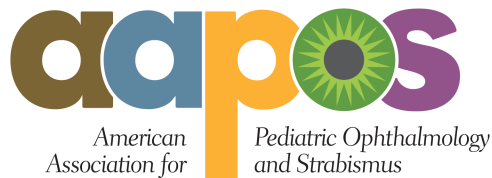


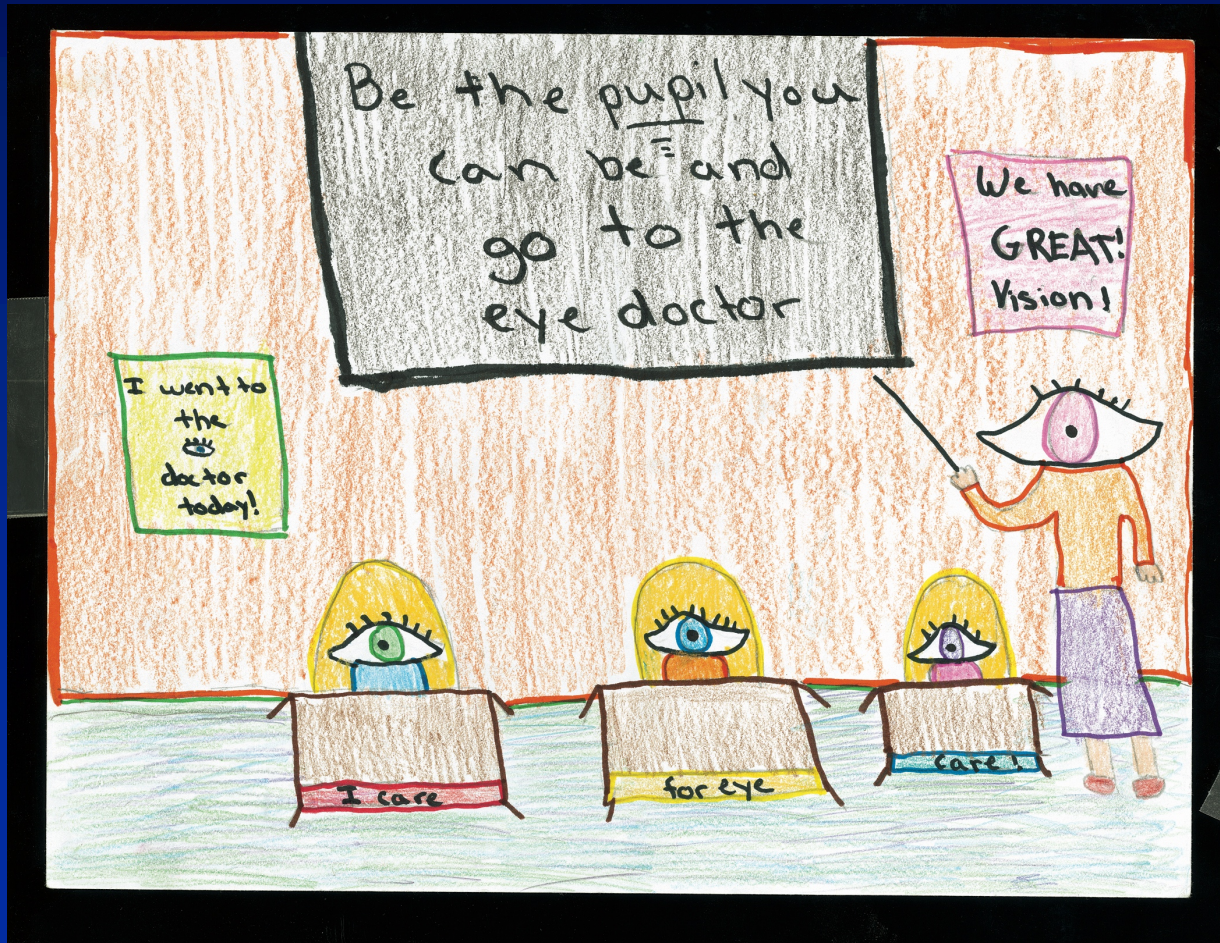
Efficient and Effective School Vision Screening

Kathy Lee, MD, PhD

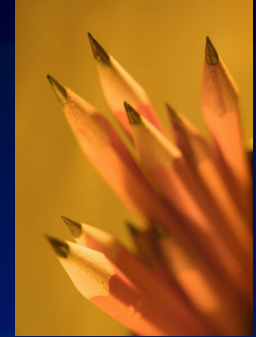
Pediatric Ophthalmologist



-No financial relationships to disclose

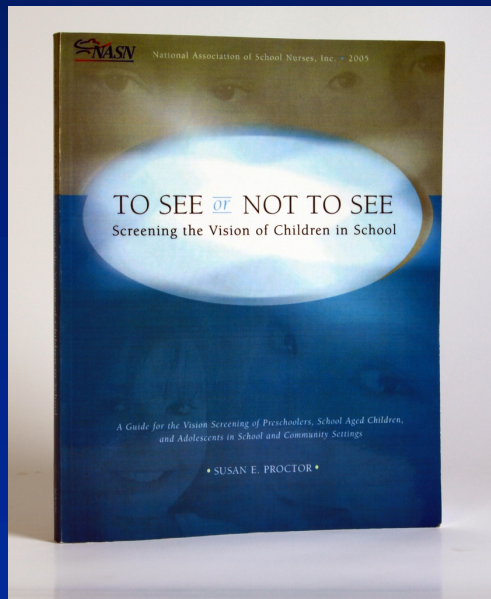


Why screen in schools?



- Amblyopia, strabismus and significant refractive errors occur in up to 5-10% of children
- Captive audience
- Very cost effective
- Repeated screenings more effective in catching problems than single comprehensive exam

Dr. Susan Proctor, school nurse



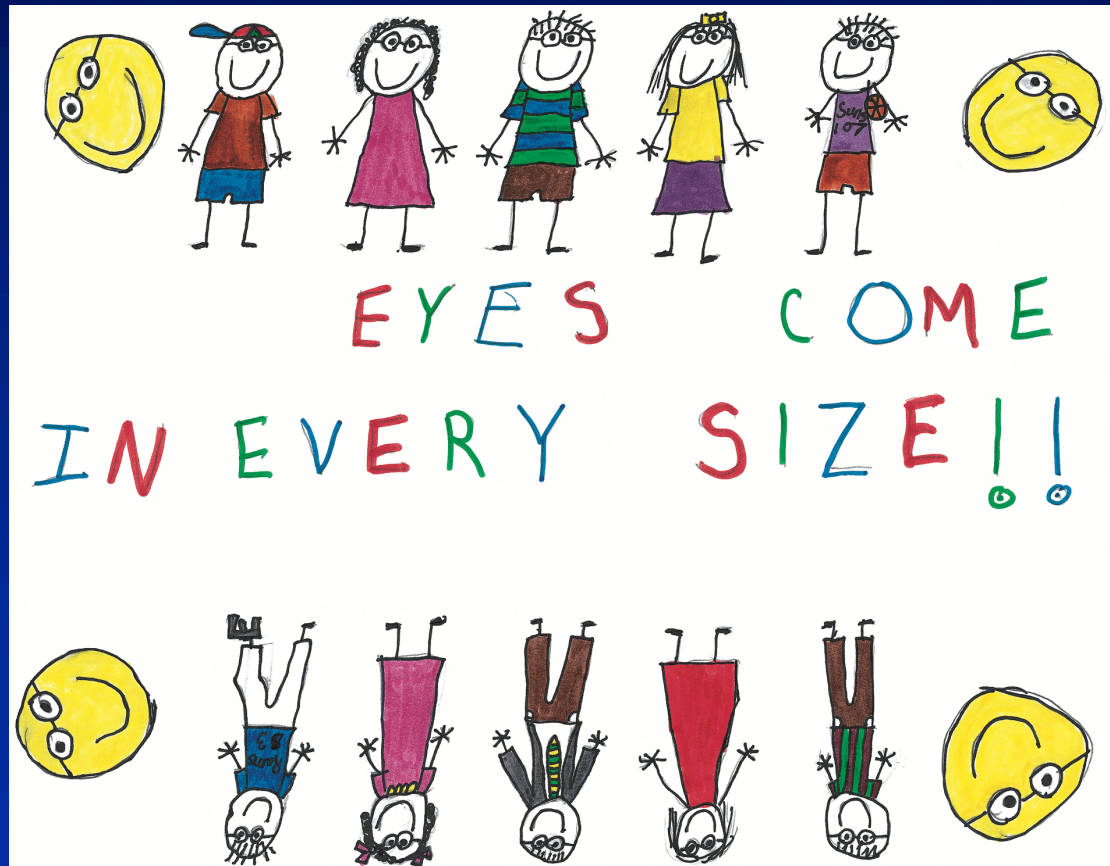
Goals of vision screening

- ✓ Identify the presence of impaired vision
- ✓ Assess for the ability to use the eyes together
- ✓ Detect structural abnormalities

Close the loop

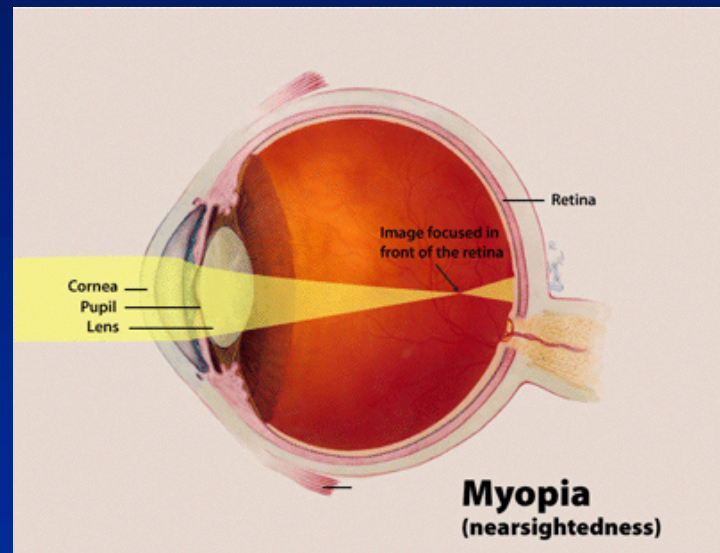


Background Information



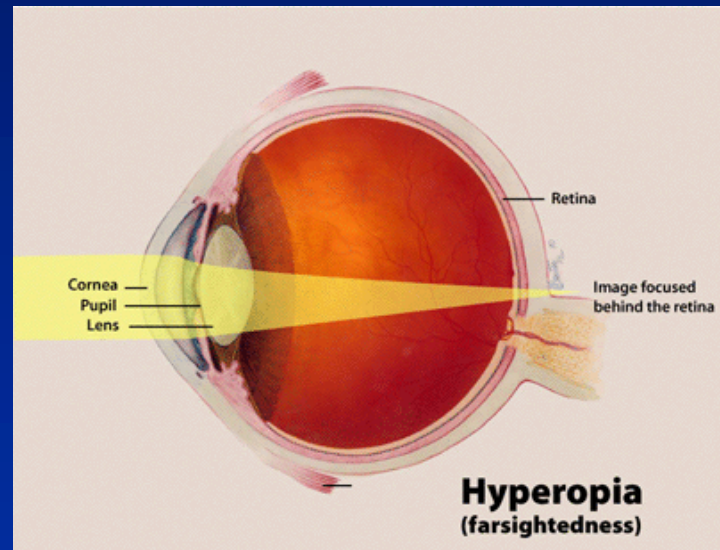
Myopia

- Nearsighted: see well at near without correction
- School age phenomenon
- Increases as eye grows



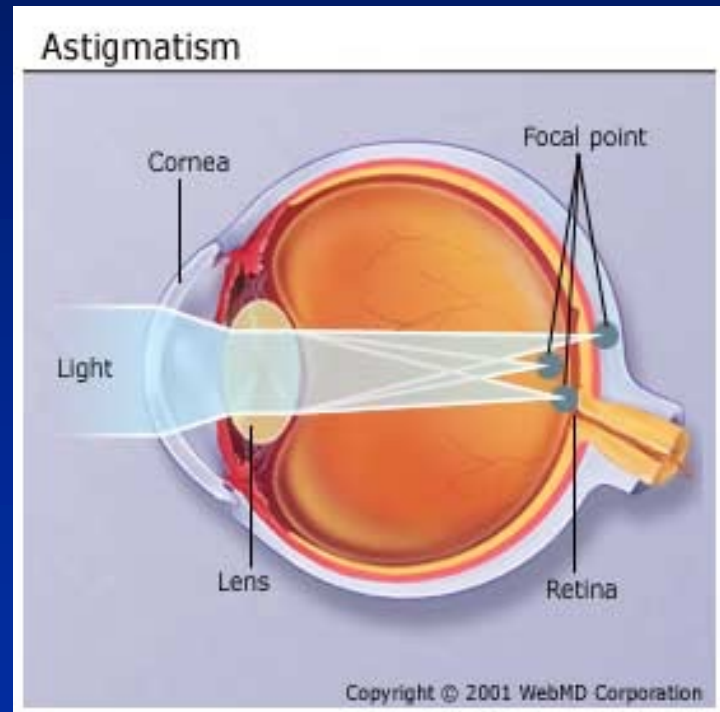
Hyperopia

- See better at distance
- Low amount of hyperopia normal in children
- High hyperopia warrants correction



Astigmatism

- Blurs at both distance and near
- Higher amounts warrant correction

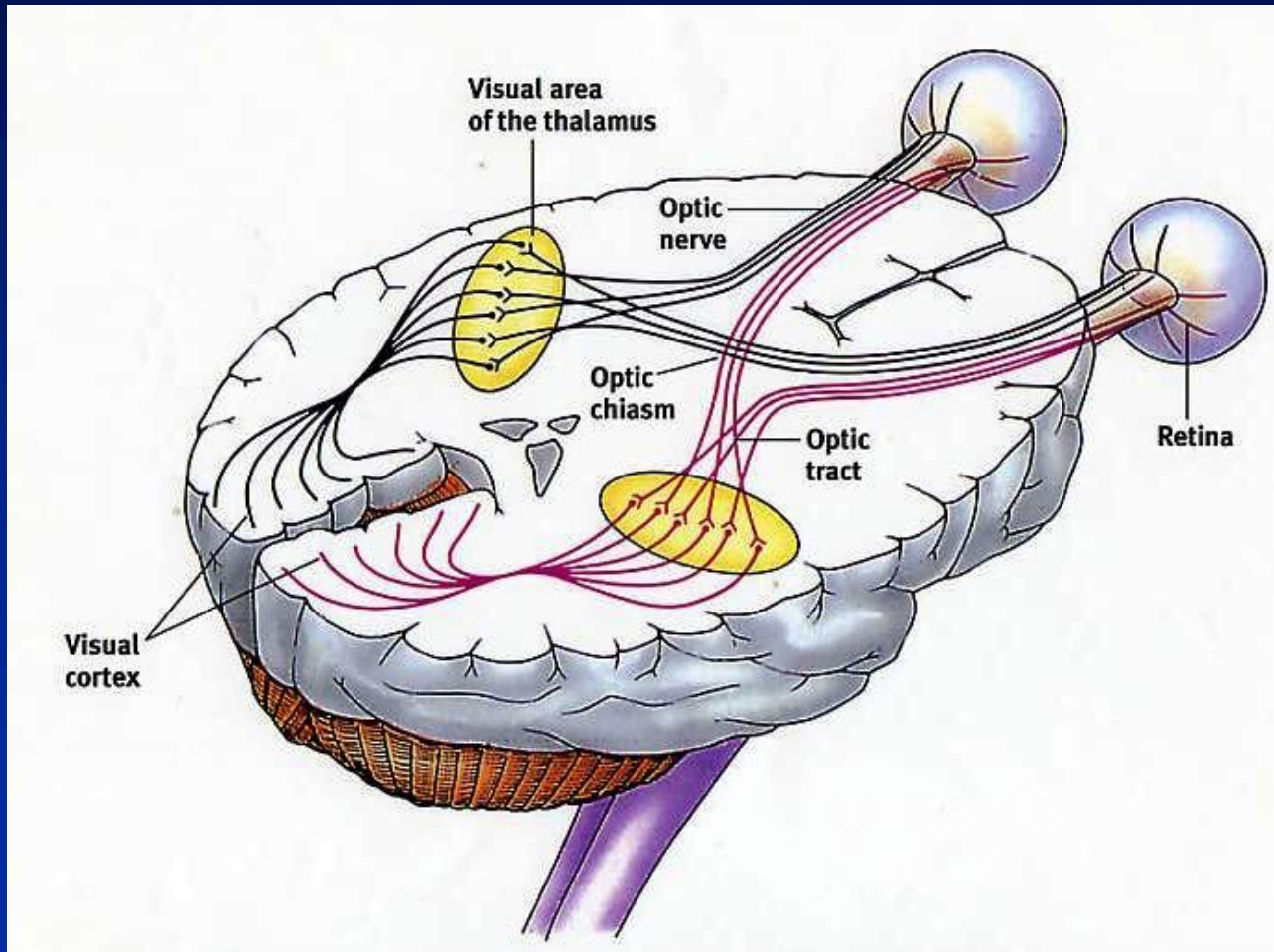


Amblyopia

- Brain ignores one or both eyes during the critical period of vision development
- One eye gets a better picture
- Other eye gets ignored



Critical period



Amblyopia must be treated
during childhood



Refractive amblyopia

- Brain receives blurred image from one or both eyes and ignores it
- Occurs most often in hyperopic children
- CHILD DOES NOT COMPLAIN
- EYES ARE STRAIGHT
- VISION SCREENING CRITICAL!!

Strabismic amblyopia

Esotropia

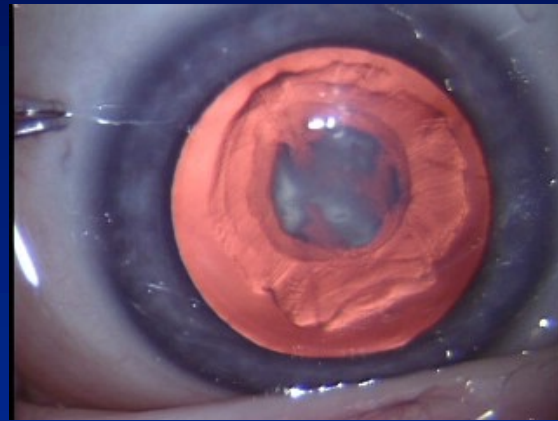


Exotropia



Deprivational amblyopia

- Image is blocked or degraded
- Brain ignores eye(s) receiving blocked/degraded image



Elements of a successful vision screening program

1. The child can perform the test reliably.
2. The examiner is knowledgeable and competent.
3. The examiner has no vested interest in the result.
4. The examiner uses the best methods available.
5. The results are reliable: sensitive and specific.

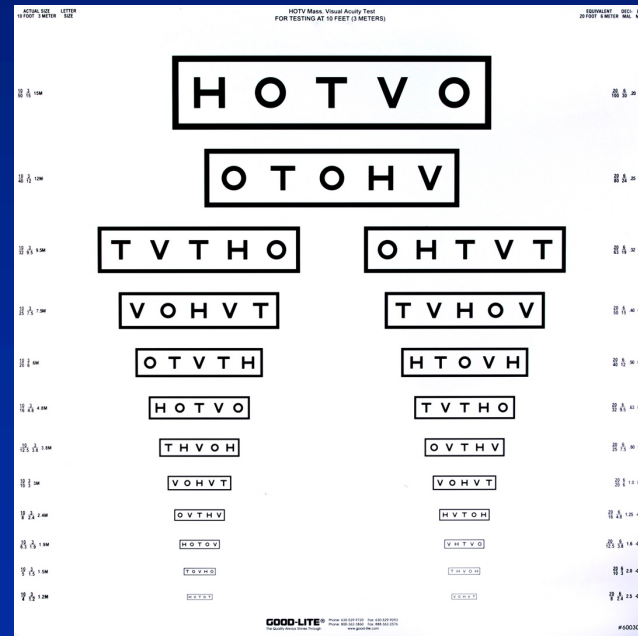
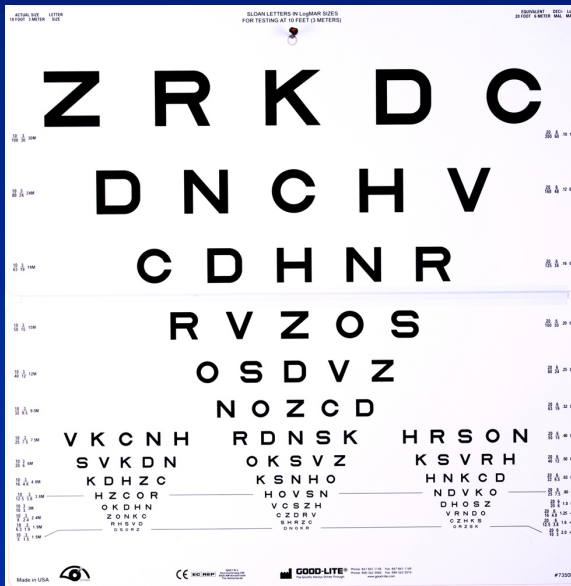
6. The criteria for referral for a comprehensive examination are clear.
7. The results are clearly communicated to parents and guardians.
8. The opportunity for a follow up examination is accessible.
9. A mechanism to ensure follow up is in place.
10. The results of the comprehensive examination are communicated to school screener.

Screening intervals

- State mandated perhaps
- If not...
 - Available preschoolers
 - All Kindergarteners
 - All transfer students
 - Every other year through grade 12
 - Upon teacher request

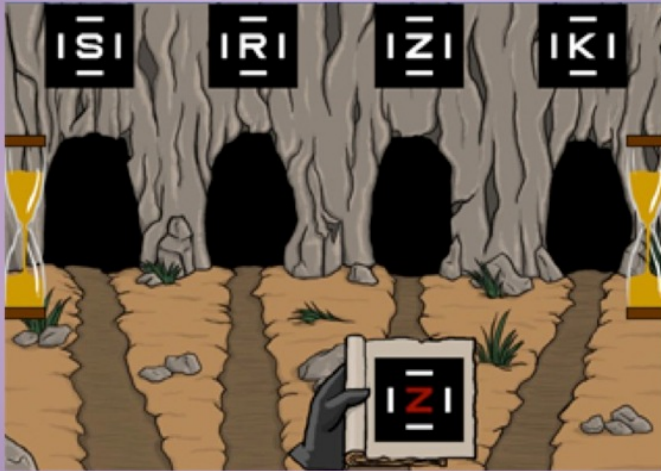
Subjective vision screening examinations

- Identification of optotypes
 - Symbols or letters

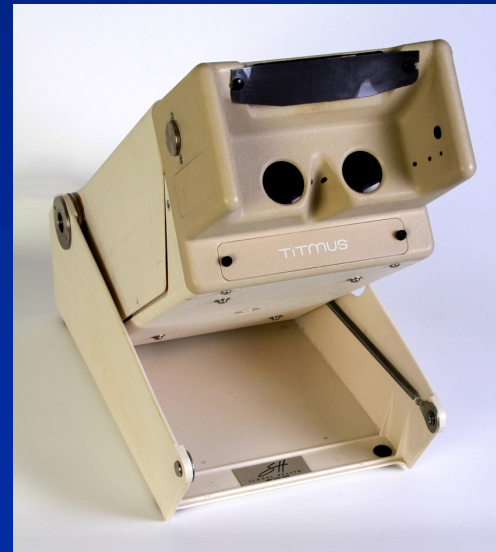




COMPUTER PROGRAMS



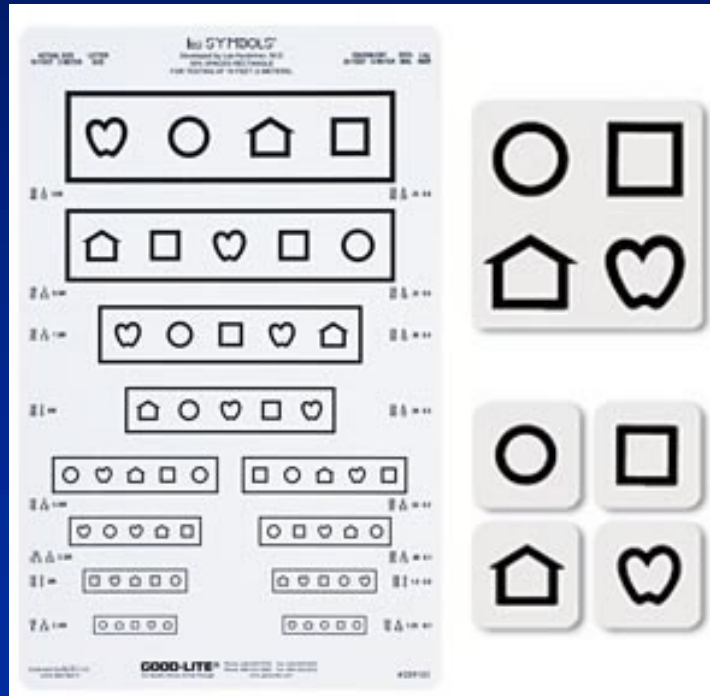
VisionQuest 20/20 "Cave Entrances"



Optotype choice matters

- Clarity
- Similar blurring qualities
- Not culturally biased

Good charts for the little



Poor charts for the little



Problematic

20 FOOT

DISTANCE VISUAL ACUITY TEST
FOR TESTING AT 20 FEET

20
80

20
63

20
50

20
40

20
32

20
25

20
20

20
16

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ACTUAL SIZE
10 FOOT

DISTANCE VISUAL ACUITY TEST
FOR TESTING AT 10 FEET

EQUIVALENT
20 FOOT

10
50

10
40

10
32

10
25

10
20

10
16

10
12.5

10
10

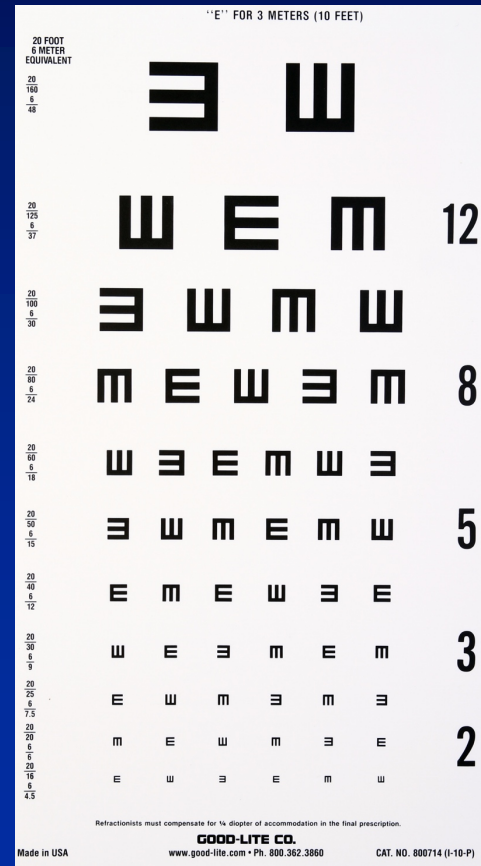
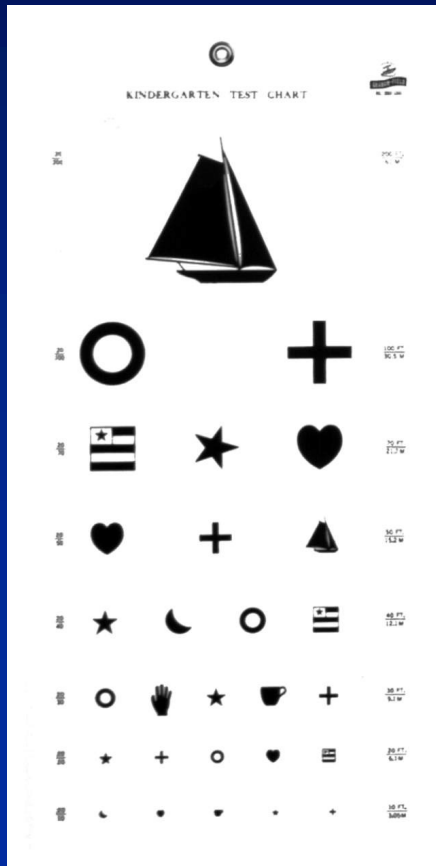
10
8

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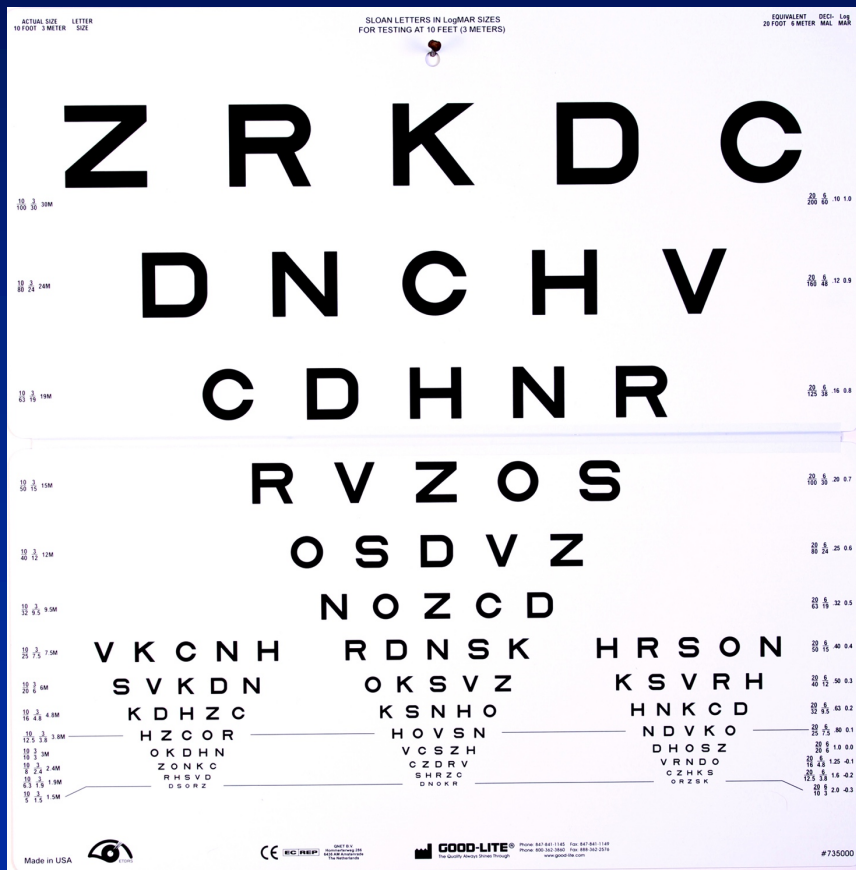
944 First Street • La Salle, IL 61301 • U.S.A. • Phone (815) 223-2022 • FAX (815) 223-2224

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No thanks!

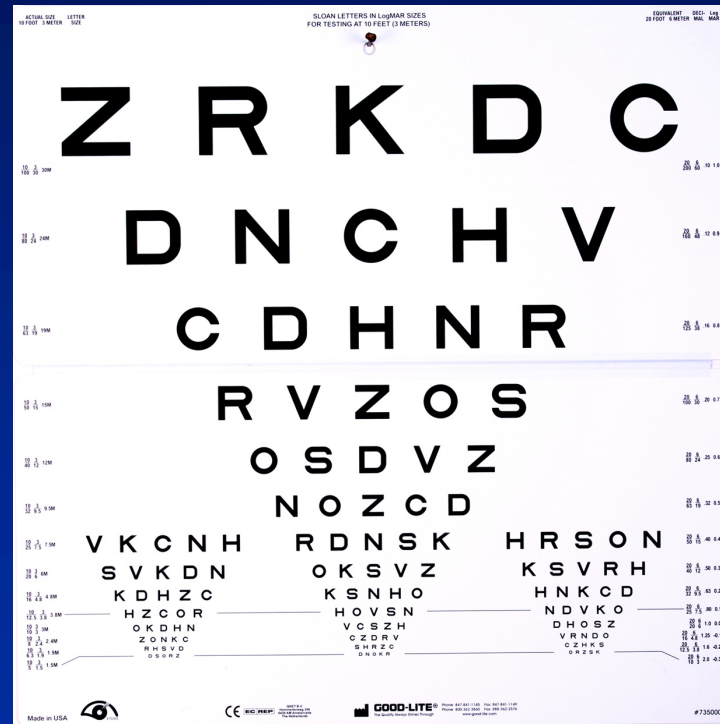


Good optotype for older kids is Sloan letters

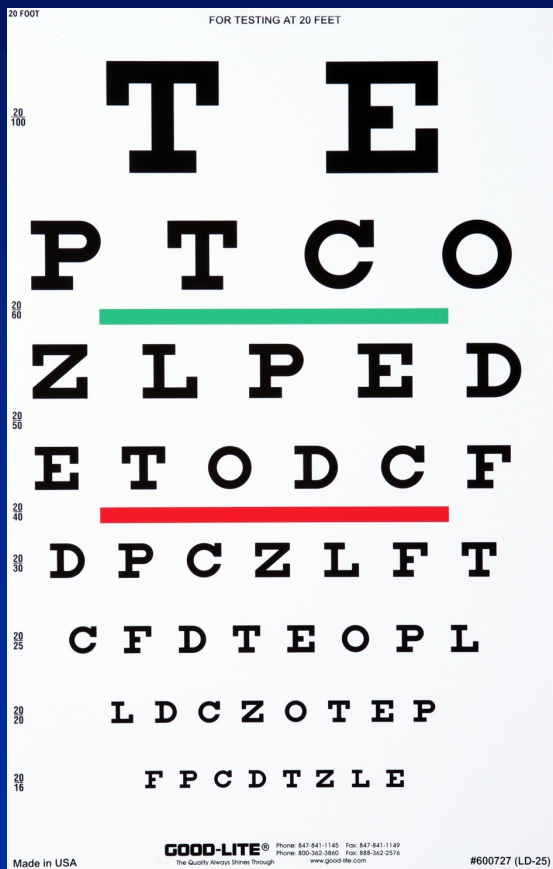


Good things about this chart

- Block font
- Five letters per line
- Proportional spacing between the letters and lines
- Inverted pyramid
- In the end, more accurate vision assessment



Avoid this worn out classic- Snellen



- Serifs
- Spacing not proportional to the letter size
- Variable # of figures per line

Optotype presentation



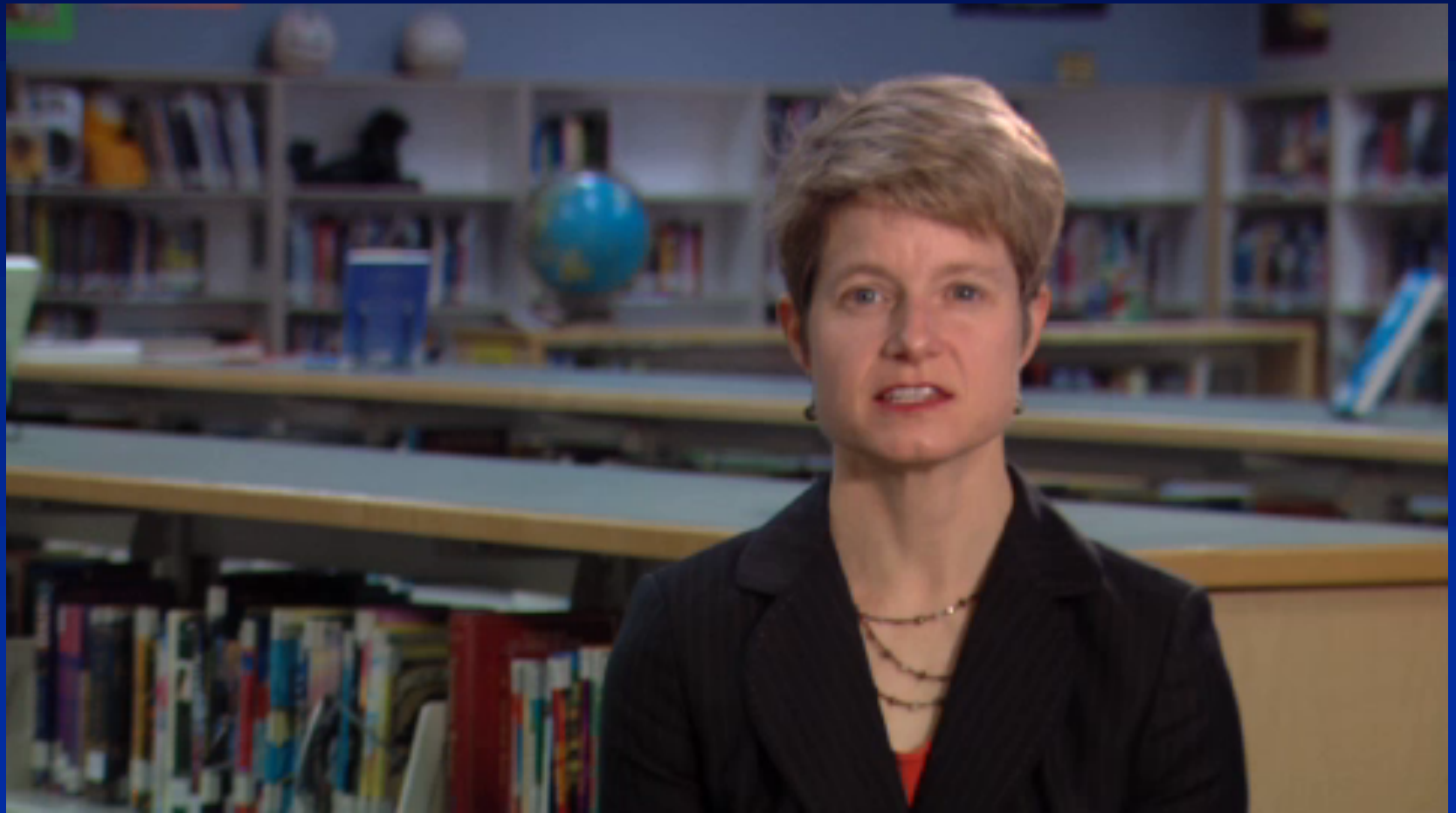
Pretest thoughts

- Which optotype is best?
- Does this child know how to do it?
- How can we make this fun?
- What do I need to do to get the best from this child?

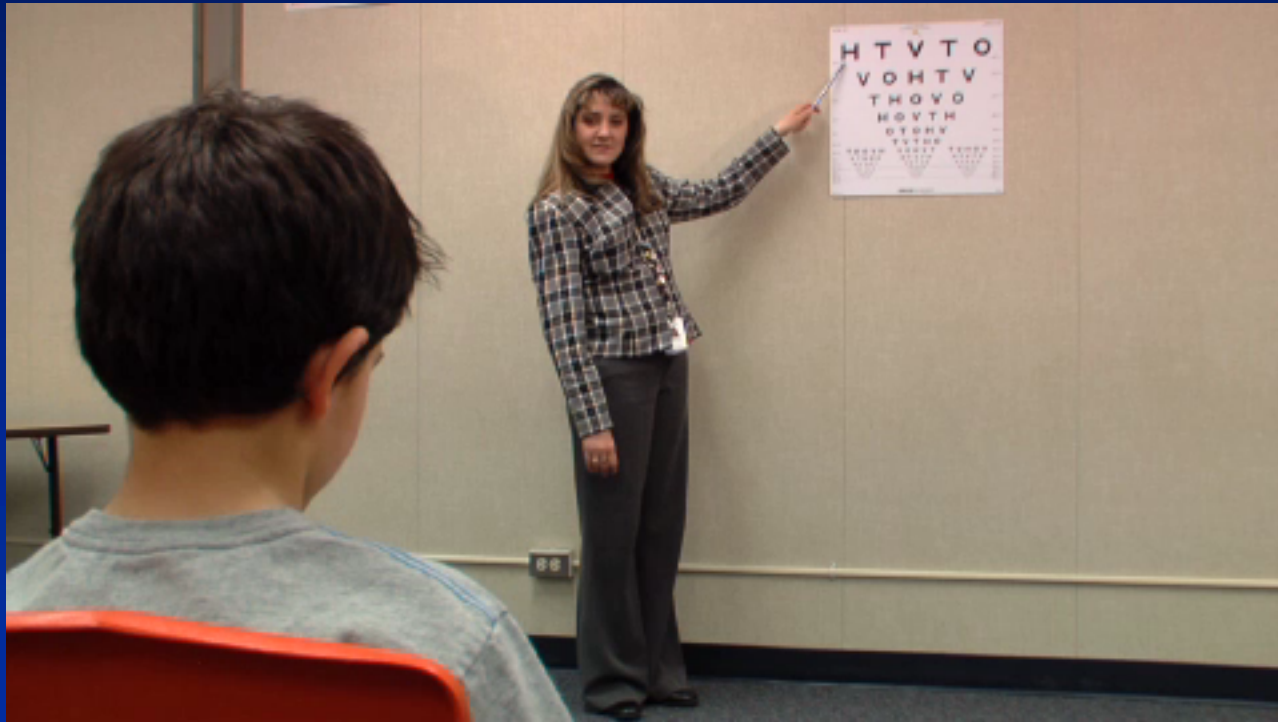
Warming the child up



One eye at a time please



Performance enhancers



Do your best until you get a better chart



AAP failure criteria

(Pass is $> \frac{1}{2}$ letters per line)

Age	Threshold	Intraocular difference
3 or 4 years	20/50 or worse	2 lines
5 years	20/40 or worse	2 lines
> 5 years	20/30 or worse	2 lines

Advantages of chart screening

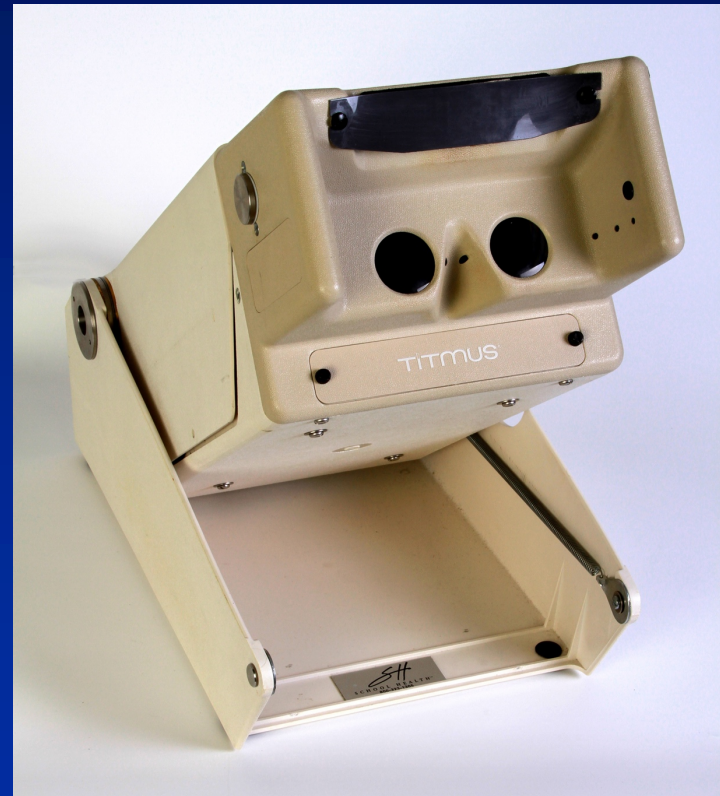
- Excellent data when well done
- Time tested and well studied
- Excellent charts available
- CHEAP

Disadvantages of chart screening

- Examiner must be competent
- Method must be decent
- Slow

Stereoscopic testing

- Several tests in one sitting
 - Vision
 - Alignment
 - Colors
 - Near
- Quick
- No patch needed



Stereoscopic devices have problems

- Challenging for little kids
- Poor symbol optotypes
- Over refers: Va and alignment
- Color plates poor
- Performance relative to standard eye charts not established

Retesting subjective vision screening failures

- Important to retest before referral
- Retest interval may be mandated
- Age < 4 years: retest within 4 months
- Age >4 years: retest within 1 month
- Retest on standard wall chart

Objective Vision Screening

- Does not provide a visual acuity
- Determines conditions that are amblyogenic
 - High or asymmetric refractive errors
 - Occlusion of visual axis
 - Strabismus
- Does not replace visual acuity screening with eye charts

How they work

- Photoscreeners obtain optical image of the red reflex
- Autorefractors use invisible wavelength of light to determine refractive error



Vision screening device in action



Vision screening devices referral criteria

- Referral criteria:
 - set by the manufacturer
 - Age dependent
 - Based on refractive error, difference between two eyes, misaligned or obstructed light reflexes
- Retesting: not needed if test well performed

Advantages of objective screening

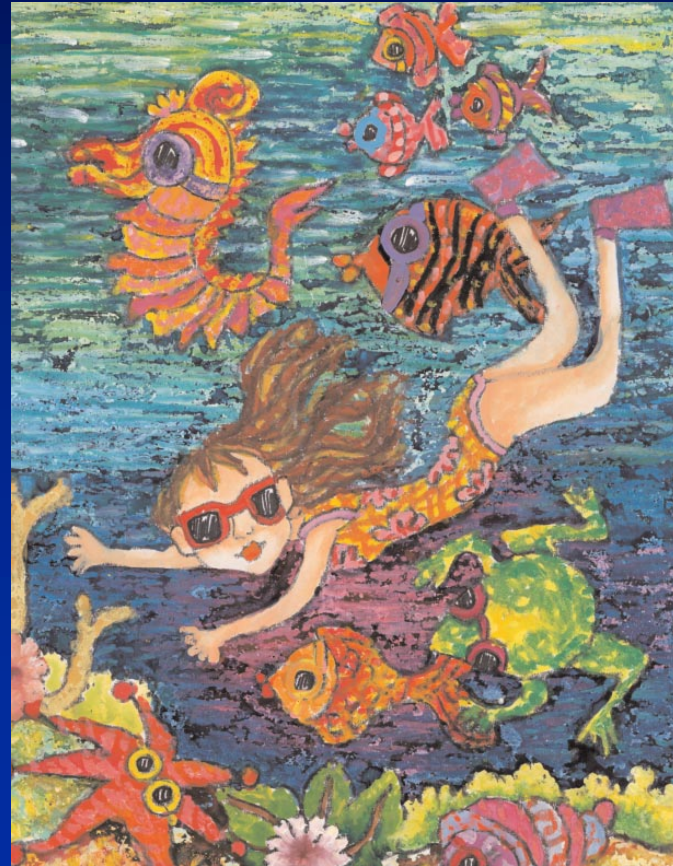
- Allows testing of kids who can't participate in subjective visual acuity testing
 - AAPOS recommends for < 5 years old
- QUICK
- Very accurate data

Disadvantages of objective screening

- Does not give a vision
- Results can be manufacturer and user dependent
- Expensive

Other elements in school vision screening

- Highly variable recommendations
- Single assessment is usually sufficient



Near vision testing

- Useful? Kids can accommodate
- +2.50 test can detect high hyperopia
 - 20/30 line at distance through +2.50 lenses
 - Can see it clearly if significantly hyperopic

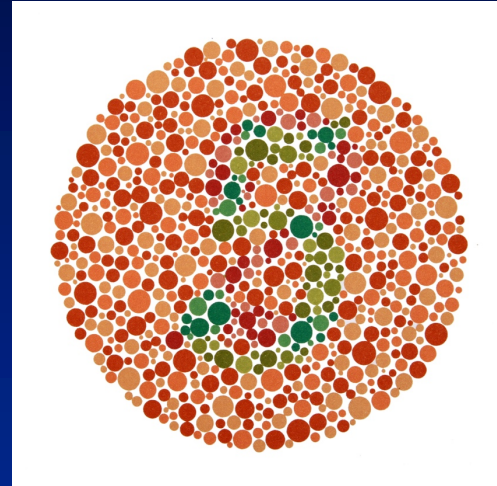
Depth perception testing

- Child views stereograms with “3D” glasses
- Useful?
 - VIP says no when combined with decent Va testing
- Time consuming?
 - YES



Color vision testing

- Teachers like it
- Pseudoisochromatic plates are the best
- Red green color deficiency affects 8% of boys



Special needs kids

- Don't be intimidated
- Tailor testing to child's level
- Objective vision screening can be very useful
- Some kids may not be testable- refer them

Learning disabilities

- Good eye exam essential
- No higher incidence eye disease
- Dyslexia is a brain problem not an eye problem
- **Learning Disabilities, Dyslexia, and Vision**
Pediatrics 2009;124;837-844; American Academy of Pediatrics, Section on Ophthalmology, Council on Children with Disabilities, American Academy of Ophthalmology, American Association for Pediatric Ophthalmology and Strabismus and American Association of Certified Orthoptists

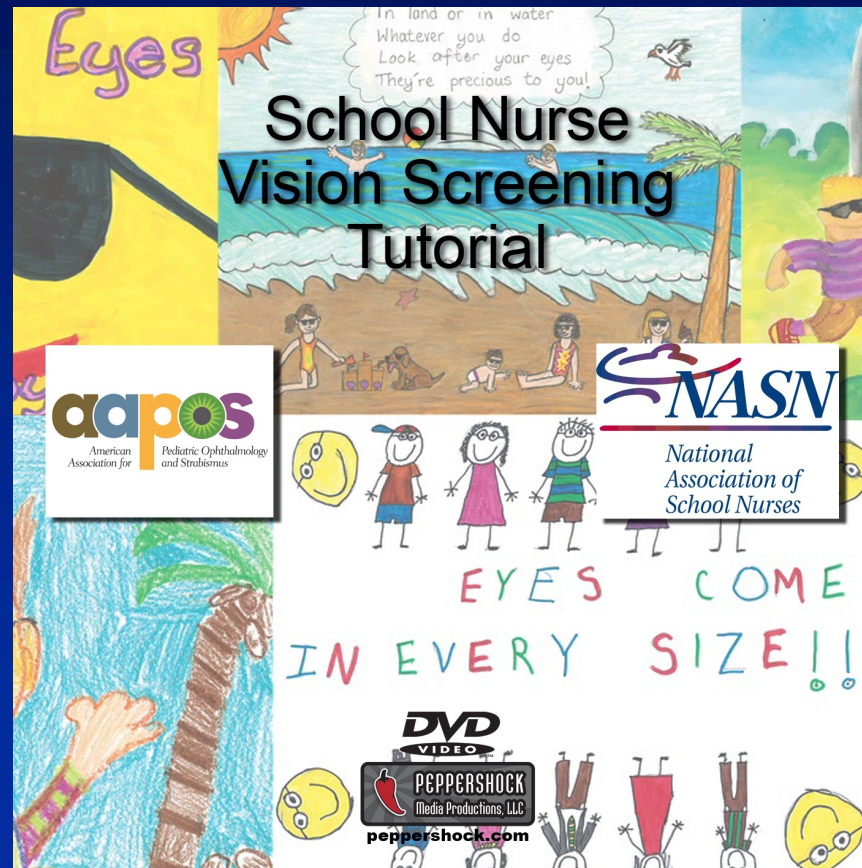
Convergence insufficiency

- Inability to cross eyes at near
- Convergence needed to read
- Can be improved through exercises
- Can cause double vision and reading fatigue
 - Not all reading fatigue is CI!!!

Dr. Susan Proctor



Online at AAPOS.org with link from [NASN](http://NASN.org)



THANKS

- NASN!!
 - Susan Proctor
 - Linda Kimel
 - JoAnn Blout
 - Helen Root
 - Sandi Delack
- AAPOS vision screening committee
- Good- Lite company
- Kid and nurse video stars