

VISION SCREENING AND ASSESSMENT

Evaluation to determine the existence of a visual impairment is a most important and difficult task for professionals. Vision screening is effective with the population of children who have a minor vision problem, who are verbal and responsive, and who know their letters or symbols.

Prevent Blindness America states that among school-age children, an estimated 1 in 4 has a vision problem; and among preschoolers 1 in 20. Parents are often not aware that a child has a vision problem unless there is some visible sign such as crossed eyes. Children do not complain because they do not know what they “should” be seeing, even if their vision is blurred or they are using only one eye to focus.

Vision screening is not diagnostic. Children who fail the test must be referred to an eye specialist for a diagnostic examination. Screening will not identify every child who needs eye care nor will every child who is referred require treatment. A screening for distance visual acuity is considered by authorities to be the most important single test of visual ability. This test will identify more children who require eye care than any other single test. Screening for distance visual acuity is reliable in detecting such vision problems as amblyopia (lazy eye), myopia (nearsightedness), hyperopia (farsightedness), astigmatism (curvature defects of the eye’s surface causing distorted images), strabismus (muscle imbalance, eyes that deviate from straight visual path), and other conditions, such as cataracts which cause decreased visual acuity. Early detection and treatment is vital in children with such eye problems. Both amblyopia and strabismus can cause a child to visually ignore one eye and rely on the other. The ignored eye becomes inefficient through lack of use; and if the condition is not treated before the age of six or seven, permanent vision impairment in the unused eye can be the result. Poor vision can also affect learning ability and the entire adjustment to school. The most important aspect of the screening program is followup. The child who fails the screening should receive a professional eye examination. Many professionals believe if the children referred do not receive professional attention, the vision-screening program has failed to achieve its goal.

Prevent Blindness America recommends the following general schedules and guidelines for screening school-age children:

- Preschool (3 or 4 years).
- Kindergarten and/or first grade (5 or 6 years).
- Second grade (7 years).
- Fifth grade (10 or 11 years).
- Eighth grade (13 years).
- Tenth or eleventh grade (15 to 17 years).

In addition to this screening schedule, Prevent Blindness America recommends the following children should also be screened even if they are not enrolled in a grade scheduled for screening:

- All new students (enrollees and registrants).
- All registering for driver education.
- All teacher referrals of children who:

- Exhibit signs or symptoms of visual problems (see the caption below: “Signs of Possible Vision Problems”).
 - Experience scholastic failure.
 - Have reading difficulties or other learning problems (among them dyslexia).
 - All children at high-risk of having vision disorders (i.e., those who are suspected of being mentally retarded, and those who have Down’s Syndrome, cerebral palsy, deafness, or diabetes).

Children with these conditions pose special diagnostic problems; and ideally, they should have a thorough professional eye examination.

<p>SIGNS OF POSSIBLE VISION PROBLEMS</p>

Children observed to have any of the following signs, by the teacher or nurse, should be referred for a vision screening regardless of age or grade placement:

- Rubs eyes frequently.
- Attempts to brush away blur.
- Has dizziness, headaches, or nausea following close work.
- Is inattentive during lessons from chalkboard, wall-chart, or map.
- When looking at distant objects:
 - Holds body tense.
 - Contorts face in attempt to see distant things clearly.
 - Thrusts head forward.
 - Squint eyes excessively.
- When reading:
 - Blinks excessively.
 - Holds book too far from face.
 - Holds book too close to face.
 - Makes frequent change in distance at which book is held.
 - Is inattentive during lesson.
 - Stops after brief period.
 - Shuts or covers one eye.
 - Tilts head to one side.
 - Tends to reverse words or syllables.
 - Tends to look cross-eyed.
 - Tends to lose place on page.
 - Confuses words or letters.

The standard Snellen letter or symbol charts are designed for use at 20 feet (recommended distance between child and chart). When a 20-foot, child-to-chart distance is not available, a chart designed for use at 10 feet can be used.

The preferred method of screening is linear and is recommended for children of all ages. This presents a whole line of symbols at one time, whether the E or letter chart is being used. This method increases the chances of detecting children with amblyopia, since their vision may test better when

letters are presented singly to the eye than when presented in a series. For these children, a “crowding effect” results when more than one letter is viewed. A pointer may be used to indicate, by pointing from below, which letter or symbol the child is to read. If a child has difficulty with the linear method, then the isolated method of presenting letters or symbols singly may be used. Children who wear glasses or contact lenses would have their vision checked only while wearing the glasses or lenses. This should be noted on the vision record (e.g., **20/40** with glasses). The record for these children should also include: date of the last professional eye examination, date of the last correction, and date for the next examination.

Visual acuity is recorded as a fraction. The numerator represents the distance, and the denominator represents the line read. Thus at a distance of 20 feet, if the child was able to read the 20-foot line, the visual acuity is **20/20** which is considered normal. If the child could only read the 40-foot line at this same distance, the visual acuity is **20/40**. If screening is done at a distance other than 20 feet with the appropriate chart, an equivalent measurement should be used. For example, in screening with the 10-foot chart, the equivalent measurement for a referral level of **20/50** is **10/25**, and **20/40** is **10/20**. The 10-foot chart is often used for low-vision patients.

The criteria for referral, based on the Snellen test for distance vision, according to Prevent Blindness America, are as follows:

- 3-year-olds.
 - Vision in either eye of **20/50** or poorer (or equivalent measurement) means the inability to identify correctly one more than half the symbols on the 40-foot line on the chart at a distance of 20 feet.
 - A two-line difference in visual acuity between the eyes in the passing range (i.e. **20/20** in one eye, and **20/40** in the other).
- All other ages/grades.
 - Vision in either eye of **20/40** or poorer (or equivalent measurement) means the inability to identify correctly one more than half the symbols on the 30-foot line at a distance of 20 feet.
 - A visual acuity of **20/20** for children of all ages is considered excellent. However, visual acuity of **20/40** is a practical referral level.

Vision screening charts and symbols are available from Prevent Blindness America, 500 East Remington Road, Schaumburg, IL 60173.

CHILDREN WEARING GLASSES

The need for referral of children who fail the visual acuity test (with their present correction) should be based on the date of the last examination; observation by parent, teacher, and screener; and the schedule of re-examinations recommended by the eye care specialist.

ASSESSMENT OF NONRESPONSIVE OR VERY YOUNG CHILDREN

Visual functioning relates to how well a child is able to use his or her vision to perform everyday tasks. Visual functioning is a learned behavior and is developmental. The more visual experiences the child has the more the pathways to the brain are stimulated which leads to a greater accumulation of a variety of visual images and memories. Experts estimate that 75% of everything a child learns in his or her first five years of life is learned visually.

When a child cannot or does not respond to traditional screening tests, an alternate way of getting the needed information is through the *Functional Vision Assessment* form. A vision screening form, *Functional Vision Screening Test*, is attached. This form is used for the nonresponsive or very young child.

In addition to functional screening, other helpful information includes observation of the child performing everyday tasks such as eating, playing, and/or moving about in the child's own environment. Information provided by the parents or those living with the child is most helpful (suggested questions follow).

FUNCTIONAL VISION SCREENING TEST

(Test Instructions Attached)

Name _____ Birthdate: _____

(Yes) (No)

- ____ ____ 1. Pupillary reaction
- ____ ____ 2. Blinks at shadow of hand
- ____ ____ 3. Orients peripherally
 - ____ ____ Right
 - ____ ____ Left
- ____ ____ 4. Fixates on 4 inch object
 - ____ ____ at 12 to 18 inches
 - ____ ____ at 10 feet
- ____ ____ 5. Shifts gaze
- ____ ____ 6. Reaches on visual cue
- ____ ____ 7. Tracks horizontally
 - ____ ____ Light
 - ____ ____ Object
- ____ ____ 8. Tracks vertically
 - ____ ____ Light
 - ____ ____ Object
- ____ ____ 9. Tracks circularly
 - ____ ____ Light
 - ____ ____ Object
- ____ ____ 10. Converges
- ____ ____ 11. Picks up or tracks (3 objects less than 1 inch in size)
 - ____ ____ a. _____
 - ____ ____ b. _____
 - ____ ____ c. _____
- ____ ____ 12. No eye preference
 - ____ ____ If preference circle (right or left)

Action

Taken: _____

Screened

By: _____

Date: _____

Observations: _____

FUNCTIONAL VISION SCREENING TEST

WHAT: The Functional Vision Screening Test is a short form version of the Functional Vision Screening Inventory.

The items were selected because they proved effective in detecting visual abnormalities.

PURPOSE: The Screening Test should be used to discriminate children who exhibit visual problems so severe that they interfere with the child's learning processes. This screening instrument was designed only for the purpose of deciding whether a severe problem exists.

ADMINISTRATION: The administration procedures for each item are the same as the procedures outlined in the manual for the Functional Vision Inventory. The only difference will be in the scoring procedure.

SCORING: Each behavior assessed is scored on either being present or absent. If the visual behavior being assessed is not within the normal limits, the **NO** column should be checked. If no visual problem is suggested, the **YES** column should be checked.

Four or more checks in the **NO** column indicate that a visual problem severe enough to interfere with learning does exist. The child should benefit from educational programs into which a vision training program has been incorporated.

ADMINISTRATION PROCEDURES

1. PUPILLARY RESPONSE TO LIGHT:

Materials: Penlight

Procedure: Direct the light into the child's eyes from 12 inches away. Observe whether the child's pupils constrict with the introduction of light; then dilate when the light is removed; and the speed with which they do so: briskly, sluggishly, or no response at all.

Note: Observe the child's eyes before shining the light; blind children's pupils may manifest a continual constricting and dilating process, regardless of the presentation of light. Observe the pupils as the child moves from one environment to another in which the room is lighter or darker. Also, observe whether the pupils are equal in size.

SCORE: The child's pupils should immediately constrict with the presentation of light and almost as rapidly readjust when the light is removed. If this behavior is observed, place a check mark in the **YES** column. If this behavior is not observed, place a check mark in the **NO** column.

2. BLINKS AT SHADOW OF HAND:

Materials: None

Procedure: Slowly pass your hand with fingers spread horizontally across the child's line of vision. Repeat several times. If the child is nonambulatory, place the child on his or her back or side and kneel behind the child's head. Be careful that the child is not responding to the wind created by your hand, rather than to the oncoming movement of the hand itself; and that the blinking is in response to the hand, not simply a coincidental response.

Observe whether the child blinks purposefully as the hand passes over the child's eyes.

Score: The child should blink reflexively to the oncoming hand across his line of vision. If this behavior is observed, place a check mark in the **YES** column. If this behavior is not observed, place a check mark in the **NO** column.

3. ORIENTS PERIPHERALLY:

Materials: Penlight or small colorful toy.

Procedure: Sit behind the child and in front of a mirror, bring the toy or light from behind the child at eye level. Slowly move it from the periphery and toward the center of the child's vision, holding the toy or light approximately 12 to 15 inches away. Move the toy around the left, as well as the right side, of the child's head.

Observe the point at which the child turns to look at the toy or light, and any spot at which the child seems to lose sight of it.

Score: The child should turn his or her eyes to each side when the toy or light is at an angle of 30 inches or more from the midline. If this behavior is observed, place a check mark in the **YES** column. If this behavior is not observed, place a check mark in the **NO** column.

4. FIXATES ON 4-INCH OBJECT:

Materials: Baby Spielzeug, bright orange squeak toy, toy car, yarn ball, nerf ball, cup, etc., all of which are approximately 4 inches in size.

Procedure: Attract the child's attention to the object at 12 to 18 inches by wiggling the toy or activating a sound component if possible. Position the object at various places within a 180° radius around the child, then move back five feet, wiggle or activate the object. Again, position the toy at various places within a 3-foot radius of the child. Move back to 10 feet, then repeat.

Observe whether the child fixates (looks at) his or her gaze for 3 seconds on the object in any position within 12 to 18 inches of the child. At 5-10 feet, observe whether the child turns his or her head, or eyes, to fixate or look at the object for 3 seconds or more in any position. If the child can sign or is verbal, teach the sign or label for the toys and ask the child to name them at 10 feet away.

Score: The child should look at the object for 3 seconds at 12 to 18 inches and at 10 feet. If this behavior is not observed, a check mark should be placed in the **NO** column.

5. SHIFTS GAZE:

Materials: Two toys from 2-4 inches in size identical in interest appeal Weebles, puppets, spinner toys, plastic animals, etc.

Procedure: Hold the two objects before the child 10 inches from his or her eyes with approximately 6 inches between the objects. Attract the child's interest to one object and allow the child to attend several seconds before attracting his or her attention to the other. Repeat several times. If the toys differ, alternate the position of the toys several times.

Observe for shift of gaze from one toy to the other attending to only one side, or for difficulty in shifting to or locating the other toy.

Score: The child should be able to shift his gaze easily and quickly from one toy to the other, 4 or 5 times in 5 seconds. If this behavior is observed, place a check mark in the **YES** column. If this behavior is not observed, place a check mark in the **NO** column.

6. REACHES ON VISUAL CUE:

Reaches for Stationary Toy:

Materials: Any bright object, toy, or cup filled with juice.

Procedure: Throughout the assessment, leave different size objects in various areas in a circumference around the child. Be alert to any attempt during the observation of the child, to reach for, or follow, or gaze at different types of objects. Be sure to record these observations, even if they are made while returning the child to the classroom.

Observe whether the child reaches for objects on only one side. Switch the positions of the objects that the child does reach for to see whether the child prefers that object or whether the child does not see in that field.

Score: A child of 5 months (chronologically or older) should reach for objects within his or her visual field. When propped upright or sitting on the floor, the child of 10 months or older should pick up small objects within 18 inches. If this behavior is observed, place a check mark in the **YES** column. If this behavior is not observed, place a check mark in the **NO** column.

7-9. TRACKS HORIZONTALLY, VERTICALLY, AND CIRCULARLY:

Materials: Penlight or a light covered with plastic figures that allow light to shine through: Big Bird puppet, Baby Spielzeug, slinky, Redheaded Rattle, a cup, spoon, bottle, patterned box, or face.

Procedure: Hold the light source 12 inches from the child's eyes and blink it several times to attract the child's attention. Slowly move the blinking light in an arc to the far left, then to the far right (horizontally). From the center point (directly before the nose) move the light in an arc to several inches above the child's chin (vertically). Next, move the light in a circular pattern (circumference should be no larger than 12 inches). The circular motion should be conducted vertically around the child's face, pause, then repeat. Follow the same sequence with a toy or object. If the child does not

attend to a stationary toy, wiggle it to create another form of motion as it is being moved across the child's visual field.

Observe whether the child follows the light or the object, the direction in which the child follows, and how the child follows. Does the child follow with both eyes together, or with only one eye, which? Does the child's eyes follow smoothly or jerkily? Does the child cross his midline or look only from the midpoint to one direction? Can the child follow with only his or her eyes or does the child also move his or her head?

Score: The child should be able to follow both light and object smoothly in all directions. If this behavior is observed, place a check mark in the **YES** column. If this behavior is not observed, place a check mark in the **NO** column.

10. CONVERGENCE:

Materials: Penlight, small puppet, flint sparkler, slinky, or Weeble.

Procedure: Sit before the child with the toy or light and attract the child's attention to it. When the child attends, move the toy or light slowly in toward the bridge of the child's nose from about 12 to 16 inches away.

Observe the child's eyes as the toy or light moves toward the child, paying particular attention to the distance at which the eyes turn in or out, or if the child looks away, turns his or her head, or closes his or her eyes. The eyes should continue to converge on the toy or light until it is 4 inches from the child's nose. Note also, whether both eyes turn in simultaneously or whether one eye turns in or out.

Score: The child should follow the light or object with both eyes until the stimulus is approximately 4 inches from the child's eyes. If this behavior is observed, place a check mark in the **YES** column. If this behavior is not observed, place a check mark in the **NO** column.

11. PICKS UP OR TRACKS 3 OBJECTS LESS THAN 1 INCH IN SIZE:

Bead/Thread Test:

Materials: Cake decorations, (1) silver beads 3mm in size, and (2) colored beads 1mm in size, and 2-inch lengths of red sewing thread.

Procedure: Position the child over a bolster or wedge, on the floor, or at a table. Be sure that there is a high contrast between the materials and the table or surface on which they rest. Scatter the large beads first, the smaller ones next, and the threads last. The child should be exposed to only one set of items at a time.

Observe the child for any focusing or attempts to pick up the objects. If this behavior is observed, place a check mark in the **YES** column. If this behavior is not observed, place a check mark in the **NO** column.

12. NO EYE PREFERENCE:

Materials: Objects administered during the assessment.

Procedure: Observe during the administration of items whether the child closed either eye to look from only one. Does the child track with only one eye? When either eye is covered, does the child resist? When objects are brought into the left and then to the right visual fields (from behind the child's head), does the child turn to one side and then to the other?

Holt and Reynell (1967, p. 27) discussed the relationship between head posture and muscle imbalance. Two of the most common defects associated with muscle imbalance are described below:

OCULAR POSTURE—Eye turned in.

USUAL COMPENSATORY HEAD POSTURE—Face turned towards affected side, chin lowered.

OCULAR POSTURE—Eye turned out.

USUAL COMPENSATORY HEAD POSTURE—Face turned towards normal side, chin may be raised.

Score: The child should maintain his or her head in midline when focusing on objects. No preference for one eye should be noted either during occlusion through head posture, or when gathering acuity data. If this behavior is observed, place a check mark in the **YES** column. If this behavior is not observed, place a check mark in the **NO** column.

FUNCTIONAL VISION ASSESSMENT

QUESTIONS TO ASK PARENTS

1. Is your child taking any medications? Are there any medical issues we should be aware of?
2. What kinds of things do you think your child sees?
3. Does your child recognize people when they enter the room (without an auditory cue). Will the child raise his or her arms to be picked up?
4. How far away does the person have to be before the child recognizes the person?
5. Have you noticed your child squinting when in bright sunlight or when near bright lights?
6. Does your child appear to tilt his or her head in an unusual way to look at things?
7. Does your child hold his or her hand or objects near his or her eyes in an unusual manner?
8. Does your child locate things he or she drops on the floor? Does the child use vision to locate lost objects? How?
9. Does your child appear to notice if the room lights are on or off?
10. Is your child interested in watching television?
11. What pictures capture your child's attention?
12. What are your child's favorite toys and color preference? Candy is a useful tool for color testing, determining size of object seen, and eye/hand coordination.