

“Functional Vision Assessment: What, When, Where, How!”

A PRCVI Professional Development Workshop with Darick Wright
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**A workshop for BC Teachers of Students with Visual Impairment
Hosted at PRCVI on Friday October 22, 2004 in Vancouver, BC.**

AGENDA:

Part One: What & When to Assess

- Quick review of Categories of Vision Loss
 - Reduced Visual Acuity
 - Central Visual Field Loss
 - Peripheral Visual Field Loss
 - Cortical Visual Impairment
- Preparing for the Assessment
 - Gathering a complete history
 - Tips for reading an eye report
 - Determining the Chief Concern(s)
- Predicting Functional Difficulties
 - Use of Functional Implications Worksheet to predict potential functional difficulties
- Components of FVA

Learning Objectives

Participants will be able to

- Identify the functional difficulties associated with each category of vision loss and list potential modifications for each category.
- Make general predictions of visual function based on clinical information.
- Identify the components of a FVA identified in Corn & Koenig's Foundations of Low Vision: AFB Press.

Part Two: Where & How to Assess

- Conducting the Assessment
 - Scheduling the assessment
 - Organizing the components
 - Observation vs. Pull-out
- Assessment Methods
 - Functional visual acuities (distance + near)
 - Confrontational Visual Field Testing
 - Fixation, Scanning, & Tracking
 - Screening for color discrimination
- Writing the Report
 - Documenting your findings

Learning Objectives

Participants will:

- Learn to organize assessment components based on chief concerns & their predictions of functional difficulties
- Use vision simulators to learn methods of assessing functional visual acuities, peripheral visual field testing, visual skills, color screening.
- Be introduced to a report format that can be used to document a functional vision assessment.

Functional Vision Assessment

22 October 2004

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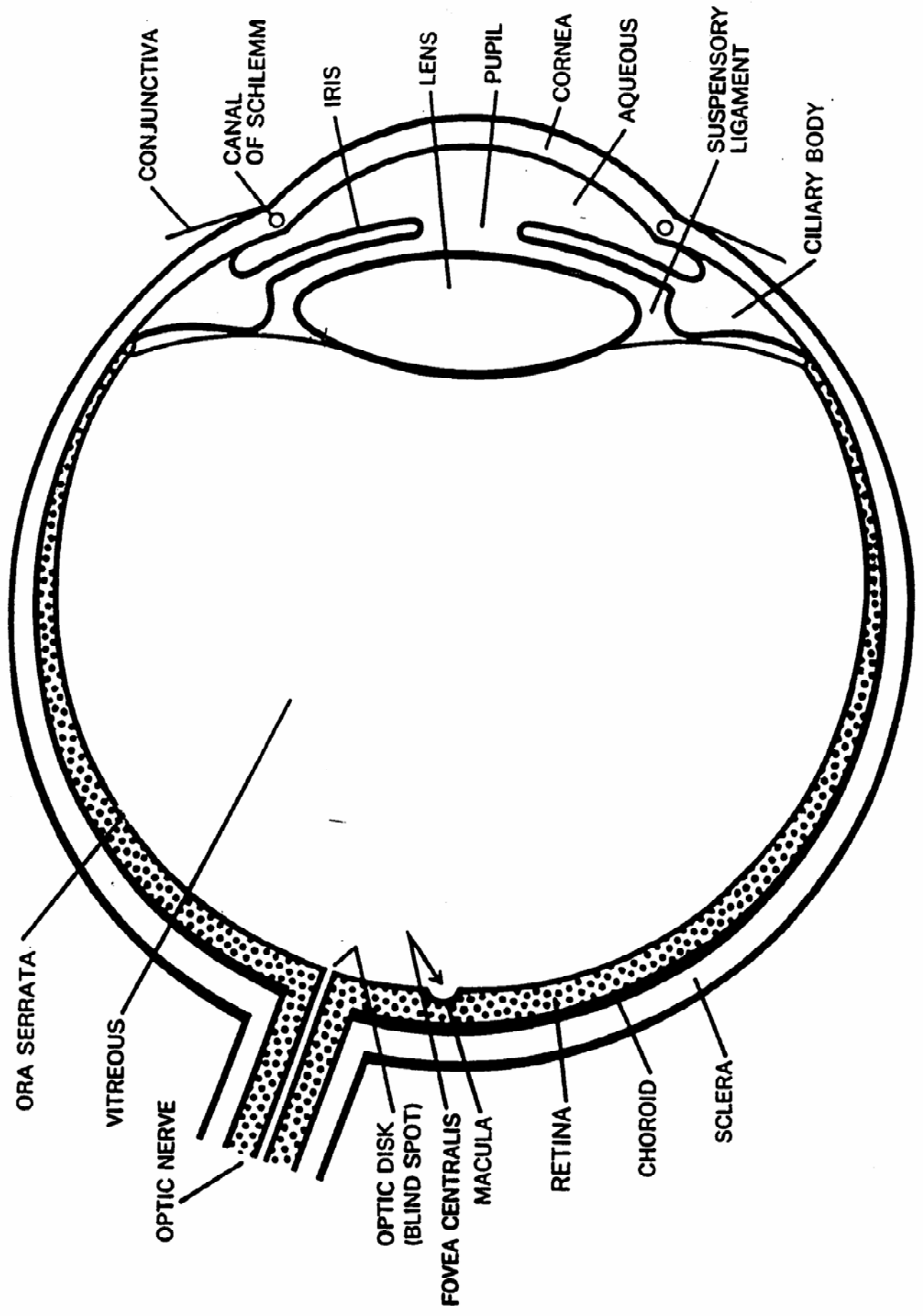
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Documents Enclosed:
Workshop Handouts
Functional Implications Worksheets
Visual Skills Lab sheets

To be used in conjunction with above documents:
FVA Presentation Slide Show*

*The FVA slide show does not include the case study video clips and photographs included in the workshop presentation due to international copyright concerns. However, we hope the text examples will still provide useful guidance in the preparation for, administration and reporting of a low vision assessment for those who were unable to attend the workshop.

- Eye Anatomy & Disease
- Anticipating the Impact on Function
- Develop an Assessment Plan
- Observational Skills
- Document Findings
- Write the Report



Categories of Vision Loss

- Reduced Visual Acuity
- Peripheral Field Loss
- Central Field Loss
- Cortical Impairment
- Combination

Functional Implications Worksheet

Disease/Condition:

Etiology (cause):

Portion(s) of anatomy affected:

Category of Vision Loss:

- Reduced Visual Acuity
- Peripheral Field Loss
- Central Field Loss
- Cortical Visual Impairment
- Combination

Resulting effect on vision:

1.

2.

3.

SAMPLE

Functional Implications Worksheet

Disease/Condition: Dry Eyes

Etiology (cause):

- Blocked Meibomian gland causing poor tear film quality (lipid/mucus layers)
- Reduced tear production (lacrimal gland dysfunction)

Portion(s) of anatomy affected:

- Cornea
- Lacrimal Gland
- Meibomian Gland

Category of Vision Loss:

- **Overall Blur (reduced visual acuity)**
- Central Visual Field Loss
- Peripheral visual Field Loss
- Cortical Visual Impairment
- Combination Loss

Resulting effect on vision:

1. Corneal Edema (swelling) causing a blurred image and glare
2. Dry Cornea (causes discomfort)
3. Tear film evaporates unequally causing an uneven surface and interfering with refractive ability (blurred/distorted image)

Functional Implications Worksheet

Disease/Condition: Cataracts

Etiology (cause):

- Congenital
- Trauma
- Age

Portion(s) of anatomy affected:

Category of Vision Loss:

- Reduced Visual Acuity
- Peripheral Field Loss
- Central Field Loss
- Cortical Visual Impairment
- Combination

Resulting effect on vision:

1.

2.

3.

Functional Implications Worksheet

Disease/Condition: Oculocutaneous Albinism

Etiology (cause):

- Genetic

Portion(s) of anatomy affected:

Category of Vision Loss:

- Reduced Visual Acuity
- Peripheral Field Loss
- Central Field Loss
- Cortical Visual Impairment
- Combination

Resulting effect on vision:

1.

2.

3.

Functional Implications Worksheet

Disease/Condition: Optic Nerve Hypoplasia,
OD: Amblyopia, Exotropia

Etiology (cause):

- Congenital Anomaly
- Sensory deprivation (amblyopia)

Portion(s) of anatomy affected:

Category of Vision Loss:

- Reduced Visual Acuity
- Peripheral Field Loss
- Central Field Loss
- Cortical Visual Impairment
- Combination

Resulting effect on vision:

1.

2.

3.

COMPONENTS OF A FUNCTIONAL VISION ASSESSMENT

(Erin & Paul, chapter 9, Foundations of Low Vision)

HISTORY

- Medical/Visual history
- Education/Rehabilitation history
- Goals (expectations) of patient & other TEAM members
- Daily Routine
- Chief Complaint/Primary Concern

OBSERVATION/ASSESSMENT OF NATURAL ENVIRONMENT

- Illumination
- Contrast
- Visual complexity
- Safety

STRUCTURE OF THE EYE AND REFLEXES

- General external eye appearance

NEAR VISION

- Formal and functional near visual acuities

DISTANCE VISION

- Functional distance visual acuities

VISUAL FIELDS (informal)

- Peripheral
- Central

COLOR DISCRIMINATION

- Screening using basic primary and secondary colors

OCULAR MOTILITY

- Eye alignment
- Fixation
- Convergence
- Saccades (shift attention)
- Tracking
- Scanning

RECOMMENDATIONS

Patrick

Questions

- Which category or categories of visual impairment can be applied?
- How might a reduction of scotopic sensitivity impact visual function?
- Why would he be prescribed photochromatic lenses?
- How might his hearing loss affect his vision and visa versa?
- What potential visual difficulties might this person experience?
- How would you sequence your assessment? Why?

Background

10 year-old boy enrolled in local public school

Primary Concerns

Identification of modifications at school. Parents have been told he does not have “color vision”.

Visual Diagnosis

Retinitis Pigmentosa. Significant reduction in scotopic sensitivity.

Visual acuities: OU 20/20 using HOTV with correction. Without correction, OD 20/30 +2, OS 20/25 +1.

Patrick wears his glasses with photochromatic lenses full-time.

Additional Disabilities/Services

Bilateral sensory-neural hearing loss. Patrick uses hearing aids, FM system, and Signed English Interpreter. He is provided with enlarged print, and preferential seating in class. He does not receive vision related services.

CATEGORY OF VISUAL IMPAIRMENT: Peripheral Visual Field Loss?

POTENTIAL VISUAL DIFFICULTIES:

- Ocular motility
- Light/dark adaptation
- Illumination
- Glare
- Visual access to communication
- Spatial Orientation

ASSESSMENT SEQUENCE:

- General observation/environmental assessment
- Functional distance acuities
- Pull-out for near acuities
- Ocular motility
- Visual fields
- Color
- Observation during recess outside

ASSESSMENT

General observation/environmental assessment: illumination provided by combination overhead florescent and natural light regulated by pull-down style shades. His desk is positioned with the windows behind him. Whiteboards are used at a distance of 10 feet from his desk. Illumination in student's storage (cubby) area not adequate. Tabletops in classrooms and library are dark, solid color with contrasting wood edge. Stair nosings are not marked. High contrast between floor/walls/doorframes present.

Distance visual Acuities: Patrick could identify and copy ½ sized letters, numbers, words from the whiteboard at 10 feet. He required verbal prompting to scan for additional objects placed several inches apart or when organized in a horizontal/vertical pattern on the whiteboard.

Near visual acuities: .5M isolated letters @ 16 inches using reduced ETDRS. Could identify 1/8 inch size figures in a book with high degree of visual clutter.

Ocular motility: fix at near. Difficulty maintaining smooth eye movements horizontally when following a slow moving target. Full movements in all gaze positions.

Visual fields: confrontational field testing, peripheral field appear full, but further clinical testing recommended

Color: Patrick could identify and name the colors yellow, orange, and red. Unable to assess further due to time constraints. Should be evaluated at future exam.

Observation outside: no problem moving from indoors to very bright outdoor environment and visa versa. Glasses worked well for him with no reported problems. Moved confidently and safely in and out of dark areas of playground without incident.

RECOMMENDATIONS:

- periodic consultation with certified Teacher of the Visually Impaired or certified Low Vision Therapist to monitor visual needs/abilities and provide support to parents/school.
- Clinical low vision examination that includes: visual perceptual testing, visual skills, and visual fields
- Use of masking device to isolate a portion of page when space is visually cluttered
- Increased contrast between objects using illumination and color.
- Preferential seating closer to instructional area to encourage visual attention and decrease visual clutter.
- Avoidance from glare is critical
- Preferential assignment in storage area “cubbies” to immediately beside opening for ease of location and to take advantage of ambient light.
- All stair nosings marked with contrasting color.

Wendy

Questions

- Which category or categories of visual impairment can be applied?
- What are the potential visual difficulties this person may experience?
- What do the visual acuities tell you about function?
- What assessment sequence may be used? Why?

Background

2.5 year-old girl, enrolled in an integrated preschool.

Primary Concerns

To understand more about her vision. No specific concerns from parents.

Teacher reports behavior issues, light gazing, no expressive speech, not sure if glasses help.

Visual Diagnosis

OD: Aphakia (secondary to cataract), slight exotropia. OS: myopia with pendular nystagmus.

Visual acuities: OD 20/190, OS 20/130, OU 20/130 Teller.

Wendy wears glasses for near vision, and her left eye is patched 4-5 hours daily.

Additional Disabilities/Services

Down's Syndrome, global developmental delays, receiving OT, PT, Speech 2X/week.

CATEGORY: Overall Blur

POTENTIAL VISUAL DIFFICULTIES:

Difficulty seeing details at all distances
(Aphakia/myopia/nystagmus)

Fixation

Head turn/position (left eye dominant)

Depth perception (functionally monocular)

Eye-hand coordination

Glare

ASSESSMENT SEQUENCE

Environmental assessment & general observation

Functional visual acuities (near/intermediate/far)

Ocular motility

Eye-hand coordination

Visual fields

Independent movement (indoors)

ASSESSMENT:

Environmental assessment: OVHD florescent with natural light from large tinted windows. Flooring is light colored tile with dark colored carpeted areas. Many high contrast, brightly colored toys are placed on shelves and floor. Wendy prefers to sit in sunlit spot on carpet with toys places around her. Her body position is slumped forward, head to chest, but can/does raise head to visually search for/examine objects.

Near acuities: aware of people, toys around her. Able to visually locate ¼ inch size objects (food) at 16 inches.

Intermediate/far acuities: visually locate 3 inch ball at 2 feet and other brightly colored objects on table top or floor. Does not visually attend to objects at distances greater than 2-3 feet.

Ocular Motility: could fixate and follow (track) a slow moving object in all gaze positions, but most responsive to objects placed

in primary position. She could maintain fixation without auditory prompt up to 16 inches from body when given a motivating/high color contrast object.

Eye-hand coordination: she could accurately reach for objects placed in all positions within 2-3 feet. Performed best with auditory prompting.

Visual Fields: Did not react to people or objects in periphery unless given auditory/tactile cue.

Based on the information provided, write your recommendations.

RECOMMENDATIONS

Luis

Background

12 year-old boy enrolled in local public school. Recently moved into area, no vision services in place.

Primary Concerns

To better understand his vision.

Teachers expressed concern regarding his reading/writing skills. Penmanship is “sloppy” and cannot read his own handwriting. Luis does not accept enlarged print.

Visual diagnosis

Mild ocular albinism with congenital nystagmus, and moderate hyperopic astigmatism

Visual Acuities: OU 20/200

Luis wears glasses and has a prescription of:

OD +0.50 +1.75 x 85

OS +0.75 +2.95

With a +3.5 progressive bifocal

Additional Disabilities/Services

None Noted

Answer the following questions about Luis based on the information provided.

1. Which category or categories of visual impairment can be applied?
2. How might his eyeglasses be affecting his ability to read/write?
3. Why is Luis refusing to use enlarged print?
4. How would you sequence your assessment? Why?

CONSIDERATIONS WHEN CONSTRUCTING A FUNCTIONAL VISION ASSESSMENT KIT

- **Age Group (population)**
What is the general age of the individuals?
Additional disabilities?
- **What will you be observing/testing?**
How specialized is your assessment?
(see components of FVA)
- **Supplement kit with familiar objects**
Use real, familiar objects that the person uses everyday
- **Each object in kit should have multiple uses**
- **Portability of container**
Do all of the materials fit inside one container?
Is it easily carried?
- **Organization of materials**
Can items in the container be easily located?
Is there space for files or forms?



Text Resources

Cassin & Solomon (1997) Dictionary of Eye Terminology, 4th edition, Triad Publishing Co.: Gainesville, Florida.

Cassel, G., Billig, M., et al (1998) The Eye Book: A complete guide to eye disorders and health. Johns Hopkins University Press: Baltimore, Maryland.

Program in Low Vision Therapy (2004) Region IV Education Service Center: Houston, Texas.
To Order: 713-744-6324/6315

Corn, A., & Koenig, A.J. (1996). Foundations of Low Vision: Clinical and Functional Perspectives. AFB Press: New York, NY.

Moore, B.D. (1997). Eye care for infants & young children. Butterworth-Heinemann: Woburn, MA

Duffy, M. (2002) Making Life More Livable: Simple adaptations for living at home after vision loss. AFB Press: New York.

Levack, N. (1991) Low Vision: A resource guide with adaptations for students with visual impairments: Austin, Texas: Texas School for the Blind and Visually Impaired.

Brilliant, R. L. (1999) Essentials of Low Vision Practice. Butterworth-Heinemann: Woburn, Massachusetts.

Brown, B. (1997) The Low Vision Handbook. SLACK Inc.: New Jersey

D'Andrea, M. & Farrenkopf, C. eds. (2000) Looking to Learn: Promoting Literacy for Students with Low Vision. AFB Press: New York

Web Resources

Anatomy & Medical Sites

Canadian Association of Optometrists

<http://www.opto.ca/>

Informational site with Provincial listings of Optometrists. From the homepage, go to OPTOMETRY, then FINDING AN OPTOMETRIST, and click on the PROVINCIAL ASSOCIATION you need.

PubMed

<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?holding=necolib>

PubMed, a service of the National Library of Medicine, includes over 15 million citations for biomedical articles back to the 1950's. These citations are from MEDLINE and additional life science journals. PubMed includes links to many sites providing full text articles and other related resources.

Anatomy, Physiology & Pathology of the Human Eye

http://www.tedmontgomery.com/the_eye/

St. Lukes Eye

<http://www.stlukeseye.com/anatomy.asp>

A good site for basic anatomy with a short quiz

Medline Plus

<http://medlineplus.gov/>

A general health site. Contains a medical dictionary and basic encyclopaedia. For eye information go to Health Topics, then eye diseases.

Macula.org

<http://www.macula.org/anatomy/index.html>

More anatomy and short video

Marchon Eyewear – basic optics

<http://www.marchon.com/index.html>

Once on this site, select "professional courses" and look through OPTICS OF LIGHT AND VISION.

One Small Voice Foundation – Optic Nerve Hypoplasia

<http://www.onesmallvoicefoundation.org/whatisonh.html>

About Brain Injury

<http://www.waiting.com/brainfunction.html>

General information about function/role of various parts of the human brain.

Eye Movement Simulator

<http://cim.ucdavis.edu/EyeRelease/Interface/TopFrame.htm>

Low Vision & General Blindness Information

Vision Connection

<http://www.visionconnection.org/VisionConnection/default.htm?cookie%5Ftest=1>

General information site for individuals, families, professionals

American Foundation for the Blind

<http://www.afb.org/>

Texas School for the Blind and Visually Impaired

<http://www.tsbvi.edu/>

Lighthouse International

<http://www.lighthouse.org/>

Appendix: Lab Sheets

Visual Acuities

Visual Fields

Visual Skills

Extra-Ocular Movements (EOM's)

NAME:

Lab Sheet: Visual Acuities

For this activity you will need:

- Low vision simulators
- Measuring tape
- Objects of various sizes
- A desk lamp
- The near visual acuity card from your packet

FUNCTIONAL VISUAL ACUITY

Determine your partner's functional distance acuity

(object size) (distance)
OD:
OS:
OU:

Determine your partners functional near visual acuity

(object size) (distance)
OD:
OS:
OU:

Determine your partners near visual acuity using a near acuity card

(symbol/letter size) @ 40cm (16 inches)
OD:
OS:
OU:

Chart(s) used:

(symbol/letter size) @ Preferred Distance
OD:
OS:
OU:

Chart(s) used:

Does the level of illumination change your findings? How?

Did the type of chart change your findings? If so, why?

Did the type of simulator change your findings? What was different?

Summarize your findings in two brief paragraphs, one for distance acuities and one for near acuities.

Were they able to perform all aspects of this task easily?

If not, what would enable them to perform better?

Write those recommendations here:

NAME:

Lab Sheet: Visual Field Testing

For this activity you will need:

- Vision simulators (constricted peripheral fields, reduced visual acuity)
- Fixation target of various sizes on a stick or end of coat hanger.
- Areas of dim and bright illumination

PERIPHERAL VISUAL FIELDS

Both with and without a simulator, conduct a confrontational visual field test on your partner and record your results. Use the terms: Full, superior/inferior/temporal/nasal constriction.

Without Simulation

OD:

OS:

OU:

With Simulation

OD:

OS:

OU:

What difference does the level of illumination make on your findings?

What difference does the size of target make on your findings?

What instrument would be used to measure visual fields in a clinical exam?

Summarize your findings in a brief paragraph:

Were they able to perform all aspects of this task easily?

If not, what would enable them to perform better?

Write those recommendations here:

NAME:

Lab Sheet: Visual Skills - EOM's

For this activity you will need:

- A variety of fixation targets, including a penlight
- Peripheral visual field loss simulator

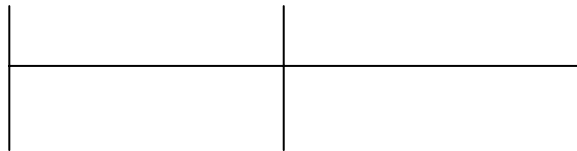
EXTRA-OCULAR MOVEMENTS (EOM's)

Without a simulator, evaluate your partner's eye movements using a variety of fixation targets. First determine if they can **FIXATE** on the target in all positions of gaze, then evaluate their ability to **FOLLOW** the target. Record your results using the terms Fix & Follow, Smooth, Accurate, Full

OD:

OS:

OU:



What type of target would you use for an adult/child?

Does the size of target make a difference?

Try again using the peripheral field loss simulator. NOTE: The person must use whole head movements when using this simulator.

What happens when the target is moved very slowly? Very quickly?

Without a simulator, evaluate your partner's ability to **visually track** horizontally/vertically, near/far.

Did they use: Whole head movement independent eye movements

Without a simulator, evaluate your partner's ability to visually **trace** and **scan**.

Trace: whole head movement independent eye movement

Scan horizontally: whole head movement independent eye movement

Scan vertically: whole head movement independent eye movement

What real-life tasks might demonstrate these abilities?

Could you incorporate observation of these tasks into your functional vision assessment?

Summarize your findings in a brief paragraph: (make sure to note the object(s) that you used as a target)

Were they able to perform all aspects of this task easily?

If not, what would enable them to perform better?

Write those recommendations here:

Notes:
