Maximizing the Potential of Learners with CVI

Slide 1: Title Slide

Maximizing the potential of learners with CVI
- Adam P. Wilton, PhD, Manager, PRCVI

awilton@prcvi.org
- Kim T Zebehazy, PHD, Associate Professor, UBC

Kim.zebehazy@ubc.ca

Slide 2: Truth or Myth?
Students with CVI by definition do not have any form of ocular visual impairment.
MYTH!
CVI is commonly associated with refractive error (e.g., near sightedness) and accommodation issues (focusing near and far). It can also coexist with various ocular visual impairments (e.g., retinopathy of prematurity).

Slide 3: Truth or Myth?
The visual functioning of students with CVI will vary based on environment and individual factors.
TRUTH!
Similar to ocular conditions in this way, students with CVI can optimize their visual functioning if we are conscientious on how we structure the environment and the instructional strategies we use. Time of day and other factors can also affect functioning.

Slide 4: Truth or Myth?
Most students with CVI show persistent preference for red and/or yellow visual targets.
MYTH!
While this may be true for some learners, it is equally plausible that students with have other colour preferences or may be more attuned to colour contrast. Some students, over time, may also no longer exhibit colour preferences.

Slide 5: Truth or Myth?
For some students with CVI, light gazing represents meaningful visual information gathering.

MYTH!

Light gazing is informative to the professional, but it does not represent meaningful visual information gathering. Some may be light gazing to attend to other sensory information, while others may simply be seeking sensory stimulation.

Slide 6: Truth or Myth?

The visual developmental sequence for children with CVI is qualitatively different from that seen in children with typical vision and those with ocular impairment.

TRUTH!

Ocular visual impairment is an impairment of sensation while CVI has implications across multiple domains of cognitive functioning.

Slide 7: CVI Basics

Terminology: Cortical visual impairment vs. cerebral visual impairment

CVI is often connected with other conditions:

> Cerebral Palsy
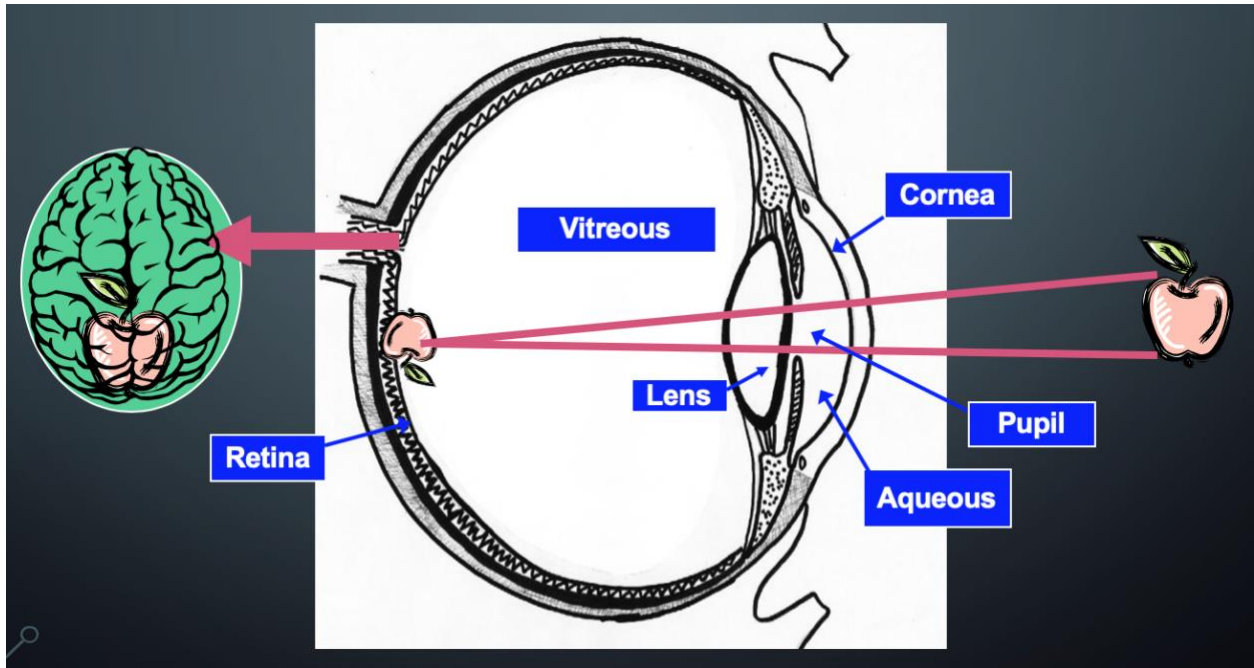> ADHD
> Hydrocephalus
> Periventricular white matter injury
> Meningitis and encephalitis
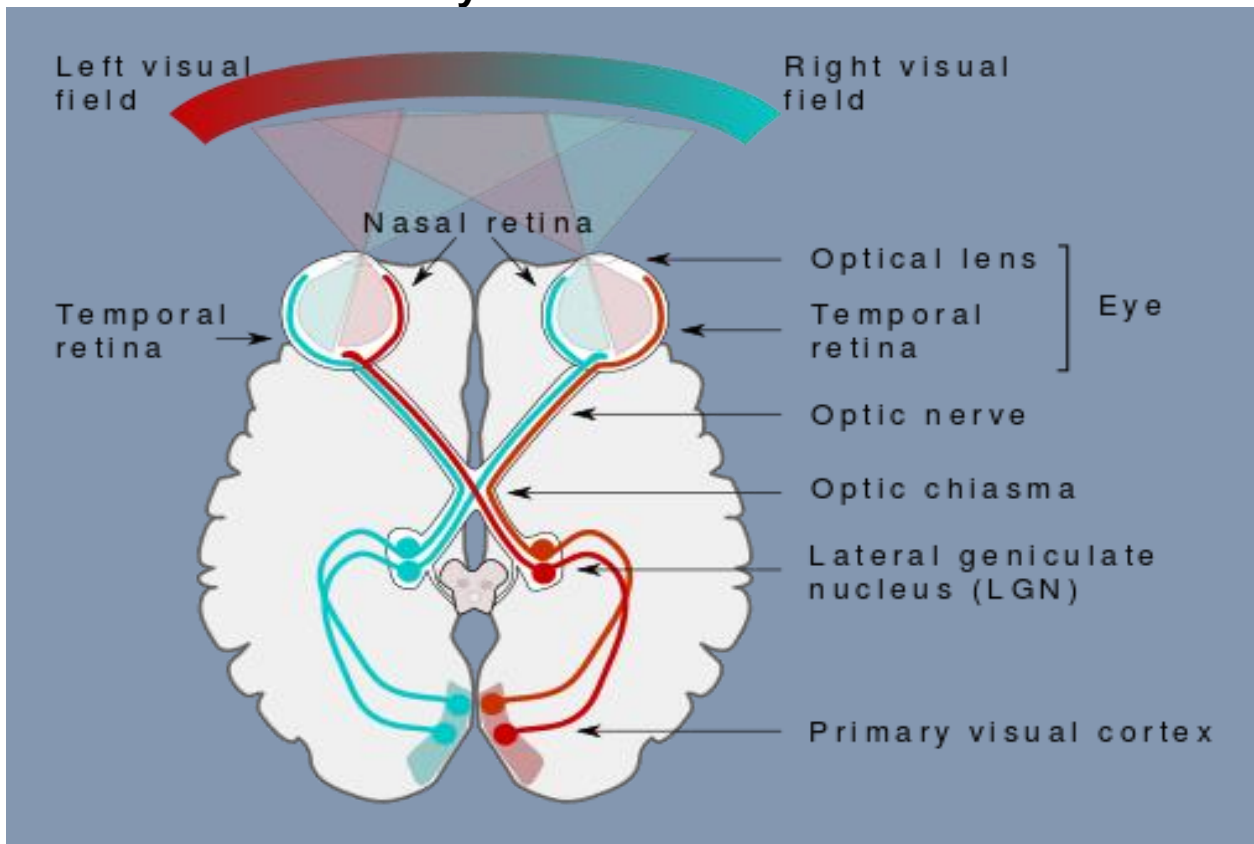> Chromosomal and genetic disorders
> Hypoxic ischemic encephalopathy

CVI is the leading cause of visual impairment in high income nations and is increasing in low income nations
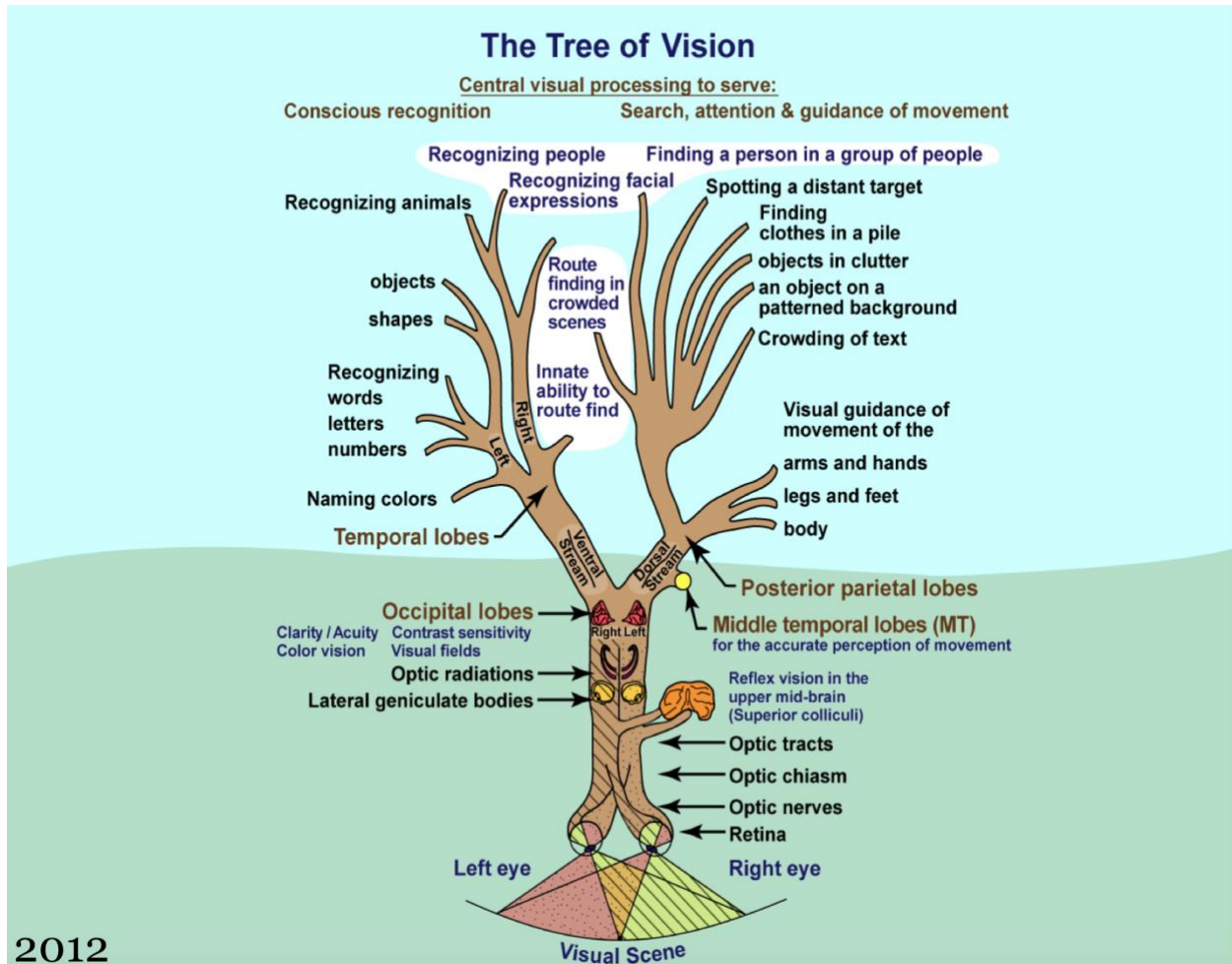
Slide 8: Process of Seeing
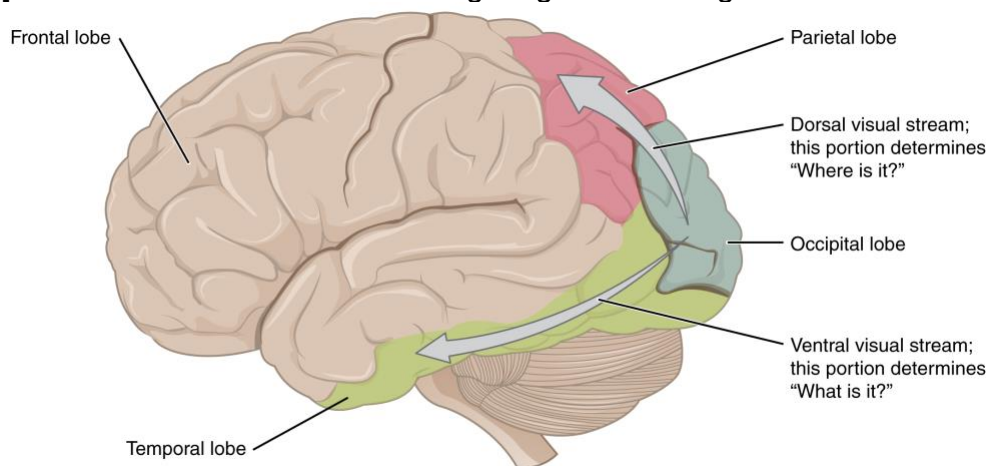
Slide 9: Visual Pathways

Slide 10: The Tree of Vision

[Slides 11-13 include the following diagram showing the lobes of the brain]

Slide 11: Impacts on Vision - Occipital Lobes

Left	Right	Both
• Lack of visual field on right side (both eyes)	• Lack of visual field on left side (both eyes)	• Central visual functions • Acuity • Contrast • Colour • Constricted visual field on both sides

Slide 12: Impacts on Vision - Parietal Lobes

Left	Right	Both
• Lack of visual attention on right side (e.g., bumping into people/ objects) • Reduced accuracy of visually guided movement on the right • Difficulties with spoken or written language	• Lack of visual attention on left side (e.g., bumping into people/ objects)	• Inability to see more than one or two items in a visual scene • Inability to use vision to guide movement with accuracy • Inability to give attention to one or two things at once • Inability to shift gaze between targets • Lack of ability to see moving targets • Lack of lower visual field below horizontal midline

Slide 13: Impacts on Vision - Temporal Lobes

Left	Right	Both
• Impaired object recognition	• Impaired face recognition	• Combination of left and right parietal lobe impairments

• Impaired shape recognition • Difficulty learning the shape of letters (alexia)	• Impaired ability to see meaning in facial expressions • Difficulty being orientated and navigating known environments	• Difficulty knowing the length and orientation of lines and size of objects • Impaired visual memory

Slide 14: Medical Reports on CVI

"At today's visit, Alec was able to identify at 6.8 cycles per degree (20/89)"

"Smooth pursuit was saccadic. When presented when 2 targets, she could alternate between them. I had difficulties eliciting optokinetic nystagmus."

"At 20/200, she has a 10 fold difference compared to her peers. As a result, information has to be presented 10 times closer or 10 times larger for her to see the same details."

Slide 15: Functional Vision Assessment (FVA)

Ophthalmological reports are conducted under clinical conditions in short time spans and tend to focus on data to guide subsequent medical intervention.

FVAs are conducted by a qualified teacher of students with visual impairments (TSVI) in order to:

Translate data from the medical report into information that can guide educational programming

Assess how the student uses vision in everyday school environments

Connect functional data to team-driven decision-making processes (e.g., Assistive Technology)

Corn Model of Visual Functioning

Slide 18: Corn Model of Visual Functioning

Visual Abilities

- Acuity
- Visual Fields
- Light and Color Perception
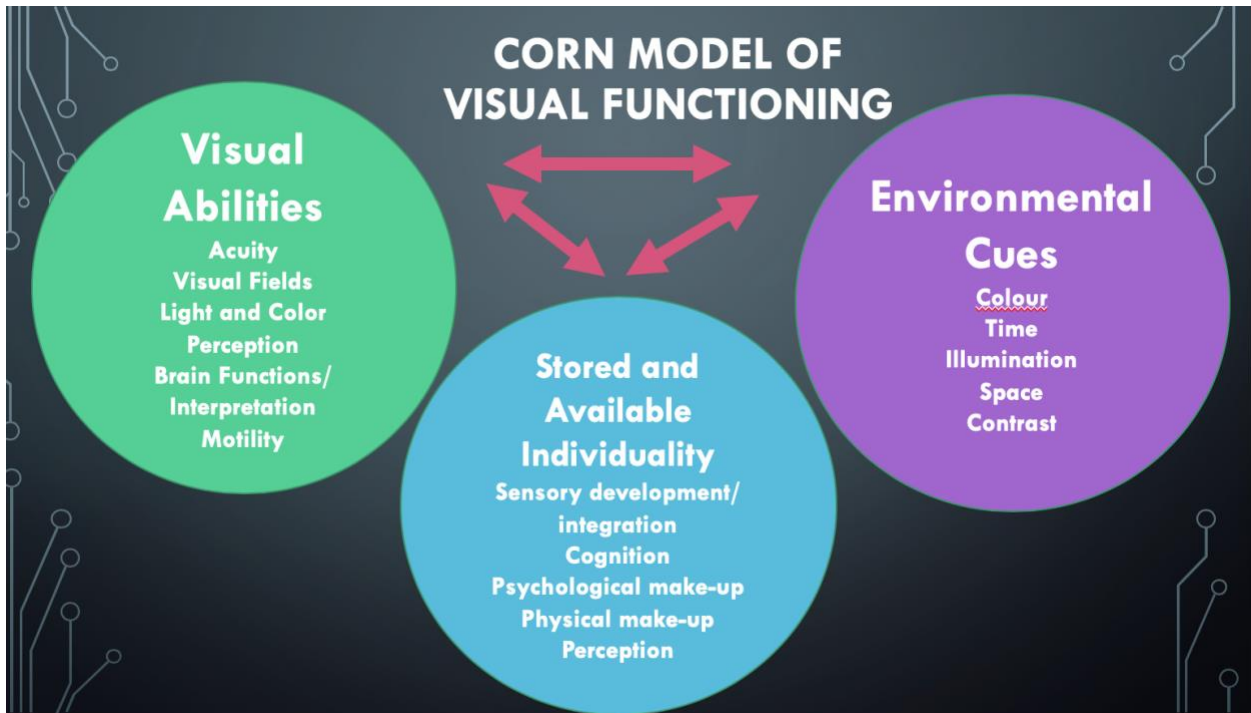- Brain Functions/ Interpretation

- Motility

Stored and Available Individuality
- Sensory development/ integration
- Cognition
- Psychological make-up
- Physical make-up
- Perception

Environmental Cues
- Colour
- Time
- Illumination
- Space
- Contrast

Slide 17: Example FVA assessment tasks for CVI

Searching for the same visual target while increasing the complexity of the visual background

    Visual abilities: acuity, perception, visually guided reach (to point/select)

    Environmental: Space, contrast, colour

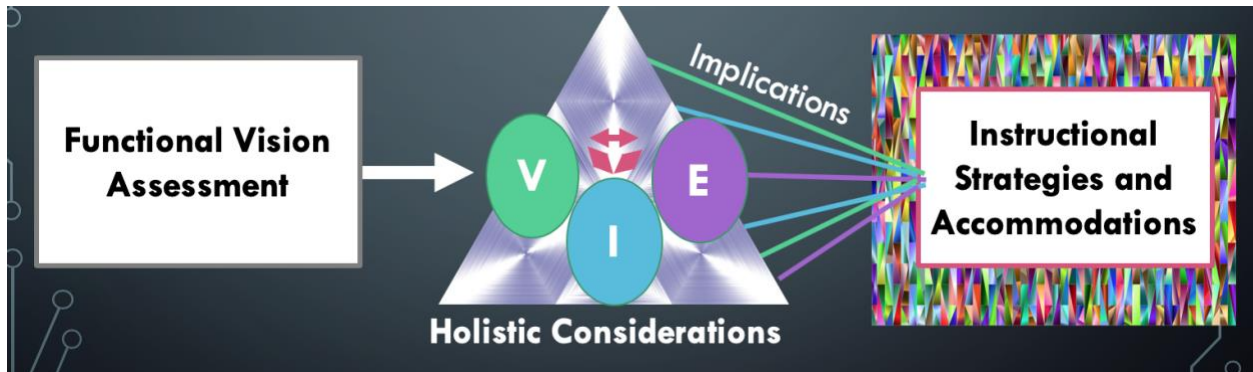   Stored and Available Individuality: cognition, physical ability(to point)

Confrontational field test

    Visual Abilities: visual fields, fixation

    Environmental: contrast, colour, time

Stored and Available Individuality: physical ability, cognition

Slide 18: Process

Slide 19: Instructional Strategies
- Wait time (latency, visual attention)
- Visual enlargement and enhancement (central vision)
- Size and placement (visual field)
- Control of complexity (perception, recognition, visually guided movement)
- Richness and depth of experience (recognition)

Slide 20: Wait Time (Latency)
Determining a long enough pause for student to respond without disrupting the student's processing

Match speed of working with the speed the student is reacting

KISS- Keep it slow and simple

Spoken words should be consistently matched to and immediately follow the experience of the student in real time.

Speech clearly articulated and matched to a speed that leads the student to maintain attention

Consistent vocabulary/symbol use

May also be determined by task demands (in addition to quality/timing of input)

Slide 21: Visual Enlargement and Enhancement

Slide 22: Visual Enlargement and Enhancement

Purposeful use of colour, light, or contrast

Avoid the "Ronald McDonald" extravaganza!

Light gazers: redirect to purposeful looking (e.g., lightbox activities)

Consider whether just 'enlarging' is too complex. Simplifying and enlarging is may be more impactful

Depending on field loss or attention to fields, enlargement may not be the solution

Slide 23: Size and Placement
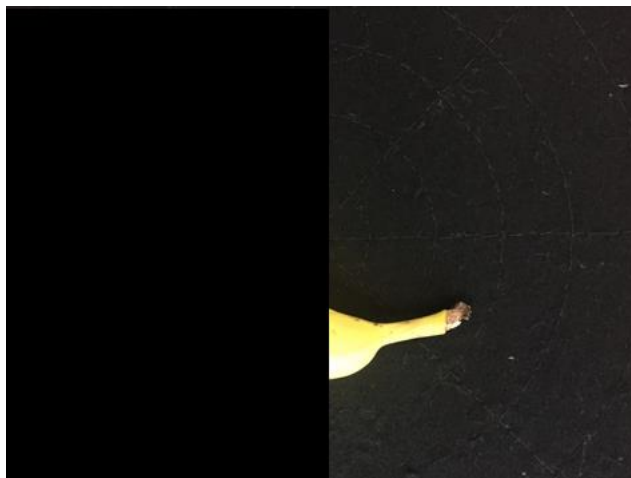
Slide 24: Size and Placement

Fields - loss vs. preference vs. attention is an important distinction for instructional strategies

Positioning may be just as/more helpful than enlargement for some students, depending on visual acuity, environmental factors, etc. (holistic considerations)

Present learning materials in the student's strongest field for learning

TSVI-guided program to promote functional vision strategies may encourage use of less emphasized visual field

Slide 25: Control of Complexity

Slide 26: Control of Complexity

Figure/ground discrimination may be difficult in typical classroom settings

Simple black backgrounds, consider clothing choices

Real photos with simple backgrounds are often better than black-line drawings

Complexity means other senses too- auditory happening when you want a visual response

Use of space can help complexity/clutter

Consider busy-ness of the classroom environment when a visual response is expected of the student

Slide 27: Richness and Depth of Experience

Developmentally-informed experiences made accessible through selective sensory channels (based on FVA)

   Not all students may be "multisensory" in their information gathering

Ensuring that students are involved in the beginning – middle – end of activities.

"Learning by doing" as a support of concept development

Slide 28: Quality of Life Principles

- Present in community (accessing the same community as everyone else)
- Choice (stimulating choices, life defining choices)
- Competence (expectation and opportunity, learner)
- Respect (valued social roles, contributes)
- Inclusion (network or relationship that enhances life and safety)

Slide 29: Formula

Slide 30: Lesson Example

Meet Sarah!
Information

- Pleasant and social
- CVI
- Cognitive challenges
- Smile/laugh is the most consistent form of communication; although, switch use is an instructional goal
- Able to sweep left arm, can isolate index finger on right hand

Slide 31: Lesson Example

Goal: To increase Sarah's exposure to the environment to encourage:
   Concept development
    Active learning
    Choice making
What was done before: Sarah would go with her educational assistant every day to various places in the school. Travel time consisted of Sarah being pushed in her chair with little or no contact to what was going on around her. Her EA would talk to Sarah but the pace was too quick for

Sarah to active engage in the process of travel or to develop and
practice basic concepts (Orientation and Mobility)

Slide 32: Optimizing Sarah's Learning Potential
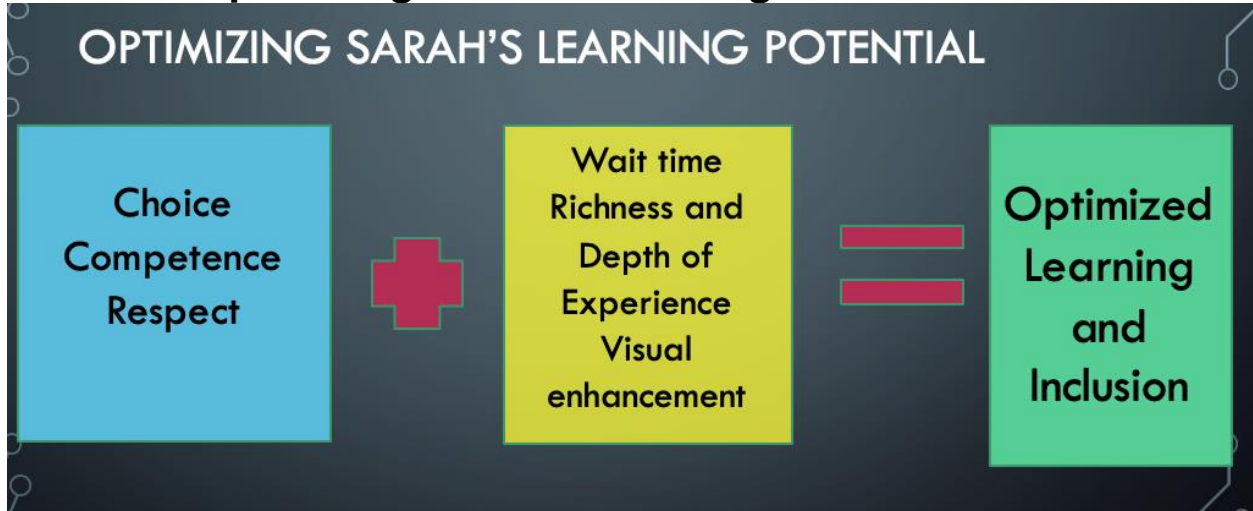
Slide 33: Optimizing the Learner's Potential
Scripted route from classroom to library where Sarah would return a book
and pick up a new book for the daily class story (respect; competence)
Route built in opportunities for deciding the next turn (choice), practice with
communication, and concept development through engagement with the
environment (right/left, sensory aspects and identification of everyday
items)

Slide 34: Optimizing the Learner's Potential
Route activity used CVI instructional strategies relevant to Sarah's
assessed CVI needs:
Consistent language and predictable decision points
Use of markers along route (initially) to draw attention to aspects
Wait time built in before prompting
Did delivery during quiet time in the hallways to reduce complexity
As Sarah showed progress in taking the lead on the route, the lesson could
be added on to and expanded to continue learning opportunities (e.g.,
reverse route, new route with same concepts, more communication
expectation with switches with the librarian, etc.)

Slide 35: Route/Landmark Markers
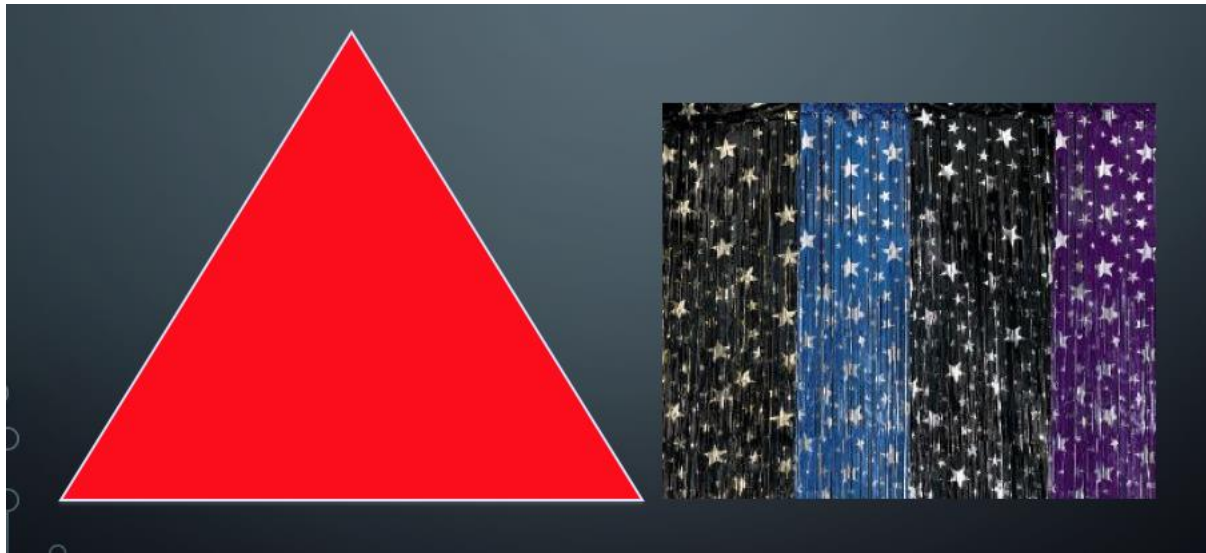
Slide 36: Sarah's Mobility Routine
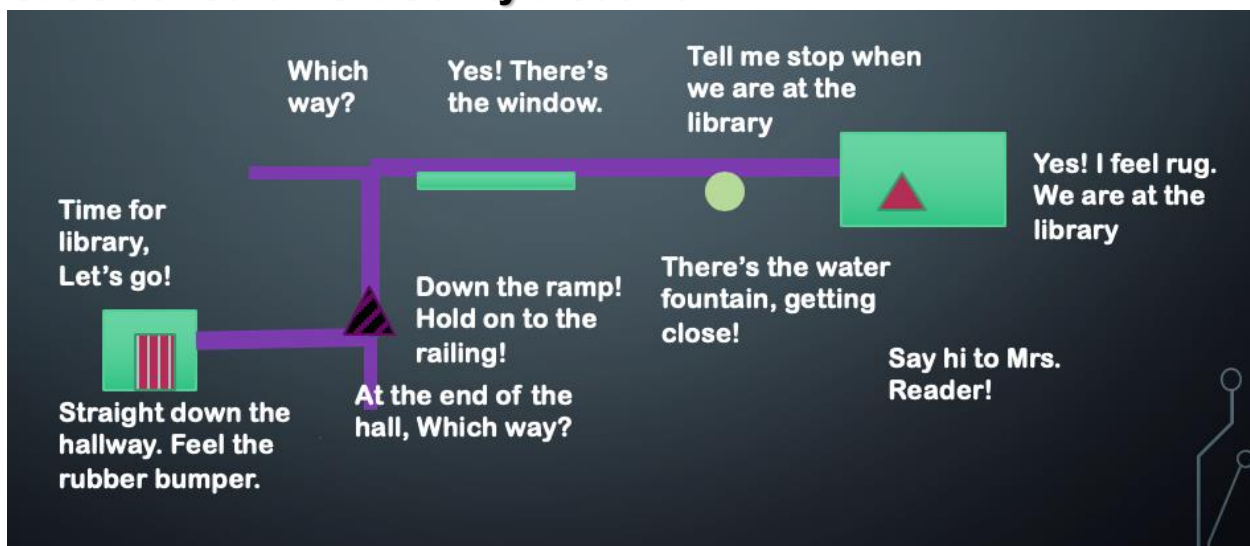
Slide 37: Sarah's Prompts for Right/Left (Least to Most)
Give beginning script statement
Wait for response
Repeat, "Tell me on your switch which way?"
Wait for response
Repeat, [touching right then left hand] "Which way, right or left?"
Wait for response
Repeat, [hand-under-hand], "Which way? We go left"

Slide 37: Lesson Example

Meet: Marcus
>   Student in grade seven. Spends 50% of his day in a general
>   education classroom, 50% in a resource setting.

Goal: Meaningful literacy-based activities to enjoy with peers

Current programming: Team has noticed that Markus responds to highly
contrasting colours and voices. He spends a portion of each literacy
block watching "Blues Clues" clips on YouTube.

Slide 38: Student Information

CVI resulting from hydrocephalus
>   Dense right homonymous hemianopia, visual acuity estimated at
>   20/400 using Teller cards. Noted preference for displays with
>   simple, clear lines and solid colours.

Communication – team notes smiling, laughing, and tapping with the left
hand when Markus is enjoying himself.

Very sociable student – enjoys when involved in conversation though non-
verbal.

Team includes TSVI/O&M, PT/OT, speech language pathologist, and very
engaged resource teacher and SEAs

Slide 39: Social Engagement through Literacy

Team is looking for more purposeful literacy activities that include
opportunities to engage with peers.
>   Concern that Markus is not seen as a "reader," and that this may
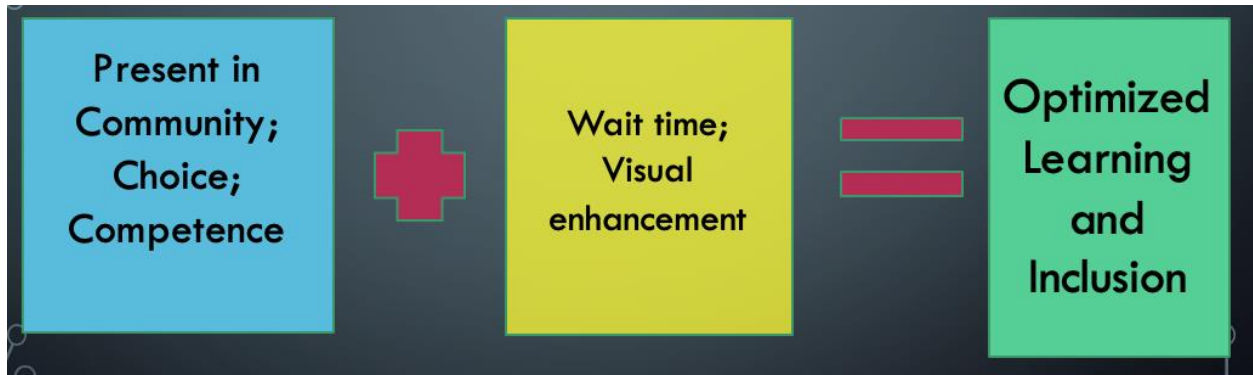>   implicitly encourage more YouTube time.

Team has been following a lightbox program with Markus since grade five.
He is able to fixate on and follow targets on the lightbox.

TSVI looks to design literacy-focused activities around the lightbox:
>   Focused, successful time for Markus
>   Sensory-controlled environment

Slide 40: Optimizing Markus' Learning Potential

Slide 41: CVI-Focused Literacy materials

Markus has shown he enjoys illustrations with high contract images (e.g., those of Todd Parr) in optimal lighting conditions, presented on the left side.

Using the lightbox to highlight important story elements while a peer reads.

Slide 42: 3D Light Box

As story unfolds, lightbox colour and target images are changed.

Peer reads the story while the SEA changes the visual display according to a pre-determined sequence.

Response times between change point and visual attention are observed and recorded.

Slide 43: Conclusion
With purposeful assessment and attention to the unique combination of how a child with CVI uses their vision and other contributing factors (environment, etc.), we ensure a good fit between inclusive programming and the data used to inform its design.
Promoting quality of life through inclusive programming.

Slide 44: Conclusion (2)
"Don't assume a door is closed; push on it. Do not assume if it was closed yesterday that it is closed today."

Dr. Linda Mamer quoting Marian Wright Edelman, American activist