Provincial Vision Screening Training Manual

BC Ministry of Health
June 22, 2007

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I. PURPOSE OF THE VISION SCREENING TRAINING MANUAL:

The purpose of the Vision Screening Training Manual is to provide vision screeners with the information required to carry out the vision screening program in the preschool age[1] and/or kindergarten[2] age population. This manual can be used as a basis for teaching vision screeners, staff or volunteers basic vision screening techniques to ensure consistent, standardized practice and procedures by all vision screeners and associated staff.

II. OBJECTIVES:

After reviewing this manual, and having successfully completed a training session, the vision screener will be able to:

1. Understand the vision screening services offered to the preschool age and/or kindergarten population by the Health Authorities.

2. Understand the purpose of the screening procedures for stereopsis and refractive errors/visual acuity.

3. Accurately carry out the screening procedure for stereopsis and refractive errors/ visual acuity.

4. Record and interpret the results of the screening procedure.

5. Make appropriate referrals if indicated and liaise with other professionals involved in follow up (e.g. eye doctors, teachers etc.).

6. Record findings of the referrals and complete necessary follow-up.

[1] Preschool age child refers to children who are 3 years of age.
[2] Kindergarten refers to children enrolled in a kindergarten program.

III. OVERVIEW OF BC MINISTRY OF HEALTH VISION SCREENING PROGRAM:

OBJECTIVES:

1. To identify possible visual defects (amblyopia, strabismus, refractive errors) in preschool age children and/or kindergarten age children.
2. To facilitate treatment and care for preschool age children and/or kindergarten age children with identified visual defects.

RESPONSIBILITIES:

1. Ministry of Health, Population Health and Wellness branch is responsible for stewardship of the vision screening program.
2. Health Authorities are responsible for ensuring screening personnel are trained and follow vision screening practices as outlined by the Ministry of Health Vision Screening Training Manual.
3. The Vision Screening Steering Committee is a committee of health professionals whose purpose is to advise the Ministry of Health and Health Authorities on matters related to the Vision Screening Program delivered by Health Authority personnel. Their responsibility is to provide advice and recommendations in the development, implementation and evaluation of the Provincial Early Childhood Vision Screening Program.

HEALTH AUTHORITY ACTIVITIES:

1. Support case finding through provision of information about vision and eye health to parents, guardians and care providers. (E.g. at newborn visits, Well Child Health Clinics or Parent/Guardian/Toddler programs, preschools and childcare settings, Child Development Centres or locations frequented by young children and their families.)
2. Use an appropriate screening tool to screen for visual acuity/refractive errors and stereopsis and provide follow-up to determine outcome.
3. For any child who fails the vision screening, or who exhibits signs of eye trouble, refer for further examination using the Vision Screening Referral and Follow-up form. Facilitate follow-up to outcome.
4. Determine outcome of referrals and enter onto appropriate forms/health records.
5. Maintain records for vision services as per Health Authority guidelines.
6. Provide consultation to parents/guardians or other care providers about vision screening.
7. Collect and maintain program statistics and provide to Population Health and Wellness, Healthy Children, Women and Senior's Branch as per evaluation guidelines.

IV. VISION DISORDERS THAT MAY BE DETECTED BY SCREENING:

The purpose of vision screening is to detect vision disorders such as refractive errors, amblyopia and strabismus at an early age (less than 6 years.)

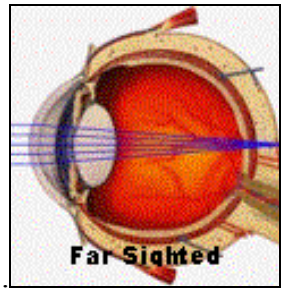
AMBLYOPIA or Lazy eye is where the vision in one eye is weaker than the other. The child's brain ignores the weak eye and uses the stronger eye in an attempt to see. If left untreated, the child's brain develops a clear picture in the good eye and a blurry picture in the weak eye. Lazy eye is often associated with crossed-eyes or a large difference in the degree of nearsightedness or farsightedness between the two eyes. It usually develops before the age of 6.

STRABISMUS or Crossed eyes occurs when one or both eyes turns in, out, up or down, and is usually caused by poor eye muscle control. This misalignment often first appears before age 21 months but may develop as late as age 6. A child will not outgrow strabismus. In fact, the condition may get worse without treatment.

REFRACTIVE ERRORS: Hyperopia, Myopia and Astigmatism

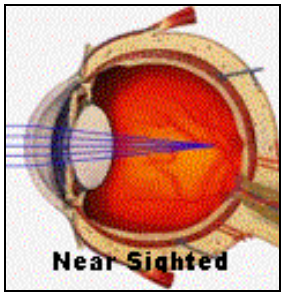
The normal eye has various transparent parts through which the light must travel to reach the retina. Light is refracted by the transparent media so that the eye, while at rest can form a clear image on the retina. When light rays cannot be brought to a single focus on the retina of a resting eye, a refractive error is present.

HYPEROPIA (Farsightedness)



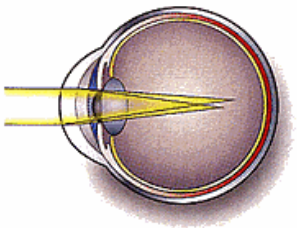
A condition whereby the eye, while at rest, insufficiently refracts light from a distant object so that the image theoretically is focused BEHIND the retina. This may be due to a short eye or too flat a curvature of the cornea. Sight may be normal or very poor depending upon the state of accommodation and the amount of hyperopia. The person sees distant objects clearly but close objects appear blurry.

MYOPIA (Nearsightedness)



A condition whereby the eye, while at rest, over refracts the light from a distant object so that the image of the distant object is focused in FRONT of the retina. The person perceives a blurred image that cannot be improved by accommodation. The condition is usually a structural, congenital, and/or developmental anomaly. The person sees near objects clearly but distant objects appear blurry.

ASTIGMATISM



A vision condition that occurs when the front surface of the eye, the cornea, is slightly irregular in shape. This irregular shape prevents light from focusing properly on the retina. As a result, vision may be blurred at all distances.

V. VISION SCREENING

Screening is a process by which a large number of persons are assessed by a fast, efficient method in order to separate them into different groups. The purpose of vision screening is to separate those children who probably do not have vision problems from those who should be examined by an eye doctor for further assessment and possible follow up.

The goal of the provincial vision screening program is universal vision screening of preschool age and/or kindergarten children. However, a target of 100 percent may not be feasible as preschool and kindergarten are not a mandatory programs, families may decline service or may not complete follow up recommendations.

The kindergarten screening program is a temporary program until preschool age[3] vision screening is realized.

Screening is NOT a diagnostic procedure and does not determine that correction of a possible defect or need for glasses is indicated. The diagnostic aspects and recommendations are made only by an eye doctor. Parents/guardians should be instructed to seek professional evaluation whenever they have any doubt about their child's vision regardless of how recently the child may have been screened for vision with normal results.

VI. VISION SCREENING TOOLS – GENERAL GUIDELINES

The following screening tools have been selected for vision screening of preschool age and kindergarten age children.

- The H.O.T.V vision chart in combination with the Randot Preschool Stereotest; or,
- The *Welch Allyn SureSight Vision Screener* in combination with the Randot Preschool Stereotest.

Visual Acuity Screening for Preschool Age and Kindergarten Age Children:
Visual acuity refers to the sharpness of one's eyesight. It is the ability of the eye to distinguish the detail of an object. Visual acuity can be tested using Vision Charts or other screening devices.

[3] Screening of children 3 years of age

Vision Charts to Test Acuity:

Vision charts are composed of letters or symbols. The size of all letters in a row on an eye chart is the same. The size of all the letters in a row is smaller than the row above. Beside each row is a fraction.

When screening for visual acuity the person is asked to look at chart symbols of varying sizes from a distance of 10 or 20 feet. Correctly identifying the 10 sized symbol at 10 feet is considered normal vision. This can be abbreviated by writing the visual acuity similar to a fraction. The top number corresponds to the distance in feet separating the individual from the symbols. The bottom number denotes the size of the symbol. The visual acuity of the normal seeing individual above would appear as:

$$\text{V.A.} = \frac{10 \text{ (number of feet from symbol)}}{10 \text{ (size of symbol)}}$$

Consider a person with a visual acuity screening result of 10/15. They were tested 10 feet from the symbols. But, they could not correctly identify any symbols until they were shown a 15 size symbol. Thus, the notation 10/15 denotes their visual acuity.

When screening is performed using a 10 foot chart, the results would be:

10/10; 10/15; 10/20; 10/25; 10/40; 10/45; 10/50; 10/100.

When screening is performed using a 20 foot chart, the results would be:

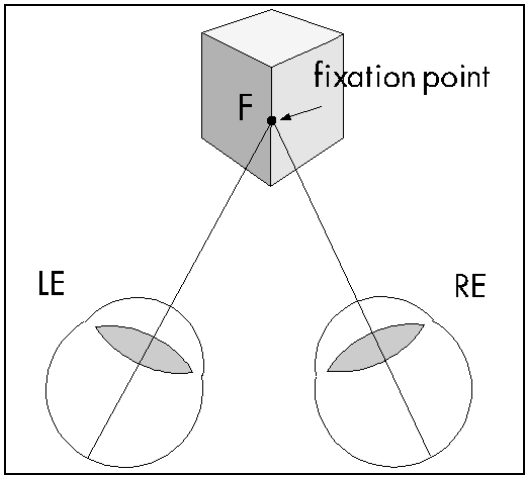
20/20; 20/30; 20/40; 20/50; 20/80; 20/90; 20/100; 20/200.

Welch Allyn Vision Screener to Test for Refractive Errors:

An autorefractor is a lightweight, portable, handheld screening device that is easy to administer and objective (eliminates the need for the child to respond). The autorefractor operates by pressing a button on the unit and lining up the hand held device 14" away from the child's eye. This instrument displays a measurement of refraction for each eye. It automatically screens for common vision problems, including near and farsightedness (myopia/hyperopia), astigmatism (asymmetrical focus), and anisometropia (unequal power between eyes). It can be used to screen preschool age and kindergarten children.

Stereopsis Vision Screening for Preschool Age and Kindergarten Age Children:

Fusion is the mental ability to blend two similar images and see them as one. Fusion should not be confused with depth perception. Depth perception is a layman's term used to describe our ability to perceive that one object is in front of another. This is a learned response using such clues as size, shadows, overlay of contours and perspective (e.g. railway tracks). Stereopsis is binocular visual perception of depth in three dimensional space.



Some people have finer fusion and stereopsis than others. A stereopsis test is used to determine one's degree or grade of fusion in relation to 3-dimensional vision.

The purpose of a stereopsis test is to measure how minutely the two eyes can discern differences in the distances of objects from the observer. Pictures are arranged in order of decreasing disparity so that the appreciation of stereopsis becomes increasingly more difficult and can be graded.

While wearing special stereopsis glasses, the child is asked to match pictures on the left side of a stereotest booklet with those on the right side of a stereotest booklet. Each stereotest booklet measures different levels of stereopsis.

- Stereotest Booklet #1 – measures stereopsis at 200 and 100 seconds of arc
- Stereotest Booklet #2 – measures stereopsis at 60 and 40 seconds of arc **(omit – do not use)**
- Stereotest Booklet #3 – measures stereopsis at 800 and 400 seconds of arc

VII. VISION SCREENING – GUIDELINES FOR PLANNING AND PREPARATION

1. Coordinate screening dates and locations with Health Authority staff and other agencies/schools.
2. Distribute vision screening information letters as appropriate (e.g. parent/guardian template letter, teacher, principal, superintendent).
3. Obtain lists of children to be screened (e.g. class lists, booking sheets etc.).
4. If needed, arrange for helpers to assist with screening activities (e.g. older students may be of help bringing children to and from classrooms etc.).
5. Prepare children for vision screening. Show children the vision screening equipment and tell the child how the screening device will be used.
   - The preschool age child should be instructed individually. The younger child may do better with a parent in attendance.
   - Kindergarten age children can be instructed in small groups of 3 to 5 children.

GUIDELINES FOR SMALL KINDERGARTEN COHORTS:

Health Authorities may elect to offer kindergarten vision screening at the health unit or other locations if the Health Authority deems that the number of kindergarten children enrolled does not warrant an onsite screening.

Suggested Action:

1. A letter will be sent to parents/guardians offering kindergarten screening at the health unit or an alternate site where screening will be performed by public health or designated personnel.
2. Parents/guardians will be contacted (phone or mail) if children do not present at the offered screening. Advise that screening is recommended if parents/guardians decline service. Record refusal as an exemption due to parent/guardian refusal.

GUIDELINES FOR MISSED OR ABSENT KINDERGARTEN CHILDREN:

It is the expectation that Health Authorities will offer screening to children who missed or were absent on day of vision screening.

Suggested Action:

1. Notification to parents/guardians offering kindergarten screening at the health unit or an alternate site. OR
2. The Health Authority may return to site to offer screening.

GUIDELINES FOR CHILDREN UNWILLING OR UNABLE TO BE TESTED AFTER SCREENING ATTEMPTED:

Let the child observe multiple screenings, let them handle some of the tools (occluder or stereopsis booklets) and suggest they ‘assist the screener’. Have the child observe another child before attempting the screening one more time. Refer if child unwilling or unable to be tested after screening attempted.

GUIDELINES FOR CHILDREN LESS THAN 36 MONTHS OF AGE:

Use of the H.O.T.V., 'SureSight Vision Screener', and Randot Preschool Stereotest in ages less than 36 months is at the discretion of the Health Authority and is based on professional judgement of the screening personnel. For example, some children younger than 36 months may be mature enough to understand screening instructions and complete vision screening procedures.

GUIDELINES FOR COMPLETION OF FOLLOW UP:

It is suggested that client follow up should be completed within four months after referral.

Facilities or Screening Site Selection

Prior arrangements should be made regarding the date, place and time that the screening will be carried out. Check the screening location for suitability in advance. Select a quiet room where you will not be interrupted. If at all possible, avoid carrying out screening in the classroom or busy locations.

General Room Requirements when using H.O.T.V charts	
Room Size:	The room should be at least 5 feet longer than the test distance. (e.g. 15 feet when using a 10 foot eye chart).
Lighting/ Room Conditions:	Well lighted, without glare, without distracting windows, or patterns on the wall.
Light Boxes	Use a LIGHT BOX with the vision chart. Light boxes should be placed so that: a. The child is not facing a window or other light source while reading the chart; b. The greatest amount of light comes from the light box; and c. The light box is at eye level with the child.
Other Equipment	Extension cord if the electrical outlet restricts optimal placement of the light box.

General/Room Requirements when using an Autorefractor	
Lighting/Room Conditions	Ambient lighting- avoid brightly lit spaces. Do not perform screening by uncovered, bright windows. a. If the room is too bright the pupils cannot dilate properly, if the room is too dark it is difficult to see.
Other Equipment	The night prior to screening check that the battery is fully charged.

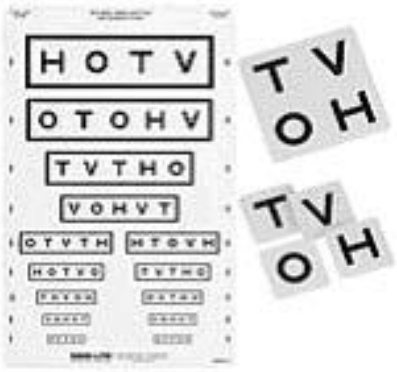
VIII. VISION SCREENING - TOOLS AND PROCEDURES:

1. H.O.T.V. Visual Acuity Screening:

The H.O.T.V. is a screening procedure particularly suited for determining visual acuity for:

- Children 3 to 5 years of age;
- Children not able to read the English alphabet;
- Older children with special needs.

The child is not asked what the letters are, but is taught to match the shape of the object.



HOTV Response Card and Flash Cards

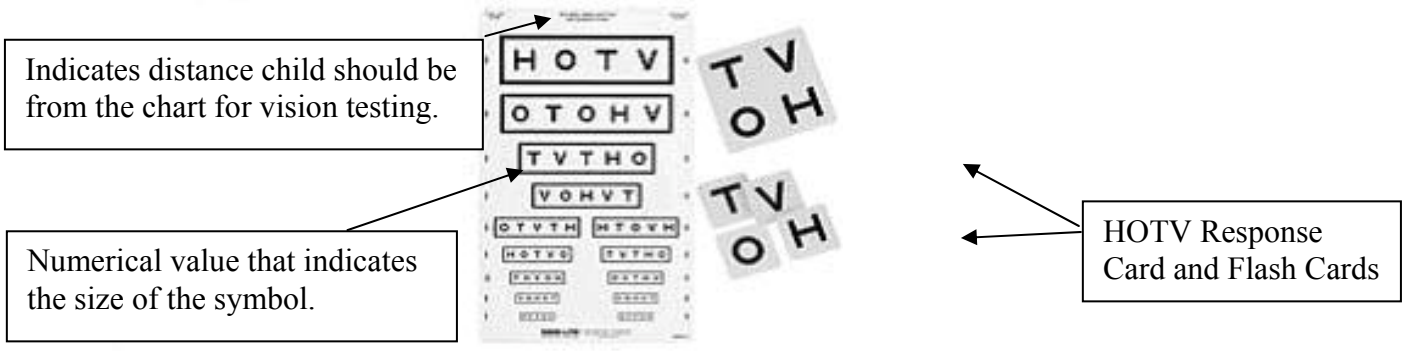
Equipment Required for H.O.T.V. Visual Acuity Screening:

- 9" by 14" H.O.T.V. card for 10 FEET;
- 4-object response H.O.T.V. (lap) card;
- Four separate training "H", "O", 'T', "V" flash cards;
- Occluder glasses or eye cover paddle;
- Pointer (e.g. pencil or pen)
- 10 foot measuring tape;
- Masking tape or string to measure 10 feet;
- Chair
- Extension cord
- Light box

General Preparation for Visual Acuity Screening Using a Vision Chart:

1. Check the chart's screening distance (indicated at the top of the vision chart).
2. Measure and mark the distance between the chart and the child to be screened with tape to ensure the distance is maintained throughout the screening session.
3. Place the chart at eye level with the child. It is important for the child to be able to look straight ahead and not be looking off to the side or lower than the letters.
4. If the child stands during screening a chair could be placed with the back closest to the child. This will prevent the child from creeping forward and will give the child something to hold onto.
5. Children waiting to be screened should not be facing the vision chart.

HOTV Eye Chart



Preparing a child for screening using the H.O.T.V.:

1. Show the child the flash cards using care not to call the letters by name.
2. Ask the child to match each flash card symbol with one on the response panel (lap card).
3. When the symbols can be matched without difficulty, the screening may begin.

Note: The child must learn to identify the shape of the symbols rather than the name of the letters. Recognition can usually be taught in a few minutes or less depending on the maturity of the child.

Procedure for H.O.T.V. Screening:

1. If the child wears corrective lenses, screening must be done with the child wearing the lenses.
2. Position the child 10 FEET from the chart.
3. Give the child the lap card to hold on his/her lap. A helper may sit or stand next to the child and hold the lap card. If you do not have a helper, have the child hold the lap card flat on his/her lap, with the letters right side up as the child is looking down at them.
4. Test each eye separately always starting with the right eye.
5. Make sure the other eye is completely occluded but avoid pressure on the eye. Use the occluder provided. Do not have the child cover the eye with his/her hand.
6. Point to one of the letters on the chart. Ask the child to either point to or cover up a matching letter on the response panel to indicate his/her choice. If the child is correct,

point to a second letter and have the child match it. Continue pointing to the letters until the child correctly matches at least 4 of the 5 letters on a line.

7. Do not isolate letters (all letters on a row should be visible).
8. Make sure your pointer is directly under the letter. To avoid ruining the chart, use only the non-marking end of a pen or pencil.
9. Avoid going straight across a line, changing sequence on that line and always moving down the vision chart.
10. Due to the limited attention span of the young child and to avoid fatigue, test only two or three of the larger letters on each line to gain the child's confidence before moving quickly down to the smaller letters.
11. The last line where 4 out of 5 test symbols are correctly identified represents the child's visual acuity
12. Record the result for each eye.

HOTV - Hints for Screeners:

- Maintain the distance during the test. Do not allow the child to move up closer to the chart.
- Always watch to make sure that the child's head is kept straight and there are no signs of peeking or squinting. A child who peeks is likely a child not seeing well.
- Make a game of the screening procedure. Reassure the child that there is no right or wrong answers but encourage the child to do the best he can;
- If the child seems to understand the procedure but is hesitant, try testing the other eye.
- Encourage and praise the child.
    - "One more test to go, you're doing great!"
    - "Good job!"

VIII. VISION SCREENING – TOOLS AND PROCEDURES: (Cont'd)

2. Welch Allyn SureSight Vision Screener:

The 'SureSight Vision Screener' is an objective screening device that eliminates the need for a child to respond. The device can be used for screening:

- Preschool age and kindergarten age children;
- Children with special needs.

Equipment Required for vision screening using the Welch Allyn 'SureSight':

- Welch Allyn SureSight Vision Screener
- Charger/Stand
- Chair(s) – one for screener and one for the child

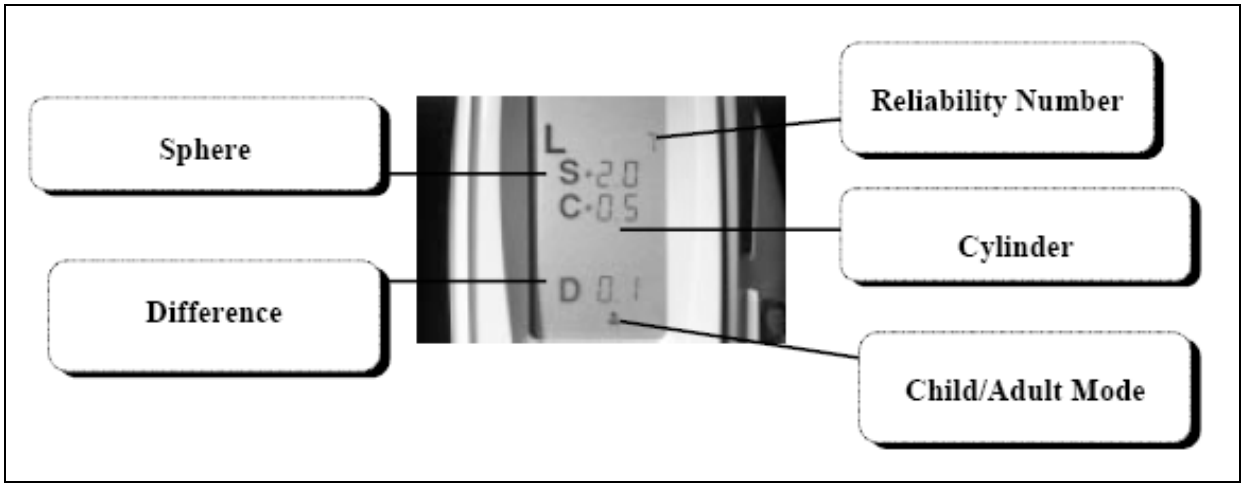
a. Preparing a Child for Screening Using the 'SureSight':

1. Position the child so that the test can be conducted level with, and square to the child's eyes.
2. Push any button on the 'SureSight' device to turn the device on.
3. Show the child the 'SureSight' unit. Tell the child the vision screener has a red light and makes sounds. Allow the child to see the red light and hear the sounds
4. Explain the test procedure to the child. Screeners may want to demonstrate screening procedure on a teddy bear.
5. Choose the 'child' setting on the child/adult calibration button. (The 'child' setting is used for children 6 years and under). Hold the button until you hear a double beep and see the desired icon on the LCD.

b. Procedure for Screening Using the 'SureSight':

1. If the child wears corrective lenses, screening must be done with the child wearing the lenses.
2. Push the GO button on the unit.
3. Position yourself at eye-level and square with the face of the child.
4. Hold the unit 14 inches from the child at eye level:
    a. If the unit is too far away, you will hear slow, low-pitched beeps;
    b. Slowly move closer. **At the correct 14" distance you will hear a steady low tone;**
    c. When the unit is too close, you will hear quick, high-pitched beeps;
    d. The crosshair will flash in synch with the tones.
5. Tell the child to look at the "red light".
6. When you are at the correct distance, look through the peephole and align the cross hairs on the pupil of the child's right eye. While the unit is acquiring data, you will hear a very high-pitched chirping sound with a steady low tone.
7. When the test of the right eye is complete, you will hear the "tah-dah" sound. (Testing resumes 1 second after the first eye is complete, so you do not need to press any buttons.).
8. Turn the unit to the left eye and align the cross hair over the left eye's pupil and repeat.

9. At the end of the test, you will hear the "tah-dah" sound again.
10. If the unit has not gathered a good reading from either eye, you will hear 5 tones to signify that the testing has stopped. You must re-test that eye.
11. If unable to successfully obtain a reading after TWO attempts, refer the child. Children can accommodate if an eye is re-screened more than twice.
12. To stop a test at any time hold down any button until you hear the 5 tones sound.
13. Record the results for Sphere 'S' , Cylinder 'C' and Reliability 'R' for each eye.
14. Record the Difference 'D' between both eyes.
15. Repeat the process for the next child.



Reliability Numbers and Results

Reliability Number indicates the number of good readings obtained and their consistency, based on a 1 to 9 scale. The higher the reliability number, the better the reading

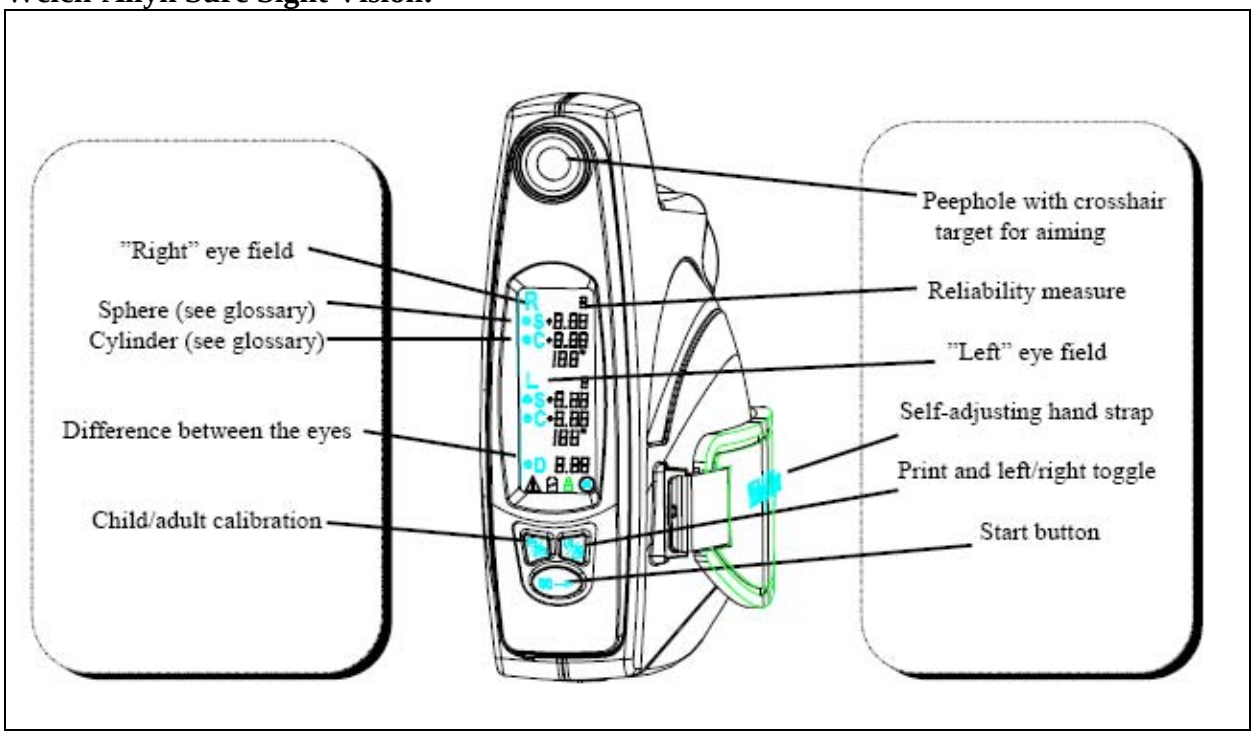
Reliability Reading Results

- 6 to 9 indicates an acceptable test result
- Less than 5 indicates that the testing must be repeated
- +9.99 or –9.99 indicates a reading outside the unit's measurement range – repeat testing required

If the patient did not appear to fixate on the unit during data acquisition, repeat the test, even if reliability numbers are ≥6.

*An asterisk on a reading in child mode indicates it is in American Academy of Ophthalmology (AAO) pre-school referral range.

Welch-Allyn Sure Sight Vision:



Child/Adult Calibration
- Clears readings.
- Changes calibration mode by holding button down.

Left/Right Toggle & Print
- Selects single eye to re-test or switches back to regular test.
- Prints results (hold button down while aiming SureSight at printer.

"Go button"
- Unit on: Starts test.
- Unit Off: recalls old reading (if less than 5 minutes have passed.

c. Hints for screeners:

- Helpful phrases when working with children might include:
  - "look into the camera while I take a picture of you"
  - "look in the green circle at the red dot inside and you will hear a little birdie chirp"
  - "look at the red dot inside the flashing green lights and tell me when it changes color"
- Encourage and praise the child.
  - " One more to go, you're doing great!"
  - "Good job!"

- If you are at the correct distance and **NOT** acquiring data:

    - Make sure the unit is straight and level with the child;
    - Remind the child to look at the red light, check that the child is fixating on the device; and
    - Slowly move the cross-hairs around the eye.
- When testing the second eye, simply rotate the unit over since it is already at the proper angle and distance;
- Make sure the child's eyelids are not occluding the pupil;
- If the unit is in the "sleep mode" any button wakes the unit and displays the previous results;
- A charged unit can test children for about 3 hours of continuous use;
- To recharge the unit, place firmly into the stand.

See Welch Allyn SureSight User Manual for full product details and instructions.

VIII. VISION SCREENING – TOOLS AND PROCEDURES: (Cont'd)

Stereopsis Vision Screening Procedure using the Randot Preschool Stereotest:

The Randot Preschool Stereotest is a screening procedure particularly suited for determining stereopsis for:

- Children as young as 2 years of age;
- Children who are non-verbal.

Randot Preschool Stereotest with 3 test panels and stereoglasses

In each test booklet, the left-hand page shows two-dimensional black-and-white silhouettes of two sets (panels) of four test shapes. The right-hand page contains two sets of four random-dot patterns in different sequences that are on the left-hand page. In each set of random-dot patterns, one contains no test shape, while the remaining contains test shapes. While wearing Stereoglasses the child must correctly identify at least two of the three test shapes at each disparity level.

Equipment Required for Randot Preschool Stereotesting:

- Randot Preschool Stereotest (3 booklets);
- Stereoglasses

a. Preparation for screening using the Randot Preschool Stereotest:

1. Prepare the child by saying this is a game and you would like the child to look through a pair of "magic" glasses and match the pictures.
2. Have the child put on a pair of stereoglasses. Children wearing glasses should wear their eyeglasses during testing with the stereoglasses worn over their own glasses.
3. Hold the book directly in front of you, about 13 inches from the child's eyes, under good lighting.

b. Procedure for Randot Preschool Stereotesting:

1. Hold Stereotest Booklet #3 in front of the child. Confirm that the child can identify each of the test shapes on the left page of the booklet by either pointing to the shapes or naming each shape seen while pointing to the test target. If the child responds correctly to at least two of the three test shapes at the 800 seconds of arc level (top panel of test #3), testing proceeds to the 400 seconds of arc level (bottom panel of Test #3)

2. If the child has difficulty, the book may be moved around to catch the light better. Turning the book upside down makes the pictures sink into the page and is also sometimes helpful.

    a. If the child has correctly identified at least 2 of the 3 test objects in each panel on Stereotest Booklet #3, move on to Stereotest Booklet #1.

3. Hold Stereotest Booklet #1 in front of the child. Confirm that the child can identify each of the test shapes on the left page of the booklet by either pointing to the shapes or naming each shape seen while pointing to the test target. If the child responds correctly to at least two of the three test shapes at the 200 seconds of arc level (top panel of test #1), testing proceeds to the 100 seconds of arc level (bottom panel of Test #1)

4. Omit test booklet #2 as the provincial cut off criteria for stereoacuity is 100 seconds of arc for children 36 months to kindergarten age.

5. This testing can be tiring for a young child. Provide encouragement and praise frequently to maintain co-operation and to acknowledge child's patience and effort. TAKE TIME to make sure the child understands.

6. Record the best (smallest) stereopsis result in seconds of arc.

Hints for Screeners:

- Some children need additional time to appreciate stereopsis;
- Provide encouragement and praise the child;
- Always ask questions the child can understand;
- Do not let the child see the booklets without wearing the stereoglasses;
- Allow adequate time for testing.

The following chart gives the corresponding degree of stereopsis to the responses.

Randot Preschool Stereotest – Stereopsis Results

The following chart gives the corresponding degree of stereopsis to the responses.

Stereotest booklet #	Test Panel Position	Disparity (seconds of arc)
Stereotest booklet #1	Top Panel	200
Stereotest booklet #1	Bottom Panel	100
Stereotest booklet #2	Top Panel	60 (omit – do not use)
Stereotest booklet #2	Bottom Panel	40 (omit – do not use)
Stereotest booklet #3	Top Panel	800
Stereotest booklet #3	Bottom Panel	400

IX. REFERRAL PROCESS:

Guidelines for Referral: Individual eyes are referred to as:

O.D.	Oculus Dexter	Right Eye
O.S.	Oculus Sinister	Left Eye
O.U.	Oculus Uterque	Both Eyes

Visual Acuity – H.O.T.V. Referral Criteria:

Age of Child	Referral Criteria for H.O.T.V. Visual Acuity Chart
36 months to Kindergarten age	Refer if 10/20 or worse in one or both eyes Refer if other symptoms are present Refer if unequal acuity (where there is a 2 line difference between each eye i.e. OD 10/10, OS 10/15).
Older Student	Refer if 10/15 or worse in one or both eyes Refer if other symptoms are present Refer if unequal acuity (where there is a 2 line difference between each eye i.e. OD 10/10, OS 10/15).

Visual Acuity – Welch Allyn SureSight Vision Screener Referral Criteria:

	Sphere	Cylinder	Difference
36 months to Kindergarten age	≤ -1.0D or ≥ +3.0 D * ≤ -2.0 -1.5 -1.0 0 +1.0 +1.5 +2.0 +2.5 +3.0 +3.5 ≥	≥ 1.5D 1.0 1.5 2.0 ≥	≥ 1.5D 1.0 1.5 2.0 2.5 ≥

*** Grey zone indicates reading outside the normal limits and indicates referral required**

Stereopsis – Randot Preschool Stereotest Referral Criteria:

Age of Child	Randot Preschool Stereopsis Referral Criteria
36 months to Kindergarten age	Refer if unable to determine stereopsis at 100 seconds of arc
Older Student	Refer to eye specialist if symptomatic

Complete the Vision Screening Referral and Follow Up form for any child who fails screening or could not be tested. Record the screening results as 'Pass' or 'Fail' or 'Could Not Test 'for each screening test administered. (See Appendix B for form.)

NOTE: Children with observable eye conditions should be referred immediately to an eye doctor or family physician if:

- The eye turns in or out;
- The child has crusty or red eyelids;
- The child has drooping lids;
- The child has different size pupils or eyes;
- The eyelids are swollen;
- The child has conjunctivitis ("pinkeye").

IX: REFERRAL PROCESS: Cont'd.

Guidelines for Contacting Parent/Guardian Regarding Vision Referrals

1. Send letter and Vision Screening Referral and Follow Up form to the child's parent/guardian as soon after the screening as possible. Letter to advise the parent/guardian:
   - That the screening indicated the child should receive further follow-up by an eye doctor.
   - To take the Vision Screening Referral and Follow Up form and to their appointment with the eye doctor. **Suggested inclusion**: Healthy Kids Program pamphlet.
   - To have the eye doctor complete the form and fax/return result to the Health Unit.

2. Suggested Action:
   - Attempt up to three contacts to support child referral and follow up.
   - Client follow up should be completed within four months after referral.

X: Recording the Vision Screening Results:

Vision screening results are recorded in two places:

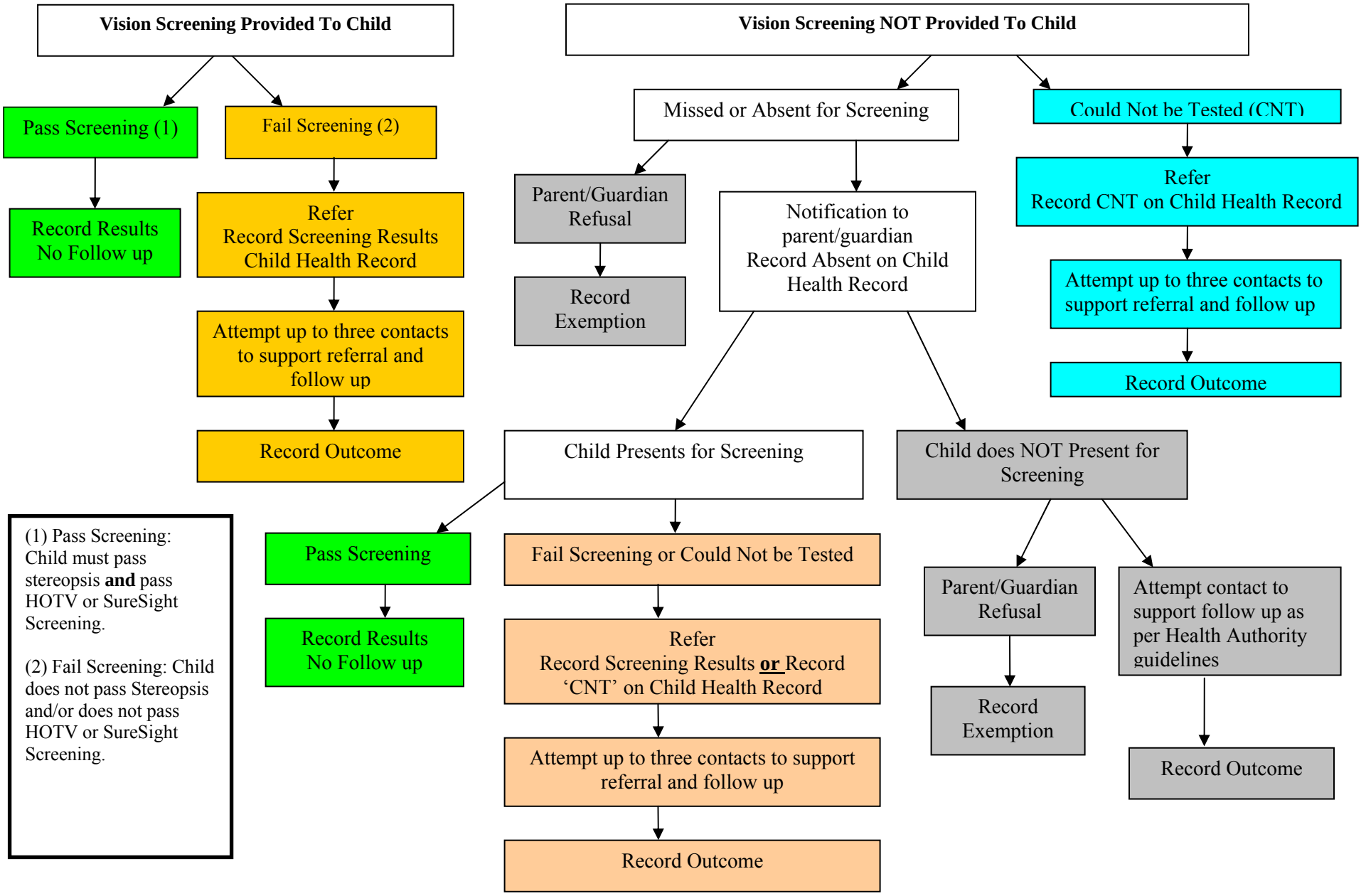
- As the screening is being done, the results are recorded on the class list or on the appointment list form as:
  - Seconds of arc (e.g., 100 seconds of arc) for stereopsis; and
  - Fraction (e.g., 10/10) for each eye for visual acuity if using the H.O.T.V chart

  OR
  - Positive or Negative Number if using the SureSight Vision Screener (e.g. 2.0 or -1.5) to indicate:
    - SPHERE 'S' and CYLINDER 'C' and Reliability 'R' for each eye
    - DIFFERENCE 'D' between eyes

- Screening results, follow up and referral outcome for children who are referred are to be recorded on the child's health record. Results are recorded as Pass or Fail.

NOTE: Paper lists indicating detailed vision screening results and completed Vision Screening Referral and Follow up Forms are to be maintained for program evaluation purposes.

For additional details on Documentation refer to the Orientation Program for Public Health Nurses, Module 3 "Documentation and Legal Issues".


Vision Screening Provided To Child
Pass Screening (1)
Fail Screening (2)
Record Results
No Follow up
Refer
Record Screening Results
Child Health Record
Attempt up to three contacts to support referral and follow up
Record Outcome
Vision Screening NOT Provided To Child
Missed or Absent for Screening
Could Not be Tested (CNT)
Parent/Guardian Refusal
Record Exemption
Notification to parent/guardian
Record Absent on Child Health Record
Refer
Record CNT on Child Health Record
Attempt up to three contacts to support referral and follow up
Record Outcome
Child Presents for Screening
Child does NOT Present for Screening
Pass Screening
Record Results
No Follow up
Fail Screening or Could Not be Tested
Refer
Record Screening Results or Record 'CNT' on Child Health Record
Attempt up to three contacts to support referral and follow up
Record Outcome
Parent/Guardian Refusal
Record Exemption
Attempt contact to support follow up as per Health Authority guidelines
Record Outcome
(1) Pass Screening: Child must pass stereopsis and pass HOTV or SureSight Screening.
(2) Fail Screening: Child does not pass Stereopsis and/or does not pass HOTV or SureSight Screening.

Guidelines for Referral[4]:

Abbreviations:

O.D	Oculus Dexter	Right Eye
O.S.	Oculus Sinister	Left Eye
O.U.	Oculus Uterque	Both Eyes

Conversion of 20 foot distance to 10 foot distance charts		
20/20 = 10/10	20/30 = 10/15	20/40 = 10/20
20/50 = 10/25	20/70 = 10/35	

HOTV Vision Chart:

Age of Child	**Referral Criteria for H.O.T.V. Visual Acuity Chart**
36 months to Kindergarten age	Refer if 10/20 or worse in one or both eyes Refer if other symptoms are present Refer if unequal acuity (where there is a 2 line difference between each eye i.e. OD 10/10, OS 10/15).
Older Student (Grade 1 and older)	Refer if 10/15 or worse in one or both eyes Refer if other symptoms are present Refer if unequal acuity (where there is a 2 line difference between each eye i.e. OD 10/10, OS 10/15).

Sure Sight Autorefractor – Referral Criteria:

	Sphere	**Cylinder**	**Difference**
36 months to Kindergarten age	≥ -1.0 D or ≥ + 3.0 D * < -2.0 -1.5 -1.0 0 +1.0 +1.5 +2.0 +2.5 +3.0 +3.5 >	≥ 1.5 D 0 0.5 1.0 1.5 2.0 2.5 > *	≥ 1.5 D 0 0.5 1.0 1.5 2.0 2.5 > *

***Grey zone indicates reading outside the normal limits and indicates referral required**

Randot Preschool Stereotest:

Age of Child	**Randot Preschool Stereopsis Referral Criteria**
36 months to Kindergarten age	Refer if unable to determine stereopsis at 100 seconds of arc
Older Student (Grade 1 and older)	Refer to eye doctor if symptomatic

[4] Use of the H.O.T.V., SureSight Vision Screener, and Randot Preschool Stereotest in ages less than 36 months is at the discretion of the Health Authority and is based on professional judgement of the screening personnel. For example, some children younger than 36 months may be mature enough to understand screening instructions and complete vision screening procedures.

XI. VISION SCREENING UNDER SPECIAL CIRCUMSTANCES:

Occasionally, the screener will encounter children with special challenges who may be unable or unwilling to perform the required task rapidly or in the usual manner. These children may require more time to be screened and, therefore, one should be prepared to slow down the process to accommodate them.

The expectation for the screener is to be able to screen children according to outlined procedures. While some adjustments may be made in how you interact with the child the screener should determine if the adjustments will impact the results of the screening. If the adjustments in your approach or the procedure impact the results you should record this and refer the child for follow up.

Many children see themselves in terms of their performance. The screener should remember that the outcome of the vision screening has absolutely nothing to do with the "goodness" of a child; neither does it reflect on the personal worth of the screener. If these points are kept in mind, the integrity of the child will not be compromised and the screener will find it much easier to work with and relate to the child. The following are some general helpful hints to assist the screener in obtaining a successful screening experience.

General Tips:

- Present information to the child at their eye level.
- Make the screening a positive experience for the child.
- Be prepared to request the assistance of a familiar person or a support person in interacting with the child.
- Don't assume a lack of response as understanding by the child during the conditioning procedure. See if you can elicit a response.

1. The shy, frightened, or crying child

   Some children are easily distressed by new or unfamiliar situations. When the child understands that the screening is harmless and perhaps even an enjoyable experience, the child usually begins to cooperate with the screener. This child needs reassurance and complete acceptance. Under no circumstances should the child be intimidated.

   - Show the child the equipment and allow them to ask questions about it.
   - Allow a child exhibiting these emotions to observe a number of other children during the screening activity.
   - If you are unable to gain this cooperation during the initial screening, excuse the child along with the group and refer the child.

XI. VISION SCREENING UNDER SPECIAL CIRCUMSTANCES: (Cont'd)

2. The child whose first language is not English

   Children who have English-as-a-second-language may show an inability to follow verbal instructions that are presented in English. Check to see if the conditioning procedure is understood by the child.

   - Show the child the equipment and how it will be used.
   - Use gestures or pantomime to demonstrate what will be done.
   - Continue to verbalize your instructions.
   - Allow the child to observe other children being screened.
   - Use a play technique, if necessary.
   - Sometimes an older child/sibling can be assigned to help the child complete the vision screening.

3. The child with learning difficulties

   Some children are unable to grasp and follow instructions. They may forget the response they were taught during the conditioning procedure. Even when they can clearly see the symbol, they may not respond appropriately due to confusion. A lack of response may mean that they either did not understand the instructions or are unable to follow screening directions. It is preferable to work with these children on an individual basis.

   - The child may require a quiet room with no distractions of other children.
   - Check the child's understanding of what was expected of them.
   - The child with learning difficulties responds very well to positive social reinforcement. A simple "Very good!" or "Good job!" can do wonders for this child's motivation.
   - The screening procedure may need to be more rigorous and have a more individualized conditioning process.

4. Children with hearing loss

   Children with hearing loss are as individual as any other child. Understanding the importance of visual communication for the child is important. The communication ability of these children will vary as a result of the level of intervention they have received and how early their hearing loss was identified. Be sure to discuss with the child's parents or support person what will work for their particular child and be prepared to engage them in support of a successful screening experience.

VISION SCREENING UNDER SPECIAL CIRCUMSTANCES: (Cont'd)

General Communication Tips

- Present information to the child at their eye level;
- Make communication a positive experience for the child;
- Be receptive to what the child is trying to communicate;
- Focus your communication to one topic at a time;
- Ensure the child has a clear view of your face and hands;
- Be sensitive to the individual needs of the child.

Visual communication

- If you don't know any signs use visual aids or ask the child's support person to facilitate communication. Gesturing or illustrating what you will be doing is also an effective communication approach;
- Make sure there is no "visual noise" behind you when you are trying to communicate with the child. Visual noise distracts the child's attention from your efforts to communicate;
- If you are using a sign language interpreter make sure that they have completed communicating before changing topics;
- Attention-getting techniques such as light shoulder tapping or eye contact with a small wave can be used.

Auditory communication (for children who are hard of hearing or have Cochlear Implants)

- Use a room that has minimal background noise as it can be difficult to hear;
- Do not exaggerate facial expression or mouth movement when talking as this is distracting;
- Make sure the child is looking at you when you are talking as they may be utilizing lip reading to support their hearing;
- Use visual aids or gesturing as means of supporting your communication.

5. The restless child

Children at this young age certainly will have a short attention span. However, you will encounter children who are fidgety or unable to sit still for a short time.

- Be sure that the child understands what is expected of them during the conditioning procedure. Have them tell you what you explained to them;
- Minimize any environmental distractions;
- Check to make sure that they don't have to go to the washroom. Sometimes fidgety behaviours are signs that they have to go to the washroom and need to be directed to do so.

6. The child with a physical disability or having significant medical conditions.

Children with physical disabilities and significant medical conditions can still be screened with small adaptations. Be very sure that these adaptations will not impact the results of the screening.

- Be prepared to request the assistance of a familiar person or a support person in interacting with the child.

XII: VISION SCREENING – VISUAL ACUITY CHECKLIST:

Purpose: This check list should be used regularly until these points become habits when testing visual acuity.

Instructions: To check the accuracy of your own testing ability, read over the check list immediately after you have finished giving the test. To check the accuracy of another person's test administration, score your observations below.

Before Test:

#	Visual Acuity Checklist – For Eye Charts	Yes	No
1.	Screener prepared the child for the test; familiarized the child with the vision chart		
2.	Screening location met guidelines: ➢ Quiet area without distractions; ➢ Room size appropriate.		
3.	Room area lighting was appropriate for the test used. ➢ Bright well lit room and light box was used.		
4.	Distance from the chart to child was correctly measured.		
5.	Vision chart was placed at child's eye level.		
6.	Equipment was checked prior to use to ensure it was operational.		

During Test:

#	Visual Acuity Checklist – For Eye Charts	Yes	No
1.	The child was not facing a window or other light source while reading the chart.		
2.	The occluder did not apply pressure to the eye area		
3.	Each eye was tested separately.		
4.	The examiner move fairly quickly down the chart, starting at the top row.		
5.	The examiner refrained from jumping from line to line, i.e.: ➢ (10/25 to 10/15) back to (10/25).		
6.	The examiner alternated the letter sequence on a line rather than pointing to the letters straight across one line.		
7.	The pointer was held directly under each letter to avoid shadows.		
8.	The tester presented the entire row and did not isolate letters.		
9.	The examiner reassured and encouraged the child.		
10.	The examiner checked that the child's head was in the straight ahead position to the chart.		
11.	The examiner frequently checked the child for signs of peeking and for squinting.		
12.	The examiner was sure that children waiting for their turn were not looking directly at the chart.		

Post Test:

#	Visual Acuity Checklist – For Eye Charts	Yes	No
1.	The test results were recorded accurately and on the appropriate screening list.		
2.	A correct referral was made and a Vision Screening Referral and Follow up form was correctly completed.		

VISION SCREENING AUTOREFRACTOR – CHECKLIST

Purpose: This check list should be used regularly until these points become habits when using the SureSight Vision Screener.

Instructions: To check the accuracy of your own testing ability, read over the check list immediately after you have finished giving the test. To check the accuracy of another person's test administration, score your observations below.

Before Test:

#	**Autorefractor Checklist**	**Yes**	**No**
1.	The screener checked that the battery was charged prior to use		
2.	Screening location was met guidelines ➢ Quiet area without distractions ➢ Appropriate lighting		
3.	Child mode setting selected		

During Test

#	**Autorefractor Checklist**	**Yes**	**No**
1.	Tester turned unit on		
2.	Child positioned at eye level with screener and device		
3.	Tester adjusted screening distance until steady tone heard		
4.	Unit pointed at the child's pupil (cross hairs aligned on the pupil		
5.	Screener instructed the child to look at 'red light'		
6.	Referred children who could not be tested after TWO attempts		
7.	Reliability reading was 6 or higher for each eye		
8.	Repeated reading once if less than 6 or +/-9.99		

Post Test

#	**Autorefractor Checklist**	**Yes**	**No**
1.	The test results were recorded accurately and on the appropriate screening list.		
2.	A correct referral was made and a Vision Screening Referral and Follow up form was correctly completed.		

VISION SCREENING – STEREOPSIS CHECKLIST:

Purpose: This check list should be used regularly until these points become habits when using the stereopsis test.

Instructions: To check the accuracy of your own testing ability, read over the check list immediately after you have finished giving the test. To check the accuracy of another person's test administration, score your observations below.

Pre Test:

#	**Stereopsis Checklist**	**Yes**	**No**
1.	The examiner prepared the child for test ➢ Child was seated comfortably; ➢ Stereoglasses were worn over regular lenses (for children with eyeglasses).		
2.	The tester explained the test procedure.		
3.	The tester assured cooperation of child by giving the child a chance to get used to examiner.		

During Test:

#	**Stereopsis Checklist**	**Yes**	**No**
1.	The tester put the stereoglasses on the child before showing the child the stereo booklets.		
2.	The book was held: ➢ At eye level or slightly below eye level; ➢ 13" in front of child; and ➢ There was adequate light on book.		
3.	The child was given enough time to respond to questions.		
4.	The screener showed the stereopsis booklets in the correct order dependent on the child's response. (E.g. The screener began with test booklet #3 and proceeded to booklet #1 if the child successfully responded to both test panels.)		
5.	The screener began with the first test panel on the booklet prior to showing the second test panel.		
6.	The child responded correctly to at least 2 of the 3 test shapes on each panel before the screener proceeding with the next test panel.		

Post Test:

#	**Stereopsis Checklist**	**Yes**	**No**
1.	The test performance was interpreted correctly.		
2.	The stereopsis result was recorded correctly.		
3.	A referral was made and a Vision Screening Referral and Follow up card was correctly completed.		

Preschool Vision Screening Protocol Self-Test True or False Questions

1) **Question:** If a child is having a difficult time on the visual acuity screening, show the child only one letter at a time to reduce the confusion. True or False?

Answer: **False.** A child with amblyopia will record a better visual acuity when tested with one letter or symbol at a time. This means that the child's vision problem may be missed. It is important to always show a line of letters (or symbols) when assessing vision in a young child.

2) **Question:** If a child does not know the alphabet, a picture chart can be used as replacement. True or false?

Answer: **False**. Many picture charts will give an incorrect assessment of visual acuity. Only HOTV letters or Lea symbols may be used for pre-literate children.

3) **Question:** Covering one eye with a hand, cup or spoon is an effective technique for measuring visual acuity in one eye at a time. True or False?

Answer: **False.** These techniques allow a child to easily "peek", especially if they have poor vision in the eye being tested. The chosen method of occlusion must ensure that the child is not able to peek.

4) **Question**: If a child is having a difficult time with the screening test, have him or her return again for a repeat screening in 6 to 12 months, as long as there are no signs of a vision problem. True or false?

Answer: **False.** It is important to detect and treat vision problems in children when they are young in order to prevent permanent visual loss. Children who fail a vision screening need a timely referral to an ophthalmologist or optometrist.

5) **Question:** If a child passes the visual acuity test in each eye tested separately, he or she has passed the vision screening. True or false?

Answer: **False.** The vision screening protocol includes a test of stereopsis in addition to the visual acuity test. A child must pass both the visual acuity/refraction screening and the stereopsis screening to pass. A child who fails either or both must be referred for a comprehensive eye examination by an ophthalmologist or optometrist.

6) **Question**: If using a wall chart to test visual acuity, it should be placed the standard 20 foot distance from the child. True or false?

Answer: **False.** Visual acuity testing in preschoolers is done at a distance of 10 feet. When using a wall chart, confirm the correct testing distance as indicated at the top of the chart.

7) **Question**: Always have a child put on his or her distance glasses, even if the child seldom uses them. True or false?

Answer: True. The glasses should be used for both parts of the screening: visual acuity testing and stereo testing.

8) **Question**: If the child is unable to do the pretest, proceed with the test procedure and complete the testing and assign a status of "pass" or "refer". True or false?

Answer: **False**. If a child is unable to successfully do the pretest, stop. Do not proceed to the test procedure. You may have the child observe another child before attempting the pretest one more time. If the child is still unable to do it, the child should be referred for a comprehensive eye examination by an ophthalmologist or optometrist.

XIII: CASE FINDING FOR VISION CONCERNS:

Case finding is a process where information is provided to parents/guardians or childcare practitioners to raise awareness about eye health and eye development in early childhood. Case finding may also occur during routine interaction with children and their families. Some eye conditions may be apparent on observation or identified during routine health assessments.

Case finding uses public health practitioners, physicians and other early childhood practitioners in established programs and services, with referral to vision specialists for diagnostic testing and follow-up.

A goal of the provincial vision screening program is to support case finding through provision of information about vision and eye health to parents, guardians and care providers (e.g. at newborn visits, Well Child Health Clinics or Parent/Toddler programs, preschools and childcare settings, Child Development Centres or locations frequented by young children and their families).

A. Observation and Assessment to Support Case Finding:

Children with observable eye conditions should be referred immediately to an eye doctor or family physician.

- Do the eyes look normal?
  - eye turns in or out;
  - crusty or red eyelids;
  - drooping lids;
  - different size pupils or eyes;
  - swelling of eyelids;
  - conjunctivitis ("pinkeye").

B. Possible signs of vision problems in children

- Complaining of blurred vision;
- Headaches;
- Squinting, rubbing the eyes, or excessive blinking;
- Covering or closing one eye;
- Holding objects too close, or avoiding activities requiring distance vision;
- Preferring to be very close to work or television;
- Poor performance in school;
- Clumsiness or lack of coordination in physical activities;
- Family history of vision problems;
- Red, itchy or watery eyes.

C. <u>Questions to Support Case Finding Activities:</u>

Does your child have a family history of vision /eye problems (e.g. amblyopia 'lazy eye', strabismus)?

- If family history is present Optometrist's recommend that the infant be assessed by an eye doctor by 6 months of age.

Newborn to 8 weeks:

- Does your infant focus on your face ?
- Does your infant follow an object with his or her eyes by 5 weeks?

8 weeks to 12 weeks:

- Does your infant: track objects, toys with his/her eyes?
- Does your infant bring his or her hands together by 8 weeks?
- Does your infant hold and sustain direct eye contact with you by 3 months?

4-5 months:

- Does your infant move eyes together, smoothly to look at objects?
- Does your infant reach for, or bat at objects?

6 -8 months:

- Does your baby see objects of interest and move towards them?
- Does your infant's eye appear "straight" and work together?

8-12 months:

- Does your baby use his/her eyes to coordinate movement around objects?

Toddlers and Preschoolers:

- Does your toddler show interest in books/stacking toys?
- Does your toddler move and climb and throw in a coordinated manner?

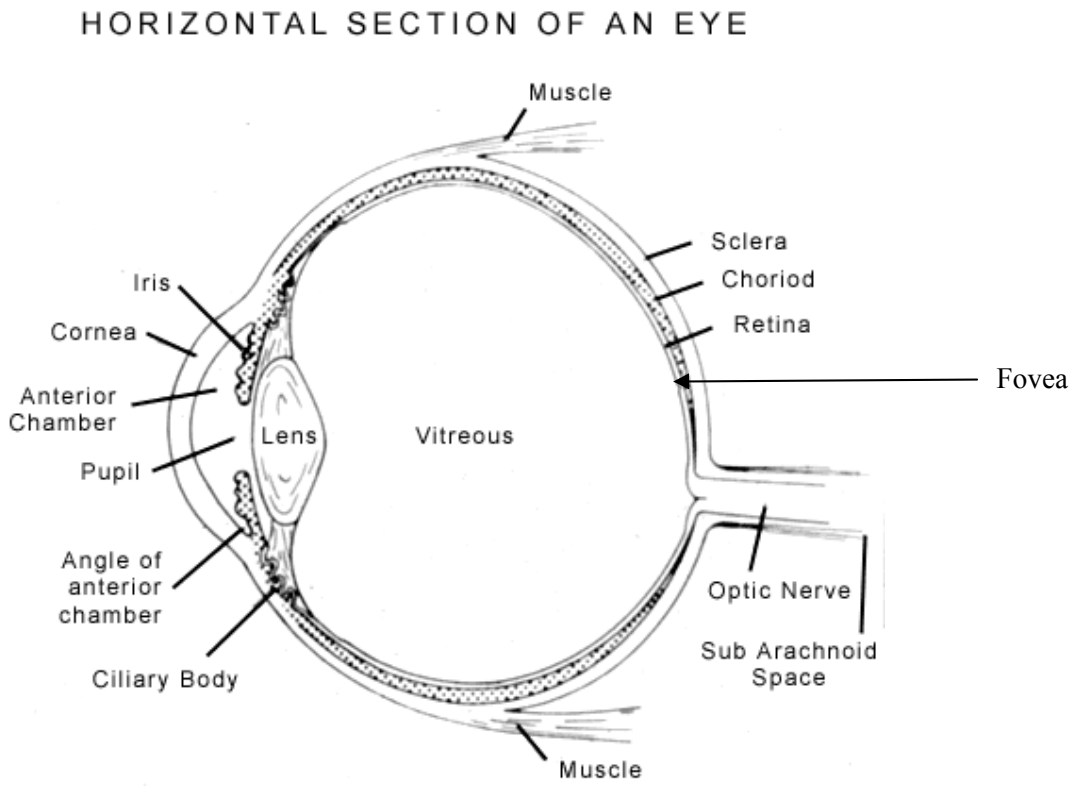
Suggested resources for distribution:

- BC Health file - # 53A Young Children and Their Eyes
- BC Health file - #53B Elementary School Age Children and Their Eyes
- BC Health file - #26 Sun Smart – Your Kids
- Healthy Kids Program pamphlet
- Babies Best Chance
- Toddlers First Steps

Vision and Developmental Milestones in Infancy and Early Childhood:

Age	Developmental Milestone	Questions for Case Finding	Suggested Activities for Parents/Guardians/Care Providers
Newborn	Focus on objects 8-12 inches Regards faces or objects of interest for a few seconds	When you hold your baby, does your infant focus on your face ? Does your infant follow an object with his or her eyes by 5 weeks?	Move baby's arms or legs simultaneously to fostering appropriate bilateral and binocular development. Keep reach-and-touch toys within your baby's focus, about eight to twelve inches.
8-12 weeks	Follows moving objects with eyes, tracking	Does your infant: Track objects, toys with his/her eyes? Bring his or her hands together by 12 weeks? Hold and sustain direct eye contact with you by 3 months?	Talk to your baby as you walk around the room. Hang a mobile above and outside the crib.
4-5 months	Coordinated eye movements Eye hand coordination, grasps at and reaches for objects	Does your infant move eyes together, smoothly to look at objects? Does your infant reach for, or bat at objects?	Let your baby explore different shapes and textures with his or her fingers.
6 months – 8 months	Accurate eye control Move towards objects	Does your baby see objects of interest and move towards them?	Give your baby the freedom to crawl and explore. Play "patty cake" and "peek-a-boo" with your baby.
8 months -12 months	Grasp and throw objects Feed self with finger foods Judge distances	Does your baby use his/her eyes to coordinate movement around objects?	Give your baby stacking and take-apart toys Provide objects your baby can touch, hold, and manipulate.
Toddlers and Preschoolers	Continued development of eye-hand-body coordination, depth perception	Does your toddler show interest in books/stacking toys? Does your toddler move and climb and throw in a coordinated manner?	Play ball, play at the park/playground Look at picture books

APPENDIX A:
ANATOMY OF THE EYE AND THE VISION PROCESS:



The eyeball consists of three concentric layers or coats - the Sclera and Cornea, the Uvea or Vascular coat, and the Retina.

Sclera and Cornea:
The outer protective layer of the eyeball consists of the sclera and cornea. The **SCLERA** is an opaque, tough, fibrous white tissue which protects the eyeball and gives it form.

The **CORNEA** is a transparent, non-vascular tissue located at the front of the eye. It is a refracting and protective membrane through which light rays pass enroute to the retina. The cornea contains many nerve endings which causes it to be extremely sensitive when injured.

Uvea or Vascular:
The middle layer is the uvea which consists of the choroid, ciliary body, and the iris. The highly vascular **CHOROID** lies between the sclera and retina, extending from the optic nerve forward to the ciliary body. Its chief function is to provide nourishment to the adjacent retinal tissue, the vitreous, and lens.

The **CILIARY BODY** secrets aqueous humor. It also provides attachment for the suspensory ligaments. The ciliary muscles which control the shape of the lens are a part of the ciliary body.

The **IRIS** is the pigmented, diaphragm-like structure which controls the amount of light entering the eye. The **PUPIL** is the small dark hole in the center of the iris through which varying degrees of light are admitted. The size of the pupil is determined by the reflex action of the muscles which control the iris. The color of an individual's eyes are due to the pigment of the iris.

Retina:

The inner layer, the **RETINA**, is a highly specialized, multi-layered extension of the optic nerve which receives light stimuli and converts them to electrical impulses for transmission to the brain. The retina consists of cones and rods which are the nerve receptors of light stimuli.

Cones and Rods:

The **CONES** are responsible for acute or sharp vision and our ability to discern colors. There are approximately 7,000,000 cones in the retina. In order to activate the cones, there must be a minimal amount of light present. The amount of light required to activate the cones is about the same as the amount of light emitted from a full moonlit night.

In dim light, the **RODS** take over the function of sight. Hence, "night vision" is attributed to the rods. There are approximately 125,000,000 rods in the total retina. The rods do not see color but allow you to pick up gross movements, general shape and form, lightness and darkness in varying shades of gray. Rods have very poor visual acuity. Therefore, our visual acuity under dim lighting conditions is poor because the cones are not functioning.

The retina covers the posterior 2/3 of the eyeball, extending from the optic nerve to the ora serrata. At the optic nerve, there are no light receptors, (rods or cones), to send electrical stimuli to the brain. Light falling on this area is not "seen" by the brain, thus the term "blind spot". If you follow a horizontal line from the optic nerve toward the side of the head, you will find an irregular area that has a yellow pigment called the - Macula Lutea (yellow spot). This yellow spot covers a part responsible for central vision. In the center of the area of central vision is a circular depression called the **FOVEA** (fovea centralis). The fovea (meaning depression) has a "rod free territory". Not only are there no rods, but, the cones become more compact, which provides us with our most acute vision.

The **OPTIC NERVE** conducts the visual impulses from the retinal nerve fibers to the brain.

Crystalline Lens:

The **CRYSTALLINE LENS** is a semi-transparent biconvex structure suspended in the eyeball between the anterior chamber and the vitreous whose main function is to focus the light rays on the retina. When opacity occurs in the lens it is known as a cataract.

The **ANTERIOR CHAMBER** is the space that contains the aqueous humor which is a clear liquid that nourishes the front portion of the eye.

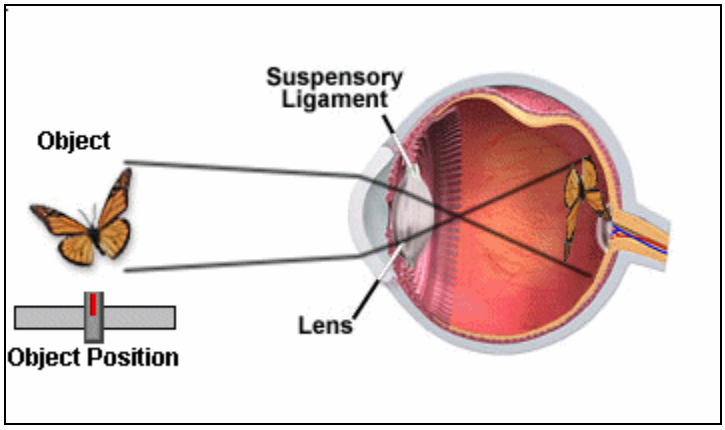
The **VITREOUS** is the posterior two thirds of the eyeball. The vitreous contains the vitreous humor which is a clear gelatinous mass that maintains the shape of the eye.

The **CILIARY MUSCLES** of the eye, by an automatic reflex action, change the curvature of the lens in accordance with the distance of objects being viewed. The lens becomes "flatter or thinner" to focus on distant objects and "rounder or thicker" to focus on nearby objects.

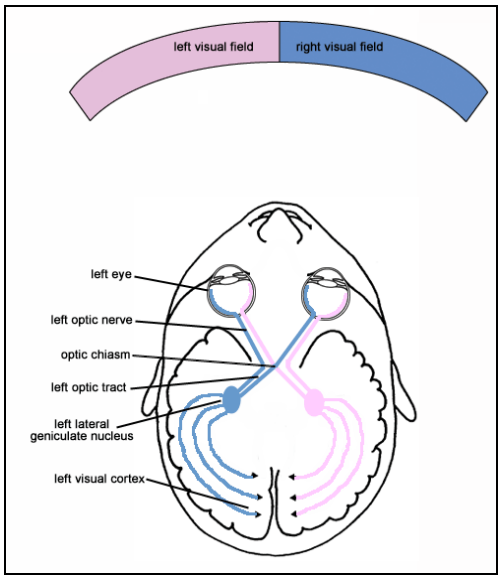
ANATOMY OF THE EYE AND THE VISION PROCESS: Cont'd

How We See:

Light rays reflected from an object enter the eye and pass through the lens. The lens projects an inverted image of the object onto the retina at the back of the eye. Signals produced in the rod and cone cells in the retina pass through the optical nerve where they are sent to the brain to be interpreted.



LIGHT RAYS → CORNEA → PUPIL → LENS → RETINA → OPTIC NERVE → VISUAL PATHWAY (to the visual cortex of the brain)



Visual Pathway

BASIC ANATOMY OF THE EYE: (Cont'd)

How Seeing Develops:

Vision is "learned" in the early years. Babies are born able to see, but their vision in not precise or sharp. During the first few months babies learn to focus, track, see colors, learn depth perception and eye-hand coordination. By six months of age infants should be using both eyes together **(binocular vision)**. By about 12 month children have "adult-like" vision. They have more accurate eye movements and can follow moving objects with their eyes.

Any child with an observable abnormal turning in, up, or out of one of both eyes at 12 months of age should have a complete examination by an eye doctor.

During the toddler years vision skills continue to increase as the child develops eye-hand-body coordination, fine motor skills and the visual motor skills necessary to learn to read.

A child's vision continues to develop until they are about 8 years old. After that, eyesight development is complete and can't be easily changed.

Binocular Vision:

In BINOCULAR VISION, both eyes automatically adjust so that the image being viewed falls on corresponding parts of each retina. The two images are fused and perceived as a single image by the brain (fusion). When the two images do not fall on corresponding parts of the retina (i.e. one eye deviates), double images result. The brain will not tolerate double vision and usually will turn the unwanted image off (suppression).

Before a child has adequate binocular vision, the child learns to use several fine muscle processes which must be correlated with each other. The child learns to adjust the size of the lens in the eye so that light can be focused on the macular area in the retina (accommodation). While the child is looking at pictures, books, and other small objects, the very young child is practicing the focusing of light rays. Stimulation of the macular area is of utmost importance since all acute or detailed vision originates in this area. This learned process may be adequately mastered by the time a child is five to six months of age. Evidence of this is observed when we see the child pick up very small items.

Muscle Balance Problems:

The young child must also learn control of the six extraocular muscles which position each individual eye. Movements of the eye up and down are controlled primarily by muscles which insert at the top and the bottom of the eye. Side to side movements are controlled primarily by muscles that insert on either side of the eye. Rotation inward or outward is controlled by various combinations of these muscles. A child learns to control the muscles as a pair as the child turns the eyes to look at something the child wants to observe, and then to work the muscles against each other in order to let both focus on an object which is less than twenty feet away. A child must learn to relate all of these actions precisely and synchronize them exactly to the action of the muscle which controls the size of the lens. There is much question as to just when this complexity of action is mastered, probably not completely until after a child is well into his school years.

As part of the complete progression, a coordinated balance must be developed so that, as an object is moved away from or toward the nose, the extraocular muscles can converge or diverge the eyeballs while the ciliary body changes the size of the lens in order to keep the object in focus. Before the child can read comfortably, the child must also learn to move the eyeballs horizontally across the page, while maintaining the other muscle controls.

Any abnormality in the associated movement of the two eyes so that they cannot complete their action simultaneously indicates some type of underlying difficulty. Common causes of muscle balance problems include congenital muscle abnormalities (muscles too long or too short), nerve paralysis, and refractive errors. Other common causes include problems with accommodation. This is when the eyes

have a tendency to converge or diverge too much or not enough relative to the object they are looking at. This can cause significant eyestrain/headaches and can also at times cause intermittent/constant double vision.

Types of Muscle Balance Problems:

Phoria:

The tendency of an eye to turn from the normal position.
Types of Phoria are:

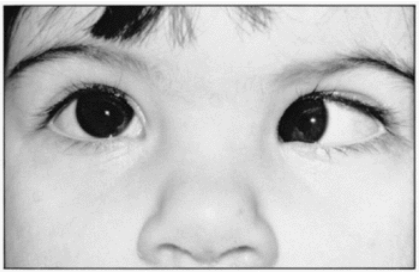
EXOPHORIA	Tendency for one (or both) eyes to deviate outward.
ESOPHORIA	Tendency for one (or both) eyes to deviate inward (toward the nose).
HYPERPHORIA	Tendency for one eye to deviate upward.
HYPOPHORIA	Tendency for one eye to deviate downward.
Treatment:	Variable, may include eye glasses, orthoptic treatments (eye exercises), medication, and/or surgery.

Tropia (strabismus, squint):

The turning away of an eye from the normal alignment while looking at a specific object. Fusion is either abnormal or lacking. Because the brain cannot tolerate a double image, secondary suppression and/or amblyopia (dimness of vision) can be complications of a tropia. A prefix is used to denote the type of tropia.

Types of Tropia are:

EXOTROPIA	One eye is deviated outward.
ESOTROPIA	One eye is deviated inward (toward the nose).
HYPERTROPIA	One eye is deviated upward.
HYPOTROPIA	One eye is deviated downward.
Treatment:	Variable, may include eye glasses, orthoptic treatments (eye exercises), medication, and/or surgery.



Amblyopia:

AMBLYOPIA is a general term meaning dimness of vision which cannot immediately be brought to normal standards by optical means. It can develop in infancy or at any period during life. The types which develop during later years are usually from toxic sources (alcohol, tobacco, drugs, or disease). The type usually affecting children results from disuse of the macular area. It is estimated that approximately 2 – 4percent of all children in Canada are affected to some extent. The following discussion will center on amblyopia in children and its causative factors.

Fine visual discrimination occurs in the fovea centralis. It is a process which must be developed during the preschool years. If there is any interference which impairs or deters the orderly progression from general vision (present at birth) to binocular vision, amblyopia can develop.

Differences between the images the two eyes send to the brain can occur if there is:

1. A large difference in visual acuity;
2. A marked unilateral refractive error;
3. Muscle imbalance; or
4. A combination of the above.

This difference between the two eyes interferes with proper binocular vision often giving a blurred or double image. The brain, not capable of dealing with double vision (diplopia), will turn off (suppress) the offending image. In the usual case, the suppressed eye will lose or fail to develop proper visual discrimination. If fine visual discrimination is not developed by the time the child is six or seven years old the central visual acuity may be permanently impaired and no longer-subject to correction. If the condition is detected and treated early, significant improvement may occur. Prognosis is most favorable when treatment is begun by the age of 18 months. The type of treatment depends on the age of the patient, the present acuity, and the age of the patient at the onset of the disorder. Patching, corrective refraction, eye exercises (orthoptics), or a combination of these procedures usually constitutes treatment.

APPENDIX B:
Sample Template Letters

- Template letter to Superintendent
- Template letter to Principal
- Template letter to Parent
- Template letter to Teacher
- Template letter Child Referral
- Template letter – General Screening
- Template letter Missed Screening
- Template Vision Screening Referral and Follow up form

Other Resources:

Ministry of Education link to school lists and contact information:
http://www.bced.gov.bc.ca/apps/imcl/imclWeb/Home.do

BC Health Files:

- Young Children and Their Eyes - BC HealthFile #53a
- School Age Children and Their Eyes – BC Health File #53b

Health Authority Letterhead TEMPLATE LETTER SUPERINTENDENT

(insert Date), 2007

(Insert Name), Superintendent
School district #**(insert #)**

Dear:

This school year public health staff will be offering the following in-school health services for children. These include:

- Vision screening for all children in kindergarten to identify those with possible vision concerns and to evaluate our efforts in the prevention of visual disorders that could affect learning;
- Dental health survey (dental 'visual check') for all children in kindergarten to identify those with dental concerns and to evaluate our efforts in the prevention of early childhood tooth decay;
- (Immunization services for Grade 6 and Grade 9 students.)
- (Other HA services e.g. Kindergarten Hearing screening, health teaching etc.)

The individual school principals will be contacted by public health staff to arrange a suitable date, and schedules and parent notices will be sent to the teachers prior to the visit. It takes from October until May to schedule all the schools in the school districts, so some schools may not hear from us for a while.

Each kindergarten child will receive a bookmark to inform the parent that their child was screened and to provide some helpful hints on keeping their child's teeth and eyes healthy. Parents of children requiring follow up will be contacted by public health staff.

The Ministry of Education and Ministry of Health endorse an integrated strategy to address vision and dental concerns in the early childhood years. Specifically, they support the provision of vision and dental screening for children in kindergarten in order to identify children whose health and learning may be affected by undetected or untreated conditions.

Schools are asked to assist public health staff by providing a copy of the class list with the children's names, parent's names, child's birth date, telephone number and address. Section 79 of the School Health Act permits persons providing health services access to information in the student record required to carry out that service.

All information will be collected, used and/or disclosed in accordance with the Freedom of Information and Protection of Privacy Act and held in accordance with strict government security standards.

We value your continued support of our efforts to improve the health status of children. If you should have any questions, please do not hesitate to call your local public health office. We may be reached at **XXX-XXX-XXXX.**

Sincerely

Health Authority Letterhead TEMPLATE LETTER PRINCIPAL

(insert date), 2007
(insert Name), Principal
(Insert Name) School

Dear:

This school year public health staff will be offering the following in-school health services for children in support of learning. These include:

- Vision screening for all children in kindergarten to identify those with possible vision concerns and to evaluate our efforts in the prevention of visual disorders that could affect learning;
- Dental health survey (dental 'visual check') for all children in kindergarten to identify those with dental concerns and to evaluate our efforts in the prevention of early childhood tooth decay;
- (Other HA services e.g. Kindergarten Hearing screening, Immunizations etc.)

Schools are asked to assist public health staff by providing a copy of the class list with the children's names, parent's names, child's birth date, telephone number and address. Section 79 of the School Health Act permits persons providing health services access to information in the student record required to carry out that service.

All information will be collected, used and/or disclosed in accordance with the Freedom of Information and Protection of Privacy Act and held in accordance with strict government security standards.

You will be contacted to schedule the dental survey and vision screening visit. Public health staff will send a package for each teacher with parent notices about these services. These notices need to be distributed prior to the visit. If it should happen that this is not done, please notify the public health staff immediately so that the visit can be re-scheduled. A pamphlet about Healthy Kids Program for children aged 0 - 18 living in low-income families is included with this letter. It will be helpful to parents if you could include this information in a school newsletter.

Following service provision, each kindergarten child will receive a bookmark to inform the parent that their child was screened and to provide some helpful hints on keeping their child's teeth and eyes healthy. Parents of children requiring follow up will be contacted by public health staff.

Public health nursing staff will continue to accept vision or dental referrals for any student experiencing vision difficulties or dental pain or infection from any grade. Please contact the public health staff directly with any concerns.

We value your continued support of our efforts to improve the health status of children. If you should have any questions, please do not hesitate to call your local public health office. We may be reached at **XXX-XXX-XXXX.**

Sincerely

cc:

Enclosures: Healthy Kids Program

Health Authority Letterhead TEMPLATE LETTER TEACHER

Teacher letter

*

Dear *:

RE: Vision Screening

Vision screening has been scheduled for the kindergarten children in your class on ** at ** am. The screener will briefly review preventive vision health practices with the children and teacher and then will provide the vision screening in a private area of the classroom.

We have included notes to be sent home with each child prior to our visit. **It is important that these notes be distributed to let the parents know we will be coming and to allow them to contact us if they have any questions.**

Schools are asked to assist public health staff by providing a copy of the class list with the children's names, parent's names, child's birth date, telephone number and address. Section 79 of the School Health Act permits persons providing health services access to information in the student record required to carry out that service.

All information will be collected, used and/or disclosed in accordance with the Freedom of Information and Protection of Privacy Act and held in accordance with strict government security standards.

We look forward to seeing you.

Enclosures

Health Authority Letterhead TEMPLATE LETTER CHILD REFERRAL

Date_____

Dear Parent/Guardian of: _____

Your child's vision was screened at school today as part of the (Health Authority Name) School Health Program. A more detailed eye examination is needed and we have sent home a Vision Screening Referral and Follow up form with your child. This does not mean that your child needs glasses. We recommend that your child be seen by an eye doctor (optometrist or ophthalmologist) for a more thorough examination.

British Columbia Medical Services Plan does provide some coverage for eye exams by optometrists, however, some optometrists do not accept that coverage as full payment for their services. You may wish to confirm the fee policy at your optometrists' office when you make the eye appointment for your child.

Please take the Vision Screening Referral and Follow up form with you to the appointment, ask the eye doctor to fax the completed form to the health unit or you can return the completed form to the health unit or school.

If you have any questions about this program, or about your child's vision, please contact us at XXX-XXX-XXXX

Sincerely,

TEMPLATE LETTER – GENERAL SCREENING

Dear Parent or Guardian:

This year your child's class will take part in a vision screening program. This will be performed by members of the (insert health authority) as part of a province-wide screening program.

As part of this screening, we will measure the vision in each eye and check for depth perception. We want to find and help children who have possible vision problems, which can affect their learning.

If we find any problems with your child's vision, we will let you know. You will then need to get your child's eyes examined by an eye doctor (optometrist or ophthalmologist). This screening does not replace regular check ups with your eye doctor.

The information about your child's vision screening will be recorded in your child's health record at the Health Unit. The information collected is to support client referral and follow up and to evaluate the vision screening program. We make sure that this information stays private. We collect, use and share this information only as allowed by law – the British Columbia Freedom of Information and Protection of Privacy Act.

If you have any questions about this program, or about your child's vision, please contact us at XXX-XXX-XXXX

Sincerely,

TEMPLATE LETTER – MISSED SCREENING

Health Authority Letterhead

Date _____

Dear Parent/Guardian of: _____

The _____ provides routine vision screening as part of the school health program in the kindergarten year. Your child was absent today when the vision screening was done in the school. We are offering this service to find and help children who have possible vision problems which can affect their learning. We believe vision screening is important and request that you contact the health unit to arrange a vision screening appointment.

(Insert HA contact information here)

Health Authority Logo

VISION SCREENING REFERRAL AND FOLLOW-UP

Client ID/PHN#_____ Child's Name: _____ _____ _____
Last First Birth Date (y/m/d)

_____ _____/_____ _____ _____ _____
Gender (M/F) Parent/Guardian Phone #/Cell # Child's Address Postal Code School/Day Care/Clinic Grade/Div

DEAR PARENT: Your child's vision was screened at school today as part of the Public Health vision screening program. We have sent home a Vision Screening Referral and Follow up form with your child as a more detailed eye examination is needed.

1. **PLEASE HAVE THIS FORM COMPLETED BY AN EYE DOCTOR (OPTOMETRIST OR OPHTHALMOLOGIST).**
2. **PLEASE SIGN THE RELEASE OF INFORMATION BELOW REGARDING THE EYE DOCTOR'S RESULTS / RECOMMENDATIONS.**

THE RELEASE OF THE FOLLOWING INFORMATION IS AUTHORIZED BY: _____
Parent/Guardian Signature

TO BE COMPLETED BY PUBLIC HEALTH VISION SCREENER

Vision Screening Result Outcome – Record Result as Pass or Fail	
Welch Allyn Sure Sight - Refer if: **Sphere ≥ -1.0D or ≥ 3.0D Cylinder ≥ 1.5D Difference ≥ 1.5 D** Right Eye: **Sphere:_____ Cylinder: _____** Left Eye: **Sphere: _____ Cylinder: _____** **Difference between eyes: _____** **OR**	□ Could Not Test □ Tested wearing glasses
H.O.T.V eye chart – For children 3-5 years of age refer if: 10/20 or worse in one or both eyes. Refer if unequal acuity (2 line difference between each eye). Right Eye: _____ Left Eye: _____	
Stereopsis: _____ Other observable concern: _____	
Signature of Health Unit Personnel	(yyyy-mm-dd)

The personal information collected is to support client referral and follow up and to evaluate the vision screening program. The personal information will be kept confidential in compliance with the *Freedom of Information and Protection of Privacy Act.* If you have any questions about the collection and use of this information, contact your Public Health Nurse at:

TO BE COMPLETED BY EYE DOCTOR

Public health staff will find your assessment of this child's vision helpful. It will assist with client follow up and vision screening program planning and program evaluation.

EYE EXAMINATION DATE: _____			**MANAGEMENT**	**LENSES SHOULD BE USED**
(please indicate) □ Cycloplegic exam □ Non- Cycloplegic exam			□ No treatment at this time □ Present lenses adequate □ Corrective lenses □ Surgery □ Eye Exercises □ Eye Patching □ Low vision aids □ Referral to vision impairment program?	Constantly For Distance Vision For reading or close work Except for play activities **Child's first eye exam?** □ Yes □ No
Refraction	Right Eye: Sphere_____ Cylinder: _____ Left Eye: Sphere _____ Cylinder: _____			
Visual Acuity	(Unaided) Right eye _____ Left eye _____	(Corrected) Right eye _____ Left eye _____		
Stereopsis	□ Present □ Not Present _____(Seconds of Arc)		RECOMMENDATIONS OR COMMENTS:	
Strabismus	□ Yes □ No			
Amblyopia	□ Yes □ No			
Colour Vision	□ Normal □ Abnormal			
Other observable concern:□ _____			_____ OPHTHALMOLOGIST OR OPTOMETRIST SIGNATURE	

EYE DOCTOR - PLEASE FAX THIS FORM TO: *INSERT HU CONTACT INFORMATION AND FAX NUMBER.*

APPENDICES: (Cont'd)

GLOSSARY:

A. Vision Care Personnel and Professional Definitions:

FAMILY PHYSICIAN - A family physician (or general practitioner) is a medical doctor who assesses diseases and problems of the eye in relation to other health problems. Treatment includes eye drops and ointments. Family physicians refer patients to ophthalmologists or optometrists, when appropriate.

OPHTHALMOLOGIST - An ophthalmologist (or eye physician or surgeon) is a medical doctor specializing in defects and diseases of the visual system, who diagnoses and treats by medical, optical and surgical techniques.

OPTOMETRIST - An optometrist (or doctor of optometry) is a health care professional who examines the visual system. Patient management includes: prescribing glasses, contact lenses, vision therapy (orthoptics), low vision aids, and referral for consultation to the appropriate medical practitioner for treatment of ocular or systemic disease or eye surgery.

OPTICIAN - An optician is a technician who grinds, fits, and dispenses corrective lenses on the written prescription of an ophthalmologist or optometrist.

ORTHOPTIST - An orthoptist is a medically supervised practitioner who evaluates binocular vision problems and treats such problems with occlusion, exercises, or prisms.

GLOSSARY: (Cont'd)

B. General Glossary:

ACCOMMODATION - The adjustment of the eye for seeing at different distances, accomplished by changing the shape of the crystalline lens through action of the ciliary muscle, thus focusing a clear image on the retina.

AMBLYOPIA - Reduced visual acuity not correctable by refractive means and not attributable to obvious structural or pathological ocular anomalies.

AMETROPIA - Imperfection in the refractive powers of the eye so that images are not brought to a proper focus on the retina; includes hyperopia, myopia, and astigmatism.

ANISOMETROPIA - A condition in which there is a different type of refractive error between the two eyes, i.e., one eye is hyperopic while the other eye is myopic.

ANTERIOR CHAMBER - Space in the anterior portion of the eye; bounded in front by the cornea and behind by the iris; filled with aqueous humor.

AQUEOUS HUMOR - A water-like fluid which is manufactured by the ciliary body and which fills the anterior and posterior chambers of the eye located in front of the lens.

ASTIGMATISM - A defect of curvature of the cornea or lens of the eye as a result of which a ray of light is not sharply focused.

BINOCULAR - Using both eyes simultaneously.

BINOCULAR VISION - The ability to use the two eyes simultaneously to focus on the same object and to fuse the two images into a single image.

BLINDNESS - In Canada, the legal definition of blindness is: central visual acuity of 10/100 or less in the better eye after correction; or visual acuity of more than 10/100 if there is a field defect in which the widest diameter of the visual field subtends an angle no greater than 20 degrees.

BLIND SPOT (Physiological) - An area which has no nerve receptors located at the back of the eye where the optic nerve enters the eye to supply nerve fibers and blood vessels to the retina. The blind spot in one eye does not "correspond" to the other so that the vision of one eye "fills in" the blind spot of the other, and vice versa:

CANTHUS - The angle at either end of the slit between the eyelids; specified as outer or temporal and inner or nasal.

CHOROID -The dark brown, vascular coat of the eye, between the sclera and the retina, whose function it is to nourish the retina and lens and to absorb light rays not absorbed by the retina.

CILIARY BODY - Portion of the vascular coat between the iris and the choroid. It consists of ciliary processes and the ciliary muscle. This organ changes the convexity of the lens when a change of accommodation is required.

COCHLEA - The sense organ that translates sound into nerve impulses to be sent to the brain.

COCHLEAR IMPLANTS - A device that can be surgically implanted into a person's cochlea to stimulate it to cause hearing.

CONCAVE LENS – Lens having the power to diverge parallel rays of light; also known as diverging, reducing, negative, myopic, or minus lens, denoted by the sign "-".

CONES - One of the two types of light-sensitive nerve endings that are scattered over the surface of the retina making it possible to transmit visual impulses to the brain. Cones perceive fine detail and colour and are more numerous at the macula.

CONGENITAL - Present at birth.

CONJUNCTIVA - Mucous membrane which lines the eyelids and covers the front part of the eyeball.

CONTACT LENSES - A thin curved shell of plastic designed to float on tears above the cornea in order to correct refractive errors.

CONVERGENCE - The process of directing the visual axes of the two eyes to a near point, with the result that the pupils of the two eyes are closer together. The eyes are turned inward.

CONVEX LENS - Lens having power to converge parallel rays of light and to bring them to a focus; also known as converging, magnifying, hyperopic, or plus lens, denoted by the sign "+".

CORNEA - The anterior transparent portion of the outer coat of the eye through which light enters.

CRYSTALLINE LENS - A transparent colourless body suspended in the anterior portion of the eyeball, between the aqueous and vitreous chambers, the function of which is to help bring the rays of light to a focus.

CYLINDER - A measure of the power of astigmatism, or irregular focus of the eye. A display unit on autorefractor device.

DEPTH PERCEPTION - The ability to perceive the solidity of objects and their relative position in space. Syn. stereoscopic vision.

DIFFERENCE: The difference in mean spherical power between the two eyes.

DIOPTER - A unit of measurement denoting the amount a lens can bend a light ray.

DIPLOPIA - Double vision.

DIVERGENCE - The ability to relax convergence or the ability to turn the eyes out.

ESOPHORIA - A tendency of the eye to turn inward.

ESOTROPIA- A manifest or observable turning inward of the eye (convergent strabismus or crossed eye).

EXOPHORIA - A tendency of the eye to turn outward.

EXOTROPIA - A manifest or observable turning outward of the eye (divergent strabismus or wall eye).
EYE DOMINANCE - Tendency of one eye to assume the major function of seeing, being assisted by the less dominant eye.

FIELD OF VISION - The entire area which can be seen at one time without shifting the head or eyes.

FOCUS - Point at which rays are converged after passing through a refractive substance.

FOVEA - Small depression in the retina at the back of the eye; the part of the macular area adapted for most acute vision.

FUNDUS - The inner surface of the posterior part of the eye.

FUSION - Coordination of the images seen by each eye individually into one picture.

GLARE - A quality of light which causes discomfort; it may result from a direct light source within the field of vision or from a reflection of a light source not in the field of vision.

HYPEROPIA - A refractive error in which the eyeball is too short from front to back or the refractive power of the eye is too weak, so that parallel rays of light are brought to a focus behind the retina. Far sightedness is a condition requiring a convex (plus) lens to correct.

HYPERPHORIA - A tendency of one eye to deviate upward.

HYPERTROPIA - A manifest or observable deviation upward of one of the eyes.

IRIS - Coloured, circular membrane; which regulates the amount of light entering the eye by changing the size of the pupil.

LACRIMAL GLAND - A gland which secretes tears. It lies just above the outer corner of the eye.

LENS - A refractive medium of colourless transparent substance so shaped as to converge or scatter rays of light.

LIMBUS (CORNEA) - Edge of cornea where it joins the sclera.

MACULA LUTEA - The small area of the retina that surrounds the fovea and with the fovea comprises the area of distinct vision. Syn. yellow spot.

MONOCULAR - Pertaining to or having one eye.

MYOPIC - A refractive error in which the eyeball is too long or the refractive power is too strong, so that parallel rays of light are focused in front of the retina. Near-sightedness is a condition requiring a concave (minus) lens to correct.

NEAR VISION - The ability to perceive distinctly objects at normal reading distances, or about fourteen inches from the eyes.

NIGHT BLINDNESS - A condition in which the sight is good by day but deficient at night and in any faint light.

OCCLUDE - To cover.

OCCLUSION - The method of obscuring the vision of one eye, so as to force the use of the other eye.

OCULUS DEXTER (O.D.) - Right eye.

OCULUS SINISTER (O.S.) - Left eye.

OCULUS UTERQUE (O.U.) - Both eyes.

OPHTHALMOSCOPE - An instrument used in examining the interior of the eye.

OPTIC DISC - The point of entry into the retina of the optic nerve. It is more commonly known as the blind spot since it contains no light receptors and therefore has no vision.

OPTIC NERVE - Second cranial nerve; the special nerve of the sense of sight which carries messages from the retina to the brain.

PERIPHERAL VISION - Ability to perceive presence, motion or colour of objects outside of the direct line of vision.

PHORIA - A root word denoting a latent deviation in which the eyes have a tendency to turn from the normal position, used with a prefix to indicate the direction of such deviation (hyperphoria, up; esophoria, in; exophoria, out).

POSTERIOR CHAMBER - Space between the posterior surface of the iris and the anterior surface of the lens; filled with aqueous.

PUPIL - The opening at the center of the iris of the eye for the transmission of light.

REFRACTION - a) Deviation of the course of rays of light in passing from one transparent medium into another of different density. b) Determination of refractive errors of the eye and correction by glasses.

REFRACTIVE ERROR - A defect in the eye that prevents light rays from being brought to a single focus exactly on the retina.

REFRACTIVE MEDIA OF THE EYE - The transparent parts of the eye having refractive power -- cornea, aqueous, lens and vitreous.

RELIABILITY NUMBER - indicates the number of good readings obtained and their consistency, based on a 1 to 9 scale. The higher the number, the better the reliability.

RETINA - The innermost coat of the eye which receives the image and changes it into nerve impulses which are transmitted to the brain.

RODS - One of the two types of light-sensitive nerve endings that are scattered over the surface of the retina making it possible to transmit visual impulses to the brain. Rods perceive light and motion.

SCLERA - The white part of the eye -- a tough covering which, with the cornea, forms the external, protective coat of the eye.

SPHERE - The power of the eye, which determines hyperopia and myopia. A display unit on autorefractor device.

- Negative numbers indicate myopia (near-sightedness);
- Positive numbers indicate hyperopia (far-sightedness).

STEREOPSIS - Binocular visual perception of three dimensional space.

STEREOSCOPIC VISION - Ability to perceive relative position of objects in space without such clues as shadow, size, and overlapping.

STRABISMUS - Tropia or squint.

SUPPRESSING - The act of accepting the image seen with one eye and ignoring that seen with the other eye.

SUSPENSORY LIGAMENTS (OF LENS) - A complex structure of multiple bands of fibers which hold the crystalline lens in place.

TENSION, INTRAOCULAR - The pressure of the fluids inside the eye against the outer structure.

TROPIA - A root word denoting a manifest or observable deviation from normal of the axis of the eyes (strabismus) used with a prefix to denote the type of strabismus, as heterotropia, esotropia, exotropia.

UVEA - Entire vascular coat of the eyeball. It consists of the iris, ciliary body and choroid.

VISUAL ACUITY - Sharpness of vision in respect to ability of the eye to distinguish detail as an object is placed further away or as it becomes smaller in size.