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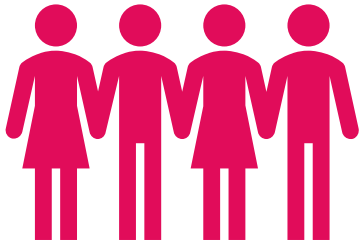
The Monarch: Tactile Access to Digital Learning

Presented by:
Stephanie Walker & Leslie Weilbacher

Zoom Poll Questions



Who is with us today?

Where are you from?

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Using the Hive's Discussion Board as a PLC

- Existing User: Sign in at www.aphhive.org
  - Forgot password? Follow reset link.
- Go to Discussion Board link in the chat

- New User: Register at www.aphhive.org
  - Create username & password
- Go to Discussion Board link in the chat

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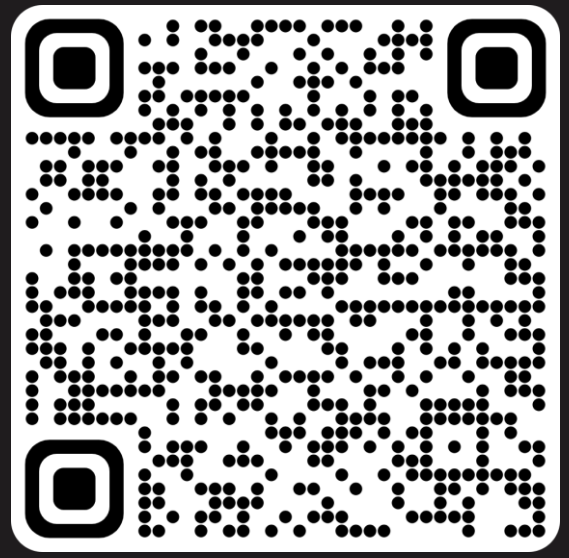
HIVE Discussion Board Activities

- How will you expand on and build concept awareness and new skills for the Monarch? Examples include zoom, tactile clutter, and panning.
- What is your plan for assessing your learner's current knowledge and skill level, and how will you begin instruction on the tactile graphics skills and concepts needed for advancing to the Monarch?



12/12/23

3:00–4:30 PM (ET)

The Monarch: Tactile Access to Digital Learning

ACVREP Credits

Stephanie Walker
Leslie Weilbacher

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Outreach Specialist
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Northwest Region

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2023 3:00 PM (ET)

Tactile Graphics Literacy for Students with Visual Impairments:

4-Part Access Academy Webinar Series

1) **Building an Early Tactile Foundation for Graphics Understanding** (October 24)
2) **Teaching Touch and Exploratory Skills to Prepare for Tactile Graphics Learning** (November 14)
3) **Strategies and Resources for the Instruction and Evaluation of Tactile Graphicacy Skills** (November 28)
4) **The Monarch: Tactile Access to Digital Learning** (December 12)

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Learning Objectives

- Participants will identify types and features of refreshable braille displays.
- Participants will describe the importance of digital literacy and refreshable braille displays in providing access to tactile information and graphics literacy skill development.
- Given an overview of digital literacy tools, participants will be able to list skills and background knowledge that a student requires to benefit from use of a multi-line, graphics-capable refreshable braille display like the Monarch.

Importance of Tactile Graphics Literacy

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The Power of Graphics Access for All

- Knowing how to gather information from graphics and use it is an important skill. (Rosenblum, 2018)
- Dr. Kent Cullers (world's first blind astronomer) "It has often been said that a picture is worth a thousand words. Well, for the first time in my career, I get the picture." (Touch the Universe, 2002)

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Challenges in Graphics Education

"Historically, by the time students with visual impairments enter school, they have not received enough instruction in the development and use of their tactile skills or had enough opportunities to touch and explore their world." (Adkins, 2023)

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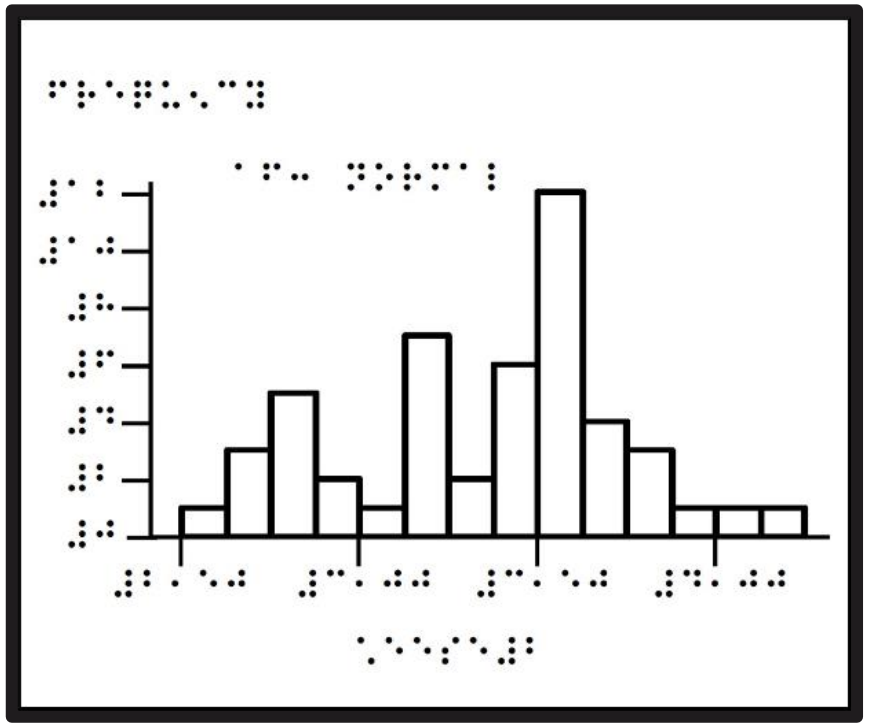
What is Tactile Graphicacy?



Ability to access, comprehend, and produce tactile graphics or raised line drawings

Requires:

- Fine motor sensitivity and dexterity
- Efficient use of carefully constructed knowledge
- Variety of tactile-cognitive strategies

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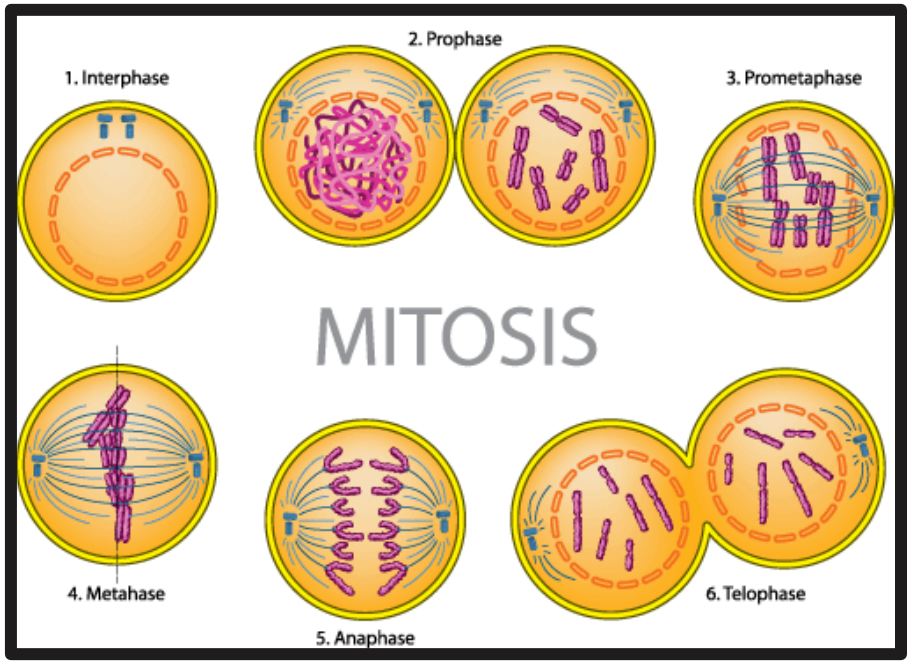
Characteristics of Tactile Graphics Literacy

- Perception that there are different kinds of symbolic information on a page with different kinds of meaning
- Ability to discriminate between different tactile surfaces and to draw meaning from them



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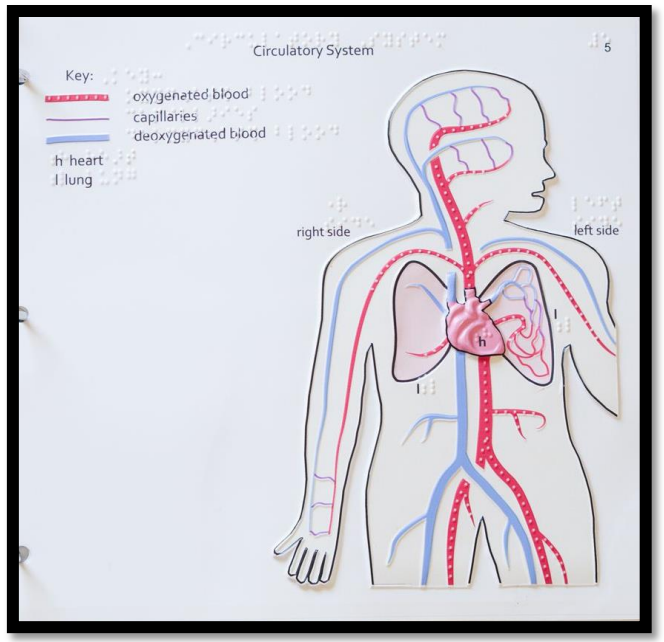
Characteristics of Tactile Graphics Literacy (continued)



- Advanced form of tactile literacy
- Not inherent for braille readers
- **Requires**:
  - Explicit attention
  - Education
  - Careful building up of skills

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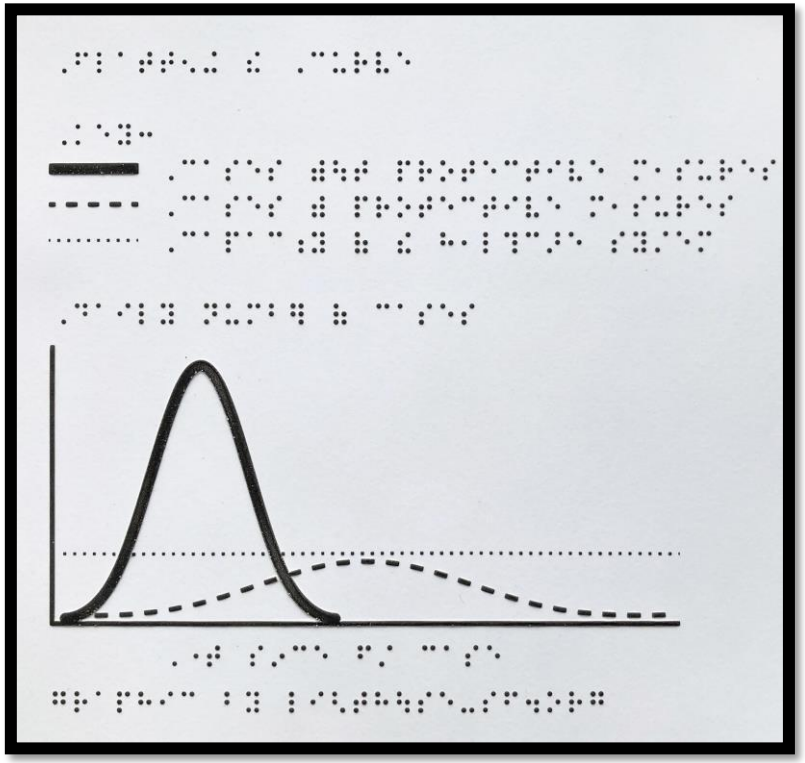
Importance of Tactile Graphicacy

- Provides a focus for attention and perception
- Builds pathways to retain and memorize information
- Natural destination for conversation and social interaction
- **Pictures invite and motivate a learner's curiosity and active engagement**



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Graphics Literacy Instruction

- Learners need skills to derive meaning from interaction with tactile graphics.
- Without equivalent tactile materials, learners are at an enormous disadvantage relative to sighted peers.
- All learners need access to tactile experiences at all developmental levels.

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Role of Digital Literacy Tools

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What is Digital Literacy?

- Ability to use a variety of technologies, platforms, environments, and individual/collaborative strategies "to find, evaluate, create, and communicate information" (American Library Association [ALA], 2023)
- Requires cognitive, technical, and problem-solving skills

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Why do Students Need Digital Literacy Skills?

Everyday tasks require digital literacy!

- Communicate with friends and family, teachers and co-workers
- Locate a restaurant with good reviews or a nearby post office
- Sign up for an online book service, bank access, or gym membership
- Evaluate the safety, efficacy, and accuracy of information in a website or email message

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Impact of Refreshable Braille Displays on Braille and Digital Literacy Skills

- Improved knowledge of braille letters and contractions
- Increased fluency
- More access to information
- Greater confidence and adaptability
- Enhanced problem-solving skills

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Unique Benefits of Refreshable Braille Display

- Opportunity to develop finger isolation and braille dot discrimination
- Auditory feedback reinforces braille learning
- Highly attractive and motivating to students
- Immediate, independent, and mobile access to information

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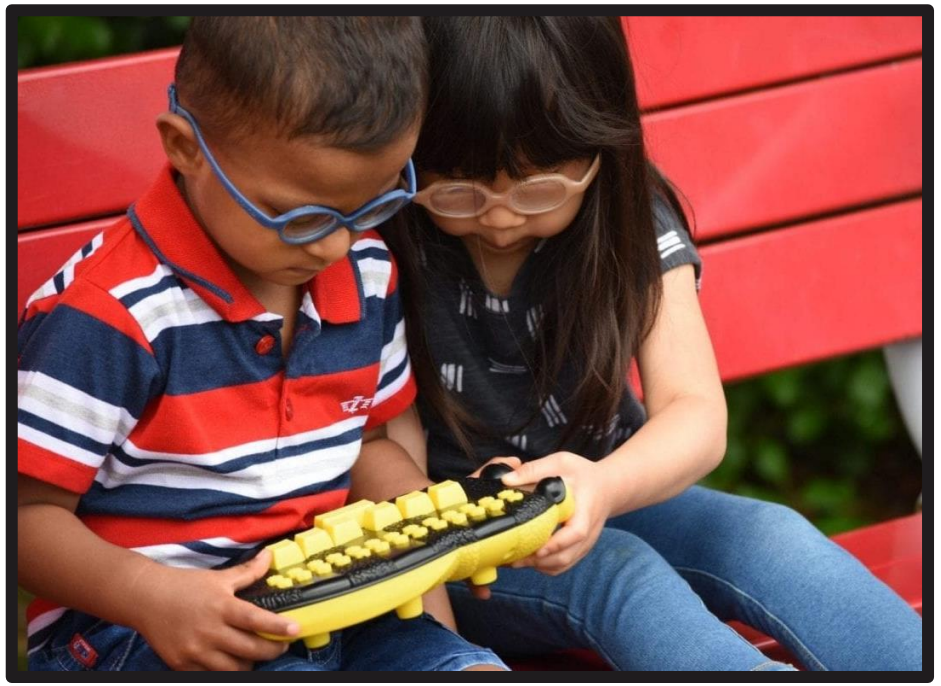
Unique Benefits of Refreshable Braille Display (continued 2 of 3)

- Works as a partner to hardcopy braille and graphics materials
- Users can quickly locate specific text using search and find commands
- Proofreading and editing capabilities
- Ability to participate more fully in group projects and information sharing



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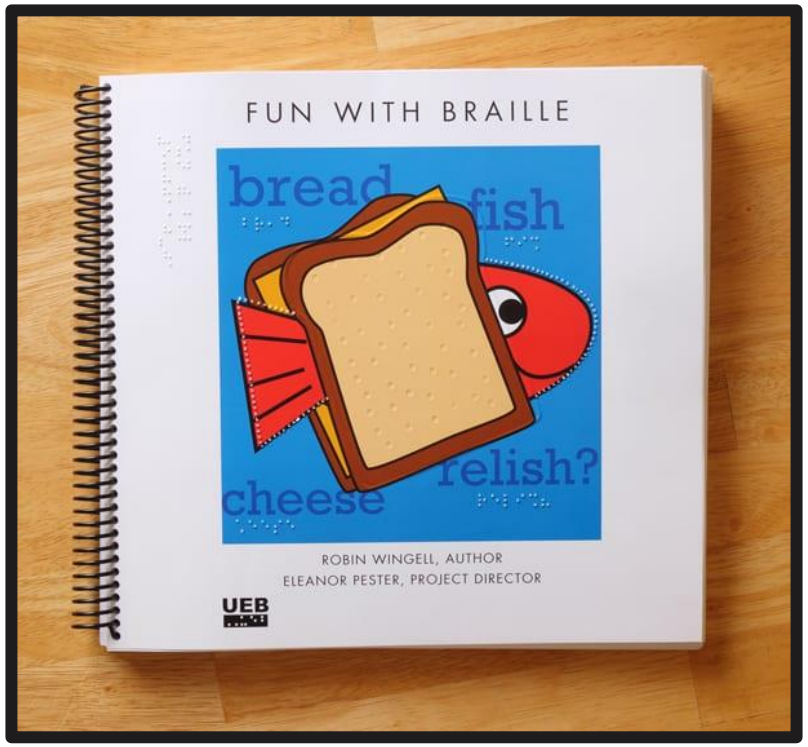
Unique Benefits of Refreshable Braille Display (continued 3 of 3)

- More options give students the ability to develop competent choice-making among tools
- Expressive and receptive communication through email, internet browsing, document creation, etc.
- Portable solution to meet many different academic and personal needs (Brauner, 2022)

Impact of Refreshable Braille Displays on Tactile Graphicacy Development

- Intensive braille-reading preparation for more advanced tactile literacy skills
- Multiple sensory channels needed to process multiple kinds of information
- Opportunities to learn problem-solving skills needed for tactile graphics reading
- Symbolic keystrokes and navigation tools help to create cognitive pathways for symbolic graphics understanding

Challenges of Refreshable Braille Displays



- Determining layout of text (i.e., indentation, justification)
- Spatial and organizational formatting
  - Headings
  - Paragraphing
  - Page numbering
- No immediate overview of a document
- Lack of full-page access to text

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Characteristics and Limitations of Current Refreshable Braille Displays

- Vary in size and capacity
- Single line of text
- Typically 20-40 braille cells
- Six-key braille entry or QWERTY keyboard
- Limited or no tactile graphics function
- Exposed braille pins

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APH's Monarch

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Introducing the Monarch

- Makes text and graphic information conveniently accessible
- Opens educational and career opportunities
- Graphics appear alongside text
- Enhanced interaction with graphics
- Increased reading fluency
- Grammar and spelling edits made easy!

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Monarch Features

- 10 lines of 32 braille cells each
- Sensors for gesture and touch manipulation
- Single dot height
- Braille keyboard input
- Enhanced notetaker applications and functions using familiar platforms

Monarch Features (continued)

- Integrated 320-cell tactile graphics display
- Panning and zoom capability
- Double-tap action
- Rapid access to APH Tactile Graphics Image Library and other PDF graphics in black-and-white outline format

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The Monarch

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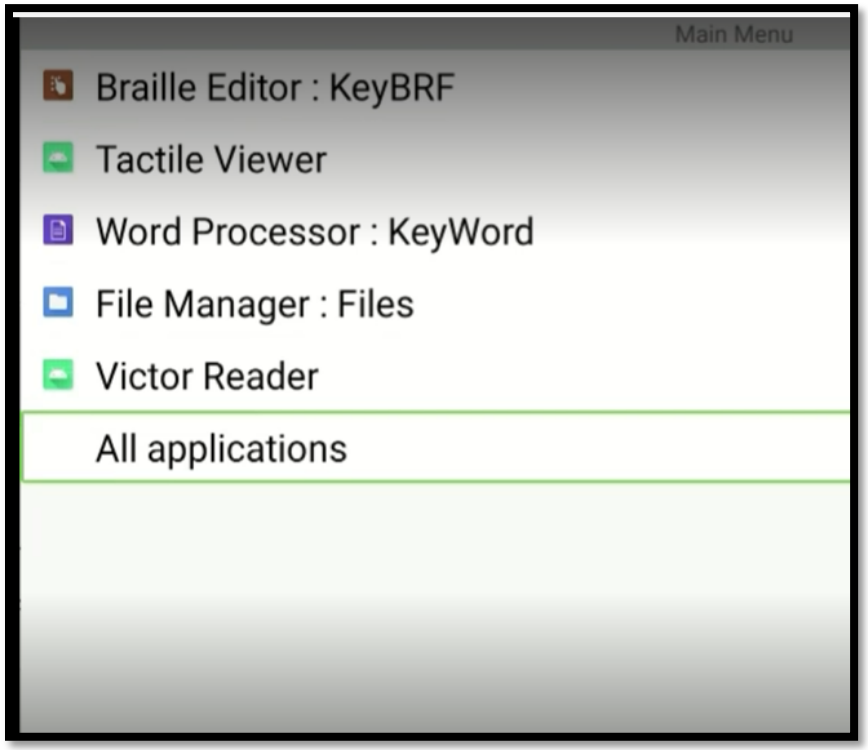
eBRF – Coming Soon

- New braille file type; includes enhanced navigation, dynamic formatting, and tactile graphics
- First specification coming in January 2024
- Continued revision through 2024
- Made as eBRF files will emerge in 2025
- Converter takes BRF and makes them into eBRF
- Files are easier to create/open than ePUB

Software Foundation



- Tactile textbook library
- Multi-line word processor
- Tactile image viewer
- Graphing calculator
- Braille Editor
- Tactile Monitor

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Monarch Integrated Features

Tactile Graphic Image Library

Bookshare
A BENETECH INITIATIVE

desmos

TGIL

Bookshare

Desmos

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Skills and Background Knowledge

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New Skills & Concepts for Students to Learn

- Location-specific gestures
- Zooming in and out
- Panning left, right, up, down
- Keeping orientation in a graphic

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Cursor Routing

Cursor Routing refers to the ability to directly move the cursor to a specific position on a braille display. This facilitates quicker editing and navigation.

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Cursor Routing in Action

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Double Tap

Double Tap is a quick succession of two taps on the braille display to execute specific commands or open items.

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Point and Click

Point and Click in this context refers to the action of selecting or activating an item on the braille display by touching it with one hand and selecting a key on the interface.

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Point and Click in Action

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Haptic Zoom

Haptic Zooming refers to the ability to enlarge or reduce the tactile representation of graphics on a braille display, allowing for easier navigation and understanding.

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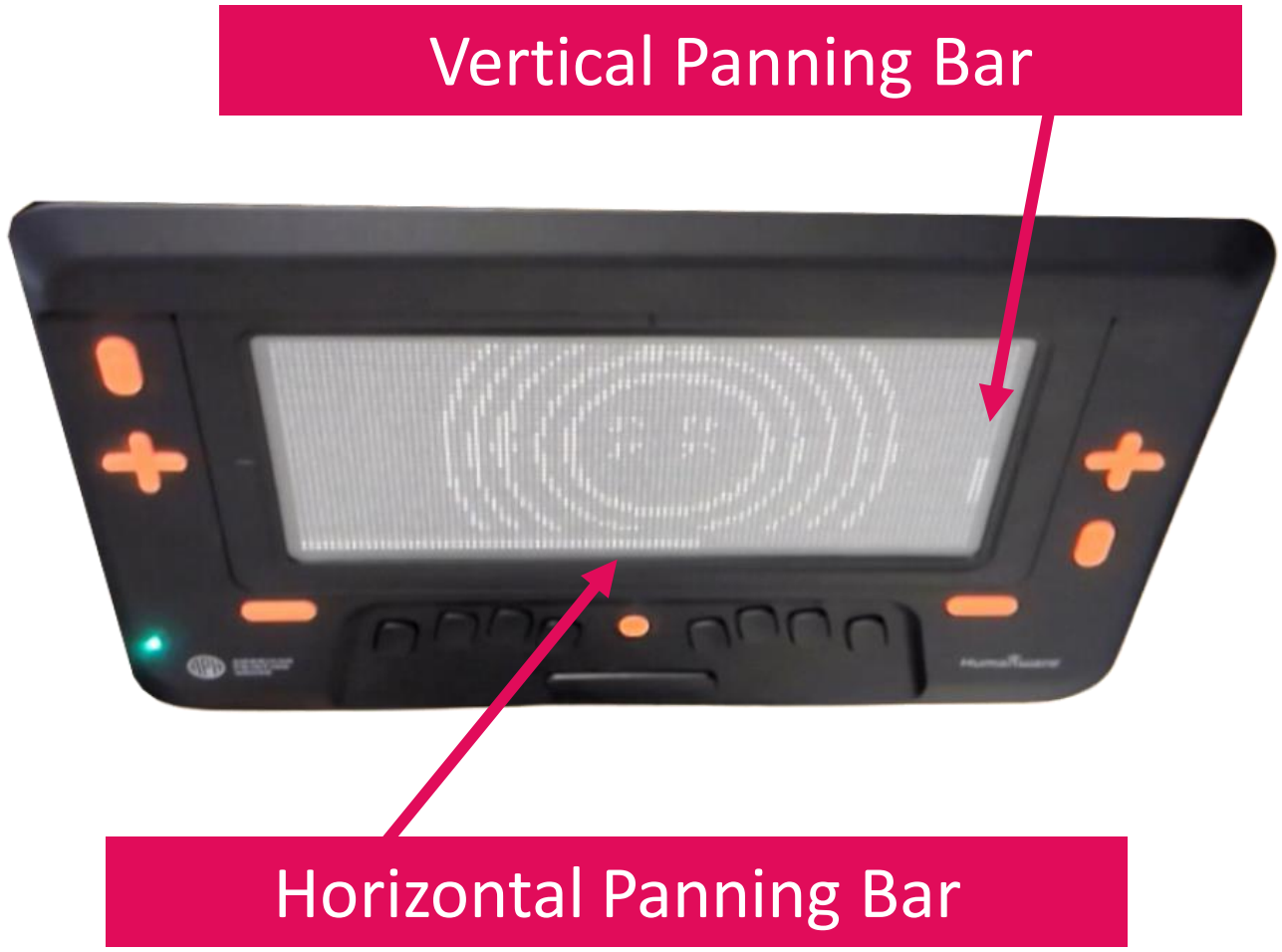
Pan

Panning refers to shifting the displayed content on a braille device horizontally or vertically to read additional text or explore tactile graphics.



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Panning in Action

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Tactile Clutter

Tactile Clutter is the overwhelming presence of too many tactile elements close together on a braille display, which can make it difficult to interpret the information.

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Teaching New Concepts

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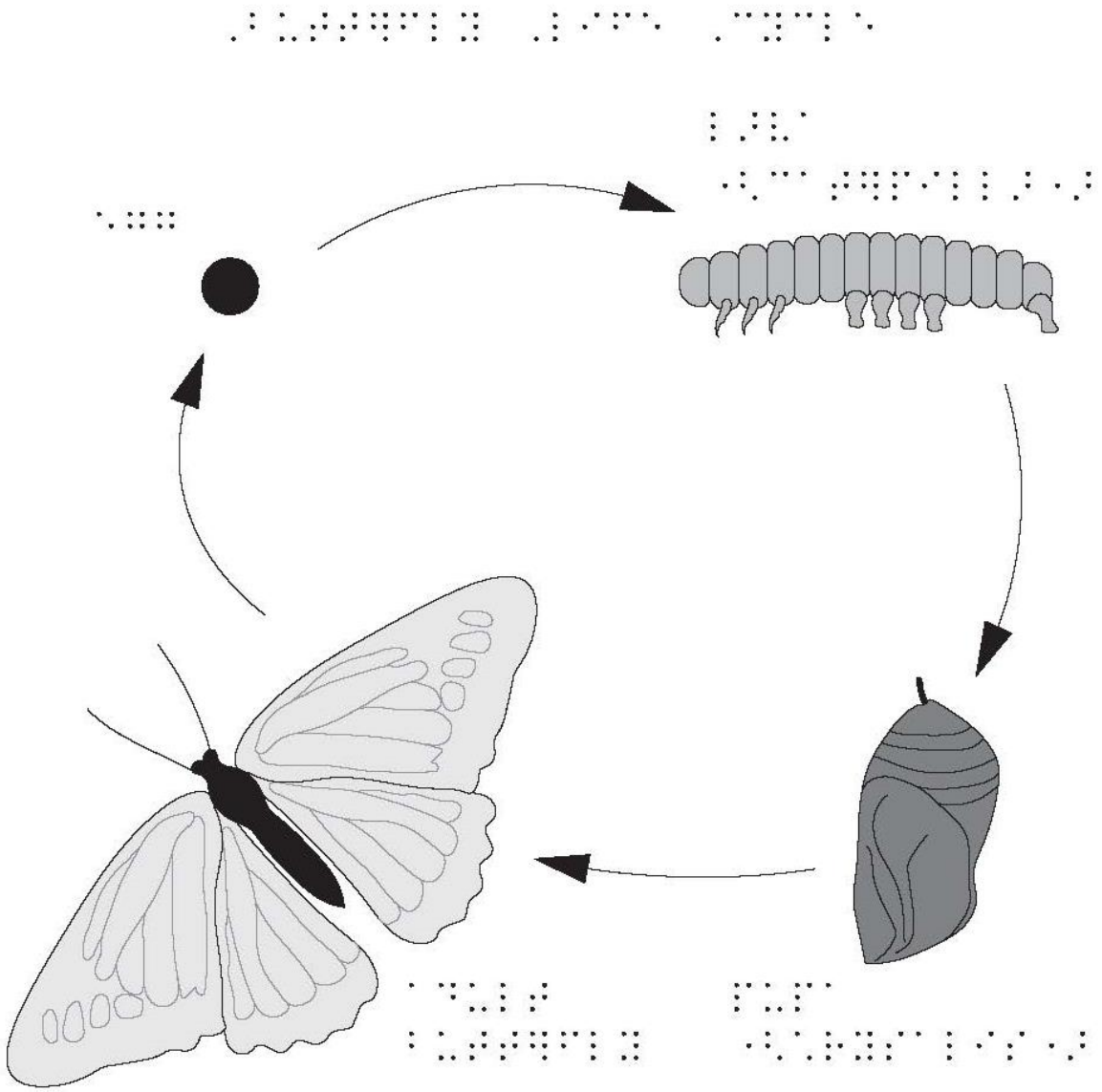

Masking Frame

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HIVE Discussion Board Activity

How will you expand on and build concept awareness and new skills for the Monarch? Examples include zoom, tactile clutter, and panning.

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Identifying Tactile Graphics Literacy Skills through Assessments

Value of a Learning Media Assessment

- Tactile exploratory procedures are necessary for all learners
- LMA supports a plan for interventions to increase tactile efficiency
- Critical to address tactile performance in all areas, not just braille literacy
  - Effective use of touch extends beyond matching textures and recognizing shapes
- Functional assessments of tactile efficiency are inclusive of other team members

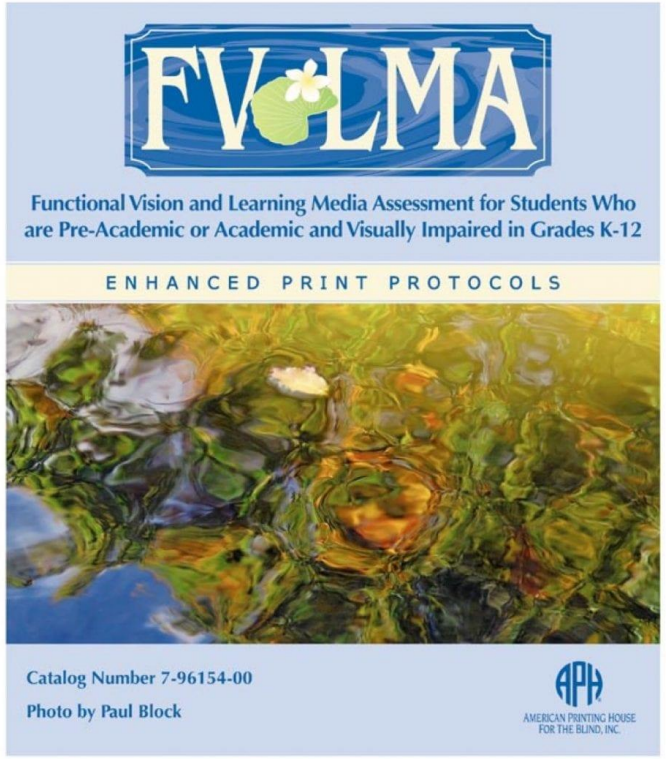
Value of Expanded Core Curriculum (ECC) Assessment

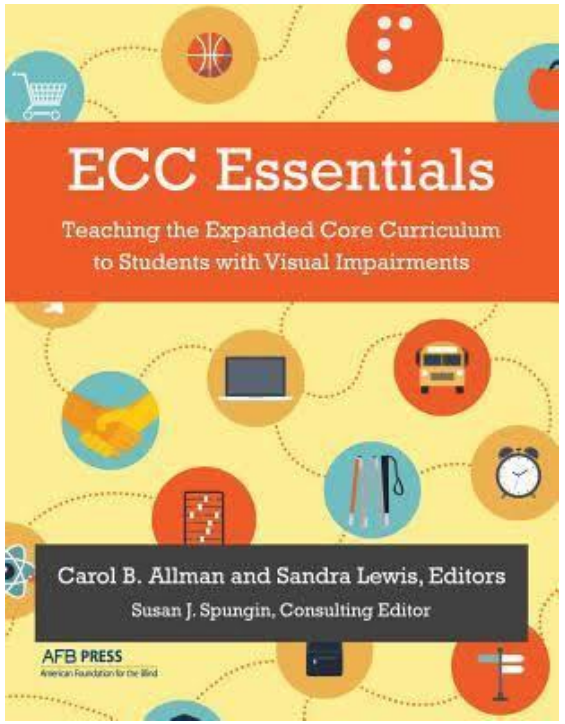
- **Compensatory Access**
  - One of the nine domains of the ECC
  - The most critical for ensuring access to academic learning
  - Skills which allow learners to access and communicate information about the world and to be literate
- Skills include concept development, spatial awareness, searching and scanning written materials (using visual and tactile scanning techniques), interpretation and creation of tactile graphics, etc.

Value of Expanded Core Curriculum (ECC) Assessment

- **Assistive Technology** (a second domain of the ECC)
  - Identifies necessary skills essential to using technology to access all aspects of daily living (work, life, play, rest)
  - Provides information about strengths and needs regarding technology
  - Current and future needs are considered
  - Yields data to guide teams in providing learners with instruction on devices thoroughly
  - Individual device checklists can be helpful

Resources





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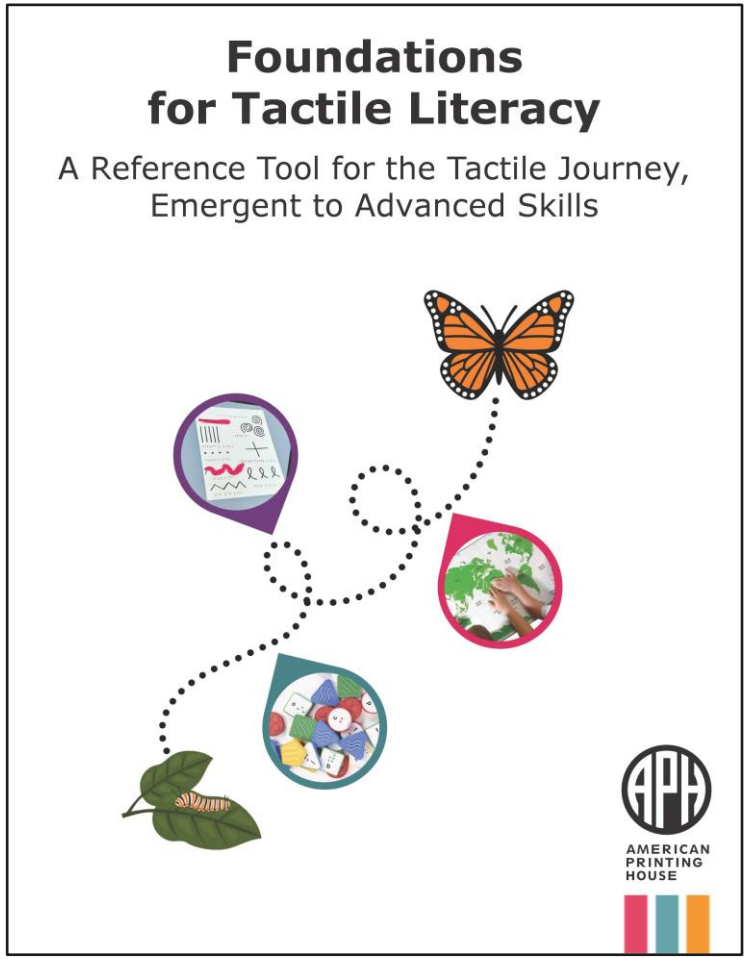
Tactile Skills Progression Resource



Advanced Tactile Literacy Skills

Cognitive Concepts

Understanding Perspective, Transition from 3D to 2D

Skill	Date	Date	Date
Using Keys/Legends	☐	☐	☐
Notes:			
Reading Maps	☐	☐	☐
Notes:			
Reading Charts and Tables	☐	☐	☐
Notes:			
Familiarity with digital tools to create tactile graphics	☐	☐	☐
Notes:			
Graphicacy Skills Using Refreshable Braille	☐	☐	☐
Notes:			

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Important Considerations

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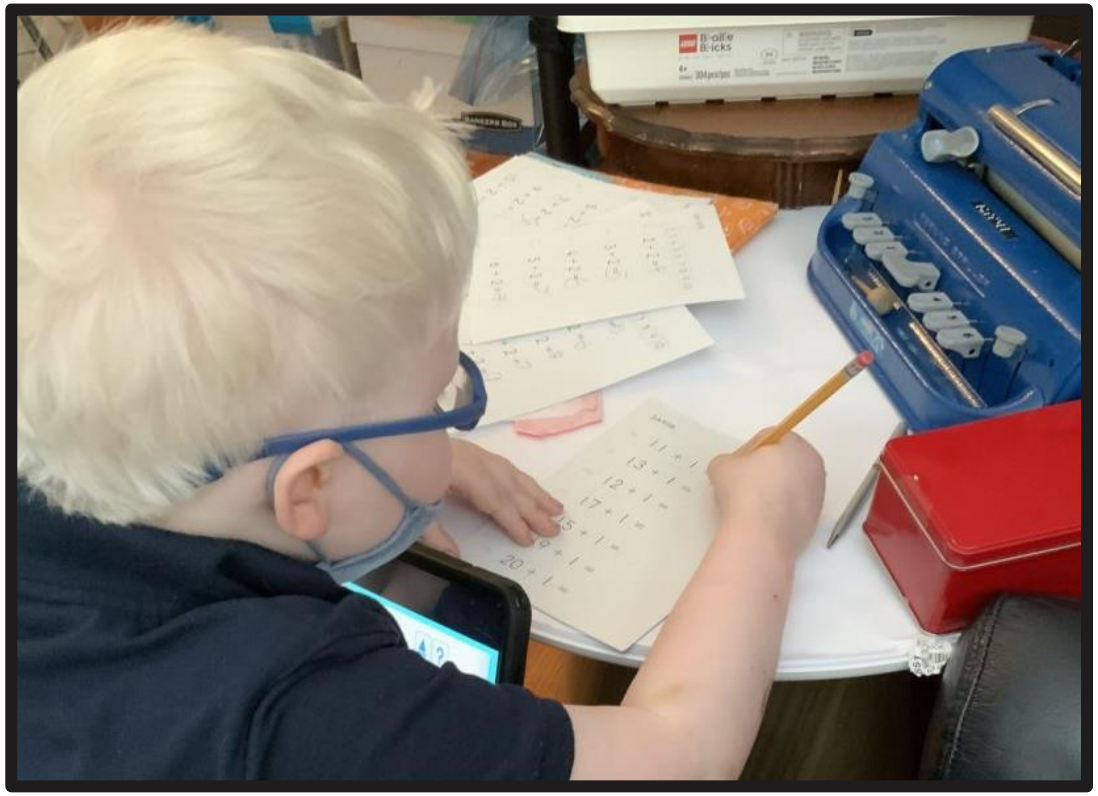
Refreshable Braille Displays Do Not Replace Hardcopy Braille or Graphics

- Devices utilize and elevate but **do not replace** skills that are first learned reading paper braille.
- **The maintenance of student skills on paper is critical for long-term success!**



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Refreshable Braille Displays Do Not Replace Hardcopy Braille or Graphics (continued)

- There are situations in which hardcopy is the most efficient way to read or express information – both textual and graphic.
- Analogy: We have 1:1 technology, but we also use books printed on paper.
- **Students need multiple modes of gathering and sharing information**

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Ongoing Challenges in Electronic Tactile Graphics Presentation

- Loss in sharpness of lines and other graphic features
- Lack of effective access to tactile graphics texture levels and types
- Need for more presentation space
- **Electronic graphics should partner with hardcopy graphics in learning and use**

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Interview with Greg Stilson, Senior Director of Global Innovation and Strategy – Technology Product Research

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Student Perspectives

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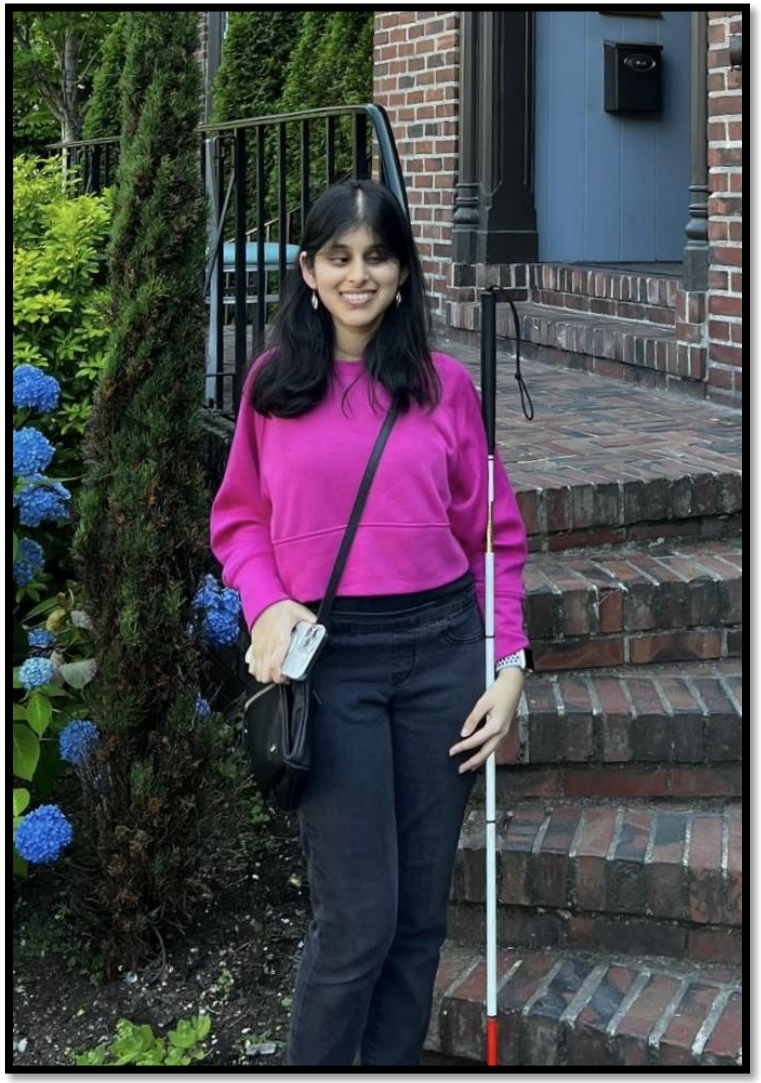
Meet Arushi

- High-school senior
- Women in STEM (founder, president)
- National Honors Society member
- APH summer 2023 intern
- JAWS user
- Mantis Q40 user



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What was your overall impression of the Monarch?

"I saw endless possibilities for its uses, both as a user and as a student going into college… I see many uses whether in coding or taking AP tests… with maps, or using it in mathematics to graph with Desmos, or even improving fluency… with reading."

What were the advantages you saw in reading a book using the Monarch?

"…with this multiline braille display, its able to display titles centered and end paragraphs with correct spacing… It allows you to have the same reading experience as sighted peers."

How do you envision using the Monarch in math class with Desmos?

"In math classes I've taken… I've struggled… whether it's algebra or geometry or trigonometry, they've all had some examples of having tactile graphics or figure shapes… but with this refreshable braille display you can graph in real time like other students and understand how… your equations are changing the appearance of the graph."

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Preparing our Learners

- Monarch is coming... are your students ready?
- **NOW is the time for preparation and instruction to build their skills!**
- We need to prepare our learners to *independently* read, understand, and interpret tactile graphics

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HIVE Discussion Board Activity

What is your plan for assessing your learner's current knowledge and skill level, and how will you begin instruction on the tactile graphics skills and concepts needed for advancing to the Monarch?

References (1 of 7)

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THANK YOU!

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