going to do. Tell a person with low vision when you enter or leave a room - she may not be aware of another person nearby or in a room.

Provide objects or materials that make activities easier, for example, use a light coloured plate or bowl on a dark mat; choose good contrasting colours for weaving.

Show how to do activities and jobs by demonstrating close to the person. Describe what is to be done and how.

5. Lighting. This refers to either natural or artificial light both inside buildings and outside. The amount and direction of light are important for best visual functioning. The amount of light cannot always be changed. A person can move to different positions to alter the amount of light from direct sunlight to shade or from a shady to a bright position. Covering the head or eyes can provide shade.

Does the person work better in bright light or in the shade?

Does the person try to shade the eyes with a hat or a hand or turn from the sun?

Inside, can the person work better where there is light from a door or window?

Is there any difference in how the person can move around when it is dark, compared with in the light?

Is vision severely affected by a change from bright to dull light or from dull to bright light?

Suggestions

Problems with too much light. Vision can be worse for some people in bright sunlight - they are better in shaded areas. If they need to be in the sun, shade the eyes with the hands or wear a hat.

Problems with not enough light. If working inside it is better to sit near a window or door to use the light. Do not face the window.

People with certain eye conditions are nearly blind at night or in dull light. They may not have enough vision to move safely by themselves or do their normal activities that they could do during the day. They may need extra help to move safely at night. A torch or flashlight is useful.

Direction of light. It is better to have light coming from behind and to one side rather than facing the light. Have light shining on the work being done (as shown in the picture on the next page). It is easier to see the detail.
6. **Contrast.** People with low vision normally have difficulty seeing objects or print that have poor contrast.

When there is good contrast with the background things are easier to see, for example, rice in a dark bowl.

Examples of poor contrast are animals which are the same or similar colour as their environment; rice, noodles or potatoes in a white bowl or plate. These are difficult for a person with low vision to see.

The effects of poor contrast can be demonstrated by using these procedures. Choose objects and background which are the same colour or do not contrast well. For example use a stone that is the same colour as the ground. Put the stone on the ground about 2 metres away from the person and ask her to find it. If the objects could not be seen from 2 metres, move the person closer.

Then use an object of the same size but which contrasts strongly with the ground. A vegetable or piece of fruit could be used. Put the object 2 metres from the person and ask her to find it. If the objects could not be seen from 2 metres, move the person closer. Discuss which objects were easier to find and why.

**Suggestions**

There are ways to improve contrast
- work with light objects against a dark background or dark objects against a light background
- put objects or books in good light without glare
- use black pens for writing; felt-tipped pens are the best
- trace over pictures or shapes with a dark pen.

It is often difficult to see steps or changes in the level of floors or the ground. Changes in levels can be marked, for example, the edges of steps marked with paint to show the edges.
7. **Colour Vision.** The correct use or knowledge of colour is important in some situations. Choosing and matching colours are important in weaving or sewing. Certain colours are used in decorations of objects or people.

A person’s colour vision can be assessed by checking if differences in colour can be identified, similar colours matched and objects sorted by their colours.

Collect different coloured threads, material or objects. Try to include red, green, yellow and blue.

Spread the objects out in front of the person on a plain table or mat. He can move as close as he wants to the objects.

*Discrimination of different colours.* Make a group of at least 5 objects, 4 the same colour and one object that is a different colour. Ask the person to pick up the one which is a different colour.

*Matching colours.* Use many objects with at least 2 of each colour. Pick up different colours in turn and ask the person to find another one the same colour.

*Sorting colours.* Use many different coloured objects. Ask the person to sort all the coloured objects into piles with the same colours in each pile.

Record if he has trouble with any particular colours, all or none.

*Suggestions*
If colours can’t be named accurately, people can still work with coloured objects if they can pick out differences and match similar colours.

Knowing the colours of objects can help in finding them. For example, fruit or vegetables could be found in a market, flowers or fruit could be found on trees by
looking for the different colours. Knowing the colour of a person’s clothing can help in finding and identifying that person.

8. **Spectacles and low vision devices.** Some people may have had spectacles or low vision devices suggested or prescribed.

Was treatment or follow up testing recommended at previous vision testing? Has the treatment been given?

Are spectacles normally used? When should they be used - all the time, or for special purposes (near or distance tasks)?

If glasses were lost or broken, find out if new ones can be obtained.

If low vision devices are available, has the person ever tried or used them? Not all people are helped by low vision devices so they need to be assessed to find if they will help.

Is a low vision device used for near or distance tasks, or both? Would a low vision device be used for:
- near tasks such as looking at small, detailed objects, reading or craft activities
- distance tasks such as finding people, objects or for assistance with mobility?

**Suggestions**
Spectacles or glasses can improve vision to normal for some people. Many people with low vision wear spectacles but their vision cannot be made normal. The spectacles may make things look clearer but vision is still impaired.

For some people the spectacles are needed only for close work, for others only for distance vision, but usually spectacles need to be worn for all activities.

People who wear spectacles should have their eyes checked every two years. The power of the lenses may need to be changed.

The lenses in the spectacles can be scratched or easily broken. Spectacles need special care:
- clean the lenses every day
- wash and wipe dry or wipe clean with a soft cloth
- when the spectacles are not being worn put them in a safe place
- do not lay spectacles on their lenses as the lenses can be scratched.

Low vision devices are sometimes not used because they look so different; the person may be shy or not want to look different from other people.

Low vision devices require a lot of time and practice to learn to use. It can be difficult to find things and then to scan the objects, the environment or to read. Like spectacles, low vision devices need special care because they can be scratched and easily broken. More information on low vision devices can be found on pages 49 to 52.
The visual skills used for functional vision are listed here in the order that they should be assessed. The order of the skills follows the sequence of normal visual development which has been explained by Professor Natalie Barraga (see references pages 58 and 59).

A person with low vision may not be able to progress through all the steps without special training. Some skills may not able to be achieved (for example tracking moving objects) but the person can still progress on to later steps. The assessment of functional vision has been based on tests and kits produced by Barraga and Tobin (see references page 58).

The seven areas of skills to be assessed are explained and examples are given of how the skills are used. These visual skills are used to carry out everyday activities. The methods of assessing the visual skills are described in the following section beginning on page 21.

1. **Awareness and attention to objects**
   Finding an object or target and looking at it (fixating) long enough to be aware of it or recognise it.

   Reason for assessment: Can a person see objects close to him? Does he search for objects visually or with his hands (tactually)? What makes objects easier or possible to be seen?

   Factors that affect how easy an object is to find or recognise are: size, distance, contrast. If an object is familiar, it is easier to recognise.

2. **Control of eye movements - tracking**
   Being able to follow moving objects with the eyes or head movement.

   Reason for assessment: Can the person follow the movement of objects without "losing" where they have gone? Different directions of movements should be tested: up and down, side to side, diagonal and forward and back.

   The movement might be people or animals running or something dropped on the ground and rolling away. Tracking is needed to follow the movements of traffic. Tracking people or objects (such as a ball) is needed to play many games.

3. **Control of eye movements - scanning**
   Accurately moving eyes from one object to another.

   Reason for assessment: Some people with low vision have to search around for a long time to find objects. Some may find it difficult to change from looking at near objects to look for something further away.

   Searching the visual environment to look for a person or object requires scanning skills. An example is looking for a stall in a market.
4. **Discrimination of objects**  
Recognition of objects from an outline or general shape.

Reason for assessment: To learn if a person can discriminate between people and objects, recognise familiar objects, recognise different or similar objects.

Objects can be discriminated because of their colour, shape, contrast, position or size - for example different foods in a market. The details within objects do not have to be seen. A person can see an object and move around it without tripping over or bumping into it. Large and small objects can give clues of how and where to move safely in the environment. Trees or doorways can help in finding where to go.

Finding objects in different situations. There may be confusing detail on or around the object or it may not contrast well against other objects. Finding an object against a background of other objects may be difficult. Good scanning and discrimination skills are needed.

Identification of objects. Differences and similarities have to be seen in objects to identify them. For example the bucket, basket and bowl all hold other objects such as food but they all look different and can be used for different purposes. Objects in the environment (trees, plants, animals) need to be discriminated and identified. How easy an object is to identify will depend on its size and distance, the type of object, how familiar it is, contrast with the background, colour and whether it is moving or still.

5. **Discrimination of details to identify actions and match objects**  
The discrimination of detail to identify an object is more difficult than seeing the object. Features of the object have to be identified.

Reason for assessment: Most learning occurs from visual awareness and imitation. It is important to know what can be seen and how the environment (such as lighting) affects what can be seen. The factors of distance, size, colour and contrast are very important.

To interact with other people, vision provides valuable information to recognise people, and identify expressions and body gestures when no auditory clues (voices or noises) are available.

Matching objects. Objects may need to be discriminated or matched by size or shape. For example - get the largest stick or find a stick the same size.

6. **Discrimination of details in pictures**  
Gaining information from pictures. Pictures can be simple outlines or complex, detailed pictures. The important features (parts) in pictures have to be identified so that the meaning of the picture can be understood.

Reason for assessment: Pictures give useful information on posters, advertisements or in books. Objects in pictures may be difficult to find and recognise.
Identification of pictures. Pictures are used to give information and instructions such as on health education posters. They are easier to recognise if they look like the real object and have clear outlines. It is sometimes difficult to find an object in a picture when there is a lot of detail and many other objects in a picture.

7. **Identification and perception of patterns, numbers and words**
   Matching letters and numbers by the similar or different features of them. This does not require reading but is a necessary skill for reading.

Reason for assessment: To find out if a person can discriminate between similar and different shapes and letters. The results will help in making decisions on whether a person should use normal size print, large print, low vision devices or may need braille.

Many other patterns, letters or numbers can be used, in addition to the examples used in this book. Make sure that the shapes, letters or numbers are drawn or written with a dark pen on light coloured paper. Start using shapes that are very different so they are easy to discriminate. Discrimination is more difficult when the shapes are similar.

Recognition of words and matching them with pictures. Experience with simple words is a necessary skill in this item.

**ASSESSMENT OF FUNCTIONAL VISION**

The full assessment of functional vision contains 19 items listed below and takes less than one hour to complete. The full assessment is recommended if a vision training program is to be undertaken and for children with impaired vision enrolled in a special school or program. A shorter version with eight items can be used if the results of the assessment are not needed for a vision training program. The short version can be used to understand more about the effects of low vision for a person.

The items in the assessment are listed under the seven sections described on pages 13 to 15. The tasks are ordered from easy to difficult. In the sections 1 to 5 real objects and people are used. In sections 6 and 7 pictures and symbols in this book are used.

1. **Awareness and attention to objects**
   1a Attention
   1b Reach

2. **Control of eye movements - tracking**
   2a Maintain gaze
   2b Tracking

3. **Control of eye movements - scanning**
   3a Shift gaze
   3b Change fixation

4. **Discrimination of objects**
   4a Find object
4b Follow path
4c Avoid objects
4d Identify objects

5. Discrimination of details to identify actions and match objects
   5a Imitation
   5b Facial expressions
   5c Match size

6. Discrimination of details in pictures
   6a Recognise actions
   6b Complex picture

7. Identification and perception of patterns, numbers and words
   7a Abstract figures
   7b Match numbers
   7c Inner detail
   7d Match words

In the short version of assessment of functional vision, one or more items have been selected from each section. The items are listed below. On the Record Form, the items for the short version are shown in italics.

1. Awareness and attention to objects
   1b Reach

2. Control of eye movements - tracking
   2a Maintain gaze

3. Control of eye movements - scanning
   3a Shift gaze

4. Discrimination of objects
   4d Identify objects

5. Discrimination of details to identify actions and match objects
   5b Facial expressions

6. Discrimination of details in pictures
   6a Recognise actions

7. Identification and perception of patterns, numbers and words
   7a Abstract figures
   7d Match words

When an item is completed successfully, an item from the next section is tried. If an item from any section is not able to be done, all items in that section should then be tried.
For example: If Reach, Maintain gaze and Shift gaze (from sections 1, 2, and 3) were completed successfully but the person could not do the Identify objects item (section 4) then the other items in Section 4 should be tried (Find object, Follow path and Avoid objects). If these items are completed, then continue with the Section 5 (item 5b - Facial expressions).

SPECIAL PURPOSE ASSESSMENTS

Parts of the full assessment can be selected for particular purposes. Examples for mobility, socialisation, work and low vision devices are set out.

**Mobility** - the ability to move safely. Skills to be assessed:
- 3b Change fixation
- 4a Find object
- 4b Follow path
- 4c Avoid objects

**Socialisation** - taking part in social activities. Skills to be assessed:
- 1a Attention
- 4a Find object
- 4d Identify objects
- 5a Imitation
- 5b Facial expressions

**Work** - skills that are needed will depend on the type of work to be done. Suggestions are given but can be altered to suit the type of work.
- 4d Identify objects
- 5a Imitation
- 5c Match size
- 7b Match numbers

**Low Vision Devices.** The purpose is to identify people who may improve their visual functioning by using low vision devices. Near and distance vision should be tested using the vision test card included with this kit. The better the results from the acuity and functional assessment (particularly 1b and 6a), the more likely it is that a person may be helped with low vision devices. There are some people with distance acuity of less than 3/60 who can have their functional vision improved by using low vision devices.
- 1b Reach
- 6a Recognise actions
PROCEDURES FOR ASSESSMENT OF FUNCTIONAL VISION

SELECTING OBJECTS FOR ASSESSMENT

The success and the information obtained from an assessment can depend on the objects chosen. It is best to use objects which are familiar to the person being assessed. Try to make the objects interesting and ones which would be normally used. Food, playthings and money are usually good to use with children.

When assessing near vision, use objects which would normally be used close to the person. For distance vision, use objects which the person would have to find or identify from a distance.

The factors that need to be considered when choosing and using objects are:
- size
- distance
- contrast
- colour
- position
- light on and around the object.

Size. Larger objects are not always easier to see. For some people with reduced visual fields, they can only see parts of large objects.

Distance. Objects are usually easier to see when they are close. Objects which are too small or have poor contrast may not be seen even when very close. Children can usually see objects held very close (10 cm or even less) to their eyes. Adults (especially when over 35 years old) cannot see objects held very close to them.

Contrast. Good contrast is an important factor for people with low vision. Improving contrast can make objects or print easier to see without changing the size or distance.

Colour. Some things can be recognised by their colour even if details cannot be seen. For example a banana may be recognised because it is yellow.

Position. The position of an object may cause difficulty for some people. Different positions should be used to have the person look straight in front, to one side, up and down. The position of an object can make it harder to see - on, beside or under other objects.

Light. Some people prefer and see better with bright light but others prefer dull light. Glare makes it difficult for all people to see. The light in the environment and on objects can affect how well objects can be seen.

When assessing vision, change one of the conditions listed above at a time. For example, change the distance and leave everything else the same. Then other factors such as size or contrast could be changed to find the effect of these changes on vision.
In a home or village objects used could be - objects used for eating, cooking or gathering food, buckets for collecting water, wood or fuel for fires, tools, toys or clothing.

In a school objects used by the teachers or children can be used; books, pencils (short, long and different colours), blocks or paper. Pictures and shapes can be drawn on a board or paper.

GENERAL INSTRUCTIONS FOR ASSESSMENT

Use information from tests already given by you or by other people. Use Book 1 from this set to test vision. The test results may give some indication of what to expect for each person. Knowledge of acuity (size, detail and distance of objects), effect of contrast, best amount and direction of light and visual fields are important for planning the assessment and the objects to be used.

Be aware when to stop testing. Not all people will be able to complete all the activities. Do not continue with the assessment if the person cannot complete 4 or 5 items in a row. Record all items attempted and the reason for not continuing with the assessment, such as, "The person could not see the pictures or letters."

Watch for fatigue. Be prepared to stop for short rests or continue testing at another time.

The person may lean as close as she wishes, or move to look at the material, unless a particular distance is stated. Record the distance used for viewing. The person may hold her head or the material at an unusual angle to see better. Allow this to happen and make notes about it.

Provide the best lighting conditions you can arrange. Make sure that there is no glare where you are working and there is good light during the testing.

There are no time limits for these items. Allow plenty of time for each task. Give encouragement without suggesting the answer.

The time taken for a task can indicate the ease or difficulty a person is having. The actual time is not important. Record whether the response was immediate or if the person was slow to respond. Also describe if the task was easily and quickly completed or slow and difficult. Record questions or comments made by the person during the task.

You can give as much explanation as required. You do not have to use only the words suggested in the book.

Do not use questions that suggest the answer or require yes/ no answers, for example, "Can you see the basket?" Use questions such as, "Where is the basket?", "What is the thing near the tree?", "Tell me what I'm doing", "Describe the object near the door", "Show me one the same as this one", "Do the same as I am doing."
If a task is unable to be done, try to find out why - is it the distance from the object, or that the object was not recognised? Ask what made things able or not able to be seen. Was it movement, bright clothing, contrast, size, distance or colour?

Many differences occur in children’s development. Low vision is only one factor. Their experiences and ability are also factors which influence their performance and achievement.

Assessment is not a test. The aim is to find out what a person can do, rather than what she can’t do. It is important that the person is relaxed and wanting to cooperate instead of feeling she is being tested.

The instructions for each item in the assessment procedures following state the aim. The procedures list:
- suggestions for objects and materials to use
- the instructions and methods to use
- behaviour or the response expected from the person.

RECORDING RESULTS

Use the record form "Observation of the Effects of Low Vision and Assessment of Functional Vision" to record each response after the item has been completed. Record the actual response, not what the person says they can do or you think they can do. Make notes on:
- the objects used for the assessment
- how easy or difficult the work was
- the person’s comments
- behaviour during the assessment
- distance for each item
- the time taken to finish the activity, for example, "quick", "needed a long time" or "slow to respond", "scanning slow and random"
- if low vision devices were available and used.
1. **Awareness and attention to objects**

1a **Attention**

Aim: To attend to an object. This test need not be done if the person could do the acuity testing.

Procedure:

Choose a bright object about the size of your hand. Make sure it can be easily seen against the background.

Stand opposite and 1 metre from the person. Hold the object at the person's eye level.

Tell the person that you want him to find the object you are holding. Watch if the person can see the object held in front of him.

Watch to see if fixation is maintained on the object. Note if the eyes are steady. Note also if the eyes and head are turned to one side or are straight ahead.

If the object cannot be seen at one metre, repeat the procedures at half a metre or closer until it can be seen and record the distance.

If the object cannot be seen at less than half a metre, try to attract attention with sound or movement. Try other items from the functional assessment and observe behaviour to find if the person has any vision.
Aim: To reach accurately for an object.

Procedure:

Choose an object that has good contrast with the background. Food, a stone or a block could be used; rolled up balls of paper of different sizes are good.

Ask the person to close his eyes while you put an object down in front of him. Place it so that he has to stretch his arm to pick it up.

Ask the person to open his eyes and reach out with one hand and pick up the object.

Note if the reach was accurate and straight to the object or if he had to search or feel around to find it.

Repeat the activity with smaller and smaller objects to find the smallest that can be seen and picked up.

Note the distance from the face that reach was accurate.

Repeat the activity by placing the object in different positions - in front and to the sides of the person.
2. Control of eye movements - tracking

2a Maintain gaze

Aim: To maintain gaze on an object which is rolled away.

Procedure:
Use a small object which will roll easily such as a small ball or rolled up paper.
Stand beside the person and show him the object. Tell him to watch the object as you roll it and then to walk to it where it has stopped.
Roll the ball in front of you for 4 metres. Do not roll the ball from a dark to bright area or a bright to dark area.
Watch the person to see how far he was able to follow the object with his eyes. Note the distance he was able to track the object and if he was able to walk straight to it or point to it.
Repeat the activity using shorter or longer distances depending on the result.
Aim: To track an object.

Procedure:
Stand opposite the person 1 metre away. Hold a bright object in one hand.

Hold the object to the right of your body. Tell the person to watch the object as you move it. When the person is watching it, move it slowly and smoothly across your body to the far left side in a horizontal movement.

Also use vertical movement from above your head to waist level and diagonal movements across your body.

The person should be able to follow the movement of the object with either a smooth eye or head movement. Note if the eyes wandered or jerked away from the object. Children with nystagmus can follow movement even though their eyes may be continually moving.

If the object cannot be seen at 1 metre, move closer and record the distance at which the person could track the object.
3. Control of eye movements - scanning

3a Shift gaze

Aim: To shift gaze from one object to another.

Procedure:

Use two different objects about the size of your hand.

Stand 1 metre from the person. Hold the objects in outstretched hands at your sides and in front of the person at eye level.

Name the objects held in each hand. Ask the person to look at one object and then to the other object in turn. Show one object and then the other. Repeat this at least once. For example say, "Look at the fruit, now look at the cup, back to the fruit and to the cup".

There should be distinct horizontal eye and or head movements from one object to the other.

Repeat the procedure with one object held above your head and the other at your waist level. Tell the person to look at the object at the top. Then show the lower object and tell him to look down at that. There should be distinct vertical eye and or head movements.

If the objects cannot be seen at 1 metre, move closer and record the distance at which the person could scan to both objects.
Aim: To change fixation between near and far objects.

Procedure:
Tell the person to hold a small object in one hand held below the eyes and in front of the chest.

Stand opposite the person about 3 metres away. Hold up a bright object about the size of your hand.

Ask the person to look at the object held in his hand and then to look at the object you are holding and then look back to the near object in his hand.

Observe if gaze is shifted accurately from one object to another - near, distance, near.

If the object cannot be seen at 3 metres, move to 2 metres or even 1 metre. Repeat the activity and record the distance.

Note: Scanning skills should be noted in other items in the functional assessment. Observe scanning while finding objects, mobility activities and in matching activities in this book.
4. Discrimination of objects

4a Find object

Aim: To find a distant object.

Procedure:

Choose objects which are familiar to the person.

Without the person seeing you, place the objects 4 to 5 metres from him. Avoid dark places or glare. An example shown in the picture is to find the basket.

Ask the person to look for the object. The person can describe where it is or walk to it when he has found it. Note how long the person takes to find the object.

If it cannot be found move the person closer and note the distance.

If these objects were seen, repeat the activity using smaller objects.
Aim: To locate and follow a pathway safely.

Procedure:

Choose an outdoor pathway. It could be a path from one building to another building or through the bush. The pathway should contrast with the ground on either side. It could be a made path or a worn pathway with grassy edges.

Ask the person to walk in front of you. Follow closely to keep the person from dangerous situations.

Observe if the person is aware of the sides of the path to follow. Check if he can see turns in the path and does not trip over rocks or hit over-hanging branches. Ask how the person can see to follow the pathway.

Note the person's posture while walking - is the head held straight up or bent down?
Aim: To move safely and avoid objects.

Procedure:
Choose an area with objects on the ground and bushes or trees overhead and to the sides.

Tell the person the direction to take. Follow closely behind so that she does not bump into objects.

Note how close the person needs to be to the objects to see and avoid them. Also note if she does not see objects on the ground, close to her sides or above her head.

If working inside, choose an area where there are objects on the floor and to the sides.

You may also want to observe the person using stepping stones to check if they can be seen and used safely.
Identify objects

Aim: To identify near and distant objects.

Procedure:

Near objects. Place objects within 1 metre in front of the person. Use familiar objects such as a coin, piece of food, pencil, spoon or knife.

The objects have to be recognised by looking without touching. Record the distance needed to recognise near objects.

Distant objects. Choose an outside area with activity happening and a variety of objects present.

Try to use activities where sound does not give a clue to what is happening - the activity or object should be recognised visually.

Ask the person to describe what she can see in the area. Ask her to point to, or describe, where some objects or activities are happening. For example, point to the bucket, the bowl or the people cooking.

Note if objects, people and activities can be recognised. Record the distance for recognising objects, people and activities.
5. Discrimination of details to identify actions and match objects

5a Imitation

Aim: To imitate body gestures or actions.

Procedure:

Explain that you want your actions to be copied.

Move away about 5 metres and face the person. Wave one arm as a sign of greeting or use the usual greeting sign. Use large and obvious movements.

If your action cannot be copied move closer until it can.

Record the distance that the person could see to copy the actions.

Other actions moving one or both arms or one or both legs can be used.
Facial expressions

Aim: To identify and copy facial expressions.

Procedure:

Explain that you are going to make different expressions with your face which you want the person to copy.

Stand or sit 2 metres opposite the person. Use your face only to make the expressions. Do not make any sound which would indicate what you are doing.

Show that you are happy. Then show that you are frightened or unhappy. Other actions can be done such as closing your eyes or opening your mouth. Use actions appropriate in your country.

If the expressions cannot be recognised and copied, move closer and repeat the same expression.

Record the distance that the person could see to copy expressions.
Aim: To match objects by size.

Procedure:
Use objects which are the same kind but in two or three different sizes. Coins, beads, feathers or stones would be suitable. Use sticks of different lengths to assess matching by length.

Spread them out in front of the person.

Ask him to look at the objects and find the ones that are the same size. Put all the objects which are the same size together.

He should pick up only one at a time. The objects must be matched by looking, not feeling the different sizes.

Record the distance the person has to be from the objects to see and match the sizes.
6. Discrimination of details in pictures

6a Recognise actions

Aim: To recognise actions in pictures.

Procedure:
Explain that each picture shows people doing different things. Ask what the person is doing in each picture.

The action should be described exactly. For example, for the person running, the answer "standing" is not correct. For the person eating, the answer "sitting" is not correct. The boy in the tree should be identified as climbing.

If the answers are not correct, ask the person to describe what he sees in the pictures. Record the answers and the distance of the eyes from the page.
6b Complex picture

Aim: To find objects in a complicated picture.

Procedure:
Ask what the large picture shows. If it is not recognised as a market, explain what it is.

Point to the picture of the melon drawn in the small box without naming it. Say, "Show me where this is in the picture of the market". Then ask the person to show other objects that you name. For example, "Show me a table." "Show me a basket". "Show me a person. How many people can you see at the market?"

Record whether the picture could be matched and the named objects found. Note if some kinds of objects in the picture were easier to find than others. Is it the size or detail of objects that makes them easy or difficult to find and identify? Record the distance of the eyes from the page.

Use similar complex pictures from books or magazines. If possible, use coloured and black and white pictures and note which is easier for the person to recognise or match objects.
Identification and perception of patterns, numbers and words

7a Abstract figures

Aim: To match abstract figures.

Procedure:
Follow the instructions and if necessary you can add explanations but do not suggest the answer.

Say, "Look at the shape in the small box where I am pointing." Allow time for looking at the shape. "Now look at these shapes. Can you show me the shape that is the same as the one in the box?" Record the distance of the eyes from the page.
7b Match numbers

Aim: To match numbers.

Procedure:
Follow the instructions and if necessary you can add explanations but do not suggest the answer.

Say, "Look at the number in the small box where I am pointing." Allow time for looking at the number. "Now look at these numbers. Can you show me the number that is exactly the same as the one in the box?" Record the distance of the eyes from the page.
Aim: To match shapes with inner detail.

Procedure:
Follow the instructions and if necessary you can add explanations but do not suggest the answer.

Say, "Look at the shape in the small box where I am pointing." Allow time for looking at the shape. "Now look at these shapes. Can you show me the shape that is exactly the same as the one in the box?" Record the distance of the eyes from the page.
7d Match words

Aim: To test matching of words and pictures.

Procedure:
Follow the instructions and if necessary you can add explanations but do not suggest the answer. Say, "Look at these pictures. For each picture there is a word to match." Allow time for looking at the pictures. "Look at these words." Allow time for looking at the words. Point to each picture in turn. Say, "Show me the word for this picture."

Repeat this for each of the pictures until all the pictures and words are matched. Record the answers separately for each word.

If the person cannot read the words, ask if the pictures can be identified.

If you want to make your own words, use simple, short words. Choose words with different first letters or symbols and words which have different shapes.
TRAINING EFFECTIVE USE OF VISION

"Let the child look and look and look again, and help him understand what he sees."
Bill Brohier, President, International Council for Education of the Visually Impaired.

The aims of a vision training program are:
- to encourage and help each person make best use of his vision
- to provide a variety and number of opportunities for the person to learn about and understand his environment.

There are 3 aspects in training effective use of vision.
1. Stimulation of vision. People who have very little vision or have not used vision need to know that they can use their vision. They may also need encouragement to do so.
2. Visual efficiency. How vision is *used* can be improved with training. Measures of vision do not change after this training, that is, visual acuity or visual fields will not change because of the training.
3. Knowing when and how to use vision leads to knowing how to change the environment (for example, lighting), choosing suitable materials and using low vision devices if needed.

It is important that people with low vision are examined for possible treatment. Some conditions which cause low vision can be cured or vision improved. Spectacles or low vision devices should be used when necessary if they are available.

Make sure that each person is ready to start a vision training program. Refer to information from the section on observations of the person with low vision, such as attitude towards the use of vision. A person who does not think he has any useful vision or for some reason does not want to use vision may need encouragement before vision training can start.

Try to find the reason why a person is unable to do an activity. If poor vision is the problem, try again at a shorter distance or make the object easier to see by increasing contrast or making it larger. It is possible that the work may be too difficult.

The suggestions for training are divided into the same sections as the Assessment of Functional Vision. The assessment shows which skills need to be trained. Only use the sections in the training program that could not be done in the assessment. For example if a person had some difficulty in tracking an object, the suggestions on page 42 can be used to try to improve tracking skills.

Hints for vision training:
- try to make training a part of normal programs or everyday activities
- arrange short training sessions
- provide variety so that the person doesn’t become bored with doing the same activity and using the same materials; the activities can be fun
- don’t keep on with an activity when the person is frustrated
- do not move on to the next skill until each one is able to be done well. Some skills may take weeks or months to achieve
- include the training of other senses such as hearing and touch in the programs
- give practice to develop physical skills to improve the co-ordination of vision with movement and physical skills
- not all skills can be achieved by all people. If a skill cannot be achieved, teach a different way to do the same thing. An example is visual recognition of people
- teach recognition of voices, how to recognise people by their clothing and differences in sizes
- work in the best possible lighting conditions
- make sure that the size of objects and the working distance is right for each person
- use objects that contrast well with other objects or the background
- use materials that interest the person
- use a dark pen to draw shapes and for writing.

This book explains what to do in a training program. Objects that may be available where you are working are suggested. The activities using numbers, letters and words can be handwritten. Use materials you have already if they are suitable for the activities.

This is not a reading program. It teaches the visual skills which are needed for reading.

Other kits and books on vision assessment and training are listed on page 58.

1. **Awareness and Attention to Objects**

Start with objects held close to the person. Use interesting bright or shiny objects such as toys or plates to gain attention. Move the object in your hand and talk about it or make a noise with it to get attention. Watch the person’s eyes to observe if the object has been noticed. Practice many times until fixation can be maintained.

Try to increase the period of fixation up to 3 seconds.

When the person can attend to close objects increase the distance and hold objects in different positions in the visual field (in front and to the sides).

Repeat the activity without talking about the object or making any sound with the object.

The person can practise fixation on his own hands held at different distances or on another person’s face.

Encourage the person to reach out and touch an object. Start with objects close to the eyes then gradually increase the distance to an arm’s length. After touch is accurate, tell him to pick up the object.

It is easier to judge the distance to an object using 2 hands. Practise with 2 hands then try with one hand. This will be hard at first for people who have poor or no vision in one eye.
2. **Control of Eye Movements - Tracking**

Hold an object close to the person's face and move it slowly and put it down in front of her. The movement of the object should be followed with the eyes.

Ask the person to find a familiar object and move to touch it. Start at 1 metre then increase the distance.

Hold a light object that will fall slowly to the ground above the person's head. A piece of bright cloth would be suitable. Let the object drop and ask the person to find it and watch it as it falls. Repeat this without telling the person what is happening and watch if she sees it and follows the movement. An additional activity is to ask her to touch it as it falls.

Series of activities can be done with rolling and throwing objects such as balls. Start by rolling the object away from the person. Next roll it towards her and then roll it in front from one side to the other. Repeat the activity by throwing the object. Be careful when throwing towards a person. The movement of the objects should be followed with eye and/or head movement.

Bouncing or rolling a ball and hitting it with the hand.

Stand opposite the person about 1 metre away and make patterns in the air. The pattern can be made by moving a hand, waving a stick or a brightly coloured object. The pattern should be followed with smooth eye movements. It may be easier at first for the person to follow the pattern by also pointing to the movement.
3. **Control of Eye Movements - Scanning**

Eyes should move smoothly from the first to the second object without going off in other directions. When training scanning, start with side to side movement, then up and down and then diagonal movements. Practise first with the objects close to the person and then increase the distance. Begin with 2 objects and later increase the number.

Choose two familiar objects and place or hold them in front of the person as shown in assessment item on scanning. Give help at first by calling the names or positions of the objects. The eye movements should go straight to each object in turn and fixate without going off in other directions.

The person can practise this by herself by stretching her arms straight in front and holding up the hands. Gaze can be shifted from one hand to the other in turn.

Place two objects in a row in front of the person about half a metre apart. When scanning along a row is accurate, then train scanning up and down and then in diagonal movements.

A game can be played which requires scanning at greater distances. People stand in a row or scattered about. As they call their names the person has to find each one before the next name is called out. This also helps to identify people from their voices and direct vision to the position of a sound.

Place a row of objects on a table or the ground in front of the person while she closes her eyes. Tell her to open her eyes and start at the beginning of the row where your hand is and look to the end. She has to find an object from the row. The example in the picture is to look along the row to find the feather. Objects can then be scattered and the activity can be repeated. Eye movements should be from one object to another without going back to objects. Practise these activities to improve the speed of scanning.

Ask the person to describe the scene and name objects she can see from a window or where you are outside. Other people can describe the same scene when she has finished.

*Fixation on an object while the head or body is moving.* Tell the person to keep her eyes on your face while turning her head from side to side. Also the head can be rocked from one shoulder to the other while keeping gaze fixed on your face.
Walk around inside or outside together and ask the person to point to objects as you pass them. Touch close objects as you walk past.

4. **Discrimination of objects**

*Colour* can be used to discriminate between objects if the person learns the colour of objects such as food or clothing.

The general *shape* of an object can give clues to help identification. People can learn the outline or general shape of trees, birds or animals, or the difference between a stool and a bench or table.

Differences in *contrast* between objects can help even though the detail of the object cannot be seen. People can be taught to use differences in contrast between objects. Examples are

- differences in light from doorways and windows
- pathways may be lighter than the ground around them
- objects on the ground such as rocks or holes may not be identified but can be avoided if they contrast with the rest of the ground.

Learn where objects are normally kept so that *position* can be remembered. It is important that other people do not move objects without telling the person with low vision.

Differences in *size* of people or objects can help in recognition. Details do not have to be seen to know the difference between a child and an adult, or different kinds of animals.

To assess *discrimination of objects*, present one familiar object to be named by looking at it without touching it. Then present two and later more objects for the person to pick out the one you name. Later all items can be named by the person. Choose familiar items used in the home, school, cooking, play, work, small animals, food including fruit and vegetables and leaves and flowers from trees. Let the person look as closely as he needs. The items are to be named without touching them.

For objects that cannot be brought to the person, walk around the room or community to explore and name objects.

5. **Discrimination of details to identify objects, actions and match objects**

When looking at objects, talk about what makes them different. Discuss the things about them that tell you what they are. For example a knife, fork and spoon are similar but the end is different on each; a bowl for eating is different to one for cooking and a basket has handles so that you can carry it.

Look at the important parts on objects. For example, the latch or handle on a door, the sharp part of a knife or the part of the pen you write with.

*Imitation of body movements.* Start with moving the whole body, then large movement of the arms or legs, then small parts of the body such as the head. Even smaller movements with hands and fingers are more difficult to see and copy. Work close to the person then move further away. Examples of movement are:
- whole body - bending over, turning around
- arm or leg - kicking or throwing
- hand and finger - screwing hand into a fist, pointing.

Special ways of holding objects may need to be taught. Sometimes it is better to use the whole hand to pick up something or other times to use the thumb and first finger.

Imitation of expressions of the face. Start by working close to the person (less than 1 metre). Make expressions to be copied - closing both eyes, opening and closing the mouth and smiling.

Recognition of familiar people. People are normally recognised by their faces. If a person with low vision cannot normally get close enough to recognise another person, she needs to learn other ways of identifying people. Other features such as voices, clothes or size and shape can help to identify people.

Recognition of animals. Animals are recognised by their shape, size, colour or special parts of them. Animals that are similar such as birds have different things such as beaks. Animals with 4 legs and similar size are recognised by such things as the shape of the head or tail. Point out these differences in animals found in your environment.

Parts of objects and how they go together to make a whole object. Look at parts of an object and show how they fit into the whole object. For example with vehicles such as a car, boat or bike - look at all the parts and talk about how they are used.

Play hiding games with part of the object still showing. For example a person can stand behind a doorway with part of her still showing or hide a familiar object partly behind another. Make it harder by hiding more of the object with only a small part showing.

Identifying objects that belong together. From a collection of different objects, put all the things together that are the same kind or used for the same thing. In a house it could be all the objects used in cooking; in a school, all the things for drawing or writing but not the books.

Matching and sorting the length of objects. Start with only two sizes - short and long then later add more sizes. Use objects that the person will need to use that are different lengths. Examples are sticks or wood for building and twine or string for tying up objects.

Matching objects by size. Start with only two sizes - big and little then later add in-between sizes. Objects which are the same type but different sizes should be used. These could be fruit or vegetables, feathers or beads. Sort objects and put them in separate boxes or bowls. For example put all the small beads in the small bowl and all the large beads in the large bowl.

6. Discrimination of details in pictures
Matching pictures of objects by size. Use objects that are the same type but different size. Match the ones that are the same size or all the small ones or all the big ones. Pictures used could be clothes, fruit or bowls.
Matching pictures by shape. Use simple shapes such as squares and circles at first. Match solid shapes with solid shapes, that is pick out all the squares. Then match solid shapes to outline shapes. During the matching activity the person can trace around the outline of the shape with a finger.

The next step is to match solid pictures to outline pictures such as a hand, stool or fruit.

Matching outline shapes or pictures. From a page of shapes the person can point to all the same shapes or he can colour in all the shapes that are the same.

Imitation of actions in pictures. The pictures have to be identified and the actions copied. Start with simple actions such as sitting, lying or standing. More difficult actions to see in pictures could be looking at a book, pouring water into a mug or mixing food in a bowl. The next step is to copy expressions from pictures such as laughing or crying or pretending to be asleep.

Matching pictures with different detail. Use pictures of the same objects that have different patterns on them. Examples are pictures of shirts, baskets or balls.

Use pictures with people and objects showing a scene. The person has to identify what is in the picture. For example find all the people, what they are doing and name the objects. Pictures should be of familiar activities such as a family eating, people in a schoolroom, a market, children playing or people working.

Finding and naming parts of objects or people in complicated pictures. Examples are - people's arms or heads, handles on a basket or food being cooked.

Pictures with missing parts. The person has to tell or show the necessary part that is missing in a picture. Examples are people or animals with a leg missing or a bird without a beak or wings.

Showing missing parts of shapes. The person has to draw in or point to the missing part such as a square with only three sides.

Finding partly hidden objects in pictures. An object which is behind another object has to be found in a picture. An example would be an animal partly hidden behind a bush or tree.

Arranging pictures of events in the order that they happen. Start with a simple activity in 2 pictures such as picking a piece of fruit and then eating it. Talk about what happens in each picture and which comes first. Use more complex activities with 3 or more pictures.

Identifying pictures of objects that belong together. Pictures of objects can be grouped together because of what they all look like or what they do. Pictures of animals - the groups could be animals that swim, fly or walk; pictures of objects - the groups could be the kinds of objects they are such as clothing or food.
7. Identification and perception of patterns, letters, numbers and words

Matching shapes or patterns by detail. Use shapes or patterns like the ones used in assessment item 7c, inner detail (page 38). The outline shapes are similar but there are differences in detail which have to be identified.

Tracing over or copying patterns of straight or curved lines.

Direction in pictures. Match pictures of objects or animals and shapes which face in the same directions.

Match the position of objects from a picture. Put objects in the same positions as they are in a picture such as a hat in front of a basket.

Matching numbers and letters. Talk about the similar features and differences in numbers and letters. The lines are straight, curved or circular.

Matching numbers and letters on cards or paper to numbers and letters used in the environment such as signs or a board in a classroom.

Signs used in the environment. Discuss colours or shapes used on signs to give information such as red for danger or to stop something happening.

Matching or sorting letters with similar parts, that is -
letters that go below the line  g y p j q
tall letters  t d b f h k l
small letters  w e r u i o a s z x c v n m

Matching of upper case (capital) and lower case letters.

Upper case  B H D W O K C P M
Lower case  b h d w o k c p m

Matching script (handwriting) and printed letters.

box
write
wet

Matching unusual shapes and symbols. Examples are $, #, %, &, { }.

Tracing over handwritten and printed letters and numbers. Start with easy shapes such as 1, L, t, O, o and lastly the most difficult shapes such as 5, 8, W, S, B, m, z, e, k.

Naming letters and numbers.
Matching words that look the same. The words do not have to be read. Write out words in groups to find one the same. Start with words that look very different. An example is:

bat more bat no sow

Words can later be used that look more the same:

most nest west cost most
dear clear near dear fear.

Matching words that are held close to the person or on a table with words at some distance such as on a notice or a board. Make sure the words further away have good contrast and are large enough.

Matching words to objects and actions in a complex picture. In the picture of the market, item 6b (page 35), match words such as man, fruit, melon, table, basket, vegetables. Use other similar detailed pictures.

Trace over and copy words.
LOW VISION DEVICES

There are two main types of low vision devices:
- optical devices which use lenses to magnify objects
- non-optical devices and techniques which make objects easier to see.

Optical Devices
Optical devices are of two kinds - near and distance. Near devices are designed for magnifying close objects and print. Distance devices are for magnifying things in the distance (from about 3 metres to far away).

Children can magnify print and small objects by holding them very close to their eyes, so some children will not need magnifiers to see near objects.

Check that each person has been examined, if possible, to see if spectacles are needed to correct or improve vision before recommending low vision devices.

It is necessary to find out what people are unable to see and what they want to be able to see better. It might be a very specific task such as reading labels on food packets. The nature of the task will also affect the type of low vision device which is suitable. Before selecting a low vision device, consider
- the size of objects to be viewed
- the possible viewing distance from the object
- the length of time needed for the activity
- whether one or both hands are needed for the activity.

Some people use both near and distance devices, others use only one type.

Optical devices for near tasks
Magnifiers for close tasks are designed to be either held in the hand (hand-held magnifier), to be placed on a book or over a small object (stand magnifier) or mounted in spectacle frames. With magnifiers for near tasks, objects or print look larger and detail can be seen. A stand magnifier is a strong lens which is mounted in a plastic stand (see picture). A stand magnifier is usually easier than a hand held magnifier for a child to use. It can be moved along while still resting on a page of a book. With spectacle magnifiers, both hands are free to work on tasks.
Magnifiers for near tasks can be used for:
- reading a book or a newspaper
- reading labels, signs or prices in shops
- using tools, for example measuring
- threading a needle
- identifying money
- inspecting objects such as plants or insects.

For reading, the magnifier has to be moved along each line of print, sometimes only showing a word or part of a word at a time. More words will be seen if the eye is held close to the magnifier. Reading is very slow at first. It is difficult to learn to use the magnifier properly - a lot of practice is needed.

Large print is better than a magnifier when learning to read because the magnifier limits the number of words/ letters seen. A magnifier can be used when the person is reading efficiently.

*Optical devices for distance tasks*

Magnifiers for distance are like small telescopes. They improve the ability to see distant objects or people. Objects appear to be closer and it is hard to judge distances properly. It is best not to use telescopes while walking around.

![Telescope](image)

Telescopes can be used for looking at distant objects and activities such as:
- signs
- finding and recognising people or animals
- reading from a blackboard in school
- finding an entrance to a building
- watching games.

*Training to use optical devices*

Encouragement and training are needed for people to use low vision devices well.

The field of view or amount able to be seen through the magnifier or telescope is small. It takes practice to be able to find objects and then follow them or scan to find other objects.

For distance tasks it is best to look in the general direction of an object without the device and then point or place the device in that direction to locate objects. It is easier to scan along horizontal objects such as roads or fences and up and down vertical objects such as trees or walls.
It is best to practise using actual activities that the person needs to learn. The activities for training tracking and scanning on pages 42 to 44 can be used for training with low vision devices. The closest distance should be 3 metres for distance devices.

Simple, low cost low vision devices are now being produced in some countries. Christoffel Blindenmission (CBM) is making near optical devices and have instructions on how they are made. See Appendix C for CBM’S address.

The picture shows a person using a telescope to look at a distant object. The telescope is held in one hand with the arm supported by the other hand.

Non-Optical Devices
Reading stand
A stand for work to lean on and which brings it closer to the eyes is often useful. It helps the person keep good posture. It keeps the person from getting a sore back and neck from leaning down close to her work.
**Felt-tipped pens**
Contrast is important for people with low vision. Use pens which make clear, **bold** marks. A black felt-tipped pen on white or light coloured paper is usually best.

**Lighting**
The amount and direction of light are important for best visual functioning. Lamps or good room lighting can help to improve visual functioning. If no artificial lights are available, use light from windows or doors.

**Reading slit**
A reading slit which is put over a page of print is often helpful for a person with low vision as it reduces the glare from the page. It is also easier to find and keep the place while reading.

A reading slit can be made by cutting a hole in a rectangular piece of cardboard. The hole should be big enough to uncover one line of print (approximately 1 cm high and up to 15 cm wide).

**NORMAL PRINT, LARGE PRINT OR BRAILLE**

It is often difficult to decide which print size is best for each person or if braille should be learnt. Some people need to learn in both braille and print before the most appropriate decision can be made.

No single piece of information can be used to make a decision. Take time to make a decision. Gather information and discuss it with the person with low vision and his family. Useful information is:

- the smallest print size able to be identified in a near vision test. On the test card which comes with this Kit, the smallest size on the near vision test is similar to normal print. The medium size is similar to large print. The largest print in the near test is similar to print used in headings and on labels and signs. The near vision test card is shown on the next page. If only the largest print can be read, low vision devices would be needed for print reading. If these are not available, a combination of braille and print reading should be taught

- results from assessment of functional vision. How well (or poorly) a person uses his vision will influence whether print or braille should be considered

- speed of reading; reading below 20 to 30 words per minute is not efficient reading. Braille may need to be considered if print reading is very slow

- ability to keep reading at the same speed without becoming too tired (fatigue)

- availability of spectacles and low vision devices

- availability of large print or braille

- probable future needs at school or work for braille or print.
Distance visual acuity should *not* be used to decide which is the best type of reading material.

The lowest cost and most efficient method of reading for most people with low vision is normal or large print with spectacles and/or low vision aids.

Near Vision Test

`W E E W
 E W E M
 ....`

Near Vision Test
A general knowledge of the eye and how it works is useful in helping to understand impaired vision.

The eye. The eye and brain work together to form images, the things we see. For good vision the pathway of light through the cornea, lens and fluids in the eye has to be clear. The light rays are focused at the back of the eye. The fluids in the eye (aqueous and vitreous) maintain the correct shape and pressure in the eye.

The eyelids protect the eye and keep the front surface of the eye moist. The cornea is the clear "window" at the front of the eye. Its curved shape helps focus light rays. Injuries or disease can cause scars or clouding of the cornea which may affect vision. The conjunctiva is a thin transparent coat covering the sclera and inner parts of the eyelids. The sclera is the tough, white outer coat of the eye.

The iris is the coloured part of the eye which changes size to control the amount of light entering through the pupil. The pupil is the opening at the centre of the iris. In bright light the pupil becomes small. In dull light the pupil is larger to allow more light to enter the eye.

Inside the eye and not normally visible is the lens which is a clear oval shape. It is held in place by thin ligaments. It changes shape to focus light from near or far objects.

The retina is a lining inside the eye. It receives light rays and sends messages along the optic nerve to the brain. The small central part of the retina, the macula, is the part capable of seeing fine detail.
APPENDIX B: COMMON CAUSES OF LOW VISION

CORNEAL DAMAGE is a major cause of impaired vision in developing countries. The cornea can be damaged from infection, injury or other disease. The whole cornea can become cloudy or parts can be damaged by scars. If light cannot pass through the cornea, vision will be affected. The result is similar to cataracts; visual acuity is reduced, good contrast is needed and the amount of light affects vision. Glasses are unlikely to improve vision damaged by corneal scars or clouding.

Some diseases which cause corneal damage are:

Neonatal Conjunctivitis (Ophthalmia Neonatorum) is severe conjunctivitis that appears in the first week of life. Serious damage to vision occurs if it is not treated immediately. The eyes must be cleansed and drops or ointment given.

Xerophthalmia is caused by Vitamin A deficiency. It starts with the drying of the conjunctiva and cornea. The retina is also affected causing poor vision in dull light and at night. Xerophthalmia is caused by poor diet - a lack of dark green leafy vegetables, yellow vegetables, tubers and fruits, eggs and milk. Treatment can be given by one or more doses of vitamin A. The condition can be present and then disappear during different seasons because of the fruits and vegetables that are available. If the condition is allowed to progress, the cornea becomes cloudy and is eventually destroyed. A child with xerophthalmia may have poor general health.

Measles and xerophthalmia are a dangerous combination and can rapidly cause corneal ulceration (keratomalacia) and blindness. The use of harmful eye medicines to treat conjunctivitis during measles can damage the cornea and lead to low vision or blindness.

Trachoma is caused by an infection of the conjunctiva. Severe conjunctivitis and corneal ulcers can occur. If not treated, scars form on the cornea and eventually blindness can result. Poor hygiene and lack of treatment affect the seriousness of trachoma. Regular washing of the face and eyes can prevent eye damage from trachoma.

CATARACT is a clouding of all or part of the lens. Usually visual acuity is reduced and vision is blurred. The effect on vision depends on the size and cloudiness of the cataract.

The amount and direction of light affects people with cataracts. Vision can change depending on the light. Glare causes discomfort and makes vision worse. Outside, a person would be better working in the shade if this is possible, or wearing a hat to shade the eyes. Inside, the person should face away from the light coming from a window or door.

Near or distance vision or both may be affected. Materials and objects of good contrast are better for a person with cataracts. Large print or increase in size of materials may not be necessary. The most important needs are for good lighting without glare and good contrast.

A cataract can be present at birth. It can develop later in life from injury, illness or in old age. Some cataracts don’t change but others become worse. Blindness can result.
The treatment for cataract is the surgical removal of the lens. This needs a specially trained person to do the operation. Glasses or special lenses are needed to take the place of the lens that has been removed.

GLAUCOMA is an increase in pressure from the fluid (aqueous) inside the eye causing damage to the retina and the optic nerve. Peripheral (side) visual fields become reduced and visual acuity is affected. Vision is affected in dull light and at night so good lighting is needed. Glaucoma can be treated with an eye operation. Sometimes drops are also necessary. Blindness can result if it is not treated.

CONGENITAL RUBELLA SYNDROME occurs in babies whose mothers have been infected by rubella (German measles) during pregnancy. Congenital Rubella Syndrome results in multiple disabilities including cataracts, glaucoma, deafness and heart disease.

RETINAL DYSTROPHIES. There are a large number of conditions where the retina and especially the macula never develop properly or are destroyed (degeneration). Both near and distance vision are affected when the central area of the retina is involved. Making objects or print larger will help make things easier to see. Low vision devices are often helpful.

Albinism. People with albinism have pale or white skin and hair and vision is poor. Near vision is usually better than distance vision. They have nystagmus, refractive errors and poor visual acuity. Spectacles usually improve vision but do not give normal vision. Albinos usually prefer dark or tinted spectacles. The skin should be protected from the sun. Low vision devices can be useful for distance but are only sometimes needed for near activities.

Retinitis pigmentosa. This usually affects young adults. There is a slow worsening of vision. The peripheral (side) vision is the first area affected. Visual acuity may remain normal or become poor. In good light the person may be able to do many activities that require good vision. Vision is often poor in dull light or at night. It can be difficult to move around safely and avoid objects.

DIABETIC RETINOPATHY. There are increasing numbers of people with visual impairment caused by diabetes in the developed and developing world. Diabetes causes growth of new blood vessels in the retina and vitreous which can leak or bleed and lead to vision loss. Laser treatment can help prevent blindness provided it is given before visual loss occurs. Vision loss depends on the amount and the area of the retina affected. Tight medical control of diabetes is important.

OPTIC ATROPHY. This is a degeneration of the optic nerves caused by injury to the eye, glaucoma, poisons, congenital (present at birth) defects and difficulties at birth. Visual acuity is affected and sometimes parts of the visual field are missing. Good lighting is usually needed for better visual functioning. Low vision devices and large print may be helpful.

NYSTAGMUS is a movement of the eyes which cannot be controlled or stopped. Usually the movements are small and from side to side but movements in other directions also occur. Nystagmus usually occurs when an eye condition has been present from birth. Vision may be blurred but the person does not see the world as moving. Near
vision is usually better than distance vision. Nystagmus cannot be treated. There may also be an unusual head posture or shaking or nodding of the head.

REFRACTIVE ERRORS occur when the eye is not the right shape or size so that light cannot focus on the retina. Vision is blurry and can usually be corrected with glasses. Astigmatism is when the front parts of the eye are not the right shape. Astigmatism may cause difficulties for near, distance or both. Longsightedness (hyperopia) is when the eyeball is too short from front to back. People without spectacles will have more difficulty seeing at near than in the distance.

![Hyperopia](image)

Hyperopia

Hyperopia corrected with convex (plus) lens

Shortsightedness (myopia) is when the eyeball is too long. People without spectacles will have more difficulty seeing in the distance than at near.

![Myopia](image)

Myopia

Myopia corrected with a concave (minus) lens

ONCHOCERCIASIS (River Blindness) is caused by a filarial worm which enters the body. It can result in corneal and chorio-retinal scarring. Vision is also impaired from inflammation within the eye and from cataracts, glaucoma and optic atrophy which can also develop. A new drug, ivermectin, is being given to people in areas where onchocerciasis occurs. It used to stop the progression of eye (and skin) damage caused by millions of tiny worms.

TRAUMA (Accidents). Often vision is impaired in only one eye in accidents but sometimes both eyes can be affected. Injuries to the surface of the eye (conjunctiva or cornea) are common. Immediate treatment of an eye injury is essential to prevent blindness.

HARMFUL EYE PRACTICES used by traditional healers or untrained people can result in low vision and blindness. Hot objects, fluids and solids (such as extracts from plants, human or animal body fluids) applied to the eye can cause serious damage to the eye.

For more information on causes of low vision and eye care, refer to the book by Larry Schwab, "Eye Care in Developing Nations".
APPENDIX C: USEFUL RESOURCES

LOW VISION TRAINING PROGRAMS FOR CHILDREN

Beyond Arm's Reach: Enhancing Distance Vision
This curriculum for training distance visual efficiency is for use by teachers, orientation and mobility instructors and parents. It was developed by Smith, Bradfield and O'Donnell and is available from the Institute for the Visually Impaired, Pennsylvania College of Optometry, 1200 West Godfrey Ave, Philadelphia, Pennsylvania 19141, USA.

Diagnostic Assessment Procedure
Program to Develop Efficiency in Visual Functioning
This comprehensive kit by Natalie Barraga includes testing procedures with equipment, lessons for visual training and reference material on low vision. Available from The American Printing House for the Blind, 1839 Frankfort Ave, Louisville, Kentucky, USA.

Look and Think Program
The books and kit of materials to assess low vision were compiled by Tobin, Tooze, Chapman and Moss. The books are available without the kit from the Research Centre for the Education of the Visually Handicapped, University of Birmingham, School of Education, Edgbaston, Birmingham B15 2TT, England.

VAP-CAP Handbook
VAP-CAP (Visual Assessment and Programming - Capacity Attention and Processing) is a kit of materials suitable for very young children with visual impairment. The Handbook contains instructions for assessment and a training program. It was developed by Dixie Blanksby for use by teachers. Available from the Royal Victorian Institute for the Blind, Burwood Highway, Burwood 3125, Australia.

Vision for Doing
Assessing Functional Vision of Learners who are Multiply Disabled.
A book written by Aitken and Buultjens for people who are not specialists in visual impairment. It explains how to carry out a functional assessment of vision and includes ideas for teaching. Available from Moray House Publications, Holyrood Road, Edinburgh EH8 8AQ, Scotland.

The guide contains suggestions for visual training activities. It was developed by the Visiting Teacher Service of the Ministry of Education in Victoria for people working with children with low vision. Available from Statewide Resource Centre for Teachers of Visually Impaired Children, P.O. Box 246, Bulleen 3105, Australia.
BOOKLETS FOR FAMILIES, HEALTH WORKERS, TEACHERS OR COMMUNITY WORKERS


"I am not blind, I just do not see clearly!!" Suggestions to help low vision people function better. By J. Kirk Horton and Renn Fuller. The Foundation for the Blind, Bangkok, Thailand.

Education of visually impaired pupils in the ordinary school. By J. Kirk Horton. UNESCO.


REFERENCE BOOKS


ORGANIZATIONS INVOLVED IN PREVENTION OF BLINDNESS AND IN EDUCATION AND TRAINING PROGRAMS IN DEVELOPING COUNTRIES

Christoffel-Blindenmission (CBM), Nibelungenstrasse 124, D-64625 Bensheim, Germany

Helen Keller International Inc., 90 Washington Street, 15th Floor, New York, N.Y. 10006, USA

Hilton/Perkins International Program, Perkins School for the Blind, 175 N. Beacon Street, Watertown, MA 02172, USA

International Council for Education of People with Visual Impairment (ICEVI), 37 Jesselton Crescent, 10450 Penang, Malaysia

International Agency for the Prevention of Blindness, Grosvenor Hall, Bolnore Road, Haywards Heath, West Sussex RH16 4BX, England

International Eye Foundation, 7801 Norfolk Ave, Bethesda, MD 20814, USA

Low Vision Unit, Department of Ophthalmology, The University of Melbourne, Royal Victorian Eye and Ear Hospital, 32 Gisborne St, East Melbourne 3002, Australia

Orbis International, 330 West 42nd Street, Suite 1900, New York, N.Y. 10036, USA

Sight Savers International (Royal Commonwealth Society for the Blind), Grosvenor Hall, Bolnore Road, Haywards Heath, West Sussex RH16 4BX, England

World Health Organization - Prevention of Blindness Programme, 20 Avenue Appia, 1211 Geneva 27, Switzerland
Further Information can be obtained from:

World Health Organization
Programme for the Prevention of Blindness
1211 Geneva 27
Switzerland

University of Melbourne
Department of Ophthalmology
32 Gisborne Street
East Melbourne 3002
Australia