Vision Screening Guidelines



Why Vision Screenings The Problem

- Undetected and untreated eye disorders, such as amblyopia and strabismus, can result in delayed reading and poorer outcomes in school.¹
- 25% of children aged 5-17 have a vision problem.²
- 35% of school aged children have never seen an eye care professional.³
- Only 22% of preschoolers receive some vision screening, and only 15% receive an eye exam.⁴



Why Vision Screenings (The Problem Continued)

- State requirements for vision screening in public and private schools vary widely from state to state.
- Hawaii has no mandated vision screening requirement.
- Vision screenings are not standardized and the quality and frequency of vision screenings vary by individual site or screener.⁵
- Studies indicate that 40% of those failing vision screening do not receive the appropriate follow up care.⁶



Vision Screening Studies

Vision in Preschoolers Study (VIP Study) National Eye Institute (U.S National Institute of Health) 1998 - 2003

- A three phase, multi-center study was used to identify whether vision-screening tests can accurately identify preschool-aged children who would benefit from a comprehensive vision examination due to of signs of amblyopia, strabismus, significant refractive error, and associated risk factors.⁴
- The study indicated that specifically trained lay people were able to identify up to 68% of children with at least one of the most prevalent vision disorders: amblyopia, strabismus, refractive errors or poor vision not associated with any obvious disorder.⁴
- Of 11 tests evaluated, three (3) were identified as best performing tools: (1) Visual Acuity (Lea Symbols), (2) Depth Perception (Stereopsis), and (3) Autorefractor to assess refractive error.⁴

Vision Screenings

A number of states recommend screening at least once for pre-schoolers, for all new students entering school, and annually for K, 1st, 3rd, 5th, 7th grades.^{4,7}

- The 2010 Vision Screening Model assesses:
 - Distance acuity (Each Eye)
 - Near acuity (Binocular)
 - Distance Plus Lens Test (+2.00) for Hyperopia Grades 1, 3, 5 (<u>Test not done if Auto refractor is used</u>)
 - Stereo Acuity using Random Dot Butterfly Test¹³ in place of RDE, Stereo Smile, or Lang Stereo II ^{14, 15} (Stereo Tests for Grades 1, 3, 5)
 - Auto Refractor (Grades 1-6 when Available)



Characteristics of Screening Programs

- Screening programs must be evaluated in terms of:
 - Validity Current Best Practices
 - Reliability
 - Yield
 - Cost
 - Acceptance
 - Follow up



Evaluation of Screening Program

To determine the effectiveness of the vision screening program, careful evaluation of the: (1)Planning, (2)Implementation, (3)Referral Process, and (4)Referral Outcomes must be completed with each vision screening.





80% of a child's learning comes through vision.





Screening Program Schedule

Grade	Screen	Type of Screening
All students new to district	Recommended	Age Appropriate
Pre-K and K	Recommended	Near & Distance Acuity Random Dot Butterfly Test
1 st	Recommended	Near & Distance Acuity Plus Lens Test (+2.00) Random Dot Butterfly Test
3 rd	Recommended	Near & Distance Acuity Plus Lens Test (+2.00) Random Dot Butterfly Test
5 th	Recommended	Near & Distance Acuity Plus Lens Test (+2.00) Random Dot Butterfly Test
7 th	Recommended as time permits	Near & Distance Acuity





Terms to Know

- AmblyopiaHyperopia
- Strabismus
- Myopia





Children's Vision Disorders

- 4th most common disability in U.S.
- Leading cause of handicapping conditions in children.⁴

Most prevalent condition is amblyopia:

- 80,000 3-year-olds develop amblyopia *each year*.
- Amblyopes have a higher risk of becoming blind because of potential loss to the sound eye from other causes.⁸
- The sooner treatment begins, the better the result (Ages 3 7), however recent studies indicate older children can benefit from treatment also.⁹

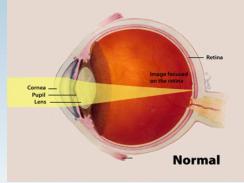


Childhood Vision Disorders

Condition	Negative Impact	Intervention
Amblyopia	Blur at distance and near	Glasses
	Poor depth perception	Contact Lenses
	Risk of future eye injury	Patching Therapy
Hyperopia	Blurry near vision	Glasses
	Difficulty reading	Contact Lenses
	Poor school performance	
Myopia	Blurry distance vision	Glasses
	Eye strain	Contact Lenses
	Poor school performance	
Strabismus	Blur at distance and near	Glasses
	Double vision	Eye muscle surgery
	Poor school performance	K (



Amblyopia



- Poor vision in an eye that is otherwise normal and healthy. Occurs in 1 – 5.3 % of children. The leading cause of monocular vision loss in adults age 20-70.⁸
- Developmental visual disturbance.
- Develops in children from birth to 8 or 9 years of age; primarily caused by anisometropia, or strabismus.
- Deprivation by cataract, ptosis (lid droop), lid tumor, or opacity of cornea may cause amblyopia.
- Best treated during these early years of life; otherwise, there may be irreversible visual loss.



Amblyopia

Good eyeAmblyopic eyeHVNTCZ HFC





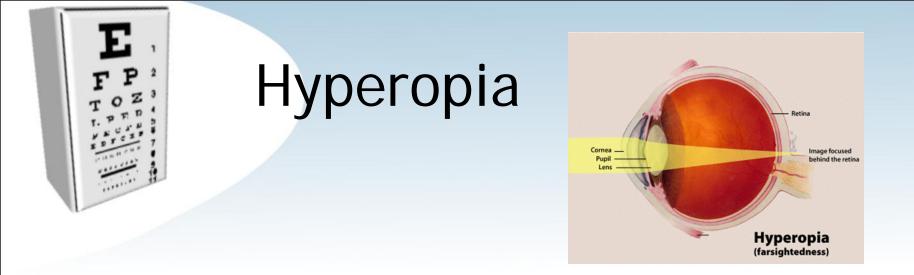


Hyperopia



- Farsightedness occurs in up to 15.7 % of school age children.¹⁰
- Near vision may, or may not, be blurry.
- A mild degree of hyperopia is normal and asymptomatic in young children.
- Distance vision is often clear.

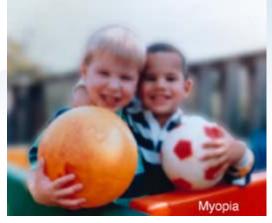


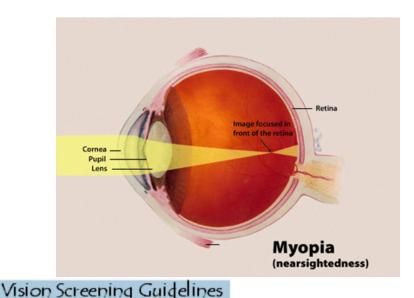


- Low degrees are undetected by the Snellen Test.
- Use of the Plus Lens Test may detect latent hyperopia indicating a need for glasses.¹¹
- Higher degrees of hyperopia can cause poor near vision, strabismus and amblyopia.



Myopia





- A common refractive error found in up to 20% of school age children.
- Nearsighted children are unable to see clearly at distance. Low levels of myopia generally <u>do not</u> adversely affect reading and school work.



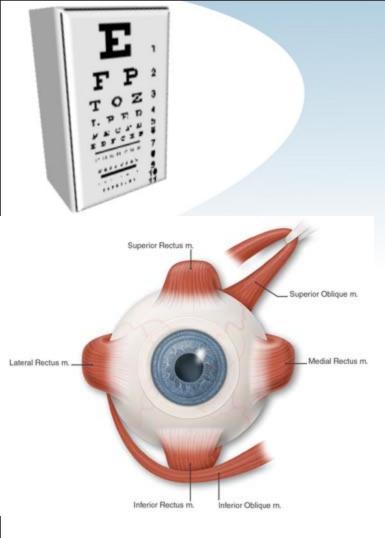




Strabismus

- Occurs in 3 5% of children
- A deviation of one or both eyes from the visual axis so the eyes are not properly aiming together.
- Also referred to as "cockeyed", "cross-eyed", "walleyed" or squint.





Strabismus

A. Esotropia



B. Exotropia



C. Hypertropia



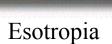
D. Hypotropia





Conditions that may cause Amblyopia







Hypertropia

Refractive Anisometropia

+5.00



Exotropia



Hemangioma Tumor

Cataract



+1.00

Corneal Opacity



Ptosis (Droopy Eye)





Amblyopia Treatment

- Refractive Correction (Full time glasses)
- Remove media opacities if present, i.e. cataract surgery, eyelid surgery.
- Occlusion (patching) Part-time patching for 2 - 4 hours just as effective as full time for moderate amblyopia.¹²



- Pharmacological penalization
- Strabismus surgery





Parent/Teacher Pre Screening <u>ABC</u> CHECKLIST FOR OBSERVATION AND HISTORY

A = APPEARANCE

Eyes turn in or out or "wander" all or part of the time

- Crusty or red eyelids
- □ Different size pupils or eyes
- □ Swelling of eyelids
- □ Red Eyes Pink eyes
- □ Drooping lid(s)
- □ Cloudy looking eyes
- White pupil
- □ Growths on eyes or eyelids
- □ Excessive tearing or mucous
- □ Closes one or both eyes in bright light
- □ Eyes in constant movement "dancing eyes"
- □ Eyes that "just don't look right"





ABC CHECKLIST (continued)

Teacher/Parent Observation

B = **BEHAVIOR**

- □ Tilts or turns head, covers or closes one eyes for critical seeing
- $\hfill\square$ Squinting, frowning, blinking or squeezing the eyes
- □ Losing place while reading
- □ Difficulty in keeping place while reading -a "finger" reader
- □ Disinterested in activities involving close work
- □ Frequent daydreaming
- Places head close to book or desk when reading
- □ Excessive stumbling, awkwardness
- □ Holds printed material in unusual position
- □ Has (reported) difficulty seeing at night or in the dark.
- □ Excessive blinking or rubbing eyes
- □ Other behaviors the child does that seem to indicate vision problems.



<u>ABC</u> CHECKLIST (continued) Child's Statements or Your Observations

C = COMPLAINTS

- Eyes hurt or blur while reading
- □ Headaches when reading
- Words move or jump about when reading
- Double vision
- Eye problem following a blow to the head
- Cannot see the chalkboard
- □ Cannot see well at night or in dark situations
- Eyes hurt or bother child when in bright lighting_or sunlight
- □ Trouble with vision following a blow to head
- Other complaints or observations that might mean a child is experiencing discomfort during visual tasks





Visual Acuity

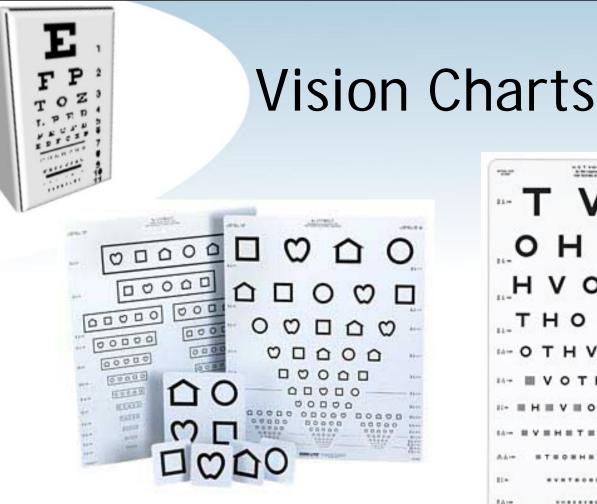
- Visual acuity refers to the sharpness of one's eyesight. Acuity is reported as a fraction.
 - Numerator distance from the subject to the chart.
 - Denominator size of the symbol the person can see at 20 feet.
 - Example A person with 20/40 must move to 20 feet to see what a normal(20/20) eye sees at 40 feet.
 Note: Vision machine testers are not recommended.

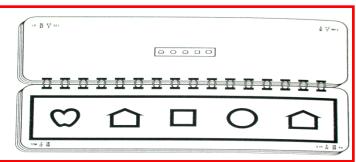


Testing Distance Visual Acuity

General Procedures:

- Make sure the room is well lit.
- Choose appropriate chart.
- Chart at eye level.
- Mark off appropriate distance for chart.
- Child positions their toes on the line.
- Use an occluder. Make sure the child does not peek.
- Ask if the child wears glasses, if yes, testing should be done with the child wearing the glasses. (Be sure to mark the form)





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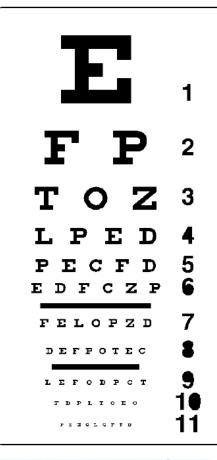
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Vision Charts (cont.)



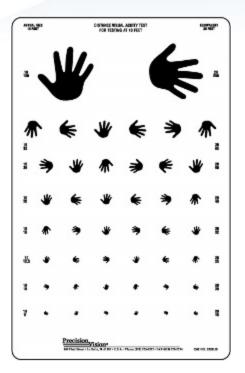
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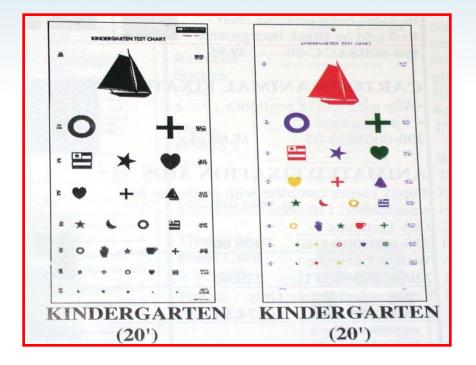






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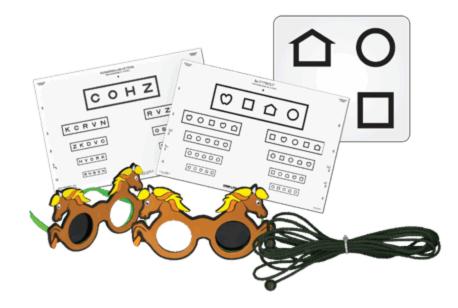


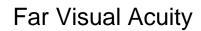


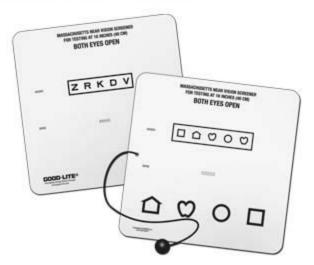


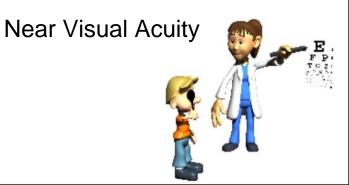


Recommended Vision Charts











Ask if the child wears glasses; if so, test the visual acuity with the glasses on and note this on recording form.





Testing Distance Visual Acuity (cont.)

 Watch carefully to observe if the child is peeking, tilting their head, or squinting.







Testing Distance Visual Acuity (cont.)

- Instruct the child to keep both eyes open and read the selected letter (symbol) or line of letters (symbols) with the uncovered eye. Do not use a marking device as a pointer.
- When screening, start at the 20/30 line and move down to the 20/20 line. (For preschoolers start at 20/40 line and go to 20/25.)
- Child must identify or match greater than 60% of the letters on the critical line.
- If the child is unsuccessful, he or she should be re-screened that same day by another screener.
- Record results including the line number for the last line read correctly with each eye. All failures should be rechecked.





Referral Criteria Distance Visual Acuity

Grade	Criteria
Pre School Kindergarten	Each eye must see at least the 20/40 line (No 2 line difference)
1 st – 7 th grade	Each eye must see at least the 20/30 line. (No 2 line difference)



Referral Criteria -Important Exception

Refer if there is a two-line difference

One Eye	Other Eye	Results
20/20	20/20	Pass
20/25	20/25	Pass
20/30	20/30	Pass
20/20	20/25	Pass
20/20	20/30	Refer - 2 line difference



Plus Lens Test

(Test with Distance Chart) <u>Grades 1, 3, 5</u> (Not used if tests include auto refractor)



- •Used to determine the presence of latent (uncorrected) hyperopia.
- •Child views the 20/30 row of letters through a plus +2.00 diopter lens (one eye is covered).
- •Child is asked to read the row first with the right eye and then with the left.
- If the child can read the entire 20/30 row of letters through a plus +2.00 lens with either eye, a referral is indicated.





Testing Near Visual Acuity (Pre K - Grade 6)

- Hold the card at the appropriate distance. (14 16 inch distance)
- Test with both eyes open.
- Ask the child to start at the 20/30 row (20/40 for Pre-K and K) and call out the letters or symbols.
- Record YES __ or NO __ on the score sheet.
- Near Visual Acuity Cards:







Testing Near Visual Acuity

- Ask the child to name or read the letter or symbols on each line as directed. If the child is able to read greater than 60% of the optotypes on the line, the child passes.
- If the child is unsuccessful, he or she should be re-screened the same day prior to referral. Do not comment either positively or negative on the child's response.
- Record results.





Referral Criteria Near Visual Acuity

Grade	Criteria
Pre School and Kindergarten	Must see at least the 20/40 line.
1 st – 6 th grade	Must see at least the 20/30 line.





Auto refractor (Grades K - 7 when available)

Auto refractor measures refractive power of eye





Vision Screening Guidelines

Auto refractor Measurement

- Tell the child that you are going to measure the focusing power of the eye with this machine.
- "This machine is like a camera. All you have to do is look into this little opening and you will see a picture of a balloon, house, tree (depends on model), and I will take a picture."
- Child places head against forehead rest and the person taking the measurement proceeds first with right eye and then left eye.
- Tape results to the child's score sheet.





Auto refractor Referrals Grades K - 7

- Refraction of +2.00 D or greater (hyperopia) either eye
- Refraction of -1.00 D or greater (myopia) either eye
- Astigmatism of 1.00 D or greater either eye
- Anisometropia of 1.00 D or greater (power difference between eyes)





Stereo Testing: Why do it? (Grades 1, 3, 5)

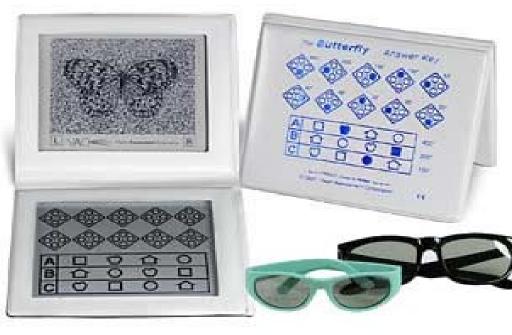
 Example: This child with misaligned eyes may pass the visual acuity test in each eye. He/she would not pass the stereo test and would be appropriately referred.





Random Dot Stereo Butterfly - Lea Symbols Test

 Equipment - Random Dot Butterfly with Lea Symbols:

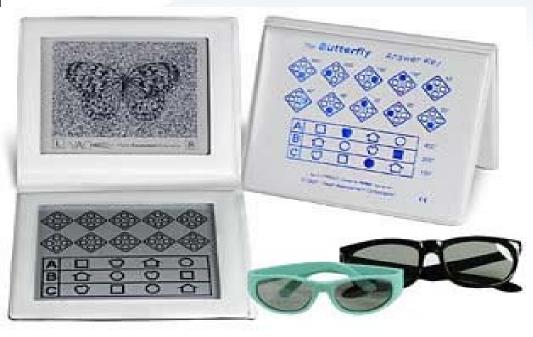




Vision Screening Guidelines



Butterfly Stereo Test



- Ages: 3 10 years
- Purpose: To assess stereopsis or depth perception. This will detect amblyopia and/or strabismus.
- Equipment: Stereo Butterfly and Polaroid glasses
- Testing Distance: 16 inches





Random Dot Butterfly



- Presents an array of dots that appear to be randomly oriented.
 - When viewed through polarized glasses, a
 Butterfly will appear and the wings will be elevated above the page





Random Dot Butterfly



With the glasses in place, children with good alignment and normal binocular vision will be able to see the Butterfly in 3- dimension





Random Dot Butterfly Test

Preschoolers - K

- Be careful to hold the stereo test plate parallel to child's face. Tilting the top of the stereo test plate may be helpful.
- Ask the child to tell you what they see. If they identify the butterfly, ask them to point to the wings.
- For preschoolers and K, the child passes the stereo screening if the child name the butterfly or describes the butterfly by a similar name (bird, moth, etc) and can identify the correct symbol in row A (400 sec arc) as coming up from the page (apple/heart).¹⁶



Random Dot Butterfly Test Grades 1, 3, 5

Be careful to hold the stereo test plate parallel to child's face. Tilting the top of the stereo test plate may be helpful.

- Ask the child to tell you what they see.
- If the child names the butterfly, ask them to point to the wings.
- Now ask the child to look at A B C and tell you which Lea Symbol is above the page in each row.
- The child passes if he sees the butterfly and correctly identifies the raised symbols in 2 out of 3 rows¹⁶. (Row A = 400 sec arc; Row B = 200 sec arc; Row C = 100 sec arc)

Screening Results

- Let the parents know the results of the screening, include type of screening, score sheet and date.
- The eye care professional wants to know the screening methods used and the pass/fail criteria.
- Parents are encouraged to inform the pediatrician of the screening results.





Score Sheet (Preschoolers - K)

Student Name

School/Grade _____/____

_ Date____

If glasses are worn, the following tests are completed with glasses on.

Were the child's glasses worn? Yes ____ No ____

Using the 20/40 Row, child can identify 4 out of 5 Lea Symbols

Distance Visual Acuity: Right Eye Yes ___ NO ___

Child can identify 4 out of 5 Lea Symbols

Left Eye YES __ NO __

Using the 20/40 Row, child can identify 4 out of 5 Lea Symbols

Near Visual Acuity with both eyes open

Child can identify 4 out of 5 Lea Symbols YES ___ NO ___

Random Dot Butterfly Stereo Test Demonstrates Stereopsis: Yes NO (Sees raised Butterfly and Row A (heart/apple) = 400 sec arc)





Score Sheet (Grades 1, 3, 5, 7)

Student Name _______/ Date______

If glasses are worn, the following tests are completed with glasses on.

Were the child's glasses worn? Yes ____ No ____

Distance Visual Acuity: Right Eye 20/ Left Eye 20/ Plus Lens Test Grades 1, 3, 5 (*Test not done if auto refractor is used*) Can the child read 20/30 Line looking through a +2.00 lens? Right Eye Yes ____ No ____ Left Eye Yes ____ No ____ Random Dot Butterfly Stereo Test (Grades 1, 3, 5) Stereopsis demonstrated to 200 level (Row B) Yes ___ NO ___ Near Visual Acuity with both eyes open: Can the child read 20/30 YES ___ NO ___ Auto refractor: Either eye = or >+2.00, -1.00, astigmatism > 1.00 or anisometropia > 1.00 YES__ NO ___

Manpower Requirements:

- 1. Two persons per Distance Acuity Station and Plus Lens Test
- 2. One person for Near Visual Acuity and Random Dot Butterfly Stereo Test
- 3. One or two volunteers to help check-in
- 4. One or two floaters to guide and direct. Total minimum is six for one station.



1.

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- 15. Huynh SC, Ojaimi E, Robaei D, et al. <u>Accuracy of the Lang II stereo test in screening for</u> <u>binocular disorders in 6-year-old children</u>. *Am J Ophthalmol* 2005 Dec; 140(6) :1130-2.
- 16. Birch, Ellen, Ph.D.et.al, <u>Randot® Preschool Stereoacuity Test: Normative data and validity</u>; Presented at the 33rd Annual Meeting of the AAPOS, Seattle, WA, April 11-15, 2007.





On-line Resources

- 1. Lea Visual Acuity Tests: <u>www.lea-test.fi/</u>
- 2. State of Colorado: <u>www.cde.state.co.us/earlychildhoodconnections/early.htm#vision</u>
- 3. State of Missouri: <u>www.dhss.mo.gov/SchoolHealth/MASN_Vision_Screening_Guidelines.ppt</u>
- 4. State of Minnesota <u>http://www.health.state.mn.us/divs/fh/mch/hlth-</u> vis/materials/visscrnprocedure.pdf
- 5. NEI VIP Study: www.nei.nih.gov/neitrials/viewStudyWeb.aspx?id=85
- 6. American Optometric Association: <u>aoa.org</u>
- 7. American Academy of Ophthalmology: <u>aao.org</u>
- 8. Prevent Blindness America <u>http://www.preventblindness.org/</u>
- 9. Starpupils[™] <u>http://www.starpupils.org</u>
- 10. American Association for Pediatric Ophthalmology and Strabismus http://aapos.org



Grades 1, 3, 5, 7 Vision Screening

Pass Letter to Parents

Dear Parent of _____ Date:_____

Your child underwent a school vision screening on _____. Based on the following vision screening tests, your child has <u>passed</u>.

Screened items were as follows:

Distance Visual Acuity: 20/30 minimum each eye.

Near Visual Acuity: 20/30 minimum with both eyes viewing the near point card

<u>Far-sighted screening test</u>: using a +2.00 Lens to determine the presence of farsightedness. (Grades 1, 3, 5) <u>Binocular Vision-Stereopsis</u>: to make sure both eyes are working together (Grades 1, 3, 5)

A School Vision Screening is designed to detect signs of Amblyopia (lazy eye), Strabismus (eye-turn), or Uncorrected eye focusing problems (nearsighted, farsighted and/or astigmatism).

There are many other problems which can impact your child's vision and eye health, but are <u>not</u> <u>detected in this simple screening</u>. For this reason periodic, comprehensive eye examinations are recommended to ensure that your child can visually perform to their potential.

Attached please find some literature about children's vision. Questions about your child's vision or eye health may be directed to an eye doctor of your choice, your pediatrician or your family doctor.

Vision Screening Guidelines



Grades 1, 3, 5, 7 Vision Screening

Refer Letter to Parents

Your child, _______, participated in a free vision screening on ____

Results of the vision screening indicate your child may have an undetected or uncorrected **vision problem**. Your child failed the following screening tests:

- Distance vision (for seeing the chalkboard). Scored less than 20/30 with one or both eyes; or showed
- a two line difference between the eyes. (E.g. 20/30 one eye and 20/20 the other eye)
- ____ Near vision (for reading and writing) Scored less than 20/30 while viewing with both eyes open.
- Far-sighted screening (to test for far-sightedness, which can affect reading). Was able to read 20/30 with one or both eyes through a +2.00D lens, indicating a possible uncorrected vision problem. (Grades 1, 3, and 5)
- Binocular Vision (to make sure both eyes are working together) Unable to see stereoscopic vision (binocular vision) when tested with the Random Dot Butterfly Stereo Test. (Grades 1, 3, 5)

It is recommended that you contact an eye doctor to make an appointment for a comprehensive eye and vision examination. Please bring this letter to the eye doctor. You should also inform your pediatrician or family practice doctor that your child failed a school vision screening exam.

Vision screenings are designed to detect signs of Amblyopia (lazy eye), Strabismus (eye-turn), or uncorrected eye focusing problems (nearsighted, farsighted and/or astigmatism). There are many other problems which can impact vision, but are not detected in this simple screening. Vision screenings are not meant to take the place of a comprehensive eye examination.

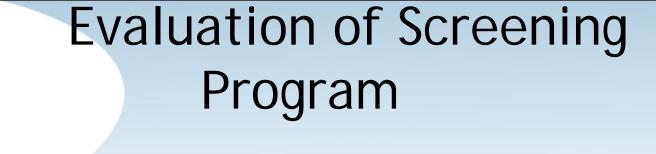


Evaluation of Screening Program

<u>Planning</u>

- Securing Volunteer Organizations to conduct the screenings: Lions Clubs, Rotary Clubs, Jaycees, etc.
- Educating the Volunteer organizations as to the need and purpose for vision screenings.
- Conduct Screening Workshop with Volunteers to thoroughly train.





Implementation

- Identify elementary schools that have not been screened.
- Contact School Principal and/or Nurse/Health Aide.
- Review Screening Protocols, Layout/Space requirements, sample of parental permission letter, teacher and parent educational pamphlets, e.g. "A Teacher's Guide to Vision Problems"



Evaluation of Screening Program Pass/Fail Statistics Records and Review

- At the conclusion of each screening, statistics should be generated that record the pass/fail rate for each class tested.
- Copies of the statistics should be sent to the school Health Aide and Principal for their records.
- Fail Rates range between 10% to 17% for school age children depending on socio-economic regions. Referral rates above 20% should be analyzed for validity of screening.



Evaluation of Screening Program Outcomes/Follow Up

- Outcomes should be shared with teachers when possible. FERPA and HIPPA guidelines, together with DOE and DOH regulations must be followed.
- A post-screening meeting with the school Health Aide and/or Principal will assure all parties that goals have been met.
- Teachers should be given pamphlets regarding children's vision and learning.





Evaluation of Screening Program Review of Screening Protocols

- Vision Screening Protocols should be reviewed annually to determine that the vision screening continues to incorporate the current best practices.
- Changes should be incorporated upon the review and agreement of eye care professionals in your area.



Resources

Vision Screening Equipment

- <u>www.bernell.com</u>
- www.good-lite.com
- <u>www.schoolhealth.com</u>
- <u>www.visionassessment.com</u>

Children's Vision Literature

- www.aoa.org
- www.aao.org
- www.preventblindness.org
- <u>www.allaboutvision.com</u>

E F P

Vision Screening Guidelines



Resources

Organizations assisting the uninsured or those in need.

- Lions Club International and local Lions Clubs around the country have programs to help people with vision issues. Contact the Lions Club in your area to learn more about the services they provide.
- Vision USA[™], a program from Optometry's Charity, the AOA Foundation, provides basic eye health and vision care services free of charge to uninsured, low-income people and their families.
- InfantSee, a program from Optometry's Charity, the AOA Foundation, ensures babies have healthy vision development. Within the first year of life, participating eye doctors provide comprehensive infant eye assessments as a free public health service.
- <u>ChildSight</u>[®], an initiative of Helen Keller International, provides free vision services and free eyeglasses to children living in poverty in the United States. It currently has programs in select cities in California, Connecticut, New Jersey, New Mexico, New York, Ohio, and Texas.
- <u>OneSight</u> partners with local charitable organizations to set up temporary eye care clinics in communities across North America.
- Sight for Students, a VSP charity, provides free vision exams and glasses to low-income, uninsured children through a national network of community partners who identify children in need and VSP network doctors who provide eye care services.
- Prevent Blindness America provide free eye exams and glasses to children and adults who qualify for their program.





Vision Screening

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