ABC'S OF iOS:

A VoiceOver Manual
for Toddlers and Beyond!

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and **CNIB Foundation**.

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CNIB

Celebrating 100 years in 2018, the CNIB Foundation is a non-profit organization driven to change what it is to be blind today.

We work with the sight loss community in a number of ways, providing programs and powerful advocacy that empower people impacted by blindness to live their dreams and tear down barriers to inclusion.

Through community consultations and in our day to day work with children and families, we have heard loud and clear that access to technology is a top priority for people with sight loss. Before we embarked on this journey of creating a manual, we asked ourselves "why iOS?" While screen readers are a key tool for many adults living with sight loss, especially in the workforce, there are a number of skills one needs to have before they can effectively use a screen reader and so younger children with sight loss are often not being introduced to technology until much later than their sighted peers. Touch screens are so easy to navigate that by the age of 2 or 3, most sighted children are exposed to and are independently navigating a smartphone or tablet. Through the use of gestures, introduced here in this manual, children with sight loss may be able to do the same; simply swipe and tap.

Our goal is to level the playing field for kids with sight loss so they have the same access to information as their sighted peers at the same time. We believe this manual will play an important role in doing just that.

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Manual Objectives

This manual will assist educators and family members as they introduce and teach 3- through 8-year old children with visual impairments or blindness to successfully, independently, and purposefully interact with an iPad running VoiceOver. The manual incorporates accessible apps

with progressive educational content to help prepare children to be successful in mainstream classrooms. Educators and family members will learn how to:

- Encourage very young children with visual impairments to explore and interact appropriately with an iPad
- Systematically introduce and teach age-appropriate VoiceOver gestures, Bluetooth keyboard commands and refreshable braille display commands
- Incorporate teaching strategies which address the unique needs of children with visual impairments
- Nurture young children with visual impairments to become confident and independent with age-appropriate iPad skills
- Provide information about age-appropriate accessible apps and activities for educational purposes

Overview

Touch screen devices are all-in-one devices with the ability for students to simultaneously or independently use screen readers, magnification, and low vision features. Accessibility features are built-into the iPad at no additional cost to the consumer. This manual will specifically address age-appropriate VoiceOver accessibility skills for children age 3 to 8 who are or will potentially be braille readers, dual media, or auditory readers. The ABCs of iOS Manual may also be appropriate for children who will use large print/magnification, as many of these children will benefit from using a screen reader in upper grades which require reading lengthy passages.

The target audience of this manual is teachers of students with visually impairments and family members. The goal is to provide a systematic approach so that family members and teachers can enable young academic children with visual impairments to use an iPad running VoiceOver for educational purposes.

VoiceOver: VoiceOver is Apple's built-in screen reader. VoiceOver uses simple gestures to physically interact with items on the screen. Touch the screen to hear an item's description, double tap to select an item, drag or flick to navigate around the iPad. VoiceOver enables users to interact directly with an item on the screen encouraging young users to understand the specific location of the item and to build spatial relationships between items. When using VoiceOver, the iPad can be paired with a refreshable braille display and/or a Bluetooth keyboard.

Children who are blind or who have severe vision loss will depend on using a screen reader to interact with the iPad and to access content on the iPad. Many children with low vision will also benefit from developing specific listening skills and screen reader skills. Low vision children may

be able to visually read letters and simple kindergarten sentences. However, these same children may struggle when trying to keep up with the huge amount of reading required in high school and college. Both blind children and low vision children will benefit from learning good listening skills and the basic VoiceOver gestures that are taught in this curriculum.

Need for VoiceOver: Indicators

The following are indicators that the child will benefit from a screen reader:

- Emerging or potential braille reader or dual media reader
- Text is magnified to the point that scrolling is required
- Posture: if a child needs to be very close to the iPad (bent over or device is held close to face) in order to see items on the iPad
- If the child has scotomas (holes) in his vision
- If the child has a field loss
- If the child demonstrates eye fatigue
- If the child has nystagmus (rapidly moving eyes that can cause double vision and/or eye fatigue) or double vision
- If the child's vision fluctuates significantly
- If reading causes headaches
- If the child has a progressive eye condition

All iOS devices - iPad, iPod Touch, and iPhone - use the same operating system. This manual is specifically for the iPad; however, the majority of the information will generalize to other iOS devices.

The iPad is intended to be a personal device – used by one person. The iPad has a variety of settings which maximize the individual user's success. Customize the iPad by choosing a unique combination of settings to best suit the child's individual needs.

0.1 iPad Concepts

Introducing a Young Child to an iPad

Touch screens are so easy to navigate that by age two or three, most sighted children are exposed to and are independently navigating a smartphone or tablet. Simply swipe and tap. Many beginner apps are self-voicing, making these apps accessible. VoiceOver - Apple's built-in screen reader – uses only a handful of gestures to navigate and interact with preschool level apps.

Where Do You Start?

- *High Interest Content*

  Know your child – does he have a favorite song or book? Does he love animals and animal sounds? Choose a simple app that contains highly motivating content that will capture your child's attention.

- *Age-appropriate skills*

  The goal is always for the visually impaired child to be able to do the same tasks as his peers. For a toddler, a technology-based task might be to tap and/or swipe in order to listen to a favorite song or to interact with a very simple cause and effect app. An educational-based task might be to explore, scribble and identify letters using an iPad paired with a refreshable braille display. If the child is in a classroom, work on the same or similar skills that the other children are doing. Choose apps, activities or Interactive eBooks that have similar content to what is being discussed in class.

- *Bite-size chunks*

  Young children succeed when tasks are broken down to small, bite-size chunks. An app that is predictable with repetitive gestures will build the student's muscle memory. The tap gesture is the most basic gesture; many popular cause-and-effect toddler apps, require repetitive single-taps to activate fun sounds. (Example: The *Peak-A-Boo Barn* app has an animal sound, when the child taps the screen, the animal appears and a child's voice names the animal.) Many of the popular children's books can be set to require a tap to turn the page. Once the child is proficient with a basic tap, add the right/left swipe gesture.

Teaching Note: Many toddler/preschool apps are self-voicing and VoiceOver is not used. These self-voicing apps are used to teach tap and swipe gestures.

- *Embed learning within tasks*

  If the task is to practice the tap and right/left swipes, try games like the *I Hear Ewe* app that requires the player to swipe between the various animals and select the desired animal. Practice the same gesture using several apps that use the same gestures. Another right/left swipe activity is navigating to the desired app. Position the child's favorite app on the Home screen towards the bottom of the screen and encourage the student to QUICKLY right swipe multiple times to locate the desired app. Working on a three-finger swipe right or left? Place the child's favorite apps on the second or third Home screen page. Is the class working on letters? Asking a child to braille the same letter over and over again quickly becomes a boring task. However, playing a fun game that happens to include producing the desired letter multiple times is much more motivating – especially if that game is a digital game with amusing sounds and interactions! (Example: *Exploring Braille with Madilyn and Ruff* app – uses a refreshable braille display paired with an iPad.)

- *Listening Skills*

  Young children love to listen to the fun sounds within an app such as the dog barking or the child laughing. Many eBooks – especially interactive eBooks - can be used to reinforce listening and comprehension skills. These books are self-voicing and have fun sounds! With the interactive story app, *Five Little Monkeys Sitting in a Tree* by OM Books, the child can randomly tap on the screen to hear a sound or word. This book is used without VoiceOver and students do not have to see the page to activate the interactions. Keep in mind, that children with visual impairments will be listening to auditory textbooks, literary books and resources throughout their educational career and beyond – listening skills are critical! Children should also be encouraged to listen to screen readers such as VoiceOver, screen reader sounds (i.e. the "thunk" sound when you are at the end of the page) and spoken hints (i.e. "double tap to open"). VoiceOver hints provide important information.

- *Basic Concepts*

  Young students who are visually impaired and blind often struggle with spatial concepts and initially learn best when these concepts are taught with tactile materials. Create a tactile overlay to demonstrate the device's home screen or an app's layout. When teaching the virtual rotor on the iPad, use tactile materials to reinforce the concept. When teaching a child a new gesture, such as a double tap, first model the gesture. Since most students initially double tap too slowly – and the device assumes that the gesture is a single tap gesture – have the student knock on the table twice before trying to do a 'real' double tap.

- *Spatial Concepts*

  A touch screen device has a powerful advantage over the traditional computer. Children

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can physically drag a finger around the screen to develop spatial concepts. On an iPad, the Back button is typically in the top left corner while the Next button is in the bottom right corner. Note: Foundational spatial concepts learned on the iPad will expand to spatial concepts used in O&M and math.

Teach your child to explore the Home screen and each app's layout by *dragging a finger* around the screen – swiping does not provide spatial feedback! When on the Home screen, children should be made aware of and learn to use spatial relationships. Place the child's favorite apps in the corners and teach the child to place his finger near the physical corner of the iPad then quickly drag his finger *around in that area* to locate the desired app. Discuss and provide opportunities to develop good spatial concepts while navigating apps. Example: The *Wheels on the Bus* app by Duck Duck Moose requires that the child tap the bottom right corner to turn the page. As the child's progresses, encourage him to explore the "tool bar" at the top of the screen and what buttons/options are located there.

iPad Settings

The iPad provides a multitude of settings and features that can be turned On or Off to best suit individual needs. Young students do best when extra features are turned Off – making the iPad as simple and uncluttered as possible. Students with certain types of eye conditions may do best with inverted or a grey color scheme as the stark white background may be too bright and glaring or washing out the print. Most of the iPad's options – including accessibility settings - are found in the Setting's app which controls these settings across the device. However, some apps provide additional options within the app that only impact that app. There are numerous iPad settings; this manual will address the most common settings for young children and is organized by General Settings, VoiceOver Settings, Braille Display Settings and Low Vision Settings.

0.2 Common Settings for Young Children: General

The following settings are the standard settings for all young children.

Do Not Disturb

Do Not Disturb is the option that stops notifications, alerts and calls from making any noise or light, when the screen is locked. Note: When VoiceOver is On and an email or text comes in, VoiceOver will read it aloud. Select the silence "always" so that notifications are not sent when the iPad is being used. You can schedule the Do Not Disturb time for specific times so that Do Not Disturb is automatically turned On/Off at specific times. Many educators will schedule Do Not Disturb during normal school hours.

You can choose to always allow incoming notifications from specific people and/or you can choose to allow repeated calls to come through. Allowing repeated calls is a nice feature in case of a family emergency.

Young students are easily distracted; it is important to use Do Not Disturb when young students are working on the iPad.

Note: When VoiceOver is On and a notification comes in, VoiceOver will announce and read the text message or email aloud!

To turn Do Not Disturb On or Off or to schedule Do Not Disturb, go to Settings > Do Not Disturb

Auto Lock

Auto Lock is the option that determines when the iOS device will go to sleep. On the iPad, the options are 2, 5, 10, 15 minutes or never. The iPhone Auto Lock options are 30 seconds, 1 minute, 2, 3, 4, 5, or never.

Young students often need extra time to come back to the activity after being distracted or additional time for instructions. Most educators prefer to set Auto Lock to 15 minutes so that the iPad does not go to sleep too quickly.

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To set Auto Lock, go to Settings > Display and Brightness > Auto Lock and set your desired time.

Allow Multiple Apps

Allow Multiple Apps enables a user to have two apps displayed on the iPad at one time, either as a Split View or Slide over. Young students may accidently cause two apps to be displayed. Turn this feature Off.

To turn On or Off Allow Multiple Apps, go to Settings > General > Multitasking & Dock > Allow Multiple Apps (toggle Off).

Four or Five Finger Gestures

Four or five finger gestures enables the user to move between open apps, pinch to move to the Home screen, or to open the App Switcher. Young students and students with multiple disabilities may accidently swipe four or fingers causing them to jump out of their desired app. Turn four or five finger gestures Off.

To turn On or Off Four or Five Finger Gestures, go to Settings > General > Multitasking & Dock, Gestures and toggle Off.

Show Suggested and Recent Apps in the Dock

The Dock typically houses and provides easy access to the user's most frequently used apps. Show Suggested & Recent Apps in the Dock is a feature designed to help with efficiency by showing the most recently used apps on the right side of the Dock – changing each time a new app is opened. For young students or students with visual impairments, apps should be located in a predictable position which helps build spatial relationships and reduces confusion. Turn Off Show Suggested and Recent Apps.

To turn On or Off Show Suggested and Recent Apps, go to Settings > General > Multitasking & Dock > Show Suggested and Recent Apps and toggle Off.

Restrictions

Restrictions is an option that enables parents to restrict their children from viewing inappropriate videos, music, and content. Parents may choose to make restrictions.

Note: School provided iPads often have district-wide restrictions on their devices, which can only be altered by the IT department.

To turn On or Off Restrictions, go to Settings > General > Restrictions and then set your desired restrictions.

0.3 Settings for Young Students: VoiceOver

These settings are the settings relating to using VoiceOver, the iPad's built-in screen reader.

Accessibility Shortcut/Triple-Click Home

The Accessibility Shortcut enables the user to determine what action is available when the Home button is pressed three times quickly. When set, this enables the user to quickly turn VoiceOver on or off by triple-clicking the Home button. If more than one option is selected in the Accessibility Shortcut, then a menu with those options appear with a triple-click on the Home button. The Accessibility Shortcut options are: Assistive Touch, Classic Invert Colors, Color Filters, Reduce White Point, Smart Invert Colors, Switch Control, VoiceOver and Zoom.

When learning VoiceOver, selecting only VoiceOver is preferred. It may be confusing for a student to initially have Zoom enabled as the student may accidently use a Zoom gesture. Once a student is comfortable with VoiceOver gestures, then evaluate whether Zoom will be beneficial before adding Zoom as an option.

To enable Triple-Click Home, go to Settings > General > Accessibility (scroll to the very bottom) > Accessibility Shortcut > select VoiceOver.

Speaking Rate

Speaking Rate, a slider switch in Settings, adjusts the speed that VoiceOver speaks. Initially, start with the speaking rate set in the middle or slightly to the right of the middle. Some young children who are slow to process may need to have the speaking rate slowed down; however, ALL students should intentionally be taught to increase their speaking rate/listening skills – which also increases their ability to process information faster!

Note: Young children are often able to listen to a faster speech rate than adults expect – listening at faster rates is a critical skill. Intentionally increase the speaking rate as soon as possible!

To adjust the Speaking Rate, go to Settings > General > Accessibility > VoiceOver > Speaking Rate. Initially set the speaking rate to the middle of the slider (approximately 55%).

Note: The Speaking Rate can also be adjusted on-the-fly using the Rotor.

VoiceOver Speech/Change VoiceOver Language

VoiceOver Speech is a section that enables users to choose a different VoiceOver speaker, correct words that are not pronounced correctly by VoiceOver, adjust the VoiceOver pitch, change the VoiceOver language. If the young child's native language is not English, you can change VoiceOver to another language – this may be important when working with a family who does not speak English.

Typically, the default VoiceOver Speech settings are used.

To change the VoiceOver language, go to Settings > General > Accessibility > VoiceOver > Speech > Add New Language > select desired language.

Verbosity

The Verbosity section includes the following VoiceOver options: Speak Hints, Punctuation, Speak Detected Text, Capital Letters, Deleting Text, Embedded Links, Table Output, Emoji Suffix and Media Descriptions.

It is critical that Speak Hints is turned On.

Typically, the default VoiceOver Verbosity settings are used.

To change Verbosity options, go to Settings > General > Accessibility > VoiceOver > Verbosity > select desired options.

Audio

There are two items under Audio: Mute Sound Effects and Audio Ducking.

Sound Effects are critical for children who rely on VoiceOver**. Mute Sound Effects should be Off.**

Audio Ducking is a feature that makes VoiceOver announcements louder than an app's sounds and audio content. **Audio Ducking should be On.**

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To change Audio settings, go to Settings > General > Accessibility > VoiceOver > Audio > and select Mute Sounds Effects or Audio Ducking.

Rotor

The Rotor is a powerful virtual menu that is only available when VoiceOver is on. The rotor is an easy way to quickly add options/features. Users can select items they frequently use and add them to the rotor. Example: Speech Rate in the rotor enables users to increase or decrease VoiceOver speech rate at any time. Some apps will add options to the Rotor that relate specifically to that app. Example: If the VoiceOver focus is on a table, "Rows" will be added to the Rotor. This enables users to use the up/down arrow to navigate when in the table.

For young children who are learning VoiceOver, limit the items in the Rotor.

Common Rotor items for young children who are learning VoiceOver:

- Characters – navigate character-by-character
- Words – navigate word-by-word
- Lines – navigate line-by-line
- Punctuation – Depending on what is selected, VoiceOver will say **No Punctuation** (and the braille display will not show the punctuation!), **Some Punctuation** (default setting; VoiceOver will announce a few things such as "capital") or **All Punctuation** (VoiceOver announces all punctuation such as "semicolon" and the braille display will spell out punctuation words, such as "period".)

  Navigating by characters, words and lines is a critical skill when learning to write and learning to correct your writing (editing).

- Speaking Rate – increase or decrease the speed that VoiceOver speaks

Common Rotor items for more advanced young students:

- Text Selection – easy method to highlight/select portions of text (important for editing)
- Headings - moves to next or previous heading (important when navigating the web, some Word documents, textbooks, etc.)
- Containers – moves to next or previous onscreen container (Example: On the Home screen, the Dock is a separate container; in Email, the inbox and an opened email are two different containers)
- Tables – moves to next or previous table
- Text Fields – moves to next or previous text field

There are many options that can be added to the Rotor. As your child advances, evaluate if and when to add additional items to the Rotor.

When VoiceOver is On, the rotor is always there, typically set to the last used rotor option; although, it is only visually seen immediately after the rotor gesture is made. To change the rotor option, place two-fingers on the screen and twist like you are turning a dial. Keep turning to move through the rotor options. When on the desired option, flick up or down to use that option. Example: To change the speed of VoiceOver's speaking rate, use the rotor gesture (two finger twist) until you hear Speaking Rate. Flick up to increase the speed or flick down to decrease it.

To change items in the Rotor, go to Settings > General > Accessibility > VoiceOver > Rotor and select the desired options.

Typing Style

There are three typing styles when using the on-screen keyboard with VoiceOver.

- Standard Typing – select a key, then double tap or drag a finger to the desired key and split tap (hold the first finger and drop a second finger to the screen)
- Touch Typing - drag a finger to the desired key and then lift your finger (character will be inserted when you lift your finger)
- Direct Touch Typing – type the same as when VoiceOver is off (touching a key inserts the character)

When teaching a young child to type using the on-screen keyboard, typically the Standard Typing style is used. Note: Children will be more efficient using a Bluetooth keyboard.

To change the Typing Style, go to Settings > General > Accessibility > VoiceOver > Typing Style > select Standard Typing.

Typing Feedback

Typing Feedback determines what VoiceOver will announce when a child is typing. The options are Nothing, Characters, Words, or Characters & Words. For young children who are "scribbling" or beginning to write letters, select Characters. Young children tend to learn quickly when each character is announced as they type!

Note: If a young child is learning to type words, for some activities you may choose to select Words or Characters & Words.

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To change the Typing Feedback, go to Settings > General > Accessibility > VoiceOver > Typing Feedback > select Characters.

Always Speak Notifications

When VoiceOver is On, in-coming emails, text messages, and other notifications are read aloud. When working with a child, these spoken notifications are disruptive. Always Speak Notifications provides an option to stop the notifications from being announced.

Note: The default setting for Always Speak Notifications is On.

To turn Always Speak Notifications On or Off, go to Settings > General > Accessibility > VoiceOver > Always Speak Notifications > Off.

Large Cursor

The VoiceOver cursor is visually displayed as a box around the item or section that has the VoiceOver focus. For children who have some functional vision, the VoiceOver cursor may be challenging to see. The VoiceOver cursor can be enlarged (made bolder) by turning on the Large Cursor. Enlarging the VoiceOver cursor may make it easier for educators or family members to follow what the student is doing on the iPad.

To turn the Large Cursor On or Off, go to Settings > General > Accessibility > VoiceOver > Large Cursor > On.

0.4 Common Settings for Young Students: Braille Display

When paired to an iPad, a Refreshable Braille Display is used to access the text in braille. Children can input text using the 6-dot or 8-dot braille keyboard, can edit text, and can navigate and fully interact with the iPad using the refreshable braille display commands.

Braille Displays come in various sizes; young children –with their very small hands - typically do best with an 18-cell braille display. Larger braille displays include 40, 60, and 80 braille cells.

Braille Display Output and Input

Output simply means the braille that is read on the braille display; Input is typing on the braille display which is then viewed in print on the iPad. There are three options for both input and output in braille: uncontracted six-dot braille, uncontracted eight-dot braille and contracted braille. Currently, there is not a way to mix uncontracted and contracted braille.

Typically, young children are introduced to braille letters before learning to write words with contractions. Most young children initially start with uncontracted six-dot braille. If your child has already been introduced to braille or is being introduced to contractions, then select six-dot contracted braille. Remember: It is currently not possible to mix contracted and uncontracted braille when using a braille display!

To select your desired Braille Output and Input, go to Settings > General > Accessibility > VoiceOver > Braille > Output or Input and select Uncontracted six-dot braille.

Show Onscreen Keyboard

When using a braille display, children do not need or want the onscreen keyboard to appear, as it will confuse the child. The Onscreen Keyboard should be turned Off.

To turn On/Off the Onscreen Keyboard, go to Settings > General > Accessibility > VoiceOver > Braille > Show Onscreen Keyboard and select Off.

Braille Code

There are three braille code options: English (Unified), English (US) and English (United Kingdom). Canada and the United States have adopted the English (Unified) literary braille code.

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To select your desired Braille Code, go to Settings > General > Accessibility > VoiceOver > Braille > Braille Code and select English (Unified).

Note: While correctly formatted braille math can be displayed correctly on a braille display, currently users cannot input braille math code using a braille display paired with an iPad.

0.5 Common Settings for Young Students: Low Vision

This curriculum focuses on teaching the VoiceOver screen reader to young children. There are children who will benefit from using a combination of auditory and visual skills to access the iPad. Young children who have some functional vision often are not yet able to choose which low vision settings they prefer. It is important for the educator/family member to be aware of these low vision options and to carefully observe how the student reacts when using the iPad with different low vision options.

For all children who have some functional vision, these options are typically turned On:

- Bold Text (On)
- Button Shapes (On)
- Increase Contrast > Reduce Transparency (On) and Darken Colors (On)
- Reduce Motion > Reduce Motion On and Auto-Play Message Effects (On)
- On/Off Labels (On)

To adjust these low vision options, Settings > General > Accessibility >

Display Accommodations

Some eye conditions will make bright screens an issue while other eye conditions require bright screens. The iPad has a variety of display accommodations so that each user can choose what options best accommodate his/her preferences. Display Accommodations include:

- Invert Colors
- Color Filters
- Auto-Brightness
- Reduce White Point

To set Display Accommodations, go to Settings > General > Accessibility > Display Accommodations.

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Note: Young students typically do not know or are unable to articulate what options work best for them.

Larger Accessibility Sizes/Large Print

You can enlarge the print in apps that support Dynamic Type. Use the slider to adjust the type size; currently, the 12-point font is one tick mark to the right of center on the slider.

To adjust the dynamic print size, go to Settings > General > Accessibility > Larger Text > Turn On Larger Accessibility Size and then use the slider to set the desired size.

Zoom/Zoom Window

Zoom magnifies the entire screen; Zoom Window magnifies a portion of the screen. Zoom and Zoom Window can be used anywhere at any time. Zoom can be set to a specific magnification in Settings and once set, can be turned On or Off using Triple-click Home. Zoom can also be turned On and Off by using a three-finger double tap. Adjust the amount of magnification by three-finger double tap and drag up or drag down. However, most young students are physically challenged by the three-finger Zoom gestures. Zoom Window and its accompanying options are often too complex for young students and should not be addressed until the children are comfortable with the iPad and have good isolated finger control and fine motor coordination.

Note: Pinch-to-Zoom is only available in some apps.

To turn Zoom On or Off, go to Settings > General > Accessibility > Zoom.

To adjust the amount of Zoom magnification in Settings, go to Settings > General Accessibility > Zoom (scroll to the very bottom) and use the slider to the desired magnification size.

Note: Zoom Region should be set to Full Screen Zoom and not to Window Zoom.

Teacher Hint: When magnifying, bigger is not always better! The more the screen is magnified, the more scrolling is required. For those students who have gaps in their vision, an over-magnified screen can be challenging to see the whole item, letter, or word at one time.

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Speech options – which are only useful for students with functional vision – include:

- Speak Selection
- Speak Screen
- Highlight Content
- Typing Feedback
- Voices
- Speaking Rate

Some of these options might be beneficial for low vision children who are reading and writing on the iPad.

Speak Screen: Swipe down with two-fingers from the top of the screen to have the content of the screen read aloud. Speak Screen is not a true screen reader like VoiceOver. Speak Screen only reads the text on the screen, it does not read buttons, etc. Speak Screen does NOT replace VoiceOver.

Note: For most beginner children, turn Speak Screen Off, as these young children might accidently activate it. However, once a child becomes proficient, there may be times that a low vision child may benefit from Speak Screen.

To turn Speak Screen On or Off, go to Settings > General > Accessibility > Speech > Speak Screen.

Note: Additional resources are available in Section 07 Next Steps and Appendix. These resources include charts of the gestures and commands used in the manual, a list of apps used in the manual and an iOS Skills Checklist organized by manual sections. To provide a baseline of the student's tech skills, complete the **iOS Skills Checklist** prior to teaching. The checklist will help identify gaps in skills, will assist when writing IEP goals and progress monitoring, and will guide in choosing where to start.

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3.3 Navigating Gestures: Four-Finger Tap Gesture

- Activity 3.3a Home Screen: Four-Finger Tap
  - Basic VoiceOver Gestures Commands for Young Children (Chart)

3.4 Introduction to the Rotor

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- Teaching the Rotor Command

- Activity 3.4a Ballyland Rotor App
- Activity 3.4b VoiceOver Practice Screen: Rotor
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Unit 04: Introduction to Refreshable Braille Displays and Bluetooth Keyboards

Objectives

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4.1 Introduction to Refreshable Braille Display

- Braille Display Overview
- Benefits of Using a Braille Display
- iPad Settings for Braille Displays
- Brailliant BI 14 Braille Display Description
- Pairing a Braille Display
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- Braille Display Navigation Commands
- Activity 4.1a VoiceOver Practice Screen: Refreshable Braille Display Practice
- Basic Braille Display Commands for Young Children (Chart)
- Activity 4.1b Home Screen: Refreshable Braille Display Practice
- Activity 4.1c Repeat Chapter 3 Activities Using Braille Display Commands
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4.2 Introduction to Bluetooth Keyboard Commands

- Bluetooth keyboard Overview
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- Low Vision and Screen Readers
- Will My Child Benefit from Using a Screen Reader?
- iPad Settings for Bluetooth Keyboard
- When to Introduce a Bluetooth Keyboard
- VO Commands (Control + Option)
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- Basic Bluetooth Keyboard Commands for Young Children (Chart)
- Activity 4.2b Home Screen: Bluetooth Keyboard Commands Practice
- Activity 4.2c Repeat Chapter 3 Activities using Bluetooth Keyboard Commands
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Unit 05: Writing and Basic Editing Text

Objectives

Overview

Braille Display Commands for Young Children Chart

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- Learning Braille Letters
- Activity 5.1a Exploring Braille with Madilyn and Ruff
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5.2 Writing with a Refreshable Braille Display

- Blinking Cursor
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- Activity 5.2c Correct Misspelled Words: Routing Buttons
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- Activity 5.3b Navigating Commands with Quick Nav Off
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- Activity 5.3c Correct Misspelled Words: Bluetooth Keyboard
  - o Correcting Misspelled Words
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- Activity 5.3g Talking Typer App
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- Activity 5.4a Tactile Version of the QWERTY Keyboard

Unit 06: Advanced Gestures and Kindergarten Classroom Apps

- Writing Time Adventure

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6.8 Blindfold Game Apps that Teach Educational Concepts

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Unit 07: Next Steps and Appendix

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- Introducing New Apps
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7.2 Resources

- VoiceOver Gestures Chart
- Refreshable Braille Display Commands Chart
- Bluetooth Keyboard Commands Chart
- Bluetooth Keyboard Navigating Commands Quick Nav Off Chart
- Apps in iOS Manual
- iOS Skills Checklist
- *Paths to Technology* website

ABCs of iOS Manual

Unit 1: Explore and Touch
iOS 12

Objectives
Objectives
Overview
- Keys for Success
- Light Version of App
- Student Levels: Tadpole, Froglet, Frog, Lizard and Turtle

1.1 Basic Gestures: Explore and Touch (Tadpole)
- Self-Voicing Apps
- Child and iPad Positioning
  - Activity 1.1a Baby Musical Hands
  - Activity 1.1b Baby Balloons and Bubbles
    - Hand Position
  - Activity 1.1c Fun Bubbles
  - Activity 1.1d My Baby Piano Lite
  - Activity 1.1e Cause and Effect Sound Box

1.2 Basic Gestures: Tap (Tadpole & Froglet)
- How to Introduce Tap Gesture
  - Activity 1.2a Infant Zoo
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  - Activity 1.2c Fisher Price Storybook Rhymes Volumes 1, 2 & 3
  - Activity 1.2d Fisher Price Laugh and Learn: Learning Letters Puppy

Overview

Everywhere you go, there are toddlers and preschoolers using tech to watch their favorite cartoon, listen to music or play an educational game. Children with visual impairments should have similar tech opportunities and tech skills as their peers. Teaching a young child how to use an iPad requires different strategies and expectations than teaching older students. A young child will need more time to simply explore the screen, learn how to physically use one-finger gestures, and to learn that he can intentionally interact with the screen to make things happen. A young child will be learning basic cause and effect concepts as well as tech skills through age-appropriate, simple apps and lots of repetition. When introducing a young child who has a visual impairment to an iPad, consider these basic keys.

Keys for Success
- Teach how to interact appropriately with tech
- Use tech as a bonding time (families) with educational goals; not as a babysitter
- YOU should be familiar with app first!
- Give the child time to explore and play at his pace
- Explain what will happen – especially if there are "scary" sounds
- Model and then verbally prompt gestures/interactions
- Anticipate short attention span

Resources
[Introducing Technology to Students with Visual Impairments: Toddler, Preschool and Kindergarten post.](#)
[Starting Blind Toddlers and Preschoolers on an iPad post.](#)

Lite Version of App
Many of the apps listed in this curriculum have a 'lite' version of the app. The lite version provides the opportunity to try the app before purchasing. This is especially beneficial when searching for apps for children with visual impairments, as you can evaluate the app's accessibility and if it will meet your child's unique needs.

Note: If the app meets your needs, it is recommended to purchase the app in order to access the full features of the app, to eliminate pesky advertisements, and to support developers who create quality apps.

Student Levels: Tadpole, Froglet, Frog, Lizard and Turtle
Young children will progress through this curriculum at their own speed. The curriculum is designed for children approximately 3 – 8 years old; however, not every child will be introduced to an iPad as a toddler and not every young child will be ready to read and write using a refreshable braille display. Some children may spend months exploring and simply touching the iPad while other children may be ready to learn specific gestures and concepts - jumping through the first exploration activities and/or skipping repetitive apps. The activities are not age-specific, but rather based on the individual's readiness. In this curriculum, these terms are used to help identify the section/activity's readiness level:

- Tadpoles: Children who are ready to be exposed to an iPad and simple touch concepts but who may not yet display finger dexterity. Tadpoles are typically the youngest group of children ready to be introduced to an iPad and who are in the exploration and/or beginning gesture stage. Typically, Tadpoles are making random touches – often using more than one finger - and are not yet ready to intentionally touch specific areas/items on the screen. App content focuses on creating music or intriguing sounds.

- Froglets: Children who are learning basic concepts with decreasing support and are applying these concepts to new apps and situations with prompts. These children are able to intentionally interact with their favorite apps and are

anticipating what will happen, where to touch on the screen, are beginning to be more consistent with 1-finger tap and swipe gestures and are ready to be introduced to basic educational content.

- 🐸 Frogs: Children who are consistently making basic gestures, show understanding of spatial concepts, can follow verbal directions, are independently finding and interacting appropriately with their favorite apps, are applying skills, and learning new apps with limited support. Content is educational-based and requires active thinking and participation from the child.

- 🦎 Lizards: Children who may be traditionally older or who are developmentally ready to be introduced to the iPad and VoiceOver through more challenging activities. These children are in a stage between the most basic Exploration apps and the traditional classroom apps that are used to teach subject matter content. Lizards are children learning the same tech skills using many of the same apps as Tadpoles and Frogs; however, Lizards will be starting at a slightly different place, will learn a few more concepts and will move at a slightly faster pace.

- 🐢 Turtles: Students who are basically independent with familiar apps/activities typically requiring only a quick review or verbal prompts and are transferring skills to new apps/activities. Students are reading and writing simple words and/or sentences, beginning to edit their work, and are using apps/iPad activities to learn and reinforce new classroom skills.

Note: Children may overlap readiness skills and/or may have gaps in their skills. The image indicates when to introduce the activity/concept level; students who start at a higher level will also need to know all of these basic concepts and skills! If there are two images, it indicates that some students may be ready to be introduced to the concept at an earlier level or that a student may be ready for initial introduction to part of the concept but is not yet ready for the full activity.

1.1 Basic Gestures: Explore and Touch

Very young children initially start with apps that do not require the child to create a true one-finger tap gesture. These beginning apps are created to entice the child to touch and interact with the screen. No tech skills, isolated finger movements or concepts are required. These apps are forgiving, meaning that the child can touch with multiple fingers and can hold a touch for a longer length of time, if necessary. Often these apps are visually stimulating with basic images and uncluttered backgrounds; sometimes the screen will display a slow-moving image to capture a child's attention and/or to encourage visual skills such as tracking. The images on these apps are often good for children with low vision and for children with Cortical Visual Impairment (CVI). These apps also include intriguing sounds and music geared for very young children –perfect for children who are visually impaired or blind.

Cause-and-Effect apps are the most basic type of children's app and many may be listed as 'infant' apps. Cause-and-effect is when the child taps the screen to make something happen. Most of these cause-and-effect apps are self-voicing, meaning that VoiceOver is not necessary in order for the child to successfully interact with and play the game. Basic gestures, such as a tap or swipe can be taught with apps that are self-voicing.

Self-Voicing Apps

The apps listed in this section can be successfully used with children who are and who are not able to see the images. **Most apps at this level are self-voicing and are not compatible with VoiceOver. Often the Home page, Settings page and Information pages are not accessible for an adult with visual impairments.** The simplest of these beginner apps do not have Settings or Parent Information – these apps open directly to the self-voicing game and are fully accessible without VoiceOver. Some of the beginning level exploration-type apps do have Settings or Parent Information - unfortunately – these adult pages are currently not fully accessible in any of the apps. Young students with visual impairments benefit greatly from these exploration apps; therefore, this curriculum will try to explain the app layout and format so that all users can navigate through the Home page in order to access the actual game. This manual is a living document and will be updated periodically as additional apps are available. CNIB is working with app developers and educators to increase accessibility.

Child and iPad Positioning

Many very young students are more attentive when sitting in an adult's lap. For these students, cuddling in a lap is a wonderful bonding time – perfect for reading books together, doing quiet activities and learning to use the iPad. When holding a young child in your lap, the iPad should be held by the adult. This is the best time to introduce basic tech rules, such as being gentle with the iPad, no throwing the iPad and using the fingers on one hand to interact with the iPad. If the child becomes rough, the adult can simply extend her arms out, holding the iPad out of the child's reach.

Choose the best time of day to work on iPad skills. The child should be relaxed and willing to sit quietly. For many young children, before or after nap time – if he is not grumpy – may be the best time. If the child is antsy and unable to sit quietly, consider trying a different time.

For children who have useable vision, it is important to position the iPad in such a way that the child can view the iPad with his unique vision. Many children with visual impairments have lower field loss; holding the iPad up – perpendicular or at an angle to the floor - and level with the height of the child's eyes may be beneficial. Note that the child may prefer the iPad held to the left/right side or higher/lower, depending on the individual's vision.

Ideally, the iPad should be held in landscape mode. Landscape mode is required when using a Bluetooth keyboard. Note: Some apps for young children do require portrait mode; landscape mode will be used during this curriculum unless otherwise noted.

Activity 1.1a Baby Musical Hands

[Baby Musical Hands](#) by Streaming Colour Studios. This award-winning app is $.99 in the App store. This app is fully accessible for children and adults; it is self-voicing and can be used with or without VoiceOver.

Purpose
Baby Musical Hands encourages young children to simply touch and explore the screen. Children create their own music with drum, piano and guitar sounds. **This app can be used to introduces basic spatial concepts and has a grid layout.**

Play
Baby Musical Hands is a 3x5 grid. The red squares in the top row produce drum sounds, the yellow squares in the second row produce piano sounds and the blue squares in the third row produce guitar sounds. The pitch increasing as you move from left to right across the screen. Touch the screen to produce different musical tones. **This app enables students to touch using one or more fingers and to drag a finger(s) around the screen.**

Settings
This very simple and fun app does not have or need Setting options.

Accessibility for Adults
Opening the app begins the game. This app is fully accessible for everyone. Note: When VoiceOver is on, only piano sounds are heard.

Additional Apps

Resource
[Laura Directions Hands video](#): Four-year old learning to find left, right, top and bottom of the iPad screen, then being introduced to Baby Musical Hands app to touch the iPad. The TVI encourages to use her pointer finger.

Activity 1.1b Baby Balloons and Bubbles

Baby Balloons and Bubbles by Edujoy has a Lite version (with ad pop-ups) and a $2.99 in-app paid purchase (eliminates ad pop-ups). This app is self-voicing and is accessible to children without VoiceOver; VoiceOver is not compatible. Visually, the app has high contrast balloons and an uncluttered background.

Purpose
Baby Balloons and Bubbles encourages young children to simply touch and explore the screen. Children create and pop balloons. This game has a basic games (balloons), ABC game, and 123 game. Introduce spatial concepts as the balloons eventually settle at the bottom of the page.

Play
Balloon Basic Game: Each time a child touches the screen a balloon appears with a sound of a someone blowing into a balloon. Tap on an existing balloon and hear the balloon pop or sounds of air being let out of the balloon; visually multi-colored stars briefly appear when the balloon is popped. Occasionally when a balloon is popped a bubble will appear. Tap on the bubble to hear a different pop sound and a new balloon appears. **Children can use one finger or multiple fingers. Drag a finger around the screen to produce numerous balloons**. Even though the child can touch the screen with multiple fingers, if the child is comfortable touching the screen and is physically ready, begin to encourage touching gently with a 1-finger gesture.

Teaching Hints: A child can randomly touch the screen to create balloons and if he taps a balloon, the balloon will pop – no vision is required. Balloons move randomly around the screen; however, balloons that are not popped settle along the bottom edge of the screen, making it easier for blind children to find.

ABC Game: Tap the screen and a balloon appears with a letter; the letter is said out loud with the associated balloon sound. Letters appear in alphabetical order. The game is played the same as the basic game.

123 Game: Tap the screen and a balloon appears with a number; the letter is said out loud with the associated balloon sound. Numbers appear in order, 0 – 20.

Settings
The settings button is found in the lower right corner. Options include these languages: English, Spanish, French, Dutch, and Italian. Games include the basic Balloon game, ABC game and 123 game.

Accessibility for Adults
While accessible for young children to play, the Settings button and the buttons to make selections within Settings are not accessible. To begin playing the game, wait a couple seconds until the Home screen is silent; the game will automatically load and begins

when you tap the screen to create a balloon. The Settings button is on the game screen in the bottom right corner.

Similar Apps

Remember: Very young students who are learning to touch and explore an iPad screen will need multiple apps that are similar, predictable and repetitive. In this section, there are multiple apps by different developers, including several basic 'bubble' apps. Your child may enjoy one of these apps more than another, may benefit from using all of these similar apps or may skip through the list of available apps. Each child is unique!

Hand Position

The main goal at this level is to encourage the child to appropriately touch the iPad and to become comfortable interacting with the iPad. Many of these exploration apps do allow multiple fingers to touch the screen. As the student learns to interact appropriately with the screen, begin to introduce a good hand/finger position with the goal of moving towards a 1-finger tap gesture. Remember, a toddler may not be physically ready to use his pointer finger in isolation! Very young children hold their hands in a fist position; start with a fist and then help the student learn to extend his index finger. Be sure to model the correct positioning! For some students, the smaller iPhone screen may encourage using the pointer finger.

If an app can be used to teach additional gestures, these additional gestures will be mentioned and will be in bold font. You may choose to incorporate the additional gestures when you initially use the app, or you may come back to these apps when teaching/practicing these gestures.

Activity 1.1c Fun Bubbles Lite

Fun Bubbles by Lewis Johnson has a [Fun Bubble Lite](#) version (with ad pop-ups) and a $.99 [Fun Bubbles – Kids and Toddlers](#) paid version (eliminates ad pop-ups). This app is self-voicing and is *basically* accessible to children without VoiceOver.

Purpose
Baby Balloons and Bubbles encourages young children to simply touch and explore the screen.

Play
Fun Bubbles is played in Portrait Mode. Tap randomly on the screen with one or more fingers to create bubbles. **Drag to make a lot of bubbles.** Tap and hold to create big bubbles. Spatial concepts: bubbles move up and then disappear at the top screen; teach the child to tap at the top of the screen when searching for bubbles to pop. Note: Creating a bubble is visual only – no sound, so the blind child does not receive any feedback when he creates bubbles. Randomly touch the screen to pop the bubbles and to hear the popping sound. Adults may choose to create the bubbles and then the child can pop them. Bubbles are high contrast and the background is uncluttered.

Settings
In Settings, there are several nice features including the ability to change the background, change the color and shape of the bubbles and adjust the speed that the bubbles move. The pop-over menu at the top right has:
- Sound
- Clear Screen
- Background
- Bubbles in multiple colors
- Questions/Information

The pull-up menu at the bottom right has:
- Shape Options: circle, star, heart, diamond, multiple shapes
- Color Options: 14 different colors
- Speed Slider: stop, slow, medium Fast

Accessibility for Adults
While accessible for young children to play, the Settings menu buttons and the buttons to make selections within the menus are not accessible. To access the game, on the Home page, tap the large Start circle in the center of the screen, then tap anywhere on the screen to create bubbles.

Activity 1.1d My Baby Piano Lite

My Baby Piano by DokdoApps has a free My Baby Piano lite version (with ads which run across the top of the page) and a $.99 My Baby Piano paid version without ads. If you like this app, you will want the paid version! This app is self-voicing and is accessible for children without VoiceOver. The buttons on the screen are accessible with VoiceOver; although, the button includes abbreviations such as, "img btn song". The piano keys on the game itself will not work if VoiceOver is on.

Purpose
This app is designed to encourage children to explore the piano keys on the iPad. Children can randomly tap to hear tones or for children who are musically inclined, they can create simple tunes. **My Baby Piano can be used to teach the Drag gesture** as children can drag 1 or more fingers at a time.

Play
Touch the colorful piano keys that are located horizontally from the middle to the bottom of the screen. Each key produces a note. Use one or more fingers and tap the keys. Drag a finger to create a musical slide. There are three buttons on the left side below the ad banner: Music, Drums, and Pause. Tap the Music button to hear a nursery song. Tap again to hear different songs. Tap the Drum button to add a drum beat. Tap again to hear a different drum beat. Tap the Pause button to stop the music or drum beats.

Settings
This app does not have any Settings.

Accessibility for Adults
The add banner at the top of the page is accessible with VoiceOver and the three buttons are accessible. The piano keys in the game are not accessible with VoiceOver. This app does not have any Settings and is only one page.

Activity 1.1e Cause and Effect Sensory Sound Box

The Cause and Effect Sensory Sound Box by Cognable is $.99 in the App Store. While the games themselves are accessible, choosing and opening the desired game is not accessible with VoiceOver and is not read aloud. This game is accessible with switch devices.

Purpose
The Sound Box app was created to encourage children with complex learning needs, autism and visual impairment, to touch and explore the screen. **This app encourages children to drag their finger around the screen.** This app can be used to teach spatial concepts.

Play
Sound Box is a collection of simple interactions controlled by a single touch. There are 18 scenes available. Each scene is a dark screen. The child 'scribbles' on the screen to produce unique sounds and visual images. Dragging one or more fingers around the screen plays a continuous sound which typically changes its pitch or intensity.
Tap or drag with one or more fingers produces sounds – most of which will change the pitch or intensity depending on where on the screen the tap is made.

Note: The app works best when the child drags his finger.

There are various types of scenes.
Examples:
- Wind Maker scene raises the intensity (drag a finger up to increase the sound intensity)
- Grayscale raises pitch (drag a finger up to increase the pitch)
- Down Pour and Ground Control have sound effects which are linked to "up" and "down" movement

To play, select the desired scene and drag (or touch) the screen to hear and change the sounds and to see the visual images/drawings.

To exit a scene page, tap the very small "x" button in the bottom right corner of the screen.

Settings
Along the top of the Main Screen are four buttons:
- Sounds
- Palette (changes background colors)
- Help
- Settings

On the Settings page are Sound Box Control Options, Visual Options and Switch Options.

Accessibility for Adults
This app requires vision to select the desired scene. The main screen, buttons, and option pages are not accessible with VoiceOver.

Additional Games
[Cause and Effect Sensory Light Box](#) is a $3.99 app by the same developer that is very similar to Sound Box. The Light Box uses abstract animation and sound to introduce basic touch skills and awareness.

1.2 Basic Gestures: Tap (Tadpole & Froglet)

The apps discussed in this section were chosen for their simplicity - in design and in content. The first Tap section (1.2) contain apps which are best suited for younger audiences. For some 'older' children who are being introduced to an iPad, the second Tap section (1.3) contain apps with content that might be more age-appropriate for slightly 'older' children. Keep in mind, that when introducing new concepts, it is important to use easy content that does not detract from the tech concept being taught. The apps in this section are basic cause-and-effect apps that require a one-finger tap. Some of these apps also allow either a tap or a one-finger swipe to move to the next screen. This section is designed to teach and reinforce the one-finger tap; however, when the child is ready for the swipe gesture, these apps can be used again to teach and reinforce the swipe gesture. If the app allows a swipe gesture, the app description will mention the swipe or additional gestures in bold letters.

How to Introduce Tap Gesture (Tadpole)

Once a child is interested in touching the screen and the child has the necessary fine motor skills, teach the child how to position his hand in order to correctly make the gesture. Remember, the child is not able to learn by *watching* others tap and swipe; physically model the gesture as necessary. Gestures work best with a light touch and a quick movement. Movements should be small, with just finger movement, not a whole hand movement. To make the tap gesture, the hand should hover with the palm just above the iPad's surface. Ideally, only the index finger will drop down and lightly tap the screen. Very young children are just learning to have isolated finger control, which is typically required for making various one-finger gestures. Often a young child will start by making a fist with the index finger extended and as his finger dexterity improves, the child learns to hold his fingers out flat (not fisted) and will only drop the index finger.

When performing a gesture on the iPad, model the gesture using hand-under hand movements, so the child can better understand the desired movement. Some children may do best with hand-over-hand modeling, but only if the child is willing to touch the screen and if you have a good rapport with the child. Do not force the child! Also be sure to pair the action with a clear, simple verbal description. As the child's skills progress, decrease the prompts. The ultimate goal is to support the child through the learning process and then help him become a confident, independent user.

Activity 1:2a Infant Zoo

Infant Zoo by Treebetty LLC has an Infant Zoo Lite version (with NO ad pop ups) and a $3.99 Infant Zoo full version. This app is self-voicing and is accessible to children without VoiceOver.

Purpose
Infant Zoo is a cause-and-effect app that reinforces the 1-finger tap. This app is designed to be a visual stimulation app for babies with its black, white, red and yellow colors. It is ideal for students with CVI or students with low vision to work on visual targeting and attention; and, it is motivating for students with no vision who are learning to interact with an iPad. The screen is uncluttered, and the app has a soothing music (which can be turned off). This app is not compatible with VoiceOver.

Play
Infant Zoo's screen displays a white egg in the middle of the screen with a high contrast, colorful background. The egg bounces slightly up and down, and a double knock sound is heard. The child makes a one-finger single tap in the center of the screen, which activates the egg. The egg opens, and a chicken, cat, or ladybug appears with an auditory sound. Tap around the screen to produce more colorful, moving circles. A tap on the right edge, middle of the screen is the default setting to turn the page. For a very young child, turning the page can initially be done by the adult.

Teaching Hint
Basic spatial concepts can and should be introduced from the start! In this app, spatial concepts are important – the student must tap in the center of the screen to activate the egg. Touching the right edge, center of the screen will turn to the next page. Very young children begin to anticipate where they need to tap, even if they do not see the images on the screen. Note: there is a Settings option to tap the background to turn the page; however, this eliminates the opportunity for the child to explore the screen.

Settings
- Advanced Mode (**Tap arrow or tap background to turn the page**)
- Vibration Mode (On/Off; iPhone only)
- Help
- More Apps
- Leave a review
- Share
- How to Play: Tips and Tricks
- Privacy Policy

Accessibility for Adults
The Home screen, buttons on the Home screen and Settings screen are not accessible to adults with visual impairments. The large Play button is located in bottom right quadrant.

Additional Treebetty Apps

There are additional Treebetty apps available individually or for $19.99, you can purchase the Treebetty's Baby & Toddler bundle of 10 apps.

Activity 1.2b PeekaBoo Barn

[PeekaBoo Barn](#) by Night and Day is $1.99. This app is self-voicing and is accessible without VoiceOver.

Purpose
PeekaBoo Barn is a cause-and-effect app that reinforces the 1-finger tap. The app also teaches 16 animals and their associated sounds.

Play
To capture the young child's attention, the barn bumps up and down, sounding like someone is knocking three times and an animal sound is heard. Tap in the middle of the screen to open the barn doors. A picture of the animal appears and a child's voice names the animal. Tap anywhere on the screen to close the barn door. The barn begins to move again with the knocking sound and next animal sound. Children love the animal sounds and the child's voice that names the animal. They also love the familiar knocking sound, which encourages them to "knock" back!

Teaching Hint
Before introducing the app, knock gently three times on the desk (same pattern as the knocking in the app) and encourage the child to gently knock back. Transition from knocking to making a one-finger light tap on the table. Be sure to encourage knocking in the child's daily routine, i.e. knock three times before opening a door.

Settings
- Play Mode (regular or looped)
- Voice (On or Off)
- Languages and Recording: The default language is US English – child.

Accessibility for Adults
The Home screen is not self-voicing. The large play button is located in the bottom right quadrant of the screen. The Options (Setting button) and Options page are not accessible. The Options button is located on the Home screen in the top right corner.

Additional PeekaBoo Apps
There are additional PeekaBoo apps available, such as PeekaBoo Trick or Treat, PeekaBoo Presents, PeekaBoo Forest, PeekaBoo Wild and more.

Activity 1.2c Storybook Rhymes Volumes 1, 2 & 3

Fisher Price has three Storybook Rhymes Apps; all three apps are free. Each app has two sing-along nursery rhymes.
- [Fisher Price: Storybook Rhymes Volume 1](#) One, Two, Buckle My Shoe and Itsy Bitsy Spider
- [Fisher Price: Storybook Rhymes Volume 2](#) Row, Row, Row Your Boat and The Animal Fair
- [Fisher Price: Storybook Rhymes Volume 3](#) Hickory Dickory Dock, Pat-a-Cake

These apps are self-voicing and are accessible to children and are not compatible with VoiceOver. These apps are used in Portrait Mode only.

Purpose
These are simple cause-effect apps in a book format. Children can practice their 1-finger tap while listening to a fun nursery rhyme song. In the Read and Play option, children can explore the page and learn basic spatial concepts. Note: **A one-finger swipe right or left will also turn to the next page or previous page.**

Play
There are two options: Read & Sing and Read & Play.
In the Read and Sing option, each page is read aloud and interesting sounds are heard. (Be sure to wait after each phrase is sung for the sounds and animation!) Tap anywhere on the page to turn the page. Note: A right or left swipe will turn to the next page or previous page.

In the Read and Play option, children explore the screen by tapping anywhere to find interactive points. Tap in the bottom right corner to turn the page. The child can spend his time exploring/tapping around the page before choosing to turn the page.

Settings
- In Settings, you can add the child's name so that his name appears on the book cover.
- Home button (On/Off)
- Sound (On/Off)
- Background music (On/Off)
- Narrator (On/Off)
- Auto Play (On/Off); Off is the default option.

Accessibility for Adults
The Home screen is not self-voicing. In the middle of the screen are the two book options: the book on the left is the first book listed above and the book on the right is the second book. Tap on the book to open the desired book. The Information button is in the top right and the Settings button is in the bottom right. These pages are not accessible.

Resources

[Fisher Price Storybook Rhymes Accessibility Review post.](#)

Activity 1.2d Laugh and Learn: Learning Letters Puppy

Laugh and Learn: Learning Letters Puppy by Fisher Price is a free app. This app is self-voicing and is accessible to children without VoiceOver; this app is not compatible with VoiceOver. Learning Letters Puppy has simple, colorful images with high contrast on uncluttered backgrounds. This app is used in Portrait Mode only.

Purpose
This app is a cause and effect app that has four games: the ABC game introduces letters and a word associated with each letter, the 123 game that introduces counting, Songs, and Shapes and Colors. This app reinforces language and words. The app also reinforces the one-finger tap gesture. Note: **A one-finger swipe right will also turn to the next page or previous page.** (Note: A left swipe will also move to the NEXT page.)

Play
ABC Game: Tap anywhere on the screen to move to the next letter in the alphabet, name of object starting with the letter, and fun sound associated with letter.

123 Game: Tap anywhere on the screen to move to the next number. Each number has a fun sound; some numbers include sound counting clues. Also, some numbers have a short rhyme. Numbers are shown visually and said aloud.

Songs Game: Tap one time to start a song. The first three songs are the same songs which are played in the other three games. There are also additional songs. Songs are played in order; students cannot choose to listen to a specific song.

Shapes & Colors App: After the song/phrase, tap anywhere on the screen to move to the next shape or color. Each page visually shows an object associated with the shape and color and the printed shape and color words. The shape and color is said aloud but the object is not; however, the object is mentioned in the song. One shape & color song is played after every four pages. This game is not as accessible (as the object is not initially described) but students who cannot access the screen visually, still enjoy this game.

Exit the game by double tapping in the top right corner.

Settings
- Home button (On/Off); enables the Home button to be removed from the game screens
- Sound button (On/Off)

Accessibility for Adults
The Home screen, Settings and Information buttons and pages are not self-voicing. On the Home screen, the middle of the page is divided into four quadrants with four large game buttons. ABC game is the top left, 123 game is top right, Songs game is bottom

left, and Shapes & Colors is bottom right. The information button is located in the very top, right and the Settings tab is located in the very bottom right. All the buttons on the Home page make a clicking sound when they are selected.

Resources
Laugh and Learn: Learning Letters Puppy App Review Post

ABCs of iOS Manual

Unit 2: Cause and Effect
iOS 12

Objectives

2.4 Introducing VoiceOver to Early Elementary Students (Modified)
- Lesson: Handling an iPad
- Lesson: Home Button
- Lesson: Intro to icons, Home Screen Layout and Listening
- Lesson: Expanding Spatial Layout and Listening Skills
- Lesson: Introduce Earcons
- Lesson: Introduce Basic VoiceOver Navigation Gestures
- Lesson: Introduction to Home Screen Folders
- Lesson: Introducing the Refreshable Braille Display/Bluetooth Keyboard to Navigate the iPad
- Lesson: Using VoiceOver to Pause/Play Speech
- Lesson: Using VoiceOver Gestures and/or the Braille Display to Navigate a Pages Document
- Lesson: Two-Finger Swipe Up/Down (Reading Gestures)
- Lesson: Two-Finger Single Tap to Pause/Play Speech

Overview

The first section of Unit 2 focuses on apps that require a one-finger tap in a specific area – a more intentional tap – *and* the progressive content requires more purposeful interaction. These apps can be used with the younger children after they progressed through the apps in section 1.2; or these apps can be used with children who prefer more challenging content.

The middle section of Unit 2 introduces VoiceOver – including basic VoiceOver gestures and concepts. Apps include basic educational concepts and activities include completing tasks while using VoiceOver.

The last section of Unit 2 is a modified teaching approach which focuses on children who are typically slightly older and who are developmentally ready to be introduced to the iPad and Voiceover through more challenging activities. These students are in a stage between the most basic Exploration apps and the traditional classroom apps that are used to teach subject matter. While the students are learning the same VoiceOver skills and concepts, the teaching method is slightly different.

Note: Please read through the accompanying activities in Unit 2 and 3 to understand the 'big picture' before using Section 2.4 with a student. Many young children who are in elementary school who will benefit from going through the manual step-by-step as it is written; however, there are some students who may learn better through the modified Lesson approach discussed in section 2.4

How to Teach the Tap Gesture (Froglet)

Very young children initially need motivation to learn gestures, so the tap gesture is taught in simple cause-and-effect apps. Children who have more finger dexterity and are more independent often learn and practice the basic gestures in the VoiceOver Practice Screen. (See Help Screen Activity 2.3e below.)

Children who have been exposed to a Perkins Braille Writer have learned to use force when pressing the manual keys; these children often swoop their hand down and smash the iPad's screen. (The Perkins Braille Writer is a manual brailler and requires a significant amount of pressure to create braille dots.) To encourage a light touch, practice a 'tickle touch' or 'feather touch'. Use one finger and gently create a light, tickle touch on your child's arm or the back of his hand while whispering, "tickle touch". Have the child make a 'tickle touch' on his arm and then on your arm. Model the gesture as often as needed and repeat this activity at the beginning of each lesson to develop muscle memory.

Encourage the child to hover his palm just above the iPad's screen and gently drop his index finger, or if necessary, gently help support his hand as he drops just the index finger.

Note: You should NOT hear the finger tapping on the screen. The tap should be quiet!

Modification: Children with physical issues or who truly do not have the ability to learn isolated, one-finger gestures may need modifications. Whenever possible, teach every child to use gestures without modifications – even if more time is required to learn the gestures initially. Keep in mind that is harder to re-teach a gesture! Modifications for children who have physical issues might include:
- Holding an iPad pen or the thicker iPad crayon stylus
- Playdough: Form a ball with a pointer that the student can hold in his fist. (Fresh playdough is conductive.)
- Glove: For a child who rests his palm or fingers, cut the index fingertip only out of a soft glove

Activity 2.1a Laugh and Learn Animal Sounds

[Laugh and Learn Animal Sounds](#) by Fisher Price is a free app. This app is self-voicing and is accessible for children; the app is not compatible with VoiceOver.

Purpose
Laugh and Learn Animal Sounds is a cause-and-effect app that teaches animal names, animal sounds, and animal facts. This app reinforces the 1-finger tap. Tap the center of the screen plays the game; the child can choose to tap specific interact areas in the first level, but it is not required to in order to play the game. The second level of the game requires tapping in a specific area of the quadrant to play the game. **This game reinforces spatial concepts!**

Play
There are two levels in this app.
Level 1: Animals are introduced one at a time. Tap in the center of the screen to interact with the animals. Each animal makes a sound. Tap once to hear the animal's sound and the name of the animal. Tap again to hear a fact about the animal. If desired, tip the iOS device to the right or left (best when using an iPhone) and visually the animal slides across the screen in that direction. Each direction has a different sound. Tap in the top left, top right or bottom right to hear an interesting sound. Tap the bottom left to hear the animal's name. Move to the next page by tapping the right, middle edge of the screen. Move to the previous screen by tapping the left, middle edge of the screen.

Level 2: Four animals appear at one time. The middle of the screen is divided into four quadrants. Tap on an animal to hear the animal's sound and name. Tap again to hear a fact about the animal. Explore the animals as long as you want. Tap the right middle edge of the screen to turn to the next page; the next page includes an animal song. The page automatically turns when the song finishes. There are multiple pages of animals to explore. Note: The animals appear randomly and may be repeated but in a different location!

Teaching Hint: **Encourage the child to explore the page and learn where each animal is on the *current* page.** Remember, it is critical for students to develop spatial awareness!

Settings
- Home Button (On/Off)
- Sound button (On/Off)
- Background Music (On/Off)

Accessibility for Adults
Open the app and the initial Home screen appears briefly (sound of children laughing). The app automatically changes to the screen with Level 1 and Level 2 (large buttons in the middle left half of the screen and middle right half of the screen). The Information

button is in the very top right corner and the settings tab is in the very bottom right corner. The Home screen, Settings and Information buttons and pages are not accessible.

Resource
[Laugh and Learn Animal Sounds App Review post](#)

Activity 2.1b See 'n Say

[See 'n Say](#) by Fisher Price is $1.99 in the App Store. This app is self-voicing and is accessible to children without VoiceOver. The Parent page is accessible with VoiceOver.

Purpose
See 'n Say is a digital version of the classic Fisher Price physical See 'n Say spinner game. The app has 12 animals and brief corresponding videos with animal facts. It is a cause-and-effect app that requires tapping in specific areas with a one-finger tap, reinforcing spatial awareness.

Play
The screen is a big circle with six pie-shaped areas; each area has an animal. In the middle of the circle is a large spinner. Tap on an animal to hear the animal sound and the name of the animal. The video about the animal automatically plays. In the first circle, starting in the top left corner and moving clockwise are the following animals: frog, eagle, cat, goat, turkey, and dog. Tap in the very top right-hand corner to access the button to move to the second page for the next six animals. Starting in the top left corner, are the following animals: duck, pig, rooster, sheep, cow, and horse. Tap the very center of the circle to activate the spinner.

Note: The spinner does not help teach spatial awareness, so encourage the child to intentionally find specific animals.

Hint: Encourage the child to find a specific animal – select each animal multiple times as there are 6 different videos for each animal. Kids who are visually impaired thoroughly enjoy learning animal fun facts!

Settings
This straight-forward app does not have game options. Parent Page includes the following buttons:
- Share
- Rate
- Submit Feedback
- Information
- See more Apps

These buttons are fully accessible with VoiceOver!

Accessibility for Adults
The app opens right into the game. Users need to understand the spatial layout; however, when an animal is tapped, the animal sound and self-voicing name indicates which animal has been selected. The videos are not audio described; children who are visually impaired will benefit too, as the animal facts are said aloud. The Parent button

and the button to switch between the animal screens is not accessible. The Parent button is located in the very bottom left corner; the button that switches animals is located in the top right corner.

Additional Apps
Fisher Price See 'n Say Vehicles is a similar app for $1.99.

Resource
See 'n Say app Review post

Activity 2.1c Animal Band Nursery Rhymes

Animal Band by StoryToys Entertainment Limited has a free version (with 2 songs) and an additional 8 songs are available ($4.99 for all the songs or $.99 per song). There are no ads in the free version. This app is self-voicing and is accessible to children without VoiceOver. The app is not compatible with VoiceOver.

Purpose
Animal Band is a 3D Interactive Music app that encourages young children to explore music. It is a cause-and-effect app that reinforces tapping in specific areas with a 1-finger tap and which encourages spatial awareness. Each musician plays a different instrument. **Tap faster to make the song play faster.**

Play
The free version includes two songs: Wheels on the Bus and Coming Round the Mountain. Tap on a musician to hear individual instruments. There are four animal musicians in the bus with three animals on top of the bus. In the top row starting on the left the animals are playing a trumpet, accordion, and guitar. In the bottom row, the animals are playing maracas, electric guitar, cymbals and singing. There is also a bus horn to the right of the top row animals. As you tap the animal, the animal adds his instrument to the song. Your taps control the instruments. Example: Tap rapidly on the cymbals and hear the cymbals crash with every tap. The faster you tap, the faster the song goes. If you stop tapping on an animal, he falls asleep, his instrument quits playing and the song slows down.

Settings
This straight-forward app does not have options.

Accessibility for Adults
When the Home screen opens it quickly shows a screen with the StoryToys logo and then a screen with the Animal Band image. When the music starts, the app is loaded; the image in the middle of the screen is a large button for the Wheels on the Bus song. Flick to the right moves to the Coming Round the Mountain song. Keep flicking to view previews of the additional songs. When in a song, three buttons are located in the top left corner: Home button, Replay button and Arrow button (next song). These buttons are not accessible.

Additional Songs
The additional 8 songs are available for $4.99 for all the songs or for $.99 per song.
- I'm a Little Teapot
- Happy and You Know It
- Old McDonald
- Baa Baa Black Sheep
- Row Row Row Your Boat
- Once I Caught a Fish Alive

- Twinkle Twinkle Little Star
- Itsy Bitsy Spider

Activity 2.1d The Very Hungry Caterpillar – First Words

The Very Hungry Caterpillar First Words by StoryToys Entertainment Limited ($2.99) is one of several Touch, Look, Listen 3D interactive books. This app is self-voicing and is accessible to children without VoiceOver. VoiceOver is not compatible with this app. The images are from the beloved children's book by Eric Carle. Images have high contrast and have uncluttered backgrounds.

Purpose

The app teaches young children over 80 words, grouped by 13 categories and offers a quiz section at the end. The 3D interactive book is available in English, French, German and Spanish as the primary or secondary language. It is a cause-and-effect app that reinforces tapping in specific areas with a 1-finger tap which encourages spatial awareness; **children need to remember the location of the objects in order to find each object when asked at the end of the book.**

Play

When the page is opened, the story is read aloud. On each page are six objects which are located around the middle of the page. Tap around the screen to find the objects. Tap on an object to hear the name of the object. Tap on the object again, to hear a sound associated with the object. Tap in a blank space and nothing happens. **To introduce children to categories, each page has a group of animals or objects.** Example: The first page contains farm animals; the second page contains jungle animals.

Turn the page by tapping on the right arrow located in the bottom right corner or the back arrow located in the bottom left corner. Each time a new page opens, the music changes.

Hint: Encourage the child to learn where the animals are located on the page. Be sure to encourage children to begin classifying the objects on each page – this will also help the child to remember which animals are on a specific page and where they are located.

At the end of the book, the child will be asked to, 'Find the _____.' The child will need to remember where each animal is located in order to tap on the correct animal. If the child taps on the correct object, a specific reward sound is heard, and the next question is asked. If the child taps on the wrong object, a tone is heard. If the child does not tap on an object, no sound is heard.

Settings

Options on the top of the Home screen:
- Book Symbol: The book has two options: Read to Me (default) and Read it Myself
- Music Symbol: Toggle Mute On/Off

- World Symbol with American Flag: Select Main and Second Language (flag indicates which language is selected)
- Big Person/Little Person Symbol: Adult options (requires a two-finger swipe up to access the adult page)
  - Home: Join StoryToys community (mail, Facebook, Twitter, newsletter)
  - Settings: Toggle On/Off: Update Messages, More Apps Page, Store Links
  - Notes: Help page
- Question Symbol: Opens book to the first page that asks the student to 'find the ___." The Question symbol is located on the right 1/3 of the page close to the middle.
- More from StoryToys Symbol: Is located in the bottom right corner. This option must be toggled On to work.

Accessibility for Adults

The buttons on the Home screen are not accessible and the pages with options are not accessible. To start the book, tap in the middle of the page.

Additional Apps

StoryToys has additional 3D Interactive book apps including Zoo Animals – Touch, Look, Listen, On the Farm – Touch, Look, Listen, Things that Go – Touch, Look, Listen and My first Words - Touch, Look, Listen; These books can be purchased separately or bundled for a discount.

Activity 2.1e iSays Free – Simon Classic Color Memory Game

iSays Free by Kfirapps Limited has an iSays free version (with ads along the bottom; full screen ads may popup) or a paid iSays verision for $.99. This auditory game is best played without VoiceOver. The Home screen and menus are fully accessible with VoiceOver. This app is played in Portrait mode.

Purpose
iSays is the digital version of the classic Simon Says color memory game. **The game is a simple memory game, reinforces listening skills, spatial skills and 1-finger single tap.**

Play
The Home screen – which is accessible with VoiceOver – has three buttons in the center of the screen: New Game, Settings, and More Apps. Select the New Game button. The game is *timed* and is best played without VoiceOver as the VoiceOver chatter may distract the player and will slow down play. Children can quickly learn the spatial layout of the four game buttons. The game is a large circle which takes up most of the screen space. The circle is divided into four quadrants. Starting in the top left and moving clockwise, are the following colors: green, red, blue and yellow. Each color has a unique tone. The game starts by lighting up one color and playing that color's associated sound. The player then echoes the sound by tapping on the correct color. If correct, the game plays the same sound and adds a second sound. The player echoes these two sounds. This sound sequence continues with each round adding an additional sound. The game ends when the player taps on the wrong color or when the time runs out.

The Game screen has a Restart button in the bottom right (above the ads in the free version) and a Home button in the bottom left. In the very center of the circle is the score. The score is NOT self-voicing. The score is accessible with VoiceOver.

Settings
The Settings button and the Settings page are accessible with VoiceOver. The options are:
- Auto Speed
  - Easy
  - Medium
  - Hard
  - Insane (available in the Full version)
- Sound Effects (toggle On/Off)
- Sound Theme
  - Piano
  - Original (tones)

Accessibility for Adults

The buttons on the Home Screen are accessible and the Settings page is also fully accessible. The Home and Restart buttons on the Game page are accessible. The game itself does work with VoiceOver but is best played without VoiceOver using the self-voicing feature, except VoiceOver is required to access the Score, which is located in the middle of the circle on the Game page.

Resource

iSays App Review post

2.2 Basic Gestures: Swipe & Drag 🐸 🐸

The swipe and drag gesture in this section are used with self-voicing apps, without VoiceOver. This enables the child to learn the gesture without needing to know about other VoiceOver gestures.

The apps listed in previous sections of this curriculum incorporate the one-finger tap gesture; however, a number of those apps also have the option of using a right swipe to turn the page. If an app can be used to teach additional concepts – such as a right swipe – the additional concept was mentioned in the Purpose section of the app description and was emphasized with bold font. For children who benefit from learning a new concept in a familiar app or who may benefit from easier content, use these familiar apps to introduce the one-finger swipe right/left gesture. Some students may have already used the swipe gesture when learning the previous apps. Other students may be ready to learn the swipe gesture through new apps which are listed below. Each child should move through this curriculum at his own speed and when he is ready!

How to Teach the Right Swipe Gesture
iPad gestures should be made with minimal movement and strength. The swipe gesture is a one-finger gesture swipe right or left; swipe right moves to the next item while swipe left moves to the previous item.

Encourage the student to hover his hand just over the iPad's screen. If possible, the hand should be held flat with the fingers loosely extended; however, some young children who physically struggle with isolated finger movements might initially need to make a fist and extend just the index finger. (Remember: It is best to learn to extend all fingers, as it is an easier transition to creating three and four finger gestures when the fingers are extended.) Ideally, only the index finger should move right; the wrist and arm should stay still. Remind the child to have a loose, relaxed fingers and that every gesture should be light and gentle!

When teaching a child with visual impairments to swipe, start by modeling the swipe. For a right-handed child, hold up your left hand parallel to your body. Make a fist with the index finger extended, pointing to the right. Use your right index finger to make the right swipe motion, quickly moving the right index finger from the first knuckle on your left finger swiping right to the tip of the finger. The movement is very small!

The swipe movement should be quick. If the finger touches the screen and hesitates before swiping, the iPad will interpret that movement as the tap gesture.

Activity 2.2a Coin Hockey (Swipe Gesture)

This is a fun game to help teach the drag gesture. This game works best on a metal cookie sheet with raised edges; the metal makes a fun sound and the raised edges define the space. The goal of the game is to "score" by making the hockey puck (coin) hit the short end of the cookie sheet. Place the cookie sheet on the table in landscape mode. Using his finger on the coin, ask the child to **drag his finger** and the coin to find the top, bottom, right and left sides of the cookie sheet and find the center of the cookie sheet. From the center, ask the child to 'swipe right' (small, quick movement) to send the puck (coin) to the hit the right edge of the cookie sheet, making a goal. Listen for the coin to hit the right edge of the metal cookie sheet! Practice until the coin hits the right edge and the gesture is small and quick (a true right swipe gesture). Now try a left swipe and send the coin to the left edge of the cookie sheet. If desired, try a right swipe from the left edge of the cookie – all the way across the cookie sheet. Be careful that the student makes a true right swipe and does not drag his finger!

Repeat the Coin Hockey activity when learning to drag, swipe up or swipe down.

Note: Coin Hockey might work for some children to learn two or three finger swipes; however, for many young children, using several fingers on several coins simultaneously can be physically challenging!

These apps - which were discussed earlier in the curriculum - include the swipe gesture:
- Storybook Rhymes Volumes 1, 2 and 3
- Laugh and Learn: Learning Letters with Puppy

Activity 2.2b Five Little Monkeys Sitting in a Tree

Five Little Monkeys Sitting in a Tree app by Oceanhouse Media is a $2.99 App. This app is self-voicing and is accessible for children. The app is not compatible with VoiceOver. The images in this popular children's book are visually busy.

Purpose
Five Little Monkeys sitting in a Tree is an interactive children's book with simple cause-and-effect images. Tap to hear the names of images or words in the book- **hearing these words will help build the child's vocabulary**. Children who are visually impaired can explore the screen by tapping; hearing the vocabulary words also provides information about the illustrations in this book. Swipe left to turn to the next page. **Double tap on the words to replay the paragraph**.

Play
When the page opens, the sentences on the page are read aloud. The book has background sounds that provide additional information. Example: When Mama sleeps, there are birds chirping and snoring sounds. When the monkeys are climbing the tree, little chattering voices are heard, tree branches rustle, and a crocodile sound is occasionally heard. There are numerous interactive touch points on each page. Touch an image or word to hear the word aloud; briefly, the printed word appears on the screen. Swipe left to turn to the next page; swipe right to go back to the previous page.

Settings
On the Home page, there are three options on how to read the book:
- Read to Me (default page)
- Read it Myself
- Auto Play

Children who are visually impaired will use the Read to Me option, as the other options are not accessible if the child cannot see the text on the page. These options are located on the right side of the screen.

Also on the Home page, are three buttons:
- Bookshelf
- Apps
- Info (access with one finger swipe up)

These buttons are located in the bottom left corner.

On each page in the book is a blue arrow button located in the bottom left corner of the screen. This exposes a tool bar located across the bottom of the page that enables the reader to record his voice on each page.

Accessibility for Adults
The app opens up to the Home screen which is read aloud. The Read Aloud button is located on the right side of the screen about one-third of the way down the screen. The

other two options are located below this button. Tap on the Read Aloud button to start the book. The other option buttons on the Home page, the adult pages, and the Blue arrow for recording options are not accessible.

Additional Apps
Oceanhouse Media (OM Books) has numerous interactive digital children's books including Dr. Seuss books, Little Critter books, Berenstain Bears, classic Christmas stories, and more. Books are available individually and in bundles.

Resources
Deacon Reading Video: Five Little Monkeys Jumping on the Bed app. Deacon is 4 years, 6 months using the swipe gesture.
Gabrielle 5 Little Monkeys 2 video: Gabrielle is 4 years, 10 months trying to use a two-finger double tap gesture.
Gabrielle 5 Little Monkeys video: Gabrielle is 4 years, 10 months learning to use a 1-finger tap to record her voice reading the story.
Gabrielle 5 Little Monkeys Record 3 video: Gabrielle is 4-years, 10 months, with her iPad on a slant board (she is no longer leaning over the iPad), independently recording the rest of the story.
 Gabrielle 5 Little Monkeys Listen video: Gabrielle listening to her recorded story; working on swipe gesture.

Interactive Stories post
Layla's Three Preschool Apps Video post

Activity 2.2c Wheels on the Bus

The Wheels on the Bus by Duck Duck Moose LLC is now a free app. This app is self-voicing and is accessible for children without VoiceOver. VoiceOver does announce "button" for the Music button, Right Arrow and Left Arrow buttons. Voiceover is not compatible with the game, but the Music page is accessible with VoiceOver. The high contrast images are simple with uncluttered backgrounds.

Purpose
This is an interactive song/book of the classic children's song. Each page has images with cause-and-effect interactions. These interactions require different gestures, including a tap or a swipe. Note: The pages that have one-finger tap interactions have 3-5 places to tap. The pages that have a swipe, only have one interactive point. Turn the page by tapping the right arrow in the bottom right corner to move to the next page or the bottom left corner to go back to the previous page.

Note: Children without vision often have favorite pages in this app and quickly learn to skip the pages that have interactive points that are visual, such as the page that the wheels turn. Skipping pages is fine, as the child demonstrates that he recognizes the page and that he prefers pages that have interactions with auditory feedback. **Children quickly learn spatial concepts in this app – where the interactive points are on each page, since the points vary from page to page.**

Settings
Tap the Music button on any of the song pages to record your voice, switch languages or change musical instruments. Some children might enjoy the "gibberish" option of a young child singing the song in made-up words! The music can be toggled Off as well.

Accessibility for Adults
A Music button is located in the top left corner of the song pages. When VoiceOver is running, the Music, Right Arrow and Left Arrow buttons are announced as 'button'. The Music page and options are fully accessible.

Additional Apps
Duck Duck Moose has several additional interactive song/book apps, including the Itsy Bitsy Spider and Old MacDonald Had a Farm. Note: These apps are not as simple as the Wheels on the Bus app as they have more complex illustrations and more interactive points. The Itsy Bitsy Spider includes interactive points that provide fun facts.

Drag

The drag gesture simply means to drag your index finger around the screen. The drag gesture is typically used to explore the screen and to learn the spatial layout of the screen. Most of the previous cause-and-effect apps – which are self-voicing – are intended to use the tap gesture and not a drag.

Note: Drag is a critical VoiceOver skill– much more important than using a right or left swipe – as dragging reinforces spatial concepts!

When VoiceOver is running, Drag - used in conjunction with a Split Tap - is used to activate an item just like a double tap. The student should drag his finger around the screen - paying attention to where he is in space – and when on the desired item, drop another finger to the screen to activate the screen. This is called a split tap.

Resource
[The Unknown Gesture: Split Tap post](#) (with videos and activities demonstrating drag and split tap gestures).

The following games introduce the drag gesture without Voiceover.

Activity 2.2d My Baby Piano Lite

My Baby Piano Lite by DokdoApps has a lite version (with ads which run across the top of the page) and a $.99 paid version without ads). If you like this app, you will want the paid version! This app is self-voicing and is accessible for children without VoiceOver. The buttons on the screen are basically accessible with VoiceOver; although, the button includes abbreviations such as, "img btn song". The piano keys on the game itself will not work if VoiceOver is on.

Purpose
This app is designed to encourage children to explore the piano keys on the iPad. Children can randomly tap to hear tones or for children who are musically inclined, they can create simple tunes. **My Baby Piano can be used to teach the Drag gesture** as children can drag 1 or more fingers at a time.

Play
Touch the colorful piano keys that are located horizontally from the middle to the bottom of the screen. Each key produces a note. Use one or more fingers and tap the keys. Drag a finger to create a musical slide. There are three buttons on the left side below the ad banner: Music, Drums, and Pause. Tap the Music button to hear a nursery song. Tap again to hear different songs. Tap the Drum button to add a drum beat. Tap again to hear a different drum beat. Tap the Pause button to stop the music or drum beats.

Settings
This app does not have any Settings.

Accessibility for Adults
The add banner at the top of the page is accessible with VoiceOver and the three buttons are accessible. The keys in the game are not accessible with VoiceOver. This app does not have any Settings and is only one page.

Activity 2.2e Blindfold Barnyard

[Blindfold Barnyard](#) by Kid Friendly Software, Inc. is a free app with in-app purchases. You can play the game 10 times before you have to make a purchase. This app is an auditory app – no visuals – and is fully accessible for children and adults. **This app is compatible with a braille display**. Blindfold Barnyard is played in Portrait Mode.

Purpose
Explore the game with your finger to find the animals then sort and drag each animal to its corresponding group's fence located north, south, east, or west. Then, use two-finger swipe to move the animals into the barn. **This game teaches basic sorting concepts, drag skills, and cardinal directions or clock directions.**

Play
Drag your finger around the screen to find the animal you want to move. When you find an animal, you will hear a ding and the type of animal will be announced. Group each type of animal by dragging each animal to the desired fence. The fences are located at the top, bottom, right or left edges of the screen. Each time a new animal appears, there will be a zip-pop-bop sound. Collect as many animals at the fences as you can, before moving them into the barn.

Blindfold Barnyard Main Menu Options:
Games:
- Practice with cow, no time limit
- Practice with 2 animals, no time limit
- Many animals, 7 minutes, 2 coins
- Many animals, 15 minutes, 3 coins
- 4 Animals, tap to change (pick the number of animals 4 – 7)
- Barnyard Standard Barnyard, tap to change
  - Options are: Standard, Standard: Difficult, With Pond, With Pond Difficult, Standard with Rotation, Standard: Difficult with Rotation

Other options on the Main screen:
- My Scores
- Help
- Settings
- Buy or Upgrade Game

Settings:
There are 22 setting options. Here are a few of the most commonly used settings:
- Background music
- Size of animals on the screen
- Seconds between new animals (default is 15)
- Animals to add when barnyard empty (default is 1)
- Say directions of nearest animal (default is compass)
- Timer and Count-down (default is 60 seconds)

- Limit animals in the barnyard (default is 10)
- Tell number of animals in the barnyard

Adult Accessibility
This app is fully accessible with VoiceOver.

Resources
[Blindfold Barnyard: Cardinal Directions post](#)
[Gabrielle Barnyard 1 video](#): Gabrielle, a 4-year old learning the drag and two-finger gestures with the Blindfold Barnyard app
[Gabrielle Barnyard 2](#): Improved gestures, now concentrating on game itself - dragging animals using cardinal directions and learning to use a two-finger swipe up to take animals into the barn.
[Gabrielle Barnyard 3](#): Demonstrates success and independence with gestures and game!

Apps created for toddlers and preschoolers are typically self-voicing and do not use VoiceOver, Apple's native screen reader. These apps typically only use a tap gesture and possibly the right and left swipe gestures. While VoiceOver does use a one-finger touch gesture and swipe right/left gestures, VoiceOver requires a different gesture set for the other gestures. Before introducing the child to VoiceOver, Apple's built-in screen reader, **be sure that the iPad is set up correctly for using VoiceOver with young children**, including Triple-Click Home to toggle VoiceOver On and Off. For details, go to the Getting Started Chapter, Common Settings for Young Students: VoiceOver (Section 0.4).

Positioning

When teaching VoiceOver, the iPad should be laid flat on a table top. iPads that are being held upright in your hand or in a case tend to jiggle, making it challenging for a beginner student to make good VoiceOver gestures.

Ideally, the child should be seated at the table, with his feet firmly on the floor. The table height should be appropriate – with his elbows at a 90-degree angle and hands just above the table top. (Preschool or kindergarten table and chair will usually work; if the not, find a table/chair that creates the desired arm/hand position and place a sturdy box under the child's feet.) If the child's arms lean on the table (table is too high/chair too low) he will have trouble making good right/left swipes, etc.

Basic VoiceOver Gestures: Double Tap and Split Tap

VoiceOver changes the gestures that are used to control the iPad so that users can hear the description without activating the screen. Users with vision look at the screen and then directly tap on the desired item. Users who cannot a box around the item called the VoiceOver cursor. Example: On the Home screen see the screen, rely on a screen reader to read aloud the item that has the focus. Touch or navigate to an item and VoiceOver will announce the item. Visually, VoiceOver creates, a student can drag a finger across an app icon on the screen. VoiceOver visually shows which icon has the focus by creating a visual box around the icon; VoiceOver will say the name of the icon aloud. Double tapping will open the app that VoiceOver announced and that has the VoiceOver cursor.

Navigate to the Desired Area with VoiceOver

There are several ways to navigate or move the VoiceOver focus:
- Directly touch the desired area
- Drag your finger to find the desired area
- Right or Left swipe to the desired area

Note: There are additional navigation commands for more advanced users.

Activate the Selected Item

There are two ways to activate the selected item:

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- Double tap (When the VoiceOver cursor is on the desired item, 1-finger double tap anywhere on the screen)
- Split Tap (drag one finger to the desired area then drop a second finger on the screen)

Note: Before double tapping, pay attention to where the VoiceOver cursor box is on the screen. Double tapping will activate the item that has the VoiceOver focus – which is not necessarily where you are physically double tapping! Double tap anywhere on the screen – whatever item has the VoiceOver focus will be activated. Users do NOT have to double tap physically *on* the desired item.

How to Teach Double Tap (Froglet and Frog)
Introduce the Double Tap gesture by making a fist and knocking – quickly and gently - two times on the table top. Ask the child to make a fist and duplicate the two quick knocks. Demonstrate or model the knocking if necessary. Make sure that the knocks are fast! Remember, the child's hand should hover just about the table top. Build muscle memory by repeating the knocks until the child is comfortable with the speed of the two knocks. Then, replace the fist knocks with a one-finger double tap on the table top. If possible, have the student extend all of his fingers and drop just the index finger to double tap the table.

Split Tap (Froglet and Frog)
The drag and split tap gestures are similar to swipe and double tap gestures. These gestures are used to navigate to and then open or activate an app or button. The power of the iPad is that you know where you are. Children should be encouraged to explore what is on the screen and to begin to understand spatial concepts – where items are located on the screen. These are foundation skills for mental mapping! Students who drag and explore the screen learn basic spatial concepts such as right/left, up/down, top/middle/bottom, and rows/columns. These spatial concepts develop mental maps of the iPad's home screen and of the layout of various apps. Mental mapping helps the student to efficiently navigate the iPad's screen and transfers over to mental mapping applied to orientation and mobility skills as well as math skills. Children who only use the swipe gesture or Read All (two-finger swipe down gesture) miss opportunities to develop spatial concepts and mental mapping.

Encourage your student to drag his finger around the Home screen or around an app when VoiceOver is running. When on the desired app, drop the second finger to the screen. (This is actually a tap gesture – drop and lift the second finger while the first finger remains on the screen.)

Resource
The Unknown Gesture: Split Tap post (with videos and activities demonstrating drag and split tap gestures).

Activity 2.3a I Hear Ewe

I Hear Ewe by Claireware Software is a free app without ads or popups. The cartoon animals and vehicles are visually appealing with high contrast and no clutter. The app is fully accessible with VoiceOver. This app is played in Portrait Mode.

Note: Turn VoiceOver On while playing this app.

Purpose

This game builds vocabulary and concepts with 24 different animal and vehicles. Select an image and the game announces what type of animal/vehicle and plays a short recording of its real sound. Practice dragging a finger and using a split tap to activate. Practice navigating through the animals/vehicles using right or left swipes and double tap to activate the animal. **This game also reinforces spatial concepts and can reinforce spatial terms.** This app introduces a grid layout; however, it is up to the adult to teach the spatial terms related to grids. Example: top, first, row, etc. **This app can also be used to teach drag and split tap.** (See 2.3 for drag and split tap.)

Play

The game layout is a 3x4 grid; each square has a cartoon animal head or a vehicle. The first two pages displays animals and the third page displays vehicles. Explore the screen as VoiceOver announces the name of the animal/vehicle. Activate the desired animal/vehicle sound and the image becomes full screen. When the sound is done, the screen goes back to the 3x4 grid.

Note: Right and left swipes are not efficient ways to navigate from the top of the screen to the last item on the screen. Swiping does not reinforce spatial concepts, as the child has no idea where he is on the screen.

Ask the child to explore the screen and name the animals that he found. Starting in the top left corner, encourage the child to drag his finger in a straight line across the row, paying attention to the three animals in that top row. Then ask him to find a specific animal - such as the cow which is in the top right corner. Encourage the child to move directly to the corner. Use a split tap to activate an animal. Have the child drag his index finger to the desired animal – keeping his index finger on the screen – then tap the screen with a second finger or thumb.

This app can teach many spatial concepts, such as left, middle, right, top, middle, bottom, corner, up, down, across, and some children will learn about rows and columns.

Hint: Dragging does provide critical spatial information and is much more efficient than swiping. Once the child learns that the sheep is in the bottom right corner, he can instantly place his finger in the general direction then drag until he finds the sheep.

Swipe right/left can be used to navigate between animals; but, right/left swipe should only be used after the student has a general idea of where the desired animal is located on the screen. The student can touch in the general area and then swipe right or left a few times to locate the desired animal. When the animal is located, double tap to activate. Do not start at the top of the page and swipe all the way through the animal grid!

Settings

The Options button (Information button) is a small button located in the bottom right corner of the screen. The Options include a link to two other apps by this developer (I See Ewe is currently not accessible with VoiceOver. It is unknown if Ewe Can Count is accessible or not.) The options include Chinese, English, German, Japanese, Korean and Spanish languages.

Accessibility

This app is fully accessible with VoiceOver for children and adults.

Resources

Teaching VoiceOver Gestures with I Hear Ewe App: Activity post
Add Juliet 3 Learning video: Introduction to VoiceOver (tap and double tap) with I Hear Ewe App. Juliet is using a combination of vision and auditory as she is being introduced to VoiceOver. (This video does not demonstrate the drag and split tap.)
Juliet 4 video: Juliet demonstrates independently using tap and double with VoiceOver.

Activity 2.3b Ballyland Magic

Ballyland Magic by Sonokids is $2.99. The app is self-voicing and is fully accessible for children and adults.

Purpose
This app was specifically designed for preschool children with visual impairments to learn basic VoiceOver gestures through fun games. Gestures taught are drag, double tap, right/left swipe and three-finger right/left swipe. This app also includes grid layouts.

Play
There are four "Scenes" in the Ballyland Magic Show. Scene 1 has five levels, starting with explore the stage using a one-finger drag. The game starts with a kid-friendly introduction to the characters in the app. This section can be skipped by selecting the Next button. Each game has verbal instructions; tech skills build as the child progresses through the app.

Additional instructions, tips for educators/families, and tutorials are available on the Sonokids website here. Instructions are also available within the app.

Settings
This app does not have Setting options.

Accessibility for Adults
The game itself is fully accessible. The app opens to a self-voicing menu navigation page. If VoiceOver is On, VoiceOver will explain the page. VoiceOver must be turned Off to access the app. To turn On the self-voicing menu navigation on the Home Screen, swipe up; swipe down to turn self-voicing Off on the Home screen menu.

Note: This app is designed to teach beginning VoiceOver gestures and the developers made the app as simple as possible. Because of this simplicity, there are a few standard VoiceOver concepts and reactions that are not incorporated in this app.

Resources
Ballyland App for the iPad: Teaching Finger Gestures for Voiceover post
Aeden Ballyland Magic video: 6-year old, totally blind student practicing swipe and double tap.
Aeden Ballyland Magic Tap video: Aeden 'tap-taps' along with the song (practicing double taps).

Activity 2.3c Ballyland Sound Memory

Ballyland Sound Memory by Sonokids is a $2.99 app. The app is self-voicing and is fully accessible for children and adults.

Purpose
This app is a sound-matching game designed to teach listening and memory skills, grid concepts, spatial concepts and basic tech skills specifically for preschool children with visual impairments. VoiceOver gestures that are reinforced in this game are: drag, double tap, right/left swipe and up/down swipe. **This app teaches digital grid concepts which is a critical math skill!**

Play
Each game begins with a description of the grid (2x3 is the default). As the Ballylander moves across the grid, the row and column numbers are announced. In settings, choose your desired gesture (flick or drag). Move to the desired card and double tap to hear the sound. Select two matching cards to make a pair. Encourage the child to remember where each sound is located (row and column numbers and/or using spatial terms such as top left). Use this app to introduce grid (math) concepts!

Note: When using the drag gesture, split tap does NOT work; you must double tap to activate the card.

Settings
There is a menu with the following options:
- Play
- Settings
- Instructions
- Memory Song

Select Settings, then the following options are available:
- Drag or flick
- Number of Cards (4, 6, 8, or 10)
- Sound Sets (Ballylanders, Musical Instruments, Animals, Cars, Human Sounds, and weather)
- Black Curtain (On/Off)

Accessibility for Adults
The game itself is fully accessible. The app opens to a self-voicing menu page. If VoiceOver is On, VoiceOver will explain the page. VoiceOver must be turned Off to play the game. To turn On the self-voicing menu navigation on the Home Screen, swipe up; swipe down to turn self-voicing Off on the Home screen menu.

Note: This app is designed to teach beginning VoiceOver gestures and the developers made the app as simple as possible. There are a few standard VoiceOver concepts that are not incorporated in this app. Example: Swipe up or swipe down is a gesture used with the Rotor; typically, VoiceOver users cannot swipe up or down to navigate vertically between rows unless in a table and the rotor is set to Rows.

Resource
[Ballyland Sound Memory Game: Matching and Math Grids](#)

Activity 2.3d Blindfold Bop Gesture Game

[Blindfold Bop Gesture](#) Game by Kid Friendly Software, Inc. is a free game with in-app purchases. This is an auditory game (no visuals) and is fully accessible for children and adults using VoiceOver and **can be played using a braille display**. Blindfold Bop Gesture is played in Portrait Mode.

In-app purchases:
- Pick Gestures $1.99
- Two-Player Mode $2.99
- Unlimited Games $3.99
- Bundle: $6.99

Purpose
Inspired by the classic Bop-It toy, Blindfold Bop Gestures is a game designed to teach VoiceOver gestures. **This game encourages users to make quick VoiceOver gestures, as the game speeds up with each level**.

Play
Blindfold Bop offers these games and levels:
- Gesture Learning
- Practice Game, 1 Player
- Easy Game, 1 Player (paid 2 player option)
- Medium Game, 1 Player (paid 2 player option)
- Hard Game, 1 Player (paid 2 player option)
- Very Hard Game, 1 Player (paid 2 player option)
- Endless Game, 1 Player

The Gesture Learning Game: In this game, make a gesture on the screen and hear what gesture you made. Each gesture has an associated sound. Note: Double tap, 1-finger triple tap, and 2-finger tap are not recognized in the Learning Mode.

Practice Game: You will be asked to perform 3 of the gestures in the following list: tap, double tap, swipe in any direction, and shake the device. The Practice Mode continues until you make 3 mistakes; this game is not timed.

Note: When using an iPad, it is recommended to purchase at least the Pick Gestures in-app purchase then deselect the shake gesture. (Teaching a child to shake the iPad is NOT recommended! Shaking an iPhone also may not be the best idea when working with most young players.)

Easy Game: This game uses the same three gestures; higher levels have more gestures and become faster. The Very Hard Game has 10 gestures.

Pick Gestures (paid option)
- Tap
- Any Swipe
- Shake
- Up
- Down
- Left
- Right
- Tap Two
- Tap Three
- Up Two
- Down Two
- Left Two
- Right Two
- Twist left (Rotor Gesture)
- Twist Right (Rotor Gesture)

Hint: Strongly recommend purchasing at least the Unlimited Games (the free version is meant to be a trial version; there is a limited number of times you can play) and the Pick Gestures (allows you to choose which gestures are incorporated into the game).

Note: Blindfold Bop Gestures works even better on an iPhone.

Hint: If your gestures do not work in the game, set your Rotor settings to Typing Mode, Direct Touch.

Settings
- Background music
- Tell gestures at start of game
- When shaking the phone, ignore one or two fingers touch
- Give sound effect on correct gestures
- Use Student Mode Menu
- Less talk and sound effects
- Post my new high score
- Customize voices
- Use braille display instead of speaking
- Customize game sounds
- Use full keyboard instead of screen
- Use gesture menu
- Repeat message if it wasn't spoken

Accessibility for Adults
This app is fully accessible with VoiceOver. **The game can also be played by adults with vision who want to learn VoiceOver gestures without turning VoiceOver on.**

Additional Apps
Zany Touch: Currently teaches mainstream gestures, such as tap, swipe, etc.

Resource
Blindfold Bop Game: Teach VoiceOver Gestures post
Zany Touch App Review post (Includes a student video)

VoiceOver Practice Screen (Frog)

iOS devices have the Help Screen - a special screen that enables users to practice VoiceOver gestures without activating those gestures. When making a gesture in the Practice Screen, VoiceOver will announce what gesture was actually made and then announces what action that gesture does. Example: If the child makes a one-finger swipe right in the Help Screen, VoiceOver will announce, "Flick right. Move to next item." This is a great way for some children to learn and practice gestures. If the child struggles with the swipe gesture, it may be because he is too slow – essentially tapping, pausing and then swiping. (VoiceOver interprets this as a tap not a swipe.) Practicing the gesture in the Practice Screen provides instant feedback about what the child is really doing. Another common issue with many children who are visually impaired is making a down swipe when trying to create a right swipe. Often children will lean their forearm on the table top – when they make a right swipe, the finger actually has a slightly downward movement, so the iPad interprets that gesture as a down swipe. The Practice Screen is a wonderful problem-solving tool when teaching/learning gestures.

Typically, a child is successful with the VoiceOver Practice Screen when he is:
- Older - preschoolers/kindergarten age
- Basically independent
- Able to follow directions
- Ready for school-age content

Activity 2.3e VoiceOver Practice Screen

To access the VoiceOver Practice Screen:
- Open the Settings app
- Activate General
- Activate Accessibility
- Adjust the speaking rate to 50% (slightly to the right of middle)
- Toggle VoiceOver On
Note: VoiceOver must be On in order to access the VoiceOver Practice Screen.
- Activate VoiceOver Practice (touch it once to move the VoiceOver focus (visual box) to VoiceOver practice, then double tap). The VoiceOver Practice screen appears, and the VoiceOver focus is on VoiceOver Practice at the top of the screen.
- Tap the middle of the screen to move the VoiceOver focus to the blank area.
- Now make a gesture in the middle of the screen and VoiceOver will announce the gesture and the gesture's action. Try these gestures:
  - Tap
  - Double Tap
  - Right Swipe
  - Left Swipe

  Note: Drag and split tap gestures do not work in the VoiceOver Practice screen.

- To exit the VoiceOver Practice Screen, touch the Done button in the top right corner.
- Activate the Done button (double tap or drag and split tap)

Purpose
The VoiceOver practice screen is designed for learners to physically practice VoiceOver gestures and to learn the actions of these gestures do. Create a gesture and hear the name of the gesture and the gesture's actions, *without the gesture activating the action*.

Play
Initially, the child can create/practice his gestures at his own speed. Or, call out the *gesture*, then quickly count 1, 2, 3 and have the student make the gesture on the count of 4. Ask the child what the gesture does (encourage him to listen to the VoiceOver Hint that states the gesture's action). Call out the *action* and have the child create the correct gesture. Have the child call out the gesture and you create it. (Make a mistake and see if the child catches it!)

Synchronized Swimming Game: If a second iOS device is available, call out the gesture and both of you create the gesture – preferably in sync! Synchronized Swimming is fun to do with two or more students together – including peers/family members who are not visually impaired.

Use the VoiceOver Practice Screen for warm up/review activities and after introducing additional gestures.

Activity 2.3f Home Screen: VoiceOver Practice

VoiceOver is turned On for this activity.

The iPad's Home screen is fully accessible with VoiceOver.

Once they are introduced to spatial concepts within apps, young children will quickly embrace and apply these spatial skills in other ways, including where their favorite apps are located on the iPad's Home screen. For young children who are just learning VoiceOver gestures, place their favorite apps on the **first** Home screen. (Children have not learned three-finger swipe left/right gesture which is used to scroll to the next/previous Home screen.) Do not place these apps in folders.

Purpose
Apply VoiceOver gestures to locate and open apps on the Home screen. Navigating the Home screen is a great opportunity to practice VoiceOver gestures, to develop spatial concepts and to listen for VoiceOver sound hints. **Include spatial vocabulary such as top, middle bottom, left, right, corner, and if appropriate rows, columns, first, second, etc.**

Play
Encourage the child to explore the Home screen by dragging his finger around the screen and **to listen** to the names of the apps. Encourage the child to learn where favorite apps are located – be sure to use spatial vocabulary! Ask the child to find a specific app. Give the spatial location and ask what app is located there.

Practice drag and split tap, by finding the desired app and opening the app. Show the child how to **close the app using the Home button.**

Navigating the Home screen is a great way to review basic VoiceOver at the beginning of each iPad lesson. Go back to the VoiceOver Help Screen if the child needs more review with making the gesture correctly or to build muscle memory.

From now on, have the child locate and open apps himself. He will be very motivated to find – and remember where – his favorite apps are!

Resources
Juliet's Home Screen video: Julie is using a combination of vision and auditory to explore the icons on the Home page using the tap gesture. VoiceOver is on.
Gabrielle Home video: Gabrielle - 4 years, 10 months - is learning to locate the desired app on the Home screen and swiping between Home screen pages. Note: In this video, VoiceOver is NOT being used.
Aeden: Playing with the iPad: Aeden is a 6-year old boy who is being introduced to navigating the Home screen with VoiceOver using right and left swipes.

[Nancilynn: Split Tap](): Nancilyn's first introduction to drag and split tap gestures on the Home screen.

Earcons

iCons are the visual symbols that represent an app (app logo) an object (such as a file) or a function (such as the command to share).

Earcons are the auditory version – it is a brief, distinctive sound used to represent a specific event or to convey other information. Mainstream earcons are the email alert 'bing' or the error alert 'beep' or the 'swoosh' when an email is sent. VoiceOver has numerous earcons that alert visually impaired users such as the 'click' when the VoiceOver focus moves to a new app icon and the 'duh, duh, duh' when dragging your finger around empty space.

The Home screen is a great place to introduce earcons and to improve listening skills.

Activity 2.3g Home Screen: Earcons

Play

Ask the child to listen for the 'secret sounds' as you drag your finger across the apps. Or, ask the child to listen for and mimic these earcons.

Listen for these sounds on the Home screen:
- 'Click' – drag finger or swipe right/left across app icons
- 'Double beep' - open an app
- 'Thunk' – Place the VoiceOver focus on the last icon on the page. Right swipe to hear the 'thunk' (Symbolizes as if you were hitting a wall at the end of the hall – you cannot move any further in that direction.) Place the VoiceOver focus on the first app icon of the screen. Left swipe to hear the 'thunk'.
- 'Duh, duh, duh' – drag your finger around the blank space on the page (Make sure there is space between the last app and the dock. App icons should not fill the entire page.)

Problem Solving If Earcons Are Not Heard

Earcons are an essential part of VoiceOver. If earcons are not heard, check these things:
- iPad volume is turned up and not muted. (Use the switch located at the top left edge of the iPad – if the Home button is on the right.)
- Go to Settings > Sounds > Ringer and Alerts. Slider should be at least 3/4ths to the right side. Toggle On Change with Buttons. The Ringer and Alerts slider should still be at least 3/4ths on the right side.

    Different iPad models and iOS software may have slightly different reactions with the Change of Buttons. With new iPads and iOS 12, leave the Change with Buttons On and go back to the Home screen. Press your volume button on the top edge of the iPad – it should show now show a bell symbol and the words 'Sound Effects' along with an indication of the slider setting. Confirm that this is not muted and the slider is at least 3/4ths. The Bell symbol indicates that the volume switch is set to adjust earcons.

    Go back to Settings > Sounds > Ringer and Alerts. Toggle Off Change with Buttons. Go back to the Home screen and press your volume button. The visual symbol should now show a speaker, the text, 'Volume' with an indication of the slider setting. **You want the volume control button on the top edge of your iPad to show the speaker and 'Volume' not the Bell and "Sound Effects".** You do not want to accidently mute your Earcons!

Resource

Icons and Earcons: Critical But Often Overlooked Tech Skills post Note: This post includes a video of the gestures that create the earcons and a dark screen video with random earcons for listening practice.

Introducing the iPad to Early Elementary Students (Lizards)

This manual begins with the most basic Explore and Touch activities; these activities may be too basic for some children, especially children that are traditionally slightly older and who are developmentally ready to be introduced to the iPad and VoiceOver through more challenging activities. **These children are in a stage between the most basic Exploration apps and the traditional classroom apps that are used to teach subject matter content. We will call this group of children, Lizards**. Lizards are learning the same tech skills and using many of the same apps as the Tadpoles and Frogs; however, Lizards may skip some or all of the first section (Exploration), will dive deeper into some of the concepts and will move at a slightly faster pace. Every child is unique – it is the teacher/parent who has to be creative in choosing what, when and how to teach the tech concepts to their specific child. Lizards are often in early elementary school when they are introduced to an iPad; their classroom teachers frequently use lesson plans that associate a specific goal that is incorporated into the iPad lesson. These lessons follow the same concepts found previously in the manual but are approached in a slightly different way.

The following lessons might be introduced one per day or several lessons combined and taught on a single day. Depending on your child's previous tech experiences and engagement, these lessons might be taught in a different order than what is listed here. Remember to review skills before building new skill!

Note: When available the associated section number is included after the skill. Go to the listed section number to find detailed information about that skill.)

VoiceOver Lessons for Lizards
Editor's Note: These lesson ideas are based on lessons that Christina Work used with her six-year old student. Christina attended the *Tech for Toddlers* workshop that occurred while this manual was being written (early fall 2018) and she joined the ABC's of iOS Manual Pilot Program (late fall 2018); Christina also provided helpful feedback as she taught her student using concepts in this manual. Dive deeper into her lessons with Aeden through the *Paths to Technology* blogs starting with Aeden: Introduction to the iPad and VoiceOver.

Lesson: Handling an iPad
- Talk about the word 'fragile' and how iPads can break if dropped on the floor. To keep the iPad safe, place the iPad flat on the desk. (Section 2.3)
- Hands should be clean before touching the iPad. The child can also learn how to wipe the iPad's screen with a tech wipe or cloth.

- Demonstrate the 'tickle touch' (light touch) and practice how to make this light touch on your arm or table top before creating the gesture on the iPad. (Section 2.1)

  Rule: I use a light touch with clean hands on a flat surface.

Lesson: Home Button

- Introduce the concept of 'home' and what it means. ("We are safe, and we know where we are.")
- The Home Button helps us find our way home on the iPad. ("If you are lost, use the Home button to go back Home.")

  Rule: I can find my way home with the Home button.

Lesson: Intro to icons, Home Screen Layout and Listening

- Introduce the concept of icons. ("An icon is a picture or symbol for an app.") On the Home screen, icons are squares.
- Later, introduce that icons found within apps can also be symbols for features or actions.
- Introduce the Home screen layout using a tactile drawing. (Creating a tactile drawing using the APH Craftsman drawing board, Sticky-backed foam squares on a braille page, etc.)
- Discuss the concept of a row on the iPad. ("A Row is a line of squares across the page.") Note: The child can drag his finger up/down columns, but the Read All command and right/left swipes only move across a row. (Section 2.3f)
- Discuss the concept of the 'Dock' on the iPad. ("The Dock is the bottom row of the iPad.)
- Later, expand the concept of the Dock to include that the apps in the Dock are on each Home screen page.
- Have the child drag his finger around the screen to find the icons and Dock – be sure to listen to each app/icon name! Introduce that VoiceOver talks about what is under your finger! (Section 2.3f)
- Ask the child where a specific icon is located (use spatial concepts such as left, center, right and top, middle, bottom). (Section 2.3f)

  Rule: I listen to icons to know where I am.

Resources
Simple Tactile Representations of iPad Features
Creating a Tactile Overlay Note: This post demonstrates creatine a tactile overlay map; however, the same principles apply for creating a tactile overlay of the Home screen.

Lesson: Cause & Effect (Expanding Spatial Layout and Listening Skills)

- Ask the child to navigate to a Cause and Effect app by dragging his finger across the screen and listening to the names of the icons. Be sure to pay attention to where the desired app is located! (Choose a simple interactive book or cause-and-effect app that only requires a tap, swipe or double tap to turn the page. (Section 2.3f; Section 2.1 a-e and Section 2.2a, b)
- Using the tactile drawing of the Home screen, have the child find the location of his favorite apps. Can the child name all the apps in the first row? Be sure to use good spatial terms when talking about app locations!
- Note: Teach the basic drag and split tap (or drag and double tap) used to complete this activity. (Section 2.3) If necessary, teach the swipe gesture to turn the page in the book app.

   Rule: If I touch the iPad something exciting will happen! When I listen, I can find my favorite apps.

Resources

Aedan Intro: Reading the Book video: 6-year old Aeden introduced to his teacher-created book called, "Aedan's Day at School". Aeden uses tap gesture to turn the pages.

Add Aedan Intro: Playing with the iPad video: Aeden navigates the Home screen to find his book (Pictello app). Aeden uses swipe left, swipe right and double tap gestures.

Lesson 5: Introduce Earcons

- Icons are visual pictures that represent an app (or feature). Earcons are sounds that convey information. There are mainstream alert sounds such as the 'ping' sound for the incoming email alert and the 'whoosh' sound for an outgoing message.
- VoiceOver also has special earcons such as the 'click' when you swipe to the next app or the 'thunk' when you are at the end of the page.
- Ask the child to listen for these 'secret sounds' and identify what the sounds mean. Find at least four VoiceOver earcons on the Home screen. (Section 2.3g)

   Rule: I can listen for VoiceOver secret sounds called earcons. These sounds tell me what is happening on the screen.

Resource

iCons and Earcons: Critical but often overlooked tech skills post

Lesson: Introducing Basic VoiceOver Navigation Gestures

- Introduce tap, swipe right/left/up/down in the VoiceOver Practice Screen. (Section 2.1, Section 2.2)
- Apply these gestures to navigate the Home screen. Open various apps and then use the Home button to close the app. (Section 2.3f)

- When the child has mastered the first gestures, add the two finger gestures. (Section 3.1b)
- If the child is learning various basic VoiceOver gestures, introduce VoiceOver apps such as Ballyland Magic, Blindfold Gestures, I Hear Ewe and even additional Blindfold games such as Blindfold Bowling. Organize these apps in various folders. (Section 2.3a-d)

Rule: I can flick right and left to move around the icons to get where I want to go.

Resources
[Aeden Intro: Ballyland Magic App video](#): Aeden playing Ballyland Magic app using right and left swipes and double tap gestures.
[Aeden's Introduction to the iPad and VoiceOver post](#)

Lesson: Introduction to Home Screen Folders

- Introduce the concept of a folder by placing multiple brailled math papers into the folder. Name the folder "math". Ask the child what is in the folder; count the number of pages. Explain that each paper has something to do with math; however, each paper is a different.
- Organize iPad apps into titled folders. Ask the child to listen the full VoiceOver Hint to the number (how many apps in the folder).
- Point out that when apps are in a folder, VoiceOver will announce, "folder". If VoiceOver does not say folder, then the app is by itself.
- Ask the child to navigate to the folder, navigate to the desired app in the folder and open.

Rule: I can listen to how many apps are in each folder.

Lesson: Introducing the Refreshable Braille Display/Bluetooth Keyboard to Navigate the iPad

- Many young children physically struggle with creating VoiceOver gestures. With a student who is or will be a braille user, introduce using the joystick to swipe left/right and to activate apps. For students who will be print readers, introduce using the arrow keys on a Bluetooth keyboard. (Section 4.1a; Section 4.2a)
- Teach basic braille display Chord commands (such as H Chord to go back to the Home screen) or Bluetooth Keyboard commands. (See Section 4.1 for refreshable braille display and Section 4.2 for Bluetooth keyboard.)

Rule: I can use the braille display/Bluetooth Keyboard to navigate the iPad, just like I use my fingers!

Resources
[Aeden's Journey on the iPad: Part 2 Post](#)

Aeden's Joystick video: Aeden learning to use the joystick on the APH 18 Refreshabraille display to navigate the Home page. Aeden is using 'swipe left, right and up' and 'double tap' gestures. Note: Aeden has a modified joystick that is slightly higher than the standard joystick.

Aeden's Aeden Home RBD Video: Aeden reviews – showing more proficiency - how to navigate the Home page using the joystick on the refreshable braille display.

Lesson: Using VoiceOver to Pause/Play Speech

- Using the Smart Brailler, braille the student's name with speech activated. Turn the voice off and braille his name again. Did the Smart Brailler still work even when speech was turned off?
- The same is true with the iPad; the iPad still works even though the speech is turned off or muted. (Section 4.1c)
- Practice 3-finger double tap to turn VoiceOver speech on and off.

  Rule: I can use a three-finger double tap to turn speech on and off.

Resource

Add Aeden video #3 Speech On/Off: Aeden is learning how to mute the VoiceOver speech. (VoiceOver must be on in order to use the refreshable braille display; however, there are times that the student will want to mute VoiceOver and rely only on the braille.)

Lesson: Using VoiceOver Gestures and/or the Braille Display to Navigate & Select a Pages Document

- Introduce the concept of documents in the Pages app by going to the library and showing rows and rows of books. Talk about how the book title tells us the name of the book and an idea of what the book is about.
- Compare documents in Pages to books in the library. Initially, listen to each document announcement in its entirety (Pages announces the title, date last opened, how big the file is and what kind of document.)
- When looking for a file/book, we do not want to look at everything, just the title. Flick right to hear the title only, then flick right again. If necessary, tell the student to flick right every time he hears you tap the table.
- Ask the student to find a specific document, such as the Puns or Joke of the Day.

  Rule: I can use the braille display or VoiceOver gestures to select the document I want in Pages.

Resources

Aeden's Journey on the iPad: Part 3 post

Aeden Pages app1 video: In the Pages app, Aeden navigates to the Joke of the Day document.

Lesson: Two-Finger Swipe Up/Down (Reading Gestures)

- Note: Aeden physically struggled with making the fist then opening up two fingers to make the two-finger swipe gesture. When asked to make the viper/snake (also called shhh! gesture) and then swipe up or down, he was successful immediately.
- Review swiping right or left on the Home screen, listening for a favorite app.
- What if we have the iPad read the entire page with just one gesture? Introduce the two-finger swipe up command. Starting in a different location, repeat the two-finger swipe up command.
- Place the VoiceOver cursor on a familiar app in the middle of the screen. Listen to what happens. Repeat and have him listen again – let the student figure out what is different. Provide guiding prompts if needed. (VoiceOver begins reading from that location, instead of starting at the top of the page.)

Rule: I can use the two-finger swipe up for the Read All command & the two-finger swipe down to Read All from the cursor.

Resources
Aeden's Two-Finger Swipe video: On the Home screen, Aeden first practices right swipe and then is introduced to two-finger Read All from the beginning and Read All from current location gestures.
The post includes a poem about a boy using the Read All VoiceOver commands. Download the poem from the post.

Lesson: Two-Finger Single Tap to Pause/Play Speech

- Use the viper or snake bite scenario to teach the two-finger tap gesture. Talk about what fangs are and that snakes have fangs that look like your index and middle fingers. When the snake is ready to strike or attack his food, he quickly and smoothly bites with his fangs.
- Practice the viper gesture on the desk first, then on the instructor's hand, then the instructor did the gesture on his hand while talking about how little pressure is needed for the 'bite' to work.
- Two-finger swipe up on the Home screen and then use the viper gesture to pause. Repeat until the student 'gets it'.

Rule: I can use the snake bite (two-finger single tap) to pause/play VoiceOver speech.

Resources
Aeden Snake Bite video: Aeden reviews and practices how to make the 'snake bite' gesture – the VoiceOver pause gesture.
Aeden Pause and Play video: Aeden demonstrating the 'snake bite' two-finger pause VoiceOver gesture.
Aeden's Journey on the iPad: part 4 post The post includes a poem about a boy using the Read All VoiceOver commands. Download the poem from the post.

Lesson: Link the iPad with the Braille Display

- Learn that the iPad does not have to be alone – it can talk with the braille display.
- First, 'wake up' the braille display (turn it on) and listen to the braille popping up.
- Have the iPad join the conversation (turn VoiceOver on).
- Are they talking? The teacher swipes left and right and the student checks to see what happens to the braille.
-

Resource

[Aeden's Journey on the iPad: Part 5 post.](#)

Lizards – like all students – will progress at their own pace. Aeden's wonderful Teacher of the Visually Impaired used content from the ABC's of iOS Manual; lessons were adapted and paced to fit the unique needs of her student, Aeden. Currently, there are five posts on *Paths to Technology* about Aeden's Journey on the iPad; stay tuned for more posts!

Resource

Layla was introduced to an iPad running VoiceOver and then a braille display as a four-year-old. In the post, [Layla: 4 Year Old Learning VoiceOver and Braille](#) is a summary video showing her progress during her first four months of iPad training.

ABCs of iOS Manual

Unit 3: Navigating, Listening, 'Reading' and Rotor
iOS 12

Objectives
Objectives
Overview

- Activity 3.3a Home Screen: Four-Finger Tap
    - Basic VoiceOver Gestures Commands for Young Children (Chart)

3.4 Introduction to the Rotor
- iPad Rotor Settings
- Understanding the Rotor
- Teaching the Rotor Command
- Activity 3.4a Ballyland Rotor App
- Activity 3.4b VoiceOver Practice Screen: Rotor
    - Basic VoiceOver Gestures for Young Children (Chart)
- Activity 3.4c Home Screen Rotor – Speaking Rate
    - Increase Listening Speeds
- Activity 3.4d Home Screen: Rotor - Characters

Overview

Unit 3 focuses on basic VoiceOver navigating gestures. Included in these navigating gestures, are the two-finger 'reading' gestures, three-finger 'scrolling gestures' (used to scroll between pages) and the four-finger tap to jump to the first or last element on the screen. Also included in this chapter is an introduction to the Rotor. The initial gestures taught – tap, double tap, split tap, and swipe – are the most frequently used gestures in apps for young children. The two-finger and three-finger gestures have a more limited use for young children until the child is ready for reading or navigating the written content in a document or book. Two and three-finger gestures are not used in Exploring and cause-and-effect apps.

In this chapter, children will learn how to create these two-finger, three-finger and four-finger gestures, the purpose of these gestures and when to use these gestures for functional purposes. These gestures will be used more frequently in Unit 5: Writing and Editing.

The Rotor is simply a hidden virtual control that is always available to VoiceOver users. The rotor enables the user to make changes on-the-fly or to quickly access additional features. Examples: Increase the speed of VoiceOver speech or to read character by character.

For many young children, creating VoiceOver gestures – especially three-finger gestures can be physically challenging. The same command can be created using a refreshable braille display (RBD) command or a Bluetooth keyboard (BTK) command. Creating a command on either of these devices is often physically easier for students who are visually impaired; these commands will also be teaching skills that transfer to using a screen reader on a computer. **Unit 3 is specifically about creating two and three-finger gestures; however, many of the same activities will be repeated in Unit 4 substituting the VoiceOver gestures with refreshable braille display or**

Bluetooth keyboard. Each activity in Unit 3 will include the VoiceOver gesture first then the equivalent RBD and BTK commands. Complete Unit 3 activities with VoiceOver gestures first. As you progress through Unit 4, repeat the Unit 3 activities using the RBD and/or BTK command.

3.1 Navigating Gestures: Two-Finger Gestures

Think of the two-finger gestures as your VoiceOver 'reading' gestures; two-finger gestures will cause VoiceOver to read all the content on the page, pause reading, and then resume the reading.

- Two-finger Swipe Up: 'Read All' from the beginning of the page
- Two-finger Swipe Down: 'Read All' starting from the VoiceOver cursor location
- Two-finger Tap: Pause or resume the reading (nicknamed the Shhh! gesture)

How to Teach Two-Finger Gestures

Note: **When introducing VoiceOver gestures, it is best to lay the iPad flat on a desk or table top.** If the iPad is in a case that holds the iPad off the table, the iPad is not stable and often does not identify the gesture correctly.

To make a two-finger gesture, have the child make a fist, then extend the first two fingers. The fist should be held just above the screen. Fingers should be relaxed, bent and slightly spread.

- Most children create the two-finger swipe up by lightly placing the two fingers on the screen and quickly pushing their fingers away from their body (top of the screen). Some children prefer starting with slightly curled fingers and then straightening the fingers – while holding their fist still. Remember, all gestures should be small!

- Most children create the two-finger swipe down by lightly placing the two fingers on the screen and quickly dragging the fingers towards their body (bottom of the screen). Some children will choose to hold their fist still and quickly curl their fingers, making a two-finger swipe down.

- Two-finger tap will pause and then resume VoiceOver speech. Make a fist and quickly/gently tap the screen with both fingers simultaneously. A two-finger tap will pause VoiceOver speech. VoiceOver tends to be chatty; the two-finger tap is the 'Shhh! Tap' and will pause VoiceOver chatter. Two-finger tap again to resume VoiceOver, after VoiceOver was paused. This will quickly become your favorite gesture!

- The two-finger tap to resume has the same reaction as a two-finger swipe down – VoiceOver begins talking from where it was paused and does not start back at the top of the page.

4

Caution: **A two-finger double tap will start/stop the current action, including start/stop music or videos.** If there is music on the iPad, a two-finger double tap will start the music. Use a two-finger double tap again to stop the music.

Note: Older children often like to call the two-finger gesture the Viper Gesture - with an accompanying 'sss!' and a two-finger 'stab' motion. Gesture. Create the Viper gesture by simulating a snake striking at the screen; this often helps children – and adults - remember the gesture. Young children rarely understand the viper concept, but they are very familiar with the 'Shhh!' concept!

Note: It is always best to use the real term when teaching children about tech. However, it is also important that the child understands the term! 'Pause' and 'resume' are the standard terms; however, 'start' and 'stop' can be substituted if necessary, as young children are familiar with these words!

Activity 3.1a VoiceOver Practice Screen: Two-Finger Practice

Use the VoiceOver Practice Screen to practice the two-finger gestures. See Activity 2.3e for detailed directions.

The VoiceOver Practice screen is found in: Settings > General > Accessibility > VoiceOver On > VoiceOver Practice Screen

Start by reviewing previously learned gestures in the VoiceOver Practice Screen.

Action	VoiceOver Gesture
Move focus to any item on the screen	Touch item with one finger
Move focus to next item	One-finger swipe right from anywhere on the screen
Move focus to previous item	One-finger swipe left from anywhere on the screen
Activate the item that has focus	One-finger double tap anywhere on the screen
Drag and Split tap	One-finger drag, stopping on desired item; tap with a second finger to activate the item
Read All starting from the top of the page	Two-finger swipe up
Read All from current position	Two-finger swipe down
Pause or resume reading at current location	Two-finger single tap

Note: Split tap does not work in the VoiceOver Practice Screen.

- Allow the child to practice various commands as he wants, if appropriate.
- Quickly call out a specific command and '1, 2, 3!' Child should quickly create the desired command after the count of three.
- Call out the *action* so that the child has to think about which gesture to use.
- If two devices are available, call out a command and 1,2,3; you and the child create the gesture at the same time (synchronized).
- Have the child call out the command and you create the gesture. Make a mistake and have the child catch your mistake!

Activity 3.1b Home Screen: Two-Finger Practice

Dragging or flicking through apps on the Home screen can be tedious. With one simple gesture, children can listen to all of the app icons on the Home screen page. Practice the two-finger swipe up ('read all' from the beginning of the page), two-finger tap (pause), two-finger tap again (resume reading), and two-finger flick down ('read all' starting at the VoiceOver cursor).

The child's favorite apps should already be located on the first page of the iPad's Home pages. Ask the child to pause VoiceOver (two-finger tap) on a specific app. Make this into a speed game – the child has to listen and quickly react when VoiceOver announces the desired app. If the child is slow to react, VoiceOver will keep going! Use a swipe left to go back to the desired app. This is a great way to encourage children to listen, process and react faster.

First practice these gestures by quickly calling out the gestures such as, "Two-finger swipe up!" and, "Two-finger tap!" Then, call out the command such as "Read All!" and, "Shhh!" Have the child call out commands for you to do. Be sure to make a mistake, laugh about it, and ask the child to say what you did and/or what you should have done.

Encourage the child to be a "Tech Detective" and listen to the earcons. (See section 2.3 for earcon information.)
- What sound do you hear when VoiceOver reads the apps aloud on the Home screen? (Click sound**)**
- What sound do you hear at after VoiceOver announces the last app on the page? ('Thunk': This earcon indicates that VoiceOver has 'hit a wall' meaning that VoiceOver is at the end or beginning of the page and cannot go any farther.)
- What sound do you hear when an app is opened?
- What sound do you hear when Voice Over moves to the next row?

Resources
Aeden pause and play video: 6-year old Aeden is learning to use two-finger gestures to play and pause on the Home screen.
Aeden Two-Finger Swipe video: Aeden navigates the Home screen using gestures, then navigates the Home screen using the Read All commands.
Navigating the Home Screen Using Gestures and Refreshable Braille Display Commands YouTube Video Note: The first part of this three-minute video demonstrates using gestures on the Home screen.

Activity 3.1c Pages: Two-Finger Gestures Nursery Rhymes

Currently in iOS 12.0 Two-finger swipe down is not working correctly in Pages, Google Docs or Notes apps. Two-finger swipe down will resume; however, it resumes from where the visual I-beam cursor is located instead of where VoiceOver was paused. (The visual I-beam cursor does not follow the VoiceOver speech.)

This Pages activity is geared for children who are ready for more challenging content. The expectations of this activity can be modified to best meet a child's readiness and skill level.

Preparing a Pages Document

Another fun and practical way to practice the two-finger gestures is in a word document such as Pages (Apple's free word processing document) or Google Docs. You can use any age-appropriate content that will motivate your child. Nursery rhymes/songs are always fun! **Open your preferred word document and then type the desired content, before working with the child.** Two examples of popular nursery rhymes/songs are: *Twinkle Twinkle Little Star* and *Five Little Ducks* (See lyrics below.)

Pages vs. Google Docs

Pages is the native Apple word processing app available on all apple devices. Pages is fully accessible with VoiceOver. Google Docs is a web-based word processing document application available on any device. Google Docs is also accessible with VoiceOver. Whenever possible, choose the word processing app that the child's school is using.

Pages and Google Docs are very similar word processor apps. Google Docs does have significantly more buttons in the top tool bar. When using a two-finger swipe up, VoiceOver will read ALL items starting from the top of page, meaning that VoiceOver will read the buttons located in the tool bar across the top of the screen. Some children find Google Docs to be a little more complicated than Pages. With the current software versions, Pages typically works better than Google Docs when using a refreshable braille display.

In this example, we will use the Pages app; the principles are the same if you use Google Docs. Open the Pages app, Create a New Blank Document. Type in your content, such as *Five Little Ducks*. Be sure to give the document a title! For your convenience, the lyrics to *Five Little Ducks* and *Twinkle, Twinkle Little Star* are available below. **Prior to the lesson, create separate Pages documents for these two nursery rhymes.**

Five Little Ducks

Five little ducks went swimming one day,
Over the hills and far away.
Mother duck said, "Quack quack quack quack,"
And only four little ducks came back.

Four little ducks went swimming one day,
Over the hills and far away.
Mother duck said, "Quack quack quack quack,"
And only three little ducks came back.

Three little ducks went swimming one day,
Over the hills and far away.
Mother duck said, "Quack quack quack quack,"
And only two little ducks came back.

Two little ducks went swimming one day,
Over the hills and far away.
Mother duck said, "Quack quack quack quack,"
And only one little duck came back.

One little duck went swimming one day,
Over the hills and far away.
Mother duck said, "Quack quack quack quack,"
But no little ducks came swimming back.

Mother duck went out swimming one day,
Over the hills and far away.
Mother duck said, "Quack quack quack quack,"
And all five little ducks came swimming back.

Twinkle, Twinkle Little Star

Twinkle, twinkle, little star,
How I wonder what you are!
Up above the world so high,
Like a diamond in the sky.

When this blazing sun is gone,
When he nothing shines upon,
Then you show your little light,
Twinkle, twinkle, through the night.

Then the traveler in the dark
Thanks you for your tiny spark;
He could not see where to go,

If you did not twinkle so.

In the dark blue sky you keep,
And often through my curtains peep,
For you never shut your eye
Till the sun is in the sky.

As your bright and tiny spark
Lights the traveler in the dark,
Though I know not what you are,
Twinkle, twinkle, little star.

Note: Depending on your child's attention span, you may want shortened the nursery rhyme to only a few stanzas. Any nursery rhyme or song can be used.

VoiceOver Poem
By Christina Work

There was a boy named Ted,
Who liked to use his iPad before he went to bed.
He would put his iPad on a flat table,
And listen as he flicked right to get to his favorite fable.
He started to listen for his voiceover to read,
But all the apps and folders always slowed down his speed.
There's got to be an easier way for me to get to my book,
So, he decided it was time to take a look.
And just as quick as his little fingers could go,
He read about a way that wasn't so slow.
He used his two fingers and swiped up away from him,
And his iPad read all the icons from beginning to end.
Hip Hip Hooray, look at what I figured out,
It is so much quicker I just want to shout.
I wonder what would happen if I swiped down towards me,
He tried two finger swipe down and smiled with glee.
His iPad read from where his cursor was at,
He smiled and said would you look at that.

I know there is so much more I can do,
If I listen to the sounds, they give me a clue.
When I have gone as far as I can go
Thunk! Smack! Oh no
It's time to go back.

Edit Mode

Both Pages and Google Docs have two modes: Read Only and Edit. When you open a previously created document, the document can be read without editing. When the document is in Edit mode, the student might accidently make changes to the content. When in Edit mode in the Pages app, another tool bar appears at the bottom of the screen.

When you want to edit the content of the document, you must be in Edit mode. To access the Edit mode, tap inside the text field (without VoiceOver) and a visual I-beam cursor appears. To access Edit mode when running VoiceOver, tap the middle of the screen to bring the VoiceOver focus to the text field. Then double tap. The visual I-Beam cursor will appear, and VoiceOver will announce, "Text field is editing."

For these two-finger gesture activities, students will be in the Read Only mode and will not be editing the document. Unit 5: Writing and Editing will cover the editing mode.

Note: Repeat the Unit 3 VoiceOver gesture activities - using RBD or BTK commands – after learning these new commands in Unit 4. For your convenience, RBD and BTK commands are included in the activities below.

Pages Activity

Encourage your child to use a two-finger swipe down to find the Pages app located on the iPad's Home screen. Be ready to use a two-finger tap to pause VoiceOver. If necessary, use a left swipe to move back to the Pages app. Open Pages with a double tap. (This is a great opportunity to practice two-finger swipe and pause on the iPad's Home screen!)

> RBD: R Chord (1 + 2 + 3 + 5 + space); P Chord (1 + 2 + 3 + 4 + space)
> BTK: VO + B; Control

If the child is familiar with the Pages app and/or is ready to apply his skills, have him locate the desired document (Five Little Ducks) and open it. Prompt him to listen carefully for Five Little Ducks and be ready to pause VoiceOver. If he is not ready, then with VoiceOver running, you can model how to navigate with right swipes through the Tool bar and options until you arrive at the desired document. For a few young children who are easily distracted, it might initially be best for you to navigate and open the document quickly. Just remember, most children will stay engaged if **they** are the one interacting with the iPad.

Note: You can navigate to the desired document or through the Tool bar by using right swipes or dragging; however, since this unit is on 2-finger gestures, use 2-finger gestures if appropriate for your child.

- Once the document is open, ask the student to 'read all' and be prepared to pause when you ask him to pause.
- After VoiceOver reads the first line of Five Little Ducks, say, "Pause!"

- Ask the child to pause each time he hears a specific word, such as "swimming" or "duck".
- Ask the child what he heard first (Document, button, etc.) and if appropriate, discuss that these buttons are in the 'Tool bar' at the top of the screen.

Note: When the document is in Edit mode, right or left swipes will jump VoiceOver out of the editing field/document content.

Variations of Pages Activity
- Use text from a class assignment, poem, or favorite circle-time song.
- Write a few sentences about the child – do this ahead of time or ask the child questions. Here are some examples:
  - My name is ___.
  - My teacher's name is ____.
  - My sister's name is ___ and my brother's name is ___.
  - My favorite animal is ___.
  - I am ___ years old.
  - My favorite food is ___.
- Write about the child's favorite pet, hobby, a recent event, etc.
- Ask the child questions and have the student dictate his/her answers into a new Pages document.

Activity 3.1d Pages: Two-Finger Gestures Puns

This activity requires creating a document with puns or jokes. (See a list of potential puns below.) In this activity, use a two-finger swipe down to start VoiceOver, two-finger tap to pause VoiceOver, and a two-finger tap again to resume VoiceOver.

Note: In iOS 12, two-finger swipe down will not resume from the location that VoiceOver was paused. You will have to use two-finger swipe down to resume reading.

In this example, we will use the Pages app; however, any word document app will work.

- Ask the child to locate and open the Pages on the iPad's Home screen using two-finger gestures.
- Ask the child to locate and open the Puns document.
- Prepare the child to be ready to pause when you tell him (immediately after the question)
    - If necessary, read the first pun joke aloud and ask the child to model a two-finger tap on the table top.
- Instead of telling the child when to pause, prompt the child to independently pause after hearing the question. If he is quick, ask him to pause again after the answer; this gives the child time to laugh at this joke before hearing the next joke!

Puns

These puns are fast! Initially, you may need to slow VoiceOver's speed in order for the child to have time to pause the joke. This activity will encourage your student to be fast with his two-finger Shhh! Command! Note: 25 Puns are provided. You may want to create a document using only 5 or 10 puns, depending on your student.

1. What do you call a dinosaur that is sleeping?
A dino-snore!

2. What is fast, loud and crunchy?
A rocket chip!

3. Why did the teddy bear say no to dessert?
Because she was stuffed.

4. What has ears but cannot hear?
A cornfield.

5. What did the left eye say to the right eye?
Between us, something smells!

6. What do you get when you cross a vampire and a snowman?
Frost bite!

7. What did one plate say to the other plate?
Dinner is on me!

8. Why did the student eat his homework?
Because the teacher told him it was a piece of cake!

9. When you look for something, why is it always in the last place you look?
Because when you find it, you stop looking.

10. What is brown, hairy and wears sunglasses?
A coconut on vacation.

11. Two pickles fell out of a jar onto the floor. What did one say to the other?
Dill with it.

12. What did the Dalmatian say after lunch?
That hit the spot!

13. Why did the kid cross the playground?
To get to the other slide.

14. How does a vampire start a letter?
Tomb it may concern...

15. What do you call a droid that takes the long way around?
R2 detour.

16. How do you stop an astronaut's baby from crying?
You rocket!

17. Why was 6 afraid of 7?
Because 7, 8, 9

18. What is a witch's favorite subject in school?
Spelling!

19. When does a joke become a "dad" joke?
When the punchline is a parent.

20. How do you make a lemon drop?
Just let it fall.

21. What did the limestone say to the geologist?
Don't take me for granite!

22. What do you call a duck that gets all A's?
A wise quacker.

23. Why does a seagull fly over the sea?
Because if it flew over the bay, it would be a baygull.

24. What kind of water cannot freeze?
Hot water.

25. What kind of tree fits in your hand?
A palm tree!

Note: This Puns activity can be repeated when the student is learning to navigate line-by-line with the rotor (section 3.4) or with Bluetooth keyboard commands (section 4.2)

Resources
Aeden's Pages App 1 video: 6-year old Aeden navigates to, opens, and reads puns and jokes in the Pages app.
Refreshable Braille Display Commands for the Emerging Braille Reader: R Chord and P Chord post (Read All and Pause Chords)

Activity 3.1e Blindfold Doggy App
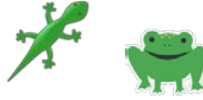
Blindfold Doggy is a free app with in app purchases for more features and additional food, etc. (The game ends when you run out of food typically - in a day or two. An in-app purchase is required to continue playing.) This app is self-voicing and can also be played with VoiceOver On. This app is played in portrait mode.

Note: Even when not playing, the dog will periodically make noises indicating that she needs care. Turn off notifications when the app is first opened or in Settings, if you do not want these notifications. You can also set "sleep" hours so that the game does not make any sounds at night.

Purpose

Blindfold Doggy is an auditory virtual pet game. The object of the game is to care for your pet. Earn points with good care and lose points if your dog runs away or is not cared for properly. This game encourages children to **listen carefully to directions, reinforces right, left, up and down concepts, sequencing, and problem-solving**. The game provides opportunities for young students to use a variety of basic gestures (one-finger swipes, two-finger swipes, and double tap) and is a great game to **introduce the concept of navigating through menus.** Blindfold Doggy has highly motivating sound effects!

Play

The game is played in portrait mode. Tap the Switch to Full Screen Mode button in the bottom right corner, if desired. The Main Menu has these options:
- Learn Sounds
- Practice Game with Explanations
- Simple Game with Explanations
- Simple Game
- My Scores
- Help
- Settings
- Get Upgrades

The free version of the game includes Learn Sounds and Practice Game with explanations.

Learn Sounds is a list of what your dog does and what he needs. Tap on each sentence to hear the dog's sound. Example: "Your dog pants because he needs water." When you tap on that sentence, you hear your dog panting. Your dog will make thirteen different sounds.

Practice Game with Explanation: Start the game with a right or left swipe to hear the "menu" or list of options. These options are:

- Kibble
- Play
- Whistle
- Leash
- Door
- Brush
- Pooper Scooper
- Water

Note: A swipe down is the door to go outside. Swipe up brings you back home.

Select your desired option by double tapping. Listen carefully to the directions – they are different according to what option you pick. If you feed or water your dog, she will need to go outside. Be careful - your dog needs a leash before you can open the door! Your dog will make noises to alert you of her needs, including the need to go outside. Guess what happens if she is not taken outside. . . (You will lose points if she poops in the house!) Taking good care of your dog will earn points.

It takes 100 points before you have access to the Adventure Game, which enables you to train your dog. 50 points to walk to town and 150 points to swim in the river.

Teacher Hint: When playing Blindfold Doggy, discuss digital menus and how a right swipe moves through each choice and a double tap selects the choice. **Allow your student to make mistakes and to learn through trial and error.** The student may try to go out the door (right swipe down) without first opening the door and he will hear the hint that the door is closed. The student then has to problem-solve and go back to the menu, select door, and open the door before he can go outside. The student will quickly learn that he has to first put on the dog's leash, before opening the door. This game provides many opportunities to problem-solve and to figure out the correct sequence of steps!

Resources
Nancilynn Blindfold Pets Video: Nancilynn uses one-finger and two-finger swipes to play the Blindfold Doggy app.
Blindfold Doggy App Review post

Exploring the Toolbar

Typically found at the top of an app, the toolbar is a row of buttons or dropdown menus. When activated, these buttons perform specific functions, such as opening the Help menu for that app. Toolbars may also be found at the bottom of the app.

Exploring the toolbar is an important tech skill. These icons are visual symbols that provide information. Example: The visual symbol of a gear represents settings or options. Sighted children quickly learn what features the icons represent. VoiceOver announces the name of the icon.

The buttons are intentionally placed in logical locations. Want to go back to the Home screen of the Pages app to pick another nursery rhyme? The back button (labeled "Documents") is in the first item on the screen located in the top left corner.
The buttons in the toolbar are important and should be introduced on an age-appropriate level.

Exploration apps and other beginning apps for young children typically do not have toolbars. As the child's tech skills progress, apps become more complex, and toolbars will become more prevalent. It is important that children learn to explore and understand toolbars early on. Exploring a toolbar enables the user to learn various app features and will help users learn about new features in future software updates. Educators should provide opportunities for children to self-explore the tool so that they can learn to transfer tech skills from one app to another.

Status Bar
The Status bar is the row of items that appear at the very top of the iPad screen. These items provide information and are not buttons. Starting on the far-left side, is the time and date. (Prior to iOS 12, the time used to be located in the top middle of the screen.) Starting from the right side of the screen is the battery level and Wi-Fi status. When available, additional items, will appear in the Status bar.

When introducing the child to the iPad, the status bar is not a priority. However, curious students may discover the status bar and want to know more about it.

Touch an item in the status bar and listen to the VoiceOver hints: "Touch the status bar then swipe down with three fingers to reveal Notifications. Touch the status bar then swipe up with three fingers to reveal the Control Center. Double tap to scroll to top." Using Notifications and the Control Center is a more advanced skill than what most young children need to know.

Activity 3.1e Exploring the Toolbar

This activity is for a more curious child who is ready to learn a more advanced tech concept. If the child is on the level of learning just the basic commands, this activity can be skipped and taught at a later time. Not all young children are ready for this concept.

Note: This activity can be done again in conjunction with braille display or Bluetooth keyboard commands. These commands are included as options in the directions below.

In this activity, we will use the previous Pages document, Five Little Ducks. (Any Pages document can be used.) Ask the student to locate and open the desired Pages document. Once the document is opened, explore the Toolbar buttons:
- Move to the Documents button in the top left corner; (drag finger to the top left corner or use multiple left swipes) or other options:
  - 4-finger tap at the top of the screen will move to the first item on the screen
  - RBD: L Chord (1 + 2 + 3 + space)
  - BTK: Control + up arrow
- Move right to hear all the buttons available in the Toolbar: (drag finger or right arrow) or other options:
  - RBD: Joy stick right or 4 + space
  - BTK: Right arrow

If appropriate, discuss the various buttons on your child's level. The Document button and the Insert (Add) button are the two buttons that your child is most apt to use first.

Two-Finger Scrub

Note: If you select a button that has a popup menu, use the **two-finger scrub gesture** to close the popup menu. The two-finger scrub gesture is two fingers moved rapidly back and forth several times. (You can think of drawing a small print 'z' or scrubbing/erasing the popup menu.) Another option to exit a popup menu is to tap outside of the popup and then double tap. A two-finger scrub action is more advanced than what most young children need to know.

Three-finger gestures are the scrolling gestures. Example: When on the iPad's Home screen, a three-finger scroll right or left will move between Home screen pages. When reading a book that has a standard page layout (turn pages), a three finger scroll left/right will move between pages. When reading a long Pages document, a website, or in a book that scrolls up or down, three-finger scroll up or down will move between pages.

- Three-finger Swipe Left: Scroll to next page (page to the right)
- Three-finger Swipe Right: Scroll to previous page (page to the left)
- Three-finger Swipe Up: Scroll to the next page (page below)
- Three-finger Swipe Down: Scroll to the previous (page above)

How to Teach Three-Finger Gestures

When creating three-finger gestures, spread the fingers apart. The fingers should be relaxed and slightly bent. Young children who are familiar with using a Perkins Brailler – a manual braille writer – often lack the required finger strength to push down the manual keys. These children tend to compensate by using stiff fingers. Since fingers are different lengths – with the middle finger being longer than the index and ring finger – the iPad often *interprets* the gesture as a one-finger touch/swipe because the middle finger touches the screen first. The combination of separating the fingers and then having relaxed, slightly bent fingers makes it easier to have all three fingers touch the screen at the same time. Remind the child to use a "tickle touch" (very light touch). Do quick little finger exercises to relax and bend the fingers. Model this exercise with your child and then have him do it:

> Hold your left palm up. Place the three bent fingers of your right hand lightly on top of your left palm and lower and raise your wrist. This causes your bent three fingers to rock up on to the tips of your fingers and then lowers your fingers to the flat pads of the fingers. This should help relax your fingers.

Most children will create three-finger scroll left or right gestures in one of these two ways: Swipe Right/Left or Push/Pull method.

Three-Finger Swipe Right or Left

This gesture is similar to the 1-finger swipe right or left. Create a fist and extend the index, middle and ring fingers. Moving just the wrist, drag the three fingers left or right. Some young children with limited control may prefer to move their whole hand slightly to the left or right. If the child's motion is too big, spread your thumb and index finger apart and place them on the iPad's screen. Ask the child to make the three-finger swipe right/left inside the bracket made by your thumb and finger. The child can rapidly move

his 3-fingers back and forth within that boundary, to become comfortable with the movement.

Remember, the palm should hover just over the screen and the motion should be small. Drag left will scroll to the next page and drag right will scroll to the previous page. Initially, the direction dragged may be confusing. Think about turning a page in a book. If you want to go to the next page, you start at the right side of the book and pull the page to the left.

> To teach the turn to the next page concept fold a piece of paper in half. Place the fold on the left side. To turn to the next page, grab the right edge and pull it to the left – unfolding the paper. To teach the concept of scrolling down to the next page, place the fold of the paper at the top. Grab the bottom edge of the paper and pull it up – unfolding the paper.

Hint: Encourage the child to keep his arm off the desk; do not rest on the desk, as this tends to make the movement a diagonal movement rather than right/left movement.

Three-Finger Push or Pull
Some children prefer holding their arm parallel to the body (elbow away from the body). Make a fist, extend three fingers out, and move the arm parallel to their body. For right handed children, the fingers of the right hand will be pointing to the left with the thumb closest to the body. Place the fingers on the screen and push the fingers slightly to the left. The left push gesture will scroll to the next page. Using the same positioning, pull the fingers slightly back to the right. This pull right gesture will scroll to the previous page.

Variation: Some older right-handed children prefer to use the left hand to create the scroll to the previous page gesture. Using the left hand, the child will push to the right (instead of using the right hand to pull to the right). However, most young children find it challenging to switch hands.

Note: This can be a challenging gesture for some children. Children who struggle to physically make this gesture will benefit from using either the Bluetooth keyboard or a braille display, as these gestures are easy to make using external devices.

If the child truly struggles with creating 3-finger gestures, try jumping to RBD (Section 4.1) or BTK gestures (Section 4.2).

Activity 3.2a VoiceOver Practice Screen: Three-Finger Gestures

Remember, young children learn by repetition and by building and expanding familiar things. A great warm-up exercise for iOS lessons is to go back to the VoiceOver Practice Screen to practice the familiar gestures and adding the new three-finger gestures. Then apply these gestures to navigate around the Home screen.

Use the VoiceOver Practice Screen to practice the three-finger gestures, if necessary. See Activity 2.3e for detailed directions.

The VoiceOver Practice screen is found in: Settings > General > Accessibility > VoiceOver On > VoiceOver Practice Screen

Start by reviewing previously learned gestures in the VoiceOver Practice Screen.

Basic VoiceOver Gestures for Young Children (Chart)

Action	VoiceOver Gesture
Move focus to any item on the screen	Touch item with one finger
Move focus to next item	One-finger swipe right from anywhere on the screen
Move focus to previous item	One-finger swipe left from anywhere on the screen
Activate the item that has focus	One-finger double tap anywhere on the screen
Drag and Split tap	One-finger drag, stopping on desired item; drop another finger to activate the item
Read All starting from the top of the page	Two-finger swipe up
Read All from current position	Two-finger swipe down
Pause or resume reading at current location	Two-finger single tap
Scroll down to the next page	Three-finger swipe up
Scroll up to the previous page	Three-finger swipe down
Scroll right to the next page	Three-finger swipe left
Scroll left to the previous page	Three-finger swipe right

Note: Split tap does not work in the VoiceOver Practice Screen.

Activity 3.2b Home Screen: Three-Finger Swipe Right/Left Practice

Prior to teaching the three-finger swipe right or left, move several of the child's favorite apps to the second Home screen page. This will give the student a reason to use the three-finger swipe right and left. Note: Only the three-finger swipe left and right will work on the main part of the Home screen. Three-finger swipe up and down does not.

Review known gestures first! This helps the student remember each gesture and what it does before applying the newer three-finger gestures.

First practice the familiar gestures by quickly calling out the gestures; then, call out the action so that the child can connect the action with the gesture. Add in the newer Three-finger swipe right and three-finger swipe left. Have the child call out commands and you do the gesture. Be sure to make a mistake, laugh about it, and ask the child to say what you did and/or what you should have done.

Some of the student's favorite apps should already be located on the first page of the iPad's Home pages. Ask the student to pause VoiceOver (two-finger tap) on a specific app. Make this into a speed game – the child has to listen and quickly react when VoiceOver announces the desired app. If the child is slow to react, VoiceOver will keep going! Use a swipe left to go back to the desired app. This is a great way to encourage children to listen, process and react faster.

Encourage the child to be a "Tech Detective". What earcons are heard when navigating the Home pages?
* 'Click' sound: Indicates that VoiceOver is moving from app to app
* 'Thunk' sound: Indicates that VoiceOver is at the end/beginning of the page
* 'Double beep' sound: Indicates that VoiceOver is moving to next/last page or when app is opened
* What other sounds do you hear?

Note: When on the first page of the Home Screen, a three-finger swipe right will go move to the 'previous page' – in this case, the Search page. For most young children, using the Search page and typing in the Search Field is not a skill that they are ready for. However, children who are swiping left and right through the Home page will eventually come across the Search Page. It is important to talk about the Search Page in general terms, so that the child will not become confused should they find it.
RBD: O chord (1 + 3 + 5 + space; scroll to next page) or 2 + 4 + 6 + space (scroll to previous page)
BTK: Option + right arrow; Option + left arrow

Resources
Scroll through Home Screen Gestures and Refreshable Braille Display YouTube video
Scrolling with RBD 2 YouTube video
Bluetooth Keyboard: Navigating the Home Screen YouTube video

Activity 3.2c App Switcher: Three-Finger Swipe Up Practice

This activity is for children who are ready for more advanced activities and will not be appropriate for all young children. These activities can be taught at a later time and are included in this section of the manual only because they incorporate three-finger gestures.

App Switcher
Once an app is opened, the app remains running in the background even after the app has been 'closed' by going back to the Home screen. While it is fine to leave a few apps running in the background, you do not want to leave ALL your apps running in the background!

The purpose of the app switcher is to have quick access to apps that you are using or use frequently.

Learning to use the App Switcher is a tech skill that students do need to know. Introduce this skill now, if your child is ready for this concept.

Three-finger activity for children (with VoiceOver on).
- Open the App Switcher: (Press the Home button twice quickly).

The app switcher screen will display up to six apps (2x3 grid) at a time along with the dock at the bottom of the screen. VoiceOver will automatically announce the app that has the focus.
- Navigate to the app you want to close: (Drag or swipe right/left). Listen to the VoiceOver hint. VoiceOver will announce the app that has the focus, then swipe up with three-fingers to close the app.

Note: Only listen to the full VoiceOver hint the first time. Once you know the command to close an app, encourage the student to quickly and efficiently close apps without listening to the VoiceOver hints.
- Close the app: (Three-finger swipe up).
  - RBD: 1 + 4 + 5 + 6 + space
  - BTK: Option + up arrow
- Repeat until all desired apps are closed.

Note: If more than six app are running in the background, use the three-finger swipe right to access additional apps.
- RBD: 2 + 4 + 6 + space
- BTK: Option + left arrow

Reboot Your iPad
Note: If your iPad becomes sluggish or has some odd behaviors, be sure to close apps that are running in the background! If necessary, do a 'hard reboot' by pressing and

holding the Sleep/Wake button at least 10 seconds until the Power Off circle appears at the top, center of the screen. Slide the circle to the right; if VoiceOver is on, use a double tap. This will turn off the iPad and reset it. If the iPad is not responsive (Power Off circle does not appear), then – and only then – should you press and hold both the wake/sleep button and the Home button to shut down the iPad. However, this method is only used as a last resort; it is not good for the iPad to overuse the wake/sleep button and Home button combination!

Activity 3.2d Apple Books: Three-Finger Gestures

Apple Books is an e-book reading and store application for iOS and macOS operating systems. Books are typically downloaded from the iBooks Store; however, users can also create and share their own EPUB books and PDF files. Create your own Apple Books using iBooks Author (free Apple app for mac books) or various iOS apps such as Book Creator, Pictello, and others. Books created in these apps are available in the EPUB format and can be opened in the Apple Books app. **Apple Books must be installed before doing this activity.**

Note: iBooks was renamed Apple Books in 2018.

Most of the books geared for young children are images and the text is not accessible with VoiceOver. When you create your own books, the print text is accessible with VoiceOver and you can add image descriptions to the pictures. Note: if the print is accessible with VoiceOver, it is also accessible with a refreshable braille display.

The Perkins website, Paths to Technology (http://www.perkinselearning.org/technology), has a section where educators/families can share e-books that they have created. These free books can be downloaded and opened in Apple Books. This page also has information on how to create accessible e-books. There are a number of Apple Books available for young children. Many of these books have simple illustrations and a sound associated with the illustration on each page. Example: The Alphabet Sound Book has one letter of the alphabet on each page, along with a word that starts with that letter, an illustration of the word, and an associated sound. (The A page has the word 'airplane', an illustration of an airplane, and the sound of an airplane flying.) Here is the link to The Alphabet Sound: iBook post which contains the link to download the free e-book.

Note: If you create accessible EPUB books, please share them with *Paths to Technology* so that others can use the books too! Have questions? Contact Technology@Perkins.org

Apple Book Gestures
When reading The Alphabet Sound book, a two-finger swipe down will read text and will automatically turn page; however, the sound buttons are skipped. Using the three-finger swipe right will move to the next page; VoiceOver announces the text and the sound button is activated.

For this activity, you will need to install the free Apple Books app (formally called iBooks) and the free Alphabet Sound Book found on the *Paths to Technology* website.

The Alphabet Sound Book Activity

Note: The main Tool Bar in Apple Books is along the bottom of the page.

- Open the Alphabet Sound book: (Book will either be under the Reading Now button – if you previously opened the book - or under the Library button.)
- On the first page, right swipe multiple times through the top Tool bar, right swipe again to hear the title of the book, right swipe again to hear the author information.
- Turn the page: (Three-finger swipe left).

VoiceOver will announce the text and the sound will automatically play.

- Turn the page again: (Three-finger swipe left).

Continue turning the pages until the book is finished.

- RBD: 1 + 3 + 5 + space
- BTK: Option + right arrow

3.3 Navigating Gestures: Four-Finger Tap Gesture

Four-finger tap at the top of the page will move the VoiceOver focus to the first item on the page. This first item is typically located at the top left corner of the page. Four-finger tap at the bottom of the page will move the VoiceOver focus to the last item on the page. This last item is typically located at the bottom right corner of the page. If in an app that has a toolbar at the top of the page, a four-finger tap at the top of the page will move the VoiceOver focus to the first button in the toolbar. The four-finger tap gestures are often overlooked. While they are not frequently used gestures, they can be very efficient gestures for older students who are navigating long passages or websites.

Note: This command – jump to first or last item on the page – is more useful when using a braille display or Bluetooth keyboard. When using gestures, it is easy to locate the physical corner of the iPad and then touch the screen near the physical corner.

For some, the four-finger tap at the bottom of the page can be challenging to make all four fingers touch the screen simultaneously. With the three-finger tap, it is recommended to spread the fingers apart and use relaxed, slightly bent fingers. When tapping four-fingers at the bottom of the page, many people find it easier to bunch the four-fingers slightly closer together.

The four-finger tap can be an awkward gesture for many people. It is much easier to use a Bluetooth keyboard command or refreshable braille display command to navigate to the first or last item on the page!

Note: Moving to the first/last item on the screen is a skill that some young children are not yet ready to learn. The child does need to understand the need to move to the first or last item and be able to physically make the gesture. **The four-finger tap is not a critical gesture; teachers may opt to wait to teach this gesture.**

Activity 3.3a Home Screen: Four-Finger Tap

When learning new VoiceOver gestures, everyone – especially young children – need repetition, familiar activities and time to review/practice gestures they have recently learned. Going back to the Home screen is a great way to practice gestures and to understand the action that each gesture performs. Review the previously learned gestures and then add the Four-finger tap at the top of the page and the four-finger tap at the bottom of the page.

Basic VoiceOver Gesture Commands for Young Children

Action	VoiceOver Gesture
Move focus to any item on the screen	Touch item with one finger
Move focus to next item	One-finger swipe right from anywhere on the screen
Move focus to previous item	One-finger swipe left from anywhere on the screen
Activate the item that has focus	One-finger double tap anywhere on the screen
Drag and Split tap	One-finger drag, stopping on desired item; drop another finger to activate the item
Read All starting from the top of the page	Two-finger swipe up
Read All from current position	Two-finger swipe down
Pause or resume reading at current location	Two-finger single tap
Scroll down to the next page	Three-finger swipe up
Scroll up to the previous page	Three-finger swipe down
Scroll right to the next page	Three-finger swipe left
Scroll left to the previous page	Three-finger swipe right
Move focus to the first item on the screen	Four-finger single tap near top of screen
Move focus to the last item on the screen	Four-finger single tap near the bottom of the screen

Note: Split tap does not work in the VoiceOver Practice Screen.

3.4 Introduction to the Rotor 🐸

The rotor is a virtual control that acts like a physical dial when VoiceOver is on. Use the rotor to change VoiceOver settings and to access additional commands and features. The rotor can be used to increase/decrease VoiceOver's speech rate, to read character-by-character, to select text, and so much more. Users can customize what options are in the rotor and app developers frequently add features to the rotor that are specific to their app.

iPad Rotor Settings
There are numerous rotor options available in Settings. To limit the number of items that appear in the rotor, we will select only the rotor items that young children are most apt to use. **As the child's tech skills increase and as he develops the need for more options, go back to Settings and select additional rotor items.**

To select rotor items, go to Settings > General > Accessibility > VoiceOver > Rotor and then check the desired options and uncheck the options that are not needed by young children at this time.

Here are the common rotor items used by young children:
- Characters (Move character-by-character)
- Words (Move word-by-word)
- Lines (Move line-by-line)
- Speaking Rate (Increase or decrease VoiceOver's speaking rate)
- Containers (Jump from container to container; containers are areas on the screen)
- Headings (Jump from Heading to Heading)
- Tables (Navigation controls for tables)
- Punctuation (Choose the amount of punctuation that VoiceOver announces)
- Text Selection (Method for selecting text to be highlighted, copied, deleted, etc.)

Note: There are many additional Rotor items that should be added as the child needs them! This small list of items is a good starting point for young children.

Understanding the Rotor
Think of the rotor as a virtual dial – similar to an old-fashioned radio dial or the old dial on a washing machine. Place your thumb and index finger on the dial and twist.

When performing the twist motion on the iPad, the rotor popup will visually appear briefly on the iPad's screen. Each twist will move to a new rotor option – you will hear a cricket sound (earcon) and VoiceOver will announce the option. Twisting clockwise will move to the next item in the rotor; twisting counter-clockwise will move to the previous item in the rotor. Once on the desired option, use a one-finger swipe up or down to

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adjust that option. Example: Twist the rotor until you hear 'speech rate'. Then, flick up to increase the speech rate or flick down to decrease the speech rate. The rotor gesture can be clockwise (moves to the next rotor option) or counter clockwise (moves to the previous rotor option).

The rotor is always available when VoiceOver is on; however, when not in use, it is visually hidden.

Teaching the Rotor Command

There are several ways to create the rotor gesture. Here are several methods:
- Make a fist, then extend your index finger and thumb and twist gently (most common method)
- Extend the right index finger and drag down while extending your left index finger and drag up
- Extend the index finger on both your left and right hands and move them simultaneously drawing a half circle
- Hold the thumb on the screen and simultaneously flick just the index finger

If your child is struggling with how to make the rotor gesture, have the child use his index finger and thumb to twist the top off of a water bottle. (Hint: Use an empty water bottle. Another training option is to have the child position his hand with the index finger and thumb out, as if he was going to make the rotor gesture. Place the water bottle top between the joint on the thumb and the big joint on the index finger. The child should pinch his thumb and finger together to hold the water bottle top. Now twist the fingers without dropping the water bottle.

A common mistake when attempting to make the rotor gesture is to bring your fingers together or apart, creating the pinch gesture (zoom feature). Another common mistake is for the thumb (or one finger) to touch the screen before the second finger; VoiceOver interprets this as a tap.

The rotor gesture can be physically challenging for many users! Remember, there are braille display rotor commands and Bluetooth keyboard rotor commands that many users find are easier than making the physical rotor gesture.
- RBD: 5 + 6 + space (move to the next rotor option)
- BTK: Up + right arrows (move to the next rotor option)

Note: Young children with visual impairments often lack finger strength, isolated finger movement, and finger dexterity. Work closely with the child's occupational therapist to develop finger dexterity that is required to create VoiceOver gestures.

Activity 3.4a Ballyland Rotor App

The BallyLand Rotor App by Sonokids is $2.99. The app is self-voicing and is fully accessible for children and adults. Like all Ballyland apps, the game is played without VoiceOver, using the self-voicing feature. Note: There is a 3D model of Ballycopter available through the Sonokids website. This tactile model can be used to practice the rotor gesture.

Purpose
This app is specifically designed for young children with visual impairments to learn the rotor gestures and concepts. The gestures used in this app are the rotor gesture (two-finger twist), swipe up, swipe down and three-finger swipe left. Children have the opportunity to make choices throughout the game.

Play
This fun game starts with a video tutorial on various ways to make the rotor gesture. The game is a story in which the child is asked to use the rotor gesture, stopping on a specific rotor option. Then, the child can swipe up or down to make a choice. The story changes according to the child's choice. The child can play the game again and create a whole new story! The story continues with additional options and choices – as the student learns to use the rotor. The game ends with a fun song.

Note: In iOS 12, **Zoom must be toggled off in Settings in order to use the Three-finger swipe left gesture to move to the next screen.**

Settings
This app does not have Settings options.

Accessibility for Adults
This game is fully accessible with self-voicing. The game cannot be played with VoiceOver running.

Resource
Ballyland Rotor App Review post

Activity 3.4b VoiceOver Practice Screen: Rotor

Remember, young children learn by repetition and by building on and expanding familiar things. A great warm-up exercise for iOS lessons is to go back to the VoiceOver Practice Screen to practice the familiar gestures and then adding the new rotor gestures. Then apply these gestures to navigate around the Home screen.

Use the VoiceOver Practice Screen to practice the rotor gestures, if necessary. See Activity 2.3e for detailed directions.

The VoiceOver Practice screen is found in: Settings > General > Accessibility > VoiceOver On > VoiceOver Practice Screen

Start by reviewing previously learned gestures in the VoiceOver Practice Screen.

Basic VoiceOver Gestures for Young Children (Chart)

Action	VoiceOver Gesture
Move focus to any item on the screen	Touch item with one finger
Move focus to next item	One-finger swipe right from anywhere on the screen
Move focus to previous item	One-finger swipe left from anywhere on the screen
Activate the item that has focus	One-finger double tap anywhere on the screen
Drag and Split tap	One-finger drag, stopping on desired item; drop another finger to activate the item
Read All starting from the top of the page	Two-finger swipe up
Read All from current position	Two-finger swipe down
Pause or resume reading at current location	Two-finger single tap
Scroll down to the next page	Three-finger swipe up
Scroll up to the previous page	Three-finger swipe down
Scroll right to the next page	Three-finger swipe left
Scroll left to the previous page	Three-finger swipe right
Select the next item in the rotor	Two-finger twist clockwise
Select the previous item in the rotor	Two-finger twist counter-clockwise
• Perform action or adjust value defined by current rotor setting	One-finger swipe up or down

Note: Split tap does not work in the VoiceOver Practice Screen.

Activity 3.4c Home Screen: Rotor – Speaking Rate

One of the 'super powers' of using a screen reader is the ability to speed up the screen reader's speaking rate. Proficient users can listen to a screen reader at 600+ words per minute. Just imagine reading books at that speed! High school and college students can whip through school reading assignments at a much faster rate than their peers. As children learn to increase VoiceOver's speaking rate, they are also learning to increase their processing speed – meaning that not only are they listening at an increase speed, but they are processing ALL information faster. Absorbing written materials auditorily – and processing this information - at higher speeds is a skill that teachers should intentionally and actively teach young children who visually impaired.

Most children -even young children - are able to start VoiceOver speaking rate at around 55%. If a child clearly demonstrates a processing issue, you may choose to start VoiceOver at a slightly lower rate as a last resort. **However, no matter what speed the child starts with, that speed should be intentionally and systematically increased.** The goal is for the child to listen to iOS VoiceOver at 90 – 100% by the end of first grade.

Note: VoiceOver on a Mac (and a PC's screen reader) can go faster than VoiceOver on iOS.

There are times that users need to **temporarily** decrease the VoiceOver's speaking rate:
- In noisy environments
- Technical content (complex materials that need focused attention to understand)
- Listening to individual letters or numbers (email address, spelling a name, phone number)

In settings, we added 'Speaking Rate' to the rotor. This enables the user to use the rotor to quickly increase or decrease VoiceOver speaking rate at any time or place when running VoiceOver. We will do this activity on the Home screen; VoiceOver should be on.

1. Read the apps on the page using the current VoiceOver speed: (Two-finger swipe up).
   - RBD: R Chord (1 + 2 + 3 + 5 + space)
   - BTK: VO + B
2. Pick a specific app in the third row and pause VoiceOver: (Two-finger double tap).
   - RBD: P Chord (1 + 2 + 3 + 4 + space)
   - BTK: Control

3. Increase VoiceOver speech rate to 100%: (Activate rotor with two-finger twist multiple times, stopping on Speaking Rate. One-finger swipe up multiple times stopping on 100%).
   - RBD: 5 + 6 + space; joy stick up or 3 + space
   - BTK: Up + right arrow; up arrow
4. Read ALL the apps on the page: (Two-finger swipe up).
   - RBD: R Chord (1 + 2 + 3 + 5 + space)
   - BTK: VO + B
5. Pick a specific app in the third row and pause VoiceOver: (Two-finger double tap).
   - RBD: P Chord (1 + 2 + 3 + 4 + space)
   - BTK: Control

Repeat the steps above with different VoiceOver speaking rates. See which speaking rate your child prefers – remember, the faster the better! When finished, set the speaking rate to around 55% or faster if the child can understand it!

Increase Listening Speeds

When the child is comfortable with the introduced VoiceOver gestures, begin to intentionally increase the speaking rate during familiar activities. Start increasing the speaking rate when reviewing activities including when locating a specific app on the Home screen.

You can also have the child listen to a nursery rhyme or other Pages document. (Initially use short content such as a nursery rhyme or a story that is about one paragraph.) Listen the first time at the child's typical speaking rate. Increase the speaking rate one time. Listen again. Increase the speaking rate again one time. Listen again. Now decrease the speaking rate and listen again. (This is one bump above the student's normal listening skills.) The student should be able to easily understand the now familiar text at a slightly higher speed.

Note: Each swipe up or down will increase or decrease the speaking rate by 5%.

Teachers/Parents: This is a great method for YOU to increase your listening skills too! Be aware that often even young children can listen at a faster rate than is comfortable for many adults. Do not slow your child down because you are not able to listen at faster speeds!

Resource
Changing the Speech Rate with Gestures and RBD Commands YouTube video

Puns Activity

Repeat the Puns activity (Section 3.1d) using the rotor to navigate by lines. The pun activity is much easier to navigate line-by-line than to pause and resume VoiceOver speech!

Activity 3.4d Home Screen: Rotor – Characters

In this activity, we will read character-by-character using the rotor. Moving by character is an important skill as children learn to read, write, spell and edit. Moving by character will enable the child to hear spell a word, hearing each letter one at a time. Knowing how to navigate by character is a critical skill!

1. Start on the Home screen
2. Navigate to the Clock app
3. Read by characters: (Activate rotor with two-finger twist multiple times, stopping on Characters. One-finger swipe down).
   - RBD: 5 + 6 + space; joy stick down or 6 + space
   - BTK: Up + right arrow; down arrow
4. Continue to listen character-by-character: (One-finger swipe down multiple times)
   - RBD: Joy stick down or 6 + space multiple times
   - BTK: Down arrow multiple times

VoiceOver will spell "clock", then the time, then "am" or "pm".

Variations
- Repeat the Home screen activity with other apps. (Pick apps that are easy to spell or that have meaning to the child.)
- In Pages, create a list of people who are important to the child (family members, teachers, peers). Have the student use the rotor to see how their names are spelled. If possible, point out names that sound alike but are spelled differently!
- In Pages, create a short list of common sight words (the, and, dad, etc.) Encourage the student to learn how these words are spelled! This is a great way to teach simple homophones, such ("to" and "two").

Resource
Navigating by Words and Characters with a Refreshable Braille Display YouTube video

ABCs of iOS Manual

Unit 4: Introduction to Refreshable Braille Displays and Bluetooth Keyboards
iOS 12

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Objectives
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Overview

For many young students, creating VoiceOver gestures – especially three-finger gestures can be physically challenging. The same command can be created using a refreshable braille display command or a Bluetooth keyboard commands. Pairing the iPad with a device is often easier for students who are visually impaired and will be teaching tech skills that transfer to using a screen reader on a computer after learning touch screen gestures. Young children often prefer using a braille display or Bluetooth keyboard. Unit 4 will introduce how to use a refreshable braille display and how to use a Bluetooth keyboard paired with an iPad running VoiceOver. Activities will include using basic braille display and Bluetooth keyboard commands for young children.

4.1 Introduction to Refreshable Braille Display.

Braille Display Overview

Young children who are or will be braille readers will benefit from pairing an iPad with a refreshable braille display (RBD). A braille display is a device that enables braille readers to easily interact with a computer, tablet or smart phone. Braille readers can use the braille display to read and write in braille. Refreshable pins move up and down creating Braille characters that mirror the print text and a Perkins-style keyboard is used to input braille characters.

There are several different brands and sizes of braille displays. This manual is based on **Humanware's Brailliant BI14**; however, any braille display will work. The basic commands that mirror VoiceOver gestures are the same for all braille displays. For young children with small hands and fingers, it is recommended to use a braille display that is 14 – 20 characters. The larger displays – with 40 or more characters – is best suited for users who are older and are reading long passages.

Note: A braille display does not replace traditional paper braille. A braille displayed paired to an iPad is a tool in the toolbox. Children should still receive some materials – especially math materials - in paper braille format!

Benefits of Using a Braille Display

There are many benefits of pairing a braille display with an iPad for emerging braille readers.

- Writing: The traditional Perkins Brailler is a manual device (similar to the old manual type writer) requiring a significant amount of finger strength and isolated finger control. Young children tend to place several fingers on one key in order to press the key down. When the keys are not pressed hard enough, 'mushed' braille is created, which is hard to read tactually. For many children – especially emerging readers, children who struggle with tactual discrimination, or children who have motor issues - traditional paper braille may be challenging to read. Refreshable braille dots are always 'crisp' and are easier to read.

- Writing: The braille display only needs a very light touch to activate, requiring very little finger strength.

- Auditory: The braille display can be set to announce individual letters, words or sentences; this provides instant feedback as the child types. Children love the instant feedback as they learn to 'scribble' and create letters and words in Braille. VoiceOver speech can also be muted so that the child must tactually read the braille (without VoiceOver announcing the letter or word).

- General Education Teachers: Classroom teachers are typically familiar and comfortable with iPads/iOS devices and are not familiar with braille. Since the

print text on the screen is mirrored in braille on the braille display, classroom teachers can easily glance at the screen to see what the student is doing and can even edit the document on the fly. The student's work is instantly shown in both braille (on the braille display) and print (on the iPad screen). No more waiting for a TVI to recreate the material in braille or to transcribe the braille back into print!

- Classroom teachers are taking ownership of teaching general reading and writing concepts and skills, instead of relying on the Teacher of the Visually Impaired (TVI).

- Motivation: There are motivating educational apps that can be played on the iPad paired with the braille display, which make learning fun!

iPad Settings for Braille Displays

The iPad has a number of braille display setting options. We will use uncontracted 6-dot braille input and output and English Unified (UEB) braille code. To see all of the braille options, go to Settings > General > Accessibility > VoiceOver > Braille. You can choose to use contracted braille.

Typing feedback announces the character and/or words as they are being typed. You may wish to change this setting, depending on the activity that child is doing. We will start with Characters only. To see all of the typing Feedback options, go to Settings > General > Accessibility > VoiceOver > Typing Feedback.

To avoid confusion, emerging readers need the text to appear exactly as it was typed. For emerging readers, turn off auto-capitalization, auto-correction, check spelling, and predictive. These can be found under Settings > General > Keyboard > English and Spanish.

Brailliant BI14 Braille Display Description

The Brailliant BI14 is a small braille display with 14 braille cells – perfect for little hands! It has an 8 key Perkins- style braille input. Starting at the top left of the device and going across to the top right corner are the keys: dot 7, dot 3, dot 2, dot 1, dot 4, dot 5, dot 6, dot 8. The navigation joy stick is located just above dots 1 and 4. Below the braille input keys is the cursor router buttons/sensors – these are touch sensors that move the cursor (and VoiceOver focus) to the corresponding braille cell. Below the router sensors are the braille cells. Below the braille cells, is the large space bar; it is located in the middle of the device. On the front edge of the Brailliant are four thumb keys: the two outer keys are Previous and Next, navigating you to the previous or next items, and the two inner keys are Left and Right panning keys.
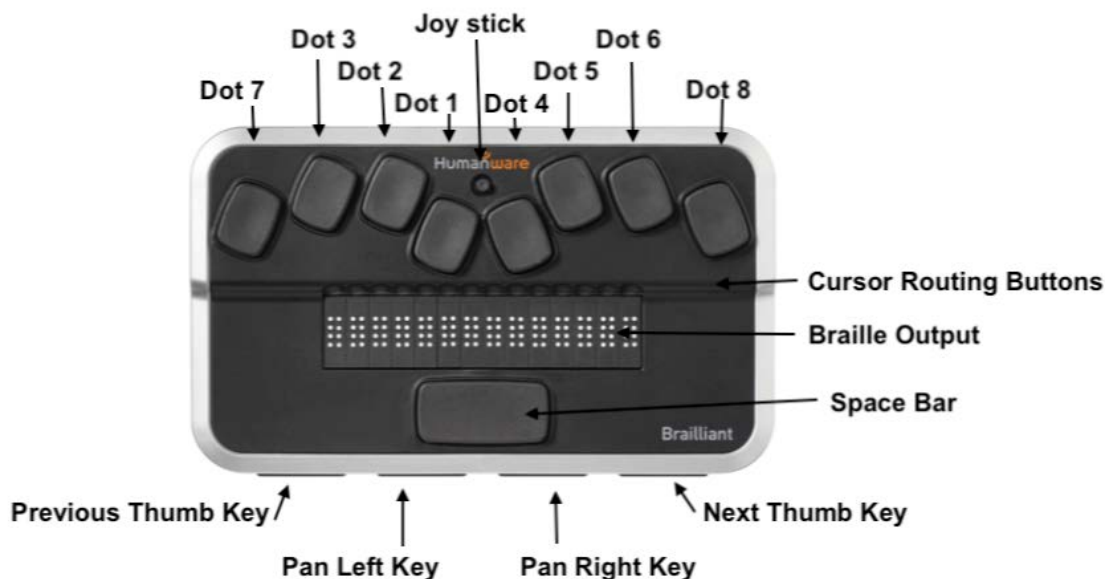
Note: All brands of braille displays have the Perkins-style braille keyboard, braille input, space bar and some typing of panning keys. Most brands of braille displays have some kind of router buttons and a joy stick. Some braille displays have the braille output at the top of the device with the Perkins-style keyboard below. The new Orbit, which replaces the APH 18 Refreshabraille, does not have router buttons. The braille display keyboard commands are dictated by Apple and typically are the same; some of the more complex braille displays may have a few additional commands and/or additional buttons.

Pairing a Braille Display

The Brailliant will pair with an iOS device running 10.3 or later.

- Turn on the Brailliant by pressing the ON/OFF button located on the left edge of the device.
- The toggle switch (located on the back, left edge of the device) should be in Terminal Mode (toggle switch to the right).

- On the iPad, go to Settings > General > Accessibility > VoiceOver (VoiceOver must be On) > Braille.
    - Bluetooth must be turned On; if Bluetooth is off, you will be prompted now to turn it On.
- Brailliant BI14 will now appear in the list under Choose a Braille Display (towards the bottom of the screen). Double tap to activate it.
    - The Brailliant will automatically connect – it does not need a code.
    - If the Brailliant is unsuccessful at pairing, you must reboot the iPad before trying to pair again.

Note: Currently in iOS 12, when VoiceOver and/or a braille display is turned Off, the braille display may become disconnected from the iPad. To reconnect, go back into Settings and repeat the pairing sequence. This is an iOS 12 bug.

Resources
Pairing a Refreshable Braille Display with an iPad YouTube video Note: The video uses the old APH 18 Refreshabraille device. The steps are the same, except, the Brailliant BI14 does NOT have a pin number.
Tricks to Pairing the APH 18 Refreshabraille with an iPad post

When to Introduce a Braille Display
Ideally, your child should have foundation knowledge of dot numbers (position of dots 1-6 that compose braille characters for reading and writing braille) and should have some pre-braille knowledge. Your child should also have some exposure to braille and to a Perkins-style braille writer, a swing-cell, and/or other tools. Ideally, students should be able to produce basic VoiceOver gestures and have developed **good spatial concepts** before learning to use a braille display.

There are some children who benefit from using a braille display to navigate and interact with an iPad without having braille readiness skills. Children who struggle *physically* with making VoiceOver gestures often find it easier to navigate and activate itemsusing the joy stick. Pushing the joystick right or left can replace the right or left swipe. Pushing the joystick in, can replace the double tap. While most young children prefer to use the joystick, there are also key commands that will do the same thing: press dot 4 + space or dot 1 + space bar will also replace the right or left swipe. Press dots 3 + 6 + space will replace the double tap. Keep in mind, that **for most children, learning the gestures first – especially the drag gesture which builds spatial concepts – is best practice!**

When introducing the braille display, start by introducing the parts of the refreshable braille display to your child. If the child is familiar with a Perkins Braille Writer, reading and writing braille letters will be very similar. Refer to the labeled image above for the braille display terms.

Braille Display Navigation Commands

Braille displays use key commands instead of gestures to interact with the iPad. Key commands that include the space bar are called 'Chords'. Example: P Chord (Dots 1 + 2 + 3 + 4 + space) will pause or resume speech. (P Chord stands for the braille letter 'P' plus the space bar. The letter 'P' was chosen as it is the first letter for the action, 'Pause'.)

Activity 4.1a VoiceOver Practice Screen: Refreshable Braille Display Practice

For a child who needs to take things slowly, only practice the basic braille display commands in the VoiceOver Practice Screen. For a child who is more adventurous, have the child try different combinations to find additional braille display commands. Encourage your child to be a "Tech Detective" by experimenting with various combinations of braille dots + space on the VoiceOver Practice screen! Example: When pressing the R Chord when in the Practice screen, VoiceOver announces, "Dot 1 + Dot 2 + Dot 3 + Dot 5 + Space bar. Read page starting at selected item."

Note: Unfortunately, VoiceOver does not announce this command as "R Chord'.

Note: When on the VoiceOver Practice screen, VoiceOver does not announce the joystick commands: when the joystick is used, VoiceOver announces a number. The Practice screen works only with gestures, braille display keyboard commands and Bluetooth keyboard commands.

Use the VoiceOver Practice Screen to practice the familiar VoiceOver gesture; pair the familiar gesture with the equivalent braille display command. See Activity 2.3e for detailed directions.

The VoiceOver Practice screen is found in: Settings > General > Accessibility > VoiceOver On > VoiceOver Practice Screen

Resources
Refreshable Braille Display Help Mode YouTube video
Refreshable Braille Display Commands for the Emerging Braille Reader: R Chord and P Chord
More Braille Display Chords for the Young Student: Layal post Note: In iOS 12 the braille input and output are changed by going into the iPad's settings.

Basic Braille Display Commands for Young Children
'Chord' = spacebar

Action/Gesture	Braille Display Command
Move to next item/right swipe	Dot 4 + space (or joy stick right)
Move to previous item/left swipe	Dot 1 + space (or joy stick left)
Activate item/Double tap	Dots 3 + 6 + space (or push joystick in)
Read All from the top/two-finger swipe up	Dots 2 + 4 + 5 + 6 + space
Read All from current position/two-finger swipe down	R Chord (Dots 1 + 2 + 3 + 5 + space)
Pause or resume speech/two-finger tap	P Chord (Dots 1 + 2 + 3 + 4 + space)
Scroll down to the next page/three-finger swipe up	Dots 1 + 4 + 5 + 6 + space
Scroll up to the previous page/three-finger swipe down	Dots 3 + 4 + 5 + 6 + space
Scroll right to the next page/three-finger swipe left	O Chord (Dots 1 + 3 + 5 + space)
Scroll left to the previous page/three finger swipe right	Dots 2 + 4 + 6 + space
Move focus to the first item on the screen/four-finger tap at top of page	L Chord (Dots 1 + 2 + 3 + space)
Move focus to the last item on the screen/four-finger tap at bottom of the page	Dots 4 + 5 + 6 + space
Go to the Home screen/press the Home button	H Chord (Dots 1 + 2 + 5 + space)
Mute VoiceOver Speech (three-fingers double tap) Note: If Zoom is also on, mute changes to a three-finger quadruple tap.	M Chord (Dots 1 + 3 + 5 + space)
Screen Curtain (three-finger triple tap). Note: if Zoom is also ON, screen curtain changes to three-finger quadruple tap	For Chord (Dots 1 + 2 + 3 + 4 + 5 + 6 + space)
Select the next item in the Rotor/two-finger twist clockwise	5 + 6 + space
Select the previous item in the Rotor/two-finger twist counter-clockwise	2 + 3 + space
Perform action or adjust value defined by current rotor setting/swipe up or down	3 + space or 6 + space; Joy stick up or down

Activity 4.1b Home Screen: Refreshable Braille Display Practice

When introducing braille display commands, typically demonstrate a new command by pairing it with a familiar gesture. Example: Start by finding and opening the child's favorite app.

- Navigate to a specific app on the Home screen using the right or left swipe gesture.
- Repeat that activity using the dot 4 + space or dot 1 + space (or move the joy stick left or right).
- Select the desired app by double tapping.
- Go back to the Home screen by pressing the Home button.
- Navigate to the desired app again using dot 4 + space (or move the joy stick right).
- Select the desired app by pressing dots 3 + 6 + space (or push in the joystick).
- Go back to the Home screen by pressing H + space.
  - Note: Your child will learn several braille letters because of using chord commands! Learning to navigate using braille keyboard commands is more beneficial than using the joystick.

Depending your child's abilities, you may spend time on just a few braille display commands. Use apps such as *I Hear Ewe* (Activity 2.3a) that only requires navigating and selecting.

Resource
Aeden Joystick video: 6-year old Aeden learning to use a braille display's joystick to navigate right and left through apps on the Home screen.

Activity 4.1c Repeat Chapter 3 Activities Using Braille Display Commands

Section 3.1 focused on two-finger gestures, section 3.2 focused on three-finger gestures, section 3.3 focused on four-finger tap gestures, and section 3.4 introduced the rotor. **Repeat the previous gesture activities. Pair the gesture with the braille display command. Substitute the VoiceOver gestures with braille display commands.** The self-voicing Exploration and Cause and Effect apps that are not accessible with VoiceOver are not accessible with a braille display. The braille display can only show what VoiceOver announces. However, apps that are accessible with VoiceOver such as I Hear Ewe (Activity 2.3a), Pages, and Apple Books are accessible.

Braille Only/Mute VoiceOver

It is appropriate for emerging readers to have VoiceOver announce the text and to have the text appear in braille; however, there are times that emerging readers should read the braille without VoiceOver announcing the text. The Mute command will mute the VoiceOver speech while still allowing VoiceOver navigation and interaction. This enables the child to focus on reading the braille text.

Note: Mute is different than the Pause VoiceOver command. Pausing VoiceOver only tells VoiceOver to be quiet. When you move to the next item, VoiceOver begins talking again. When muted, VoiceOver gestures still work but VoiceOver does not speak until Mute is turned Off.

The VoiceOver gesture to Mute is a three-finger triple tap. Repeat the gesture or braille command to toggle Mute Off and On. The braille display command is M Chord (dots 1 + 3 + 5 + space).

Note: The Mute gesture is one of only a couple gestures that will change if you have Zoom enabled. (Zoom gestures are three-finger gestures.) **If Zoom is enabled, VoiceOver Mute becomes a three-finger quadruple tap.**

Resources

Aeden Speech On video: 6-year old Aeden learning the three-finger double tap to mute VoiceOver speech on the Home screen.

Screen Curtain and Mute with Refreshable Braille Display YouTube video also demonstrates panning. Note: The Brailliant BI14 has additional panning buttons located on the bottom edge of the display.

Panning

The Brailliant BI14 is a 14-cell braille display – only 14 characters can be displayed on the screen at one time. When reading sentences, such as *Five Little Ducks*, only "Five Little" will appear on the display. In order for the child to read the entire passage, he will have to use the right panning key to display the next 14 cells. With the Brailliant, the panning keys are the two inside keys on the front edge of the braille display. If you want the child to read the braille, without hearing VoiceOver announce the content, then Mute VoiceOver speech using the M Chord. Use the right panning key to display the next 14 characters on the braille display's screen.

Resource

Naniclynn Reading Braille video: Nancilynn, dual media student, is introduced to reading her name in braille on a braille display.

Nancilynn Writing Braille Video: Nancilynn is introduced to writing using a braille display and Pages app.

Laura RBD video: Young boy, a dual media reader, is introduced to reading braille on a refreshable braille display paired with an iPad.

Bluetooth Keyboard Overview

A Bluetooth keyboard is a wireless keyboard that has been paired with an iPad. There are a variety of Bluetooth keyboards available specifically for the iPad. When purchasing a Bluetooth keyboard, you will want:

- The additional top row of iPad command keys
- Control, Option and Command keys located together and to the left of the space bar (these keys are critical for VoiceOver Bluetooth keyboard commands)
- Suggest looking for a clamshell type keyboard so that when closed the clamshell will help protect the iPad. (Young children with visual impairments need to have the iPad and Bluetooth keyboard that are in one piece, as it reduces the possibility of accidents.

Note: Bluetooth keyboards with "squishy" (rubber like) keys often will not work with VoiceOver commands. These soft keyboards are not designed to press multiple keys simultaneously; VoiceOver keyboard commands do require pressing multiple keys simultaneously.

Benefits of Bluetooth Keyboard

- Significantly more efficient than the on-screen keyboard
- When used in conjunction with VoiceOver, the Bluetooth keyboard has additional keyboard commands to navigate, drive and edit the iPad
- Children who physically struggle with producing VoiceOver gestures are often more successful with a Bluetooth keyboard
- Young children can navigate and activate items on the iPad using just the arrow keys; this is particularly beneficial for kids with motor issues and/or for students with multiple disabilities
- A child can start using a Bluetooth keyboard without knowing how to type
- Learning basic keyboarding commands helps teach the positions of a variety of keys on the keyboard
- iPad Bluetooth keyboard commands are easily transferred to computer keyboard commands and computer screen reader commands
- Navigating and typing is beneficial for low vision children who struggle with handwriting and/or reading their own handwriting
- Bluetooth keyboard skills are critical for children who have progressive eye conditions or who will struggle in grades that require extensive reading

Low Vision and Screen Readers

Many students who are visually impaired have functional vision and may be successful reading large or magnified print in Kindergarten and in elementary school. In these early years, print is often larger, with more space between characters and more space between lines. Reading is limited to small passages for short periods of time. However, the quantity of reading in high school, college and in the work place is significant; low

vision readers typically have slower reading speeds than their peers who are braille readers or peers who use screen readers. In school, slower reading speeds will often translate into shortened assignments and/or extended time. When larger amounts of reading are expected, low vision students who primarily rely on print frequently struggle with eye fatigue, migraines and sometimes even nausea. These students will benefit from accessing books, textbooks, emails, etc. in an auditory format. **It is critical that students with low vision be introduced to good listening skills early!** A young child can easily adapt new learning modes and is not resistant to change; as he progresses through school, he will be able to choose which tool works best for each task.

Will My Child Benefit from Using a Screen Reader?

Each child's vision is different – and may fluctuate according to the task, lighting conditions, fatigue, and other determining factors. Here are some guidelines for when a child should learn to use a screen reader:

- He holds his device (or print materials) close
  - Posture is important! The child should not lean over the device/text or hold the device/text close
- He enlarges the text, magnifies or zooms materials on the iPad so that he has to scroll to read across the line or only a few words are available at a time
- Eye fatigue, headaches, or other health issues
- Light, glare, environment, etc. causes issues
- Holes in his vision that impact reading (scotomos, loss of central or peripheral vision, field loss)
- Slow visual reading speed (slower than peers)
- **He has a progressive eye condition**

Children absolutely do need *to learn to read* by visually reading print or by tactually reading braille; children do not learn to read by listening to text read aloud. Learning to listen to text is another tool in the tool box – for all children, not just visually impaired children; however, listening should not be the primary tool used when learning *how* to read. Once a child is a good reader, then using a screen reader to access written material is an efficient tool. Research states that in third grade, children transition from 'learning to read' to 'reading to learn'. With that being said, it is also important to introduce auditory materials early – but auditory skills should not be the *primary* media when a child is *learning* to read.

iPad Settings for Bluetooth Keyboard

There are several keyboard settings that are typically set for emerging writers but might be changed when your child becomes an accomplished writer. To avoid confusion, emerging writers need the text to appear exactly as they have typed; text should not be auto-corrected, auto-capitalized, and predictive should be turned off. Set these features in Settings > General > Keyboard > English and Spanish.

Also choose what you want VoiceOver to announce as you type. Options are Nothing, Characters, Words, Characters and Words. For an emerging reader, Characters is often the preferred option. There are times that other options are preferred. Set these

features in Settings > General > Accessibility > VoiceOver > Typing Feedback > under Hardware Keyboards. Note: Hardware keyboards are external keyboards such as the Bluetooth keyboard or braille display.

When to Introduce a Bluetooth Keyboard

Young children do not need to know how to type, be ready to learn typing skills or even know their alphabet to begin using a Bluetooth keyboard. At the earliest levels, a child can use the keyboard to navigate and activate items on the iPad. Use the right or left arrows to navigate to the next or previous item. Activate that item by pressing the up + down arrows simultaneously. Children who *physically* struggle with making VoiceOver gestures often find it easier to use the Bluetooth keyboard commands.

When introducing the Bluetooth keyboard, start by introducing just the arrow keys. Lightly position – without pressing down - the right index finger on the left arrow, the middle finger on up and down arrows, and the ring finger on the right arrow. When activating an item (up + down arrows simultaneously), lay the pad of the middle finger across both arrows at the same time. Learning to place these three fingers in this position will build spatial understanding of these keys and is the most efficient method, as the child does not have to search for the desired arrow key. However, some young children will initially want to use only the index finger – moving the index finger to the desired arrow key.

Note: If possible, encourage the student to use the correct finger positioning. There are additional commands that use other combinations of arrow keys, making it necessary to use two fingers simultaneously to activate these commands.

Most children can be introduced to the basic VoiceOver gestures, then braille display commands (if appropriate) and/or Bluetooth keyboard commands immediately after they have mastered the action of the gesture. Children do not have to fully master gestures before starting to pair a gesture with a braille display and/or Bluetooth keyboard command. Ideally, children should understand spatial relationships on the iPad before being introduced to a Bluetooth keyboard. Most children are able to learn multiple methods at an early age. The most important thing to consider when teaching a young child is *when to introduce a new action*; some students will need extended time to practice and understand a new action. Example: A young child who needs more time may spend a month or two on learning the two-finger reading gestures before adding the three-finger scroll gestures. However, that student may learn multiple ways to do the same action. The student may learn the two-finger swipe down, R Chord (braille display command) and VO + B (Bluetooth keyboard command) but is not ready to learn the next action (3-finger commands).

VO Commands (Control + Option)

There are Bluetooth keyboard commands that use the abbreviation VO + another key. The VO – which means VoiceOver – represents the Control and Option keys. Example: To go to the Home screen, press Control + Option + H. This command is written as VO + H. It works best to press and hold the Control and Option keys, then press the H key.

Encourage the student to place his left ring finger on the Control key and his middle finger on the Option key. To initially find these keys, lightly place – without pressing down - the left pinky on the far-left key on the bottom row. The Option and Control keys are typically located in the same place on all of the Bluetooth keyboard keys; however, the bottom far left key may vary (battery indicator key, function key or the key may have another function).

Note: Most children learn to align their fingers without tactile markers. Remember, spatial relationships are critical skills! Only add a tactile marker - to indicate a specific key - as a last resort! Arrow keys and the VO keys are on the bottom row and are easily identified. Arrow keys are often a different size/shape than the other keys.

When learning the Home Row keys (or commands that use the Home row keys) teach the child about the physical mark on the home row 'F' and 'J' keys. These keys are surrounded by similar keys and are harder to identify than the bottom row keys. Teach the student to find the tactile marks - using their index fingers - on the 'F' and 'J' keys.

Activity 4.2a VoiceOver Practice Screen: Bluetooth Keyboard Practice

For a child who needs to take things slowly, only practice the basic Bluetooth keyboard commands in the VoiceOver Practice Screen. For a child who is more adventurous, have the child try different combinations to find additional Bluetooth keyboard commands. **Encourage this child to be a Tech Detective** by experimenting with the various VO keyboard commands on the VoiceOver Practice screen! Example: When pressing VO + B when in the Practice screen, VoiceOver announces, "Control, Option, B. Read page starting at the top." Pressing VO + W and VoiceOver will announce, "Control, Option, W. Reads current word."

Note: Currently, if the command requires pressing three keys simultaneously, VO may only announce one key. If the keys are slightly staggered (and held), VO will announce all three keys.

Use the VoiceOver Practice Screen to practice the familiar VoiceOver gesture and then practice the matching Bluetooth keyboard command. See Activity 2.3e for detailed directions.

The VoiceOver Practice screen is found in: Settings > General > Accessibility > VoiceOver On > VoiceOver Practice Screen

Basic Bluetooth Keyboard Commands for Young Children (Chart)
VO = Control + Option keys are pressed simultaneously

Action/Gesture	Bluetooth Keyboard Command
Move to next item/right swipe	Right arrow
Move to previous item/left swipe	Left Arrow
Activate item/Double tap	Up + down arrows
Read All from the top/two-finger swipe up	VO + B
Read All from current position/two-finger swipe down	VO + A
Pause or resume speech/two-finger tap	Control
Scroll down to the next page/three-finger swipe up	Option + up arrow
Scroll up to the previous page/three-finger swipe down	Option + down arrow
Scroll right to the next page/three-finger swipe left	Option + right arrow
Scroll left to the previous page/three finger swipe right	Option + left arrow
Move focus to the first item on the screen/four-finger tap at top of page	Control + up arrow
Move focus to the last item on the screen/four-finger tap at bottom of the page	Control + down arrow
Go to the Home screen/press the Home button	VO + H
Mute VoiceOver Speech (three-finger double tap) Note: If Zoom is also on, mute changes to a three-finger triple tap.	VO + S
Screen Curtain (three-finger triple tap) Note: if Zoom is also on, screen curtain changes to three-finger quadruple tap.	VO + Shift + S
Move to Status Bar	VO + M
Quick Nav ON/OFF (Only Bluetooth keyboard command)	Left + right arrow keys
Select the next item in the rotor/two-finger twist clockwise	Up + right arrows
Select the previous item in the rotor/two-finger twist counter clockwise	Up + left arrows
Perform action or adjust value defined by current rotor setting/swipe up or down	VO + up arrow or VO + down arrow

Activity 4.2b Home Screen: Bluetooth Keyboard Commands Practice

When introducing Bluetooth keyboard commands, typically demonstrate a new command by pairing it with a familiar gesture during a routine activity. Example: Start by finding and opening the child's favorite app.

- Navigate to a specific app on the Home screen using the right or left swipe gesture.
- Repeat that activity using the right or left arrow key.
- Select the desired app by double tapping.
- Go back to the Home screen by pressing the Home button.
- Navigate to the desired app again using the right arrow.
- Select the desired app by pressing the up + down arrow keys simultaneously.
- Go back to the Home screen by pressing VO + H.
  - Note: Your child will learn the position of several letters on the QWERTY keyboard because of using the Bluetooth keyboard commands.

Depending your child's abilities, you may spend time using just the arrow key commands. Use apps such as *I Hear Ewe* (Activity 2.3a) that only require navigating and selecting.

Resource
Bluetooth Keyboard: Navigating the Home Screen YouTube video

Activity 4.2c Repeat Chapter 3 Activities Using Bluetooth Keyboard Commands

Section 3.1 focused on two-finger gestures, section 3.2 focused on three-finger gestures, section 3.3 focused on four-finger tap gestures, and section 3.4 introduced the rotor. **Repeat the previous gesture activities. Pair the gesture with the Bluetooth keyboard command and then substitute the VoiceOver gestures with Bluetooth keyboard commands.** The self-voicing Exploration and Cause and Effect apps that are not accessible with VoiceOver are not accessible with Bluetooth keyboard commands. However, apps that are accessible with VoiceOver such as I Hear Ewe (Activity 2.3a), Pages, and Apple Books are accessible with VoiceOver and the Bluetooth keyboard commands.

Quick Nav ON/OFF

Quick Nav is a command that is unique to keyboards. "Nav" stands for "Navigation" – to move around the iPad Home screen or to move around an open app. When Quick Nav is On, the user intends to navigate. Quick Nav is turned Off when in an editable text field – when the user is typing or editing. When adding or changing text in a Pages document, email or typing in a search field, Quick Nav is Off. Typically, when in an editable text field, Quick Nav is automatically turned Off and VoiceOver announces this. Quick Nav can be toggled On and Off by pressing the right + left arrow keys simultaneously.

Note: **If Quick Nav is Off, the navigation commands will not work as expected. Check and be sure that Quick Nav is On.**

We will discuss Quick Nav in detail in Unit 5.

ABCs of iOS Manual

Unit 5: Writing and Basic Editing Text
iOS 12

Objectives
Objectives
Overview
- Braille Display Commands for Young Children Chart

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- Learning Braille Letters
- Activity 5.1a Exploring Braille with Madilyn and Ruff
- Activity 5.1b Braille Tutor

5.2 Writing with Refreshable Braille Display
- Blinking Cursor
- Activity 5.2a Writing with a Refreshable Braille Display: List
- Activity 5.2b Navigating the Refreshable Braille Display: Routing Buttons and Panning Keys
  - Routing Buttons
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- Activity 5.2c Correct Misspelled Words: Routing Buttons
  - Using the Routing Button to Correct Misspelled Words
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5.3 Writing with Bluetooth Keyboard
- Quick Nav
- Activity 5.3a Writing with Bluetooth Keyboard: List
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- Activity 5.3g Talking Typer App
  - Advocacy

5.4 Onscreen Keyboard
- Activity 5.4a Tactile Version of the QWERTY Keyboard
- Activity 5.4b Onscreen Typing: List

Overview

As they learn to write, young children also need to learn how to correct their writing errors. Previously with traditional paper braille, students could XXXX out a mistake (using multiple full cells) or they could 'erase' or rub out a mistake. However, inserting characters within a sentence or making more complex editing means re-brailling the entire page. With paper braille, children do not have the ability to copy, paste, manipulate text or add additional notes later. However, digital documents now make it possible for children to quickly manipulate text. Chapter 5 will focus on writing and editing text using gestures, refreshable braille display and Bluetooth keyboard commands. Children are anticipated to be emerging braille readers; therefore, the following braille display activities are designed to encourage learning braille and will focus on emerging braille skills.

Basic Braille Display Commands for Young Children
'Chord' = spacebar

Action/Gesture	Braille Display Command
Move to next item/right swipe	Dot 4 + space (or joy stick right)
Move to previous item/left swipe	Dot 1 + space (or joy stick left)
Activate item/double tap	Dots 3 + 6 + space (or push joystick in)
Read All from the top/two-finger swipe up	Dots 2 + 4 + 5 + 6 + space
Read All from current position/two-finger swipe down	R Chord (Dots 1 + 2 + 3 + 5 + space)
Pause or resume speech/two-finger tap	P Chord (Dots 1 + 2 + 3 + 4 + space)
Scroll down to the next page/three-finger swipe up	Dots 1 + 4 + 5 + 6 + space
Scroll up to the previous page/three-finger swipe down	Dots 3 + 4 + 5 + 6 + space
Scroll right to the next page/three-finger swipe left	O Chord (Dots 1 + 3 + 5 + space)
Scroll left to the previous page/three finger swipe right	Dots 2 + 4 + 6 + space
Move focus to the first item on the screen/four-finger tap at top of page	L Chord (Dots 1 + 2 + 3 + space)
Move focus to the last item on the screen/four-finger tap at bottom of the page	Dots 4 + 5 + 6 + space
Go to the Home screen/press the Home button	H Chord (Dots 1 + 2 + 5 + space)
Mute VoiceOver Speech (two-finger triple tap) Note: If Zoom is also on, mute changes to a three-finger triple tap.	M Chord (Dots 1 + 3 + 5 + space)
Screen Curtain (three-finger triple tap) Note: If Zoom is on, Screen Curtain changes to a three-finger quadruple tap.	1 + 2 + 3 + 4 + 5 + 6 + space
Select the next item in the Rotor/two-finger twist clockwise	5 + 6 + space
Select the previous item in the Rotor/two-finger twist counter-clockwise	2 + 3 + space
Perform action or adjust value defined by current rotor setting/swipe up or down	3 + space or 6 + space; Joy stick up or down
Toggle insertion point at start/end of document when in an editable text field (double tap)	When in an editable text field, joy stick in or dots 3 + 6 + space

5.1 Learning Braille Letters 🐸

Learning Braille Letters
Before a student is ready to write, he first must be exposed to and learn the dot configurations of the various braille letters. The Exploring Braille with Madilyn and Ruff is one fun way to be exposed to braille dot numbers, to identify braille letters and to write braille letters.

Activity 5.1a Exploring Braille with Madilyn and Ruff

Exploring Braille with Madilyn and Ruff is a free app. **This app requires a refreshable braille display** and is fully accessible with VoiceOver.

Purpose
The Exploring Braille app was created to introduce young children with visual impairments to the braille alphabet through a fun interactive, multi-sensory approach.

Play
The game has Teach Me and Let's Play options. Teach Me has Flashcards and AlphaGuide. The Let's Play option had Reading and Writing.

Flashcards
The Flashcards is a braille cell tutorial. Individual letters are announced in alphabetical order. The letter and the dot combination is announced and the letter appears on the braille display. When ready to move to the next letter, move the joystick right or 4+ space to the Next button. Activate the button by pressing the joystick in or 3 + 6 + space.

AlphaGuide
This game is similar to Flashcards; however, the game automatically goes through the alphabet letter by letter, without having to navigate to the Next button.

Reading
When this game opens, the user is prompted to turn VoiceOver Speech off using the M Chord (1 + 3 + 4 + space) or double tap the screen with three fingers. Three letters appear in print on the screen along with the visual braille dots that represent the letter. One letter appears at a time in braille on the braille display. Push the joystick right or 4+ space to move to the next letter. When on the desired letter, select the letter by pressing the routing button above (or below depending on your braille display). Note: Occasionally, the correct answer will appear as two of the three answer choices. If you have selected the correct letter and did not get a positive response, move to the next correct letter and select it.

Note: VoiceOver does NOT announce the letter because you have muted VoiceOver speech with the M Chord.

Writing
In this game, the announced directions are, "Write the letter 'a'." Type 'a' then type E Chord (1 + 5 + space) for Enter to activate the letter. Note: The keyboard numbers appear at the bottom of the screen to help sighted adults who do not know braille understand the numbering of the Perkins-style keyboard.

Braille Tutorial
On the main screen in the tool bar at the top is a button that looks like a braille cell; VoiceOver calls it the Braille Cell Tutorial Button. This is a tutorial designed for sighted adults who are not familiar with braille.

Settings
In Settings, the options are Letters in Random Order, Display Braille Images, and Customize Letters. Customized Letters enables the teacher/parent to choose which letters will appear in the games. This is a great option for students who have only been introduced to some of the letters!

Exploring Braille with Madilyn and Ruff will quickly become your student's favorite game for learning and practicing braille letters!

Resources
Exploring Braille with Madilyn and Ruff: iOS App post
Layla's Three Preschool Apps post (includes a video of a TVI demonstrating the app)
Layla: 4 Year Old Learning VoiceOver and Braille Video post (includes a video of a student playing the app)

Activity 5.1b Braille Tutor

Braille Tutor is an app designed to teach braille to players with or without vision through a series of lessons. Braille Tutor has a free version (Lessons 1 – 19) and a paid version called Braille Tutor + (Lessons 1 – 91) for $1.99. The app lessons are self-voicing and are played with VoiceOver turned off. For players with vision, there is a self-voicing onscreen keyboard for braille entry. Players without vision use a Bluetooth keyboard for braille entry using the home row keys, "S, D, F, J, K L" which corresponds with dots "3, 2, 1, 4, 5, 6". Since VoiceOver is not used during the actual lessons, a refreshable braille display cannot be used. Zoom does not work with the lessons. The app itself (instructions, settings, and choosing a lesson) is fully accessible with VoiceOver.

Purpose
Braille Tutor is a series of interactive lessons that teach braille letters, words and sentences. The free version includes 19 lessons; letters (a-z), words and sentences and whole word contractions. The paid version systematically introduces additional contractions. Note: Simple words are included after learning a series of letters; sentences are also included. If your student is not ready for sentences, you can stop and move to the next lesson, after completing the letters and/or letters and simple words.

Play
The game opens to the Introduction page. The Lesson Menu button is located in the top left corner. Select this button and the braille lessons appear as a dropdown menu on the left side of the screen. A bookmark (red ribbon) is automatically displayed on the last lesson that was opened, making it easy to remember where to start. Select a lesson and the screen will automatically open to that lesson. Touch the top half of the screen to move the VoiceOver focus to the game and to have VoiceOver read the first letter. **Turn VoiceOver off** or VoiceOver and the self-voicing will conflict! The screen shows the letter (word or sentence) to be typed at the top. There is an onscreen Perkins-style keyboard (best suited for players with vision) with a visual hint of which dots compose the desired letter. At the bottom center of the screen is the space bar. For students who are visually impaired, a Bluetooth keyboard is used to enter braille keys. The Home row keys, "S, D, F" and "J, K, L" are used for dots "3, 2, 1" and dots "4, 5, 6". The space bar is also used. Quickly type the desired dots simultaneously then press the space bar.

Note: Type quickly! If there is too long of a delay between typing the letters or space bar, a contraction may be added!

If a mistake is made prior to pressing the space bar, clear the entered dots by pressing the Space bar plus the braille letter "d" (1 + 4 + 5 + space). Press the Return/Enter key to hear the last instruction (Example: "Correct. Type: w").

Settings

When in a lesson, the Settings button is located in the top right corner. Available Settings options are:

- Speech (on/off)
- Speech rate slider (adjust the speaking rate)
- Spell (on/off)
- Voice (American, British, Australian)
- Key Color (magenta when on; dark blue when off)
- Key Effects
- Braille Cell View (on/off; shows visual braille cell dots for the desired letter)
- Contraction Hints (on/off)

Resources

Braille Tutor: App Review post

Janna Braille Tutor video: Janna practices her braille contractions using the Braille tutor app and 6-key entry on a Bluetooth keyboard.

5.2 Writing with Refreshable Braille Display 🐸 🐢

Blinking Cursor

This activity will also be done in the Pages app.

Standard braille cells have 6-characters. The braille display has 8-dot cells and eight corresponding keys. Starting with the left key and moving right are the keys for dots 7, 3, 2, 1 and space, followed by the keys for dots 4, 5, 6, and 8. The braille display uses dots 8 and 7 for the blinking cursor.

When in an editable text field (when typing), there is a blinking visual I-beam cursor on the iPad's screen. The cursor indicates where you currently are in the document. The braille display also has a blinking cursor: dot 8 in the first braille cell and dot 7 in the second braille cell. (The blinking cursor is divided into two cells for editing purposes. We will discuss this in more detail in section 5.1c.)

When using a braille display, the child must add a space or a punctuation symbol after typing on the Perkins-style keyboard before the letters will appear visually on the screen. The braille characters show up immediately on the braille display. (The space bar or punctuation symbol is necessary due to braille rules and contractions; the software has to have all the characters in the word before it can be back translated into print; pressing the space bar indicates the you are finished typing that word.)

Note: VoiceOver will announce the word after a space or punctuation symbol. VoiceOver currently does not announce the word when you Type E-Chord (to create a new line). For this list activity, it is recommended to type the name, space and then E-chord so that VoiceOver will announce each name after it is typed.

Activity 5.2a Writing with a Refreshable Braille Display: List

- Open the Pages app and create a **new** document. (The cursor will be in an editable text field; if the cursor does not appear, confirm that the focus is in the text field then press the joystick in or 3 + 6 + space.)
- Ask the child to type his name using the braille display.
- After his name, press space and then **E-Chord** (1 + 5 + space) to start a new line.
  - Discuss how the child is making a "list" of names or words.
- Encourage the student to type other names, such as the names of family members, friends and teachers.
  - Depending on his level, you may need to spell the name as he types.
- Encourage your child to type other lists, such as his sight words, spelling words, animals or favorite things.

- If the student makes a mistake, use the **D-Chord** (Dots 1 + 4 + 5 + space) to delete the last letter.
- To hear VoiceOver read the list of words, press the joystick in or press dots 3 + 6 + space to toggle the insertion point to the beginning of the text. VoiceOver will say, "Insertion point at start" and will then read the list.

Note: When working within a Pages document, the two most common navigation jumps are to the beginning of the document (in order to read the entire document through) or to the end of the document (in order to continue writing).

Teacher Hint: Encourage your child to keep writing by saying, "The blinking cursor is telling you that you need to write more!"

Title this list "Names". If the student is ready to add a title, follow these directions. If the student is not ready to add a title, you can do it for him.

- Move to the top Tool bar: (**L-Chord**; dots 1 + 2 + 3 + space).
- Move to the title ("blank"): (Joystick right or dot 4 + space stopping on "blank").
- Select "blank": (Joystick in or 3 + 6 + space).
- Move to Clear Text: (Joystick right or dot 4 + space).
- Select Clear Text: (Joystick in or 3 + 6 + space).
- Type in 'Name' (or the desired title of the document), then space.
- Move to body of document: (Joystick right or 4 + space multiple times).

Activity 5.2b Navigating the Refreshable Braille Display: Routing Buttons and Panning Buttons

Routing Buttons

The refreshable braille displays typically have a routing button located above or below each braille cell. The BI 14 has routing sensors just above the braille cell. These sensors are not true raised buttons but are circular grooves on a vertical plane. Use the pad of your finger to read the braille character then slide your finger forward to find the corresponding vertical groove. When your finger tip presses the groove, it makes a "mmm" sound and a click as the blinking cursor moves. While reading the braille, the routing buttons enable users to quickly move the cursor to the desired location typically for editing purposes.

Note: **APH's new Orbit Reader 20 does NOT have routing buttons**. To navigate to the desired location on the Orbit Reader, you must use the rotor and move by lines (if available), words or characters. Using the rotor is a multiple-step process and is not nearly as efficient.

Panning Keys

For information about Panning Keys, see Unit 4.1c

Note: **The Panning key ONLY moves through the braille words on the braille display**; the blinking VoiceOver cursor on the braille display stays in the same location. After you pan away from the first phrase, the blinking cursor on the braille display is no longer shown on the braille display. The visual blinking I-beam on the iPad's screen also does not move; but since the iPad's screen shows numerous lines of text, the I-beam cursor is shown until you scroll down a page. The panning button is used only to navigate through the braille cells for braille readers; VoiceOver does NOT announce the text. However, once you find the misspelled braille word, press the routing button will to the blinking cursor to that word.

This activity will use the Pages 'Names' list that the student created previously. You can also choose another list, if desired.

- Start with the VoiceOver focus at the beginning of the list: (Press the joystick in or dots 3 + 6 + space).
    - Since this is a list with one word per line, the braille display will show only one word.
- Pan to the next line using the Panning key: (Press the right panning key).
- Repeat, moving through the list of words.
    - Note: When the list ends, the panning key will jump to the Tab button in the bottom tool bar.
    - When on the bottom tool bar, if the left panning key is pressed, VoiceOver will jump to the beginning of the text field – to the first word in the list.

- Go through the list again, this time stopping on the last word in the list.
- Press the left panning key to go backwards through the list.
- Practice navigating from the "start" (before first word) to the "end" (after last character) of the document: (Press joystick in or 3 + 6 + space).
- Type another name at the end of the document.
- Choose two adjoining letters in the name. Using the routing button, ask the child to navigate the cursor so that blinking dot 8 is below the first letter and blinking dot 7 is below the second letter.
- Use the panning key to move to another word and then use the routing key to navigate between two letters.

Note: If the braille display's blinking cursor is in the middle of a word or at the end of the line and you activate moving the insertion point, the first time you press the joystick in (or 3 + 6 + space), the cursor will move to the beginning of the line and VoiceOver will announce, "Insertion Point at start of line." Press the joystick in (or 3 + 6 + space) to move the insertion point to the start.

Variation: If the student knows his vowels, ask him to move the blinking cursor after the vowel. Or, simply choose a two specific letters, and ask the student to move the blinking cursor between those two specific letters. Example: In the name Diane, move the cursor between the 'a' and the 'n'.

Activity 5.2c Correct Misspelled Words: Routing Buttons

Young children should be comfortable with typing a list of words, using the D-Chord to delete mistakes, and navigating with the panning keys and routing buttons *before* teaching how to use the routing button to insert, delete or substitute misspelled words.

Using the Routing Button to Correct Misspelled Words

If the child typed 'Tem' instead of 'Tim', the child could choose to delete both the 'm' and the 'e' by pressing the D-chord two times, *if the cursor was to the right of the 'm'*. However, if the child types a whole sentence and then finds the mistake when reading the sentence, he will not want to delete the rest of sentence just to edit the misspelled word. Instead, he can press the routing button above the letter 'm'. The blinking cursor – dot 8 - will be below the 'e' and the blinking dot 7 will be below the letter 'm'. This will enable the student to either insert a letter between the 'e' and the 'm' or delete the 'e' using the D-Chord.

Currently in iOS 12, the braille display does announce when a *space* is deleted, and the space is instantly eliminated. When a *letter* is deleted, the braille display does not announce the letter until a space or punctuation symbol is added. Example: In the 'Tem' example; when the 'e' is deleted and the 'i' is added, VoiceOver does not announce the changes until a space or punctuation is added or until the blinking cursor is moved off of the word. **Note: If a change is made and enough time passes, VoiceOver will announce the change and the change appears in the print on the iPad.** However, it is not recommended that the student wait the required amount of time to hear VoiceOver announce the change. The braille display instantly shows each step on the braille. It is recommended **when the editing is finished, to use the routing button to move the blinking cursor away from the corrected word; do not use a space**. If the child adds a space to make VoiceOver speak, a space is physically inserted in the middle of the word and the student then has to delete the extra space. **Encourage your child to focus on the braille letters and braille display rather than listening to VoiceOver announcements when editing, as VoiceOver currently does not announce until the editing is completed!**

In this activity, we will use the name 'Tim' misspelled as 'Tem'; however, this activity can be done with a name that your child has misspelled. (Choose a misspelled word that needs a correction in the middle of the word.)

- Navigate to the misspelled word in the braille list using the panning keys (if needed); use the routing buttons to move the blinking cursor to the desired space where you want to either insert a character or delete a character.
- If inserting a character:
  - Simply type the desired letter.
  - Be sure to check the braille to determine that the word is now correct.

- Move the blinking cursor to the right of the corrected word using the routing button and listen as VoiceOver announces the changes. Encourage the child to check the braille as he learns to edit; later, he will be more efficient if he simply listens and does *not* check the braille.
- If deleting or substituting a character:
    - Use the D-chord to delete the incorrect character.
    - Type in the desired character.
    - Check the braille to determine that the word is now correct (if desired).
    - Move the blinking cursor to the right of the corrected word using the routing button and listen as VoiceOver announces the changes.

Resource
iOS 12.1 Misspelled Words post Note: There used to be a Misspelled Words rotor option that would quickly jump to the next misspelled word; however, this feature is currently broken in iOS 12 in Pages, Google Docs, Notes and Word. Misspelled Words using the rotor does work in Mail.

Activity 5.2d Finding Misspelled Words Using the Refreshable Braille Display

Finding Misspelled Words

Encourage the student to listen for VoiceOver to announce words incorrectly; however, VoiceOver may consistently mispronounce words, especially names – even words that are spelled correctly! If the word is mispronounced, laugh about "silly VoiceOver" with the student. Remember, VoiceOver does not announce the words when the Panning key is used to move through the list of words. To hear VoiceOver announce the list:

- Move the insertion point to the beginning of the list; (Press the joystick in or press dots 3 + 6 + space).
- Read the text: (R-Chord; dots 1 + 2 + 3 + 5 + space).
- Pause reading: (P-Chord; Dots 1 + 2 + 3 + 4 + space).

If VoiceOver is mispronouncing the word because the word is misspelled, use the panning buttons (if necessary) to move through the list of words. Then use the routing button to move the VoiceOver cursor to the desired location. Delete the incorrect letter(s) and type in the correct letters. Check the braille display to make sure that the corrections are truly correct. Use the routing button to move the blinking cursor to the right of the corrected word; VoiceOver will now announce the changes and the print text on the screen will show the changes.

Modification 1: You can create a list of words that the student is familiar with and ask the child to find the words that are misspelled.

Modification 2: If the student is working on his braille reading skills, repeat the activity with VoiceOver's speech turned OFF (**M-Chord; dots 1 + 3 + 4 + space toggles VoiceOver speech ON/OFF.**)

Note: There is a rotor option to find misspelled words; however, in iOS 12, this option is only available in apps such as Mail and Safari and is not available in Pages, Docs or other Word document apps. When misspelled words option is available, set the rotor to misspelled words then use the joystick down to move forward through the misspelled words in the document. Joystick up will move to the previous misspelled words in the document.

Activity 5.2e Editing Sentences: Row Your Boat

Using familiar nursery rhymes or songs, substitute key words with other words. Your child will laugh at these silly sentences! This activity will encourage your student to listen to VoiceOver and will provide opportunities to practice editing skills.

We will use the following two verses of Row, Row, Row Your Boat:
Row, row, row your boat,
Gently down the stream.
Merrily, merrily, merrily,
Life is but a dream.

Row, row, your boat,
Gently down the stream.
If you see a crocodile,
Don't forget to scream.

However, we will substitute the following words to make a silly version of the nursery rhyme:
Row, row, row your chicken,
Gently down the stream.
Merrily, merrily, madly,
Life is but a pickle.

Row, row, row your boat,
Gently down the book.
If you see a crocodile,
Don't forget to cook.

Before the activity, type in both the standard two verses and the silly two verses.
- Ask the child to 'read' the first two verses and stop.
  - If the child is not familiar with the second verse, discuss it briefly.
- Remind the child to listen closely. Have him read the first silly verse.
- Read the first silly verse again, then correct the silly words.
- Read the second silly verse. Correct the second silly verse.
  - If necessary, have the student pan back up to the second standard verse and listen to it again.
- Write your own silly verse using rhyming words.
- Can you write a new standard verse (one that makes sense) using rhyming words? Example:

Row, row, row your boat,
Gently down the river.
If you see a crocodile,

Don't forget to shiver.

Activity 5.2f Editing Sentences: The Duck

Once the child is comfortable with typing a list of words, the next step is to type simple sentences. If the child is not ready to type sentences but is ready to read sentences (either by listening to VoiceOver read, using a combination of VoiceOver and braille or by muting VoiceOver and only reading the braille), you can type the sentence and have the child 'read' the sentence.

- Type: "A duck swims in the pond." and move to the next line; (Space and then E-Chord)
  - Note: E-Chord stands for Enter key; using Chords such as E-Chord will help emerging readers learn the corresponding braille letters.
- Edit the sentence to make, "The ducks swim in the pond."
  - Use the panning buttons and routing buttons to navigate, D-Chord to delete, type in the desired letters, then use the routing button to move off of the word.
  - Change 'A' to 'The'.
  - Add 's' to ducks.
  - Delete 's' from 'swims'.
- Edit the sentence to make it past tense: "The ducks swam in the pond."
  - Change 'swim' to 'swam'.

Detailed directions for the above activity:
- Navigate to 'A': (Use the Left Panning button to navigate to the first part of the sentence).
  - Press the routing button above and to the right of the 'A'.
- Delete the 'A': (D-Chord).
- Type 'The'.
- Add 's' to 'duck':
  - Navigate to 'k': (Press the routing button above and to the right of the 'k').
  - Type 's'.
- Delete the 's" in 'swims':
  - Navigate to the 's': (Press the routing button above and to the right of the 's').
  - Delete the 's': (D-Chord).
Edit the sentence to make it past tense.
- Change 'swim' to 'swam':
  - Navigate to the 'i': (Press the routing button above and to the right of the 'i').
  - Delete the 'i': (D-Chord).
  - Type 'a'.

o   Navigate to the end of the word 'swam': (Press the routing button to the above and to the right of the 'm').

Resource
Janna writing video: Janna using a Brailliant BI14 braille display writes sentences and then reads and pans through her sentences.

5.3 Writing with Bluetooth Keyboard

Quick Nav

There are additional commands when using the Bluetooth keyboard with VoiceOver. There are two sets of commands: navigating commands and editing commands. When **navigating** or moving around the iPad, Quick Nav is turned On. When typing or editing in a text field, Quick Nav is turned Off.

Example: When typing in an editable text field (Quick Nav is Off), the right arrow command will move character-by-character. When in an editable text field and Quick Nav is On, pressing the right arrow will jump the VoiceOver focus outside of the text field and down to the bottom tool bar in the Pages app. When in an editable text field, Quick Nav is automatically turned Off. Commands such as right arrow are used to navigate within the editable document.

Toggle Quick Nav On/Off by simultaneously pressing the left and right arrows.

Note**: If Quick Nav is Off, the navigation commands will not work as expected. Check and be sure that Quick Nav is On.**

Basic Bluetooth Keyboard Commands for Young Children (Chart)
VO = Control + Option keys are pressed simultaneously

Action/Gesture	Bluetooth Keyboard Command
Move to next item/right swipe	Right arrow
Move to previous item/left swipe	Left Arrow
Activate item/double tap	Up + down arrows
Read All from the top/two-finger swipe up	VO + B
Read All from current position/two-finger swipe down	VO + A
Pause or resume speech/two-finger tap	Control
Scroll down to the next page/three-finger swipe up	Option + up arrow
Scroll up to the previous page/three-finger swipe down	Option + down arrow
Scroll right to the next page/three-finger swipe left	Option + right arrow
Scroll left to the previous page/three finger swipe right	Option + left arrow
Move focus to the first item on the screen/four-finger tap at top of page	Control + up arrow
Move focus to the last item on the screen/four-finger tap at bottom of the page	Control + down arrow
Go to the Home screen/press the Home button	VO + H
Mute VoiceOver Speech (three-finger double tap) Note: If Zoom is also on, mute changes to a three-finger triple tap.	VO + S
Screen Curtain (three-finger triple tap) Note: if Zoom is also on, screen curtain changes to three-finger quadruple tap.	VO + Shift + S
Move to Status Bar	VO + M
Quick Nav ON/OFF (Only Bluetooth keyboard command)	Left + right arrow keys
Select the next item in the rotor/two-finger twist clockwise	Up + right arrows
Select the previous item in the rotor/two-finger twist counter clockwise	Up + left arrows
Perform action or adjust value defined by current rotor setting/swipe up or down	VO + up arrow or VO + down arrow

Resource
Bluetooth Keyboard: Editing an Existing Google Docs Document YouTube video

Activity 5.3a Writing with a Bluetooth Keyboard: List 🐸

- Open the Pages app and create a new document. (The cursor will be in an editable text field and Quick Nav will automatically turn Off.) If Quick Nav is On, press the up + down arrow keys.
- Ask the child to type his name using the Bluetooth keyboard.
- After each name, press Return to start a new line.
  - Discuss how the child is making a "list" of names or words.
- Encourage the student to type other names, such as the names of family members, friends and teachers.
  - Depending on his level, you may need to spell the name as he types.
- Encourage your child to type other words, such as his sight words, spelling words, animals or favorite things.
- If the student makes a mistake, use the Delete key.
- Move the VoiceOver cursor to the beginning/end of the document: (Quick Nav is Off)
  - Press Control + up arrow.
  - Move the Voiceover cursor to the end of the document: (Control + down arrow).
  - Move the VoiceOver cursor back to the beginning of the document: (Control + up arrow).
- Listen to VoiceOver read the list of words: (VO+A). Be prepared to pause!
- Pause VoiceOver after the last name is read; (Control).

  Note: Currently, when using VO + A, VoiceOver will read all the text in the document and will then jump to the format buttons at the bottom of the document. Pause after the last word is read or as VoiceOver announces the insertion point.

Title this list "Names". If the student is ready to add a title, follow these directions. If the student is not ready to add a title, you can do it for him.

- Move to the top Tool bar;
  - Turn Quick Nav On: (Left and right arrows).
  - Move to first item on the page: (Control + up arrow).
- Move to the title ("blank"): (Right arrow stopping on "blank").
- Select "blank": (Up + down arrows).
- Clear text:
  - Navigate to Clear Text button: (Right arrow).
  - Clear Text: (Up + down arrows).
- Type in 'Name':
  - Quick Nav Off: (Right and left arrows).
  - Type 'Name'.
- Move to body of document:

- o Quick Nav On: (Right and left arrows).
- o Navigate to body of document: (Right arrow multiple times).

Note: The onscreen keyboard should not appear on the iPad's screen. However, if it does, the Bluetooth keyboard should have a **Hide/Show Keyboard key** designated to toggle the onscreen keyboard ON/OFF. This key is usually located in the top row of Bluetooth keyboard and visually, the keyboard icon is a rectangle with multiple rows of dots – representing a keyboard.

Remember: Young students need repetition. Repeat making different lists several days in a row. Create another list of names or create a list of favorite animals, foods, sight words, etc.

Activity 5.3b Navigating Commands with Quick Nav Off

There are additional navigation commands when Quick Nav is Off. (Remember, Quick Nav is Off when typing in an editable text field.) These navigation commands are ONLY available when Quick Nav is Off and when in an editable text field. **If the Bluetooth keyboard commands do not react in the expected manner, confirm that Quick Nav is set correctly for that specific activity.**

Note: Introduce these Quick Nav Off Bluetooth Navigation Commands only when your child is ready for them. Not every young child is ready to learn these commands. Introduce the commands at your child's pace and as needed to complete an editing task. Moving to the first/last item on the page is often the best place to start, as the child may want to navigate to the first item in the document to read what he has written or navigate to the last item in order to type the next item. If the child is writing sentences, he will benefit from being able to navigate to specific characters, words and lines.

BTK Navigating Commands for Quick Nav Off

Toggle Quick Nav On/Off with right + left arrows

Action	Keyboard with QuickNav Off
Move to first item in the document	Cmd + up arrow
Move to last item in the document	Cmd + down arrow
Move to the end of the current line	Cmd + right arrow
Move to the beginning of the current line	Cmd + left arrow
Read next character	Right arrow
Read last character	Left arrow
Read next word	Option + right arrow
Read next line	Down arrow
Read previous line	Up arrow
Read next paragraph	Option + down arrow
Read last paragraph	Option + up arrow

Note: When opening an existing document, you must first activate the text field (up + down arrows)

Resource
Bluetooth Keyboard: Navigating Google Document with Quick Nav Off YouTube video

This activity will use the Pages 'Names' list that the student created previously. You can also choose another list, if desired. **Quick Nav must be Off**.

- Start with the VoiceOver focus at the beginning of the list: (Cmd + up arrow).
- Move to the next line: (Press the down arrow).
- Repeat, moving through the list of words.
    - Note: When the list ends, nothing happens when the down arrow is pressed again.
- Press the up arrow to move back up through the list.
- Practice navigating from the first word in the document to the last word in the document and back to the first word: (Cmd + up arrow, cmd + down arrow, cmd + up arrow).
  Note: VoiceOver will read all the items in the list, starting with the first item.
  Pause VoiceOver with the Cmd key.
- Choose two adjoining letters in the first word. Using the right arrow, ask the child to navigate the cursor so that cursor is between those two letters.
- Use the down arrow to move to another word and then using the right or left arrow to navigate between two chosen letters.

  Note: When moving up or down by lines, the cursor will be in the same location in the new line. Example: When the cursor is between the second and third characters is in the first line, moving to the next line, the cursor will continue to be between the second and third characters in the second line.

- Move the cursor to the beginning of the second line: (Cmd + left arrow. You can also use the left arrow multiple times, stopping at the beginning of the word).

Variation: If the student knows his vowels, ask him to move the blinking cursor after the vowel. Or, simply choose a two specific letters, and ask the student to move the blinking cursor between those two specific letters. Example: In the name Diane, move the cursor between the 'a' and the 'n'.

Young children should be comfortable with typing a list of words, using the Delete key to delete mistakes, and navigating with the right and left arrow keys before teaching how to navigate with additional Bluetooth keyboard commands to insert, delete or substitute misspelled words.

Correcting Misspelled Words

If the child typed 'Tem' instead of 'Tim', the child could choose to delete both the 'm' and the 'e' by pressing the delete key two times, *if the cursor was to the right of the 'm'*. However, if the child types a whole sentence and then finds the mistake when reading the sentence, he will not want to delete the rest of the sentence just to edit the misspelled word. Using the arrow key to navigate through the sentence character-by-character is not very efficient. Instead, he can navigate by lines (up or down arrow) or by words (option + left arrow or option + right arrow).

In this activity, we will use the name 'Tim' misspelled as 'Tem'; however, this activity can be done with a name that your child has misspelled. (Choose a misspelled word that needs a correction in the middle of the word.)

- Navigate to the misspelled word ('Tem') in the list using the up arrow or down arrow (navigating by lines); then use the right or left arrow (navigating by character) to move the cursor to the right of the desired letter ('e').
- If inserting a character:
    - Simply type the desired letter.
- If deleting or substituting a character:
    - Use the Delete key to delete the incorrect character ('e').
    - Type in the desired character ('i').

For students who are ready to be challenged, repeat this activity using text with multiple sentences or paragraphs. First listen to the story, paying attention to misspelled words. Then, navigate to the misspelled words using the commands to move by paragraph, lines, words and characters.

Activity 5.3d Finding Misspelled Words Using Bluetooth Keyboard Commands

Finding Misspelled Words

Encourage the student to listen for VoiceOver to announce words incorrectly; however, VoiceOver may consistently mispronounce words, especially names – even words that are spelled correctly! If the word is mispronounced, laugh about "silly VoiceOver" with the student. To hear VoiceOver announce the list:

- Move to the first item in the document: (Cmd + up arrow).
- Read the text: (VO+A).
- Pause reading: (Control).

If VoiceOver is mispronouncing the word because the word is misspelled, navigate through the list of words. Then use the appropriate Bluetooth keyboard command to move the cursor to the desired location. Delete the incorrect letter(s) and type in the correct letters. Listen carefully to make sure that the corrections are truly correct. Use the left arrow to navigate to the beginning of the corrected word. Use Option + right arrow to hear VoiceOver announce the word or use right arrow to hear the word spelled character-by-character.

Modification: You can create a list of words that the student is familiar with and ask the child to find the words that are misspelled.

Modification 2: If the student is ready for a challenge, use a short story which contains a couple of misspelled words. (Misspell words that the student should know, such as his sight words or spelling words. Be sure that VoiceOver mispronounces the misspelled words!)

Note: There is a rotor option to find misspelled words; however, in iOS 12, this option is only available in apps such as Mail and Safari and is not available in Pages, Docs or other document apps. (See section 5.2d for misspelled words rotor option.)

Activity 5.3e Editing Sentences: Row Your Boat

Using familiar nursery rhymes or songs, substitute key words with other words. Your child will laugh at these silly sentences! This activity will encourage your student to listen to VoiceOver and will provide opportunities to practice editing skills.

We will use the following two verses of Row, Row, Row Your Boat:
Row, row, row your boat,
Gently down the stream.
Merrily, merrily, merrily,
Life is but a dream.

Row, row, your boat,
Gently down the stream.
If you see a crocodile,
Don't forget to scream.

However, we will substitute the following words to make a silly version of the nursery rhyme:
Row, row, row your chicken,
Gently down the stream.
Merrily, merrily, madly,
Life is but a pickle.

Row, row, row your boat,
Gently down the book.
If you see a crocodile,
Don't forget to cook.

Before the activity, type in both the standard two verses and the silly two verses.
- Ask the child to 'read' the first two verses and stop.
  - If the child is not familiar with the second verse, discuss it briefly.
- Remind the child to listen closely. Have him read the first silly verse.
- Read the first silly verse again, then correct the silly words.
- Read the second silly verse. Correct the second silly verse.
  - If necessary, have the student navigate by paragraphs (Option + up arrow) back up to the second standard verse and listen to it again.
- Write your own silly verse using rhyming words.
- Can you write a new standard verse (one that makes sense) using rhyming words? Example:

Row, row, row your boat,
Gently down the river.
If you see a crocodile,
Don't forget to shiver.

Activity 5.3f Editing Sentences: The Duck 🐸

Once the child is comfortable with typing a list of words, the next step is to type simple sentences. If the child is not ready to type a sentence but is ready to read sentence, you can type the sentence and have the child 'read' the sentence.

- Type: "A duck swims in the pond." and move to the next line: (Enter key).
- Edit the sentence to make, "The ducks swim in the pond."
    - Navigate by words (Option + right arrow) or characters (right arrow), Delete keys to delete, type in the desired letters, then check the spelling by navigating by character or listen to the VoiceOver pronunciation by navigating by word.
    - Change 'A' to 'The'.
    - Add 's' to ducks.
    - Delete 's' from 'swims'.
- Edit the sentence to make it past tense: "The ducks swam in the pond."
    - Change 'swim' to 'swam'.

Detailed directions for the above activity:
- Navigate to 'A':
    - Navigate to the first part of the sentence: (Cmd + right arrow).
    - Navigate to the right of 'A': (Right arrow).
- Delete the 'A': (Delete key).
- Type 'The'.
- Add 's' to 'duck':
    - Navigate to the right of 'k': (Option + right arrow).
    - Type 's'.
- Delete the 's" in 'swims':
    - Navigate to the right of 's': (Option + right arrow).
    - Delete the 's': (Delete key).
- Listen to the sentence:
    - Navigate to the beginning of the line: (Cmd + left arrow) or navigate to the first item in the document (Cmd + up arrow).
    - Move to the end of the document to hear VoiceOver announce the sentence: (Cmd + right arrow).

Edit the sentence to make it past tense.
- Change 'swim' to 'swam':
    - Navigate to the right of the 'i':
        - Navigate back by words: (Option + left arrow) stopping in front of 'swims'.
        - Navigate character-by-character to the right of 'i': (Right arrow three times).

- o Delete the 'i': (D-Chord).
- o Type 'a'.

Activity 5.3g Talking Typer App

Talking Typer App is $4.99 and is fully accessible with the onscreen keyboard, Bluetooth keyboard and refreshable braille display. Note: The Bluetooth keyboard is strongly recommended to learn good finger positions and typing skills. However, the onscreen keyboard can be used by students who are being introduced to a QWERTY keyboard and are focused on learning the spatial relationships between each letter. Obviously, using a braille display will not teach the student the correct finger positions using a QWERTY keyboard; however, Talking Typer and a braille display is a great game used to practice brailling letters, letter combinations and some simple words.

Talking Typer is accessible with VoiceOver and is also available in a self-voicing mode. In the app's setting (Admin > App Preferences page), you can choose to toggle on/off the Echo Correct keys, the size of the lesson text, and adjust speech settings. The speech settings include the rate (speed), pitch, and voice. Students are added under the Admin > Student page and Groups are added under the Admin > Groups page.

Talking Typer has 35 built-in lessons at beginner and advanced levels. Teachers and parents can create new lessons, edit lessons, and assign lessons to individual students or groups. The app saves the results of each drill allowing students, teachers and parents to monitor improvement.

Once a student is added, the student can log in and the student's progress is recorded. Teachers can assign lessons. The lessons start with home row keys for the left hand and move through more advanced lessons. Teachers can also create their own lessons and assign these lessons. Customized lessons could include grouping the Kindergarten sight words and/or spelling words.

VoiceOver Bug

Note: **Currently in iOS 12.1 and Talking Typer version 1.7, students who rely on VoiceOver are not able to type in the text field.** The VoiceOver focus remains on the Start/Stop button and cannot be moved to the text field. Double tapping on the Start/Stop button only toggles the start/stop of the game. If VoiceOver is turned off, the student taps the Start button and the text field automatically appears with the blinking I-beam cursor. The student simply begins typing. The lessons and Hurry Scurry game can be played without VoiceOver (the words are self-voicing); although, the student may need assistance to start the lesson. Since the game does not currently work with VoiceOver running, **the game currently will not work with a braille display**.

Game Play
- Select a lesson.
- Press Start. (Currently without VoiceOver running.)
- The self-voicing game will announce the word then will spell the letters.

- The student quickly types the words and a space.
  - o If an incorrect key is typed, there is a buzz.
  - o If the correct keys are typed, a bell tone is heard and another word is given.
- When finished, press the Stop button in the top right corner.
- The game is timed. When stopped, a popup menu provides the score:
  - o Words per minute
  - o Time (minutes/seconds played)
  - o Accuracy (percentage)
  - o Number of errors

Resources
Talking Typer App: Custom lessons post
Janna Talking Typer video: Janna learning to keyboard (home row keys) using the Talking Typer app on an iPad paired with a Bluetooth keyboard.

Advocacy
It is important for educators to advocate for accessibility. When an app has a bug – such as the current VoiceOver bug with Talking Typer – **you should contact the app developer.** Tell the app developer what device you are using, the device's software version (such as iOS 12.1) and what version of the app (such as Talking Typer version 1.7). First check that you are running the current version of the app. Go to the App Store app > Updates and see if the desired app is listed as having an update available. You can find the app's version by going to the App Store app > Search button > and select the desired app. The current version will be listed under the version history. In your email to the app developer, specifically state what the problem is and if appropriate, the anticipated solution. Example: If the bug is a button that is not labeled for VoiceOver, the solution would be to label the button. Typically, it takes more than one person contacting an app developer to bring attention to a bug! As a community, we - teachers - need to advocate to make sure that educational apps are fully accessible! If the bug is an Apple bug – related to accessibility – email accessibility@apple.com.

5.4 Onscreen Keyboard

iOS devices have an onscreen QWERTY keyboard. The onscreen keyboard is fully accessible with VoiceOver; however, it is not the most efficient way of inputting letters and is often challenging for emerging readers who are/will be braille readers. The onscreen keyboard is intended to be used for short, quick typing. The onscreen keyboard is often used with an iPhone, as the iPhone tends to be used on-the-go (and stored in a pocket when not being used); and is typically not paired with another device. Children in early elementary use iPads and not iPhones in the classroom; however, young children may have access to an iOS device at home that is not paired with a braille display or Bluetooth keyboard. Even for fully sighted users, inputting letters using the onscreen keyboard is often accomplished with the 'hunt-and-peck' method and not true keyboarding. It is challenging to position fingers correctly on a flat surface and to type using all ten fingers! **Braille readers should start with a braille display not the onscreen keyboard**. Students are most efficient using a Bluetooth keyboard – not the onscreen keyboard. The onscreen keyboard is solely for typing and does not support commands such as the navigation commands.

Note: **The braille display and Bluetooth keyboard are significantly easier to use and more efficient than gestures when navigating within a document for editing and manipulating text.**

Activity 5.4a Tactile Version of the QWERTY Keyboard

Before a young child is ready to learn to type using multiple fingers, he should first explore the onscreen QWERTY keyboard layout and begin to learn the spatial relationships between a few letters. Young students learn concepts from tactile models that they can touch and/or manipulate. Create a tactile keyboard - ideally same size as the iPad's onscreen keyboard. There are many ways to create tactile representations; there is not one right or wrong way. Different children will benefit from different styles.

Example 1: For a child who is being introduced to braille letters, create empty "squares" using raised outlines to show the keys and general layout of the onscreen QWERTY keyboard. Add braille letters or use the APH letter stickers. If brailling your own letters, using braille paper, cut out the letter so that it will fit inside the outlined "square" as that letter would appear in the QWERTY keyboard. Start with the letters in your child's first name. With the child, identify and name each braille letter, then place the braille letter in the corresponding square. Be sure to discuss **where** the letter is located and let your child explore the tactile QWERTY keyboard with only that letter. Depending on your child, the location might be general (middle left) or the specific location (2nd row, third square from the left). Repeat as each letter is added to the tactile keyboard. Be sure and encourage your student to explore the keyboard. Talk about where letters are in relationship to each other – specifically in the order of spelling his name.

The same activity can be done with print letters for a student who can read print.

Example 2: For a child who knows his braille letters, create a tactile keyboard that displays all the letters in the alphabet or maybe just the Home Row keys. Ask the child to find the letters in his name. Discuss where the letter is located in relationship to the keyboard and then discuss where the letter is in relationship to the previous/next letter in his name.

Use different textures to represent important keys - such the large space bar - might be represented by cutting out a piece of felt in the shape of that key.

Note: The onscreen QWERTY keyboard is slightly different than the Bluetooth keyboard. Be sure to create a tactile version of the onscreen keyboard for these activities!

Activity 5.4b Onscreen Typing: List

For short typing, the onscreen keyboard may be used; remember, the onscreen keyboard can be challenging! The rotor option – typing mode - should be selected in Settings before the typing option will appear in the rotor. There are three typing options:

- Touch Typing – Drag your finger around the QWERTY keyboard. When you locate the desired letter, life your finger off the screen.
- Direct Touch Typing – Students with functional vision may use this method. Touch a letter and it is automatically added.
- Standard Typing – Drag your finger around the QWERTY keyboard. When you locate the desired letter, use the split tap gesture.

The following activity will be done using the Pages app. If your school uses Google apps, Google Docs can be used instead. Currently, braille displays tend to work better with Pages than Google Docs. **Set the typing mode in the rotor to Standard Typing (drag and split tap)**. Explain to the child that the onscreen keyboard will appear in the bottom half of the screen and the visual print text will appear in the top half.

- Open the Pages app and create a new document. (Cursor will be in an editable text field.)
- Ask the child to type his name using the onscreen keyboard. Encourage him to drag his finger in the general area of the desired letter. Once he hears the desired letter, use the split tap gesture.
- After each name, press Return to start a new line.
  - Discuss how the child is making a "list" of names or words.
- Encourage the student to type other names, such as the names of family members, friends and teachers.
  - Depending on his level, you may need to spell the name as he types
- Encourage your student to type other words, such as his sight words, spelling words, animals or favorite things.
- If the student makes a mistake, use the **Delete key** to delete or erase the last letter.
- To hear VoiceOver read the list of words, move the VoiceOver focus from the onscreen keyboard to the "body" or text on the upper half of the screen. Once the VoiceOver focus is on the text, double tap to toggle the insertion point to the beginning of the text, start of the current line, or the end of the text on the page. VoiceOver will say, "Insertion point at start", "Insertion point at start of line" or "Insertion point at end".

Modification 1: If your child is learning about capital letters, encourage him to find the Shift key to make a capital letter.

Modification 2: If your child struggles with split tapping or if he wants to try another typing method:

- Set the Rotor to Typing Mode (two-finger twist if needed), then flick down stopping on Touch Typing.
- Write another word by dragging to the desired letter, then lift the finger. (When finger is lifted, the word is inserted.)

Modification 3: If your child is not ready to type words, then give him the opportunity to "scribble", simply choose whatever letter he wants to! He can learn from simply hearing the letters. You can also choose to have VoiceOver announce the letter and the phonetic sound of the letter, or just the phonetics. Go to Settings > General > Accessibility > VoiceOver > Phonetic Feedback > select from 3 phonetic feedback options.

Note: This activity using Standard Typing is a great way for Lizards to practice split tap gestures!

ABCs of iOS Manual

Unit 6: Classroom Educational Apps
iOS 12

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Objectives
Overview

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- Activity 6.1a Math Melodies: Sequence
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    - Tactile Positions in a Table
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Overview
This unit focuses on applying the previously learned iOS skills to complete classroom goals and assignments. Included in Unit 6 are apps on specific subjects, such as math, reading and coding logic, along with various concepts taught through motivating apps. Teachers learn how to create (and share!) accessible customized ePub books and accessible quizzes.

6.1 Math Concepts: Math Melodies App 🐸 🐢

Digital Transitions

Our 21st Century classrooms are (or are moving towards) paperless classrooms. Digital-born materials are leveling the playing field for students who are visually impaired. All students have instant and full access to digital materials; a student using his iPad's preferred settings, can choose to magnify, change color filters, zoom in, use a screen reader and/or use a braille display.

Digital text is accessible instantly with a screen reader; however, digital math is still a work in progress. As a student transitions to higher education and into the workforce, tactile graphics and math resources in braille/tactile format are rare. Students – especially those going into competitive STEM careers - have accessible digital math options. Apps such as DESMOS (accessible graphing calculator app), LaTeX (math markup), and SAS Graphics Accelerator (accessible charts and graphs software) are examples of accessible digital math tools. Cutting-edge software using sonification and haptics is being developed that supports accessible math for young students. (Vital and Feelif are two examples.) In addition to applications, several groups are working to develop full screen braille displays that will that will display multi-line math equations, charts, graphs and images.

Best practice for students **learning** math is to have traditional tactile graphics and braille. However, students should also be exposed to digital math at an early age in preparation for advanced math tools. Tactile materials and digital materials should be paired together. Tech skills and concepts along with earcons (sounds used to represent information; see section 2.3 Earcons) and sonification should be systematically introduced early. Students should have a variety of tools in their educational toolbox!

Accessible math apps for young students are limited; however, as more young students learn to use an iPad running VoiceOver, the need for accessible math apps is increasing and developers are becoming more aware of the accessibility needs.

Math Melodies App

Math Melodies by Everyware Technologies is a free math app. This fun app has been designed specifically for students with visual impairments and blindness and is fully accessible with VoiceOver and has a self-voicing option. Note: Math Melodies was developed in Italy; some of the math terms and equation layouts are slightly different than what is used in the U.S. and Canada. Example: The addition equations have 'u' for 'ones', 'da' for 'tens' in print; VoiceOver does announce 'ones' and 'tens'.

Purpose

Math Melodies has a story plot with random math equations embedded into the story. Or, you can choose to jump straight to specific interactive math exercises. There are currently 12 types of exercises; each activity has multiple levels. Exercises range from basic concepts such as counting to comparing fractions and division. The first list of exercises is appropriate for young students and will be specifically mentioned in this manual; the second list of exercises is typically for more advanced students. Note: The higher levels of individual exercises might be more appropriate for the advanced student. (Example: The first level in the Addition exercise is adding two single digit numbers. Level 10 (Grade 5) adds four numbers together and each number is 6 digits (hundred thousand).

List of Math Melodies exercises for younger students

- Sequence: Which animal completes the sequence?
- Add or Delete: Insert or delete to obtain the given number of animals
- Compare Quantities: Count the animals and compare quantities
- Positions in Table: Find an animal in the table
- Addition
- Table of Additions: Sum the value in each row with those in each column
- Complete the Operation: Insert missing numbers to complete the operation in the column
- Subtraction

List of Math Melodies exercises for more advanced students
- Multiplication
- Compare Fractions: Insert the correct operation (less than, greater than, equal) between the fractions
- Complementary Fractions: Find the complementary fractions of the given fraction
- Operations with Fractions: Compute the operations between fractions
- Division

The games have a similar layout with the instructions at the top of the screen, the interactive piece in the middle of the screen, and the "quit" and "answer" buttons in the bottom right corner. If the game includes choosing a number answer to be entered into the text field, the numbers will appear in a row at the bottom of the screen.

Students can use the braille display to navigate through these games. Note: The braille display does NOT activate the animal sounds.

Students can use the Bluetooth keyboard to navigate through these games, with Quick Nav On.

Note: Games that are set up as tables (including addition games) can only be navigated right and left through the table; up and down arrows/commands do not work. (Typically, when tables are set up correctly for VoiceOver, the rotor can be set to Rows and then up/down arrows will navigate up/down through a column.)

Note: The developer is currently working on updating the Math Melodies app, which may change some of these games or game layouts. The basic instructions and concepts described below will still apply, even if there are software changes.

Activity 6.1a Math Melodies: Sequence 🐸 🐢

The Sequence game is a basic patterns game. Level 1 of the Sequence game has four animals; the student chooses the next animal that should appear in the pattern. The animals are in a row in the middle of the screen. When VoiceOver is running, the student should learn to drag his finger from the left side to the right side of the screen. As the finger drags over an animal, the animal's associated sound will be heard. Split tap on the animal to hear the name of the animal. The last item in the row is the question mark. After determining the pattern, split tap on the Answer button in the bottom right corner. This will open up the Answer Screen. Directions and answer options are in rows. The student should drag his finger down the rows and split tap on the desired answer. If the answer is correct, a short music clip will be played. If the answer is incorrect, the student will hear, "Try again" and the "Continue" button will go back to the previous page with the row of animals.

Note: Students can swipe right or left through the row of animals; however, dragging provides spatial information about the game layout. It is also critical that students learn how to drag in a straight line. The VoiceOver cursor box in this game is large, making it easy for the student to stay in the row. Dragging in a straight line is a required skill for successfully completing higher levels of the games such as the Addition game where the student has to drag a straight line down, staying in the Ones column to add the numbers.

Activity 6.1b Math Melodies: Add or Delete 🐸 🐢

The Add or Delete game is set up as a grid or table. VoiceOver initially provides information about how many rows and columns are in each level. Example: VoiceOver will initially read the directions, "Double tap to insert or delete an animal. There is a table with 2 rows and 4 columns." VoiceOver will also announce the number of desired animals. **Listening for and understanding the number of rows and columns is crucial for developing a mental map of the table!** Systematically dragging a finger across the row and then moving to the second row is a foundation skill. Dragging a finger will reinforce the spatial layout of this grid.

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In the game, first listen for the number of desired animals. Then, systematically drag and count the number of animals in the table. Animals are placed randomly in the squares – often with a blank square between the animals. A click sound (earcon) will be heard when the student's finger drags across an empty square. The animal's associated sound will be heard when the student's finger drags across a square with an animal. Decide how many animals need to be added (or deleted) from the table. Double tap on a blank square to add an animal or double tap on an animal to delete an animal. When finished, select the Answer button in the bottom right corner.

NOTE: If your student is not ready for Add and Delete, start with the basic counting activity. (See Create similar counting activities Section 6.2b Math: Shapes/Stickers Counting Activity.)

Activity 6.1c Math Melodies: Compare Quantities

In Level 1 of the Compare Quantities game, there are two rows of animals. The student should systematically drag his finger across Row 1 to count the number of animals in Row 1. Then count the number of animals in Row 2. Determine if there are more animals in Row 1 (Example: Dogs in Row 1) or more animals in Row 2 (Example: Cats in Row 2). There may be the same number of animals in each row!

Be sure to listen to the initial VoiceOver announcement about the number of rows and columns in each level.

Activity 6.1d Math Melodies: Positions in a Table.

Tactile Positions in a Table
Many students benefit from a tactile version of the table to help the student understand the table's layout.

For students who have not mastered table concepts and skills, create a simple tactile version of a table. If a braille title is included, ask the student to find the braille title. Discuss columns and rows; ask the student to drag his finger across row 1. Repeat with the remaining rows, if desired. Ask the student to drag his finger down column A. Repeat with the remaining columns, if desired. Place an item in a square. (Recommend using a flat item such as a quarter so that the student does not knock it over or accidently find it while systematically searching.) Demonstrate how to systematically search for the item. Once the item is found, ask the student to name the row and column where the item is found. (Drag left to find the row number. Drag right back to the item. Drag up to find the column number, drag down to find the item again.) Move the item to a new square and repeat the activity. Ask the student to place the item in a specific row and column.

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In Level 1 of the Positions in a Table game, there are three rows (1,2 & 3) and three columns (A, B, & C). An animal is located in one of the squares; the other squares are blank. The student should systematically drag through the table to find the animal. The blank squares are indicated by a click (earcon) and the animal is indicated by the animal's sound. The student should pay attention to the row and column as he drags his finger to find the animal. Once the animal is found, the student should remember which row and column the animal is in. If necessary the student can double check by dragging straight up to find the column letter, then drag straight down to find the animal again. Drag to the left to find the row number and drag back to the right to find the animal again.

Remember, these games are progressive! Introducing how to drag in a straight line with the simple games such as Add or Delete, is a tech skill that students need to master in order to be successful with harder games such as Positions in a Table.

Activity 6.1e Math Melodies: Addition 🐢

Level 1 in the Addition game asks the student to add two single digit numbers. The directions on each page will announce the equation – students should carefully listen to the equation! The layout will be a vertical equation with one column (ones) with the **plus and equal signs to the right of the numbers.** If the answer is a two-digit number, there will be two columns ('ones' and 'tens'). Students should first be exposed to vertical addition in braille. Pair the digital version of the game with the braille equation.
Note: Discuss with your student that there are some differences between math equations in Italy (where the app was developed) and the U.S. and Canada. Visually the screen shows 'u' as the ones column header and 'da' as the tens column header. VoiceOver does announce these headers correctly ('ones' and 'tens'). The app shows the addition and equals symbols to the right of the numbers instead of to the left of the second number.

In order to add each column correctly, the student must drag his finger in a straight line down the column. For equations that have two-digits or more, there will be additional columns. Dragging in a straight line will help ensure that the student is given numbers within the same column. As the student drags his finger down the ones column, VoiceOver will announce the number then 'ones' indicating that the student is in the ones column. If the student accidently drags his finger to the left and into the tens column, VoiceOver will announce the number and then 'tens'; this provides auditory feedback to ensure that the student is aware of which column the number is in.

VoiceOver announces the answer square as, "Answer, touch two times to edit." Split tap or double tap on the Answer square; a row of numbers appears across the bottom of the screen starting with the number 1. An earcon is also heard that indicates the

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appearance of the row of numbers. The student should drag his finger across the row, split tapping on the desired number.

Note: If a two-digit answer is required, select the ones column answer square and find the ones answer. Then select the tens column answer square and find the tens answer.

Note: If carrying is required, the student must carry the number in his head.

Activity 6.1f Math Melodies: Table of Additions

Level 1 in the Table of Additions has two rows and two columns. Instead of 1,2,3 numbers as row headers and A, B, C column headers, random numbers are used. The student adds these numbers and fill in the blank (answer) squares. Example: Add the number in the first row header to the number in the first column header; place the sum of these numbers in the first square. The second answer square in the first row is more challenging for students, as there is now an answer in the square to the left! Be careful! The student must remember the **first** number, or he has to drag his finger back to the first number in the row, remember that number, then drag to the blank answer square. From the blank answer square, he has to drag his finger up to the first number in the second column. Add those two numbers and place the sum in the first row, second column blank answer square. If needed, create a tactile version of the Table of Additions to help the student build a mental map of this layout. This game becomes even more challenging at the higher levels!

Note: VoiceOver will announce, "Answer, touch two times to edit." if the answer square is blank. If an answer has been added to the square, VoiceOver will announce, "Answer, 6. Type the Answer with the underlying keyboard."

Activity 6.1g Math Melodies: Complete the Operation

Level 1 of Complete the Operation is a vertical addition equation with a missing number. Level 1 has two single-digit numbers; although, the sum may be two-digits. The equation is stated at the beginning. Example: "How much do you have to sum (add) to 7 to get 10?" In the vertical equation, 7 and 10 are provided; find the "answer" square and double tap, then locate the desired number from the numbers provided across the bottom of the screen.

Activity 6.1h Math Melodies: Subtraction

Subtraction is formatted like the Addition game. The equation is stated at the top of the page and the layout is a vertical equation. Level 1 is subtracting digits up to ten. Drag

your finger down the ones column to hear the numbers. Double tap on the answer square, then select the desired number for the row of numbers at the bottom of the screen.

Note: If borrowing is required, the student must borrow in his head.

Additional Resources
Stay tuned for Word Melodies, an accessible emerging reading app that is currently under development by the same developer.

Resource
Math Melodies: iOS App post

Activity 6.2a Math Robot App

The Math Robot App by APH is $4.99 in the App Store. It is both self-voicing and fully accessible with VoiceOver.

Purpose

Math Robot is a math facts drill game designed for students who are visually impaired or blind as well as for students with vision. With VoiceOver running, the equation is announced. The bottom half of the screen is a 4 x 3 grid with numbers selected for the answer. The numbers are arranged like a number key pad. The student should drag his finger to the desired number and split tap. Once a number is inserted, a delete key is added to the left of the zero and the Enter key is added to the right of the zero. The student selects the desired number then must select the Enter key before a new equation appears. The drills are timed, and a score is kept. In Free mode, if an incorrect answer is selected, a tone will be heard, and the student can try again. In Drill mode, if an incorrect answer is selected, a tone will be heard along with a funny verbal response and the student can try again. The Drill mode, math problems are given in order. Example: 0 + 0, 0 + 1, 0 + 2.

Note: The student must choose the right answer before moving to the next equation. After an incorrect answer, when the correct answer is given, the score reverts showing that all the questions were answered correctly. **The score does not reflect how many mistakes were made.**

Braille Display

The app is accessible with a braille display; however, navigating through all the numbers and then navigating to the Enter key is time consuming and not efficient. It is much more efficient to develop spatial awareness and drag directly to the desired number or key. This also helps to develop good mental mapping skills!

Settings

There are various options in Settings: low vision mode, negative answers, number of tries, re-speak problem, speech rate, and mode. Users can also choose addition, subtraction, multiplication, division, or a combination of these operations.

Resource
APH's Math Robot: iOS Game post

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Math: Counting Shapes/Stickers (Pages App)

The Pages app can be used in creative ways to teach math concepts. Use Pages to create your own counting worksheets by adding multiple 'stickers' to the document.

This activity requires preparing the Pages document(s) prior to working with the child.

Pages has a feature that enables users to add accessible 'shapes' to a Pages documents. These 'shapes' are basically stickers - simple, solid color images in the shape of assorted items. These stickers are divided into categories: Basic Shapes, Objects, Animals, Nature, Food, Symbols, Education, Arts, Science, People, Places, Activities, Transportation and Work. The number of shapes in each category varies; there are currently 77 animal shapes. Shapes can be sized and moved around the document. VoiceOver will identify each image. Counting shapes in a Pages document is a fun math activity for young children! Note: Young children are more familiar with the term "stickers" – especially when using animal stickers instead of actual shapes.

The image below is an example of a Pages document with stickers.

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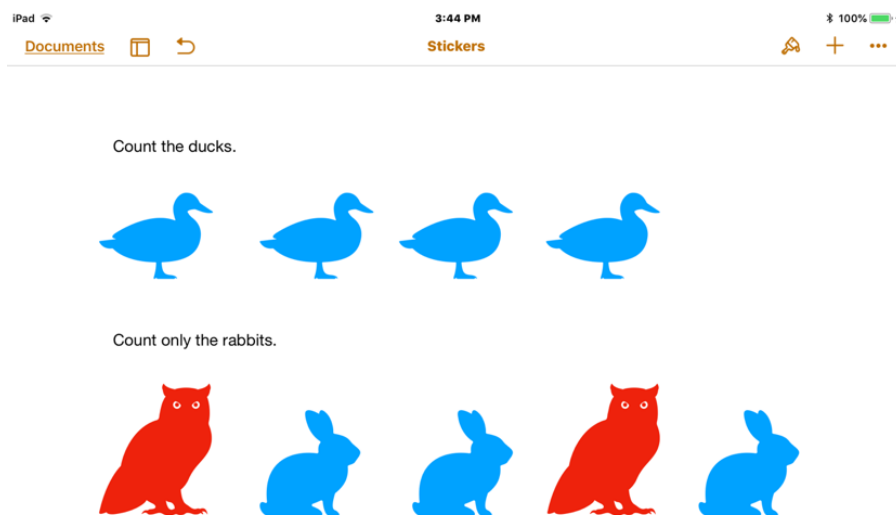
Directions for Creating a Counting Page
- Open the Pages app.
- Open a new Pages document:
  - ○ Select Add/Insert button.
  - ○ Select blank document.
- Add a Title:
  - ○ Clear Blank title: select the Clear text button (x) to the right of the blank title).
  - ○ Type the desired title: (The example used, "Stickers").
- Add the directions:
  - ○ Activate the text field: (Tap the center of the screen).
  - ○ Type the desired directions: (The example used, "Count the ducks.").
  - ○ Move to a new line: (Enter key).
- Add a sticker:
  - ○ Tap the Add/Insert button.
  - ○ In the popup menu, select the Shapes button (visual icon is an overlapping square and circle).
  - ○ Select the desired sticker. (The example added the duck.)
  - ○ Adjust the size of the image: (Drag the grabber circle and move it in to decrease the size or out to increase the size of the duck).
  - ○ Move the duck to the desired location: (Drag and drop).
- Add additional animals: (Copy and paste if duplicating the same animal).
- Leave four blank lines so that VoiceOver will pause between counting sets.
- Repeat steps to add another counting activity. Use different animals in each activity to eliminate confusion.
- Be sure to place the animals in a row across the page.

Note: VoiceOver does not announce the color of the animal. Color may be beneficial for students with low vision who might find similar animals hard to distinguish.

Resource
iOS Shapes and Stickers: Counting Activity post

Activity 6.2b Math: Shapes/Stickers Counting Activity

Encourage your child to use two-finger commands to locate the Pages app and to locate the Counting Animals document or your desired document that contains stickers. If your child is comfortable with the two-finger gestures, have him choose which gestures are the most efficient when navigating to the app or document. (Example: If the Pages app is in the bottom left corner on the Home screen, the best option might be to find the corner of the iPad and then drag his finger around that corner to find Pages.)

- Prompt the child to be ready to pause VoiceOver after the ducks are counted/when VoiceOver pauses after the last "duck".
- Open the desired document with stickers: (The example uses 'Stickers').
- Pause VoiceOver after the ducks are counted: (VoiceOver automatically begins to read the document; use 2-finger tap to pause).
- Ask the student how many ducks are there?
- Manually count each duck: (The VoiceOver cursor - black square - needs to be on the text field for the right/left swipe to work. Find the top/left corner of the iPad below the Tool bar, then drag your finger to text, "Count the ducks" to move VoiceOver to the text field.) Systematically drag across the row to count the ducks.
- If desired, recount the number of ducks by left or right swiping through the images.

Note: When swiping left or right, VoiceOver ONLY reads the stickers; the text is NOT said aloud. It is important to use different animals for each counting group as the child will NOT know when VoiceOver has moved to the next group when using the swipe commands! If appropriate, add instructions between each group or only create one counting activity per page.

Note: VoiceOver will give the size, position, etc. of each sticker. To hear only the animal announcement, encourage the child to drag quickly through the stickers. On the last sticker, have the child pause VoiceOver speech (two-finger tap).

Note: Be Aware! This is an editable document and the student can accidently make changes to the document!

The student can verbally tell you the answer. If desired, the student can type in his answer after the last animal in that math problem.

Some students may benefit from using 3D tactile objects (such as counting blocks) before transitioning to 2D paper/tactile graphics, and then paired with the digital counting activity.

Math: Accessible Bar Charts (Pages App)

Pages can also be used to create accessible bar charts. Educators can create custom bar charts; advanced students can also learn how to create their own accessible bar charts. Students should be introduced to 3-dimension bar chart activities (sorting objects and organizing these objects in to lines similar to a 'bar chart'). Then, the student should be exposed to tactile bar charts – using braille or tactile symbols laid out in columns representing a 2-dimensional tactile bar chart. Pairing a tactile bar chart with the same digital bar chart may also be beneficial for students who are transitioning to digital bar charts. Bar charts created in Pages on an iPad are interactive and fun! When introducing a student to a bar chart, always start by finding the title. Describe and find the y-axis located in a column on the far-left side of the chart. Have the student determine what the y-axis represents and what the range is. Then find the X-axis, located in a row at the bottom of the chart. Have the student determine what the x-axis represents. Finally, ask the student to explore the content of the chart.

Note: Pie charts are also accessible in the Pages app; however, VoiceOver does not announce the colors in the pie chart.

This activity requires preparing the Pages document prior to working with the child.

Preparing a Bar Chart in Pages

- Open a new Pages document
- Select the Insert button: (Plus symbol).
- Select Charts button in the popup menu.
- Select 2D Chart.
- Swipe left or right to view possible chart colors and select your desired chart. (The example used the first chart – the blue bar chart.)
- The chart template appears. Tap on the Chart.
- Select the Edit Data button in the popup row.
    - Screen now shows chart data in a spreadsheet format (grid).
- Delete data and replace with desired data. To create the Shell Bar Chart example:
    - Type in Olive, Whelk, Scallops and Bear Claw as column headers.
    - Leave Region 1 and type in 5, 4, 6, and 3 in the respective column.
    - Note: Currently, all the bar charts have two regions. If only one region is desired, delete everything in the Region 2 row.
- To change the font or size of font: Select Format button > Chart tab > select desired font and increase font size with plus or minus tabs.
- When done entering the data, select the Done button.
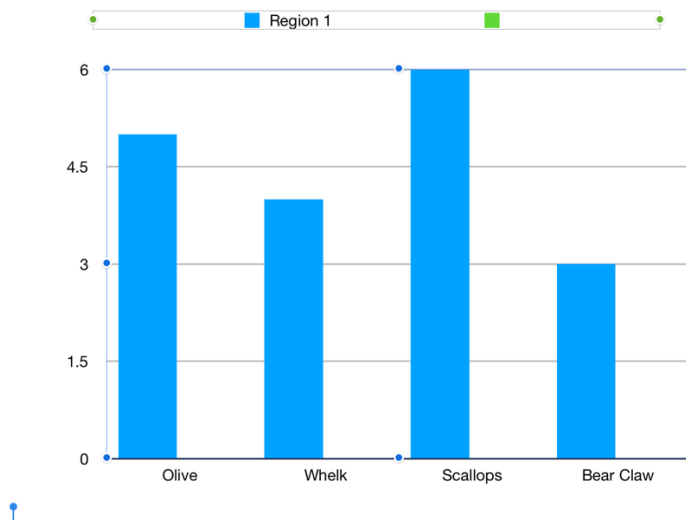
- Select the Format button (paintbrush image).
- Chart button:
  - Add a Chart Title: toggle on Chart Title. Double tap on the Title to open the text field. Replace with desired title. (The example chart title is "Shell Bar Chart".)
- To add the X Axis label:
  - Tap on the bar chart, then select Format > X axis tab > toggle on Axis Name. Tap on Category Axis text and replace with desired label. (The example chart X axis label is "Type of Shells".)
  - Additional options include adding grid lines and tick marks.
- To add the Y Axis label:
  - Tap on the bar chart, then select Format > Y axis > toggle on Axis Name. Double tap on Value Axis title and replace with the desired label. (The example chart Y axis label is "Number of Shells".)
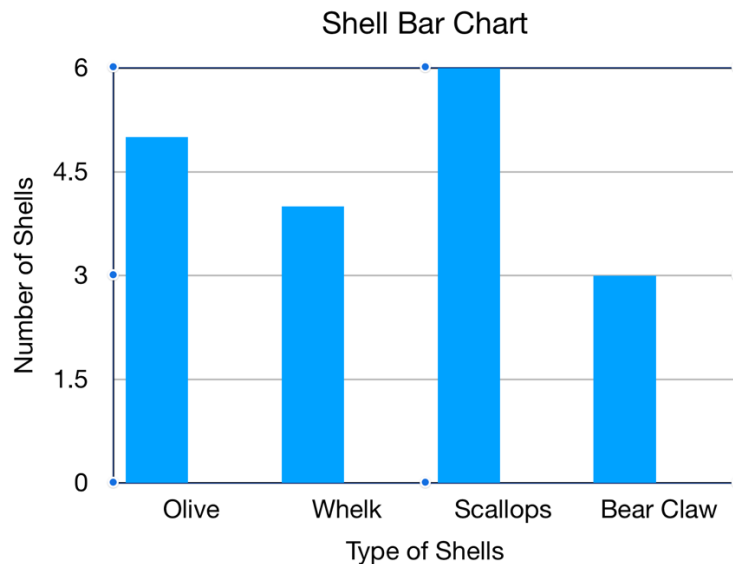
Activity 6.2c Accessible Bar Charts (Pages App)

This activity uses the Shell Bar Chart created above; however, any bar chart created in Pages can be used. Ideally, this activity would start with the student grouping real shells (or other items) into groups and then creating a simple tactile bar chart with these items.

The bar chart activity will be done with VoiceOver on; the student should drag his finger across the chart to learn the spatial relationships.

- Open Pages.
- Open the Shell Bar Chart.
- Tap the center of the chart to hear VoiceOver announce, "2D column chart body". This tells the student what kind of chart, which is an important piece of information!
- Ask the student to find the title of the chart: (Drag finger at the top, center of the screen).
- Ask the student to find the Y-axis label: (Drag finger on the left side of the chart.)
    - Note: VoiceOver currently does not announce the range. In a correctly formatted bar chart, the student could drag and find each number.)
- Ask the student to find the X-axis: (Drag finger along the bottom of the chart.)
    - Note: VoiceOver currently does not announce the category names. In a correctly formatted bar chart, the student could drag and find each shell type.
- Ask the student to systematically explore the chart, listening for each bar (name of shell and number of shells): (Starting on the left side of the chart, drag finger the finger across the bars from left to right, paying attention to each shell, number and the *order of the shells.*
- Ask the student to find a specific shell and tell you the number of shells.
- Ask the student to list the order of the shells.
- Ask the student to name the type of shell that has 4 shells.
- Ask the student to systematically explore the chart again, listening for the type of shell that has the *highest number of shells.*
- Ask the student to systematically explore the chart again, listening for the type of shell that has the *lowest number of shells.*
- If appropriate, ask the student additional math-related questions, how many shells are there if you add Olive and Whelk shells together?

If the student has a shorter attention span, only ask one or two questions, then move to another chart and ask a few more questions.

Note: Once the student understands the spatial relationships – especially if he struggles with dragging his finger across the bars – he can use right/left swipe to navigate the content of the bar chart.

Note: Using a two-finger swipe up (Read All command) is not very useful, as VoiceOver will announce way too much information, such as "upper left chart handle. . . "

Resources
Creating an Accessible Bar Chart in the Pages App post
Digital Transitions #4: Bar Charts (Fall Leaf Activity) post

6.3 Book Apps: Bookshare Reading Apps

Bookshare is a free, accessible Online library for students and adults with print disabilities *in the United States*. Students in other countries can access Bookshare for a cost of $50 per year or less. Learn more about Bookshare fees here. Students with visual impairments can register to receive digital books which are compatible with various devices and applications. Registration information available here. In school, children who are visually impaired frequently use Bookshare books to complete reading-related assignments. On the iPad, Bookshare books are typically opened in Read2Go, Easy Reader, or Voice Dream Reader. Each app offers different features. We will discuss the features that are most important for emerging readers who use VoiceOver. Once a student account is set up, teachers/parents can send books to one of these three reading apps. As the child becomes older, he can also browse and download books independently. All three of these apps are compatible with VoiceOver and a refreshable braille display and have the option of read aloud with highlighted text. When reading using a refreshable braille display, VoiceOver can be heard or muted. Some Bookshare books for young children do have image descriptions – but not all the books have image descriptions. When the image description is included, the image description text is not distinguished from the story text.

Bookshare books can be accessed with VoiceOver – students 'read' the book by listening. Bookshare books can also be accessed on the iPad paired with a braille display. When reading the book in braille on the braille display, mute VoiceOver. Remember, VoiceOver must be running in order for the braille to appear on the braille display.

While the two-finger swipe down, pause and resume gestures do work with Bookshare books, it is recommended for young children to learn to navigate using the panning buttons on a braille display and by right swiping to navigate sentence by sentence *for emerging braille readers.* When using a braille display and panning through the braille words, the VoiceOver focus will move to the next sentence when the braille display moves to the next sentence. (This is very helpful so that a sighted teacher/parent can follow along as the child reads.) *For young children* who are listening to the story using VoiceOver, a right flick will move through the story a sentence at a time. (Moving by sentences is often beneficial as the child is actively engaged with the story and the short pauses between right swipes gives him time to absorb the story. This also helps to reinforce the concept of sentences.)

Note: Students should learn to navigate longer documents (such as books with paragraphs on each page, chapter books, Word documents, textbooks, emails and websites) by large chunks of information. These longer documents are typically navigated by paragraph, which helps the student learn to organize information in paragraph chunks. Navigating by paragraph is not an option on these easy reader

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books but learning to navigate by sentence is a skill that will lead into navigating by paragraphs.

Read2Go

Read2Go is $19.99 in the App Store. **Currently, Read2Go is the only Bookshare reading app that displays images**. The image descriptions text is included along with the story text. Read2Go does support moving sentence by sentence and when using panning buttons on the braille display, the VoiceOver focus on the print text will follow the braille text.

Note: The Read2Go app was last updated in November 2016. It is believed that this app will no longer be supported/updated?

Easy Reader

Easy Reader by Dolphin is a free app in the App Store. Easy Reader does not have images; however, image description text is provided (without the images) with the same books that have image description text in Read2Go books. (Remember, image descriptions are not available with all Bookshare books.) Easy Reader does support moving sentence by sentence and when using panning buttons on the braille display, the VoiceOver focus on the print text will follow the braille text.

Voice Dream Reader

Voice Dream Reader is $14.99 in the App Store. Voice Dream Reader does not have images; however, image description text is provided (without the images) with the same books that have image description text in Read2Go books. The VoiceOver focus box is around the entire content text on the page; a right swipe will jump the VoiceOver focus outside of the content to the Tool bar at the bottom of the page instead of moving sentence by sentence. In the other two apps, the VoiceOver focus is on one sentence at a time; a right swipe will move to the next sentence. Because of this, Voice Dream Reader does NOT support moving by sentences. When using the panning buttons on the braille display, VoiceOver focus does not follow the print text. Voice Dream Reader does have numerous voices that can be downloaded; these voices are often preferred over the standard VoiceOver voices. Voice Dream Reader also has additional print options, including the spacing between letters and the spacing between lines.

Search Bookshare by title, author or ISBN number. Bookshare also has grouped books into Special Collections, including a Special Collection for Picture Books and Easy Readers. Click on a book from this list for details such as synopsis of the book, number of pages, language, and whether the book has image descriptions. Another Special Collections for young children is the Top 100 Pictures books.

The Bookshare website has detailed instructions on how register, how to download Bookshare books in the Read2Go, Easy Reader and Voice Dream Reader. Their staff is also very helpful and will answer any questions you might have!

Resources
Accessible Digital Books Picture Books for Preschoolers post (includes Bookshare Picture Books and Easy Reader Collections list)
All About Bookshare post
Voice Dream Reader App post
Dolphin Easy Reader: Windows PC and iOS App post

6.4 Apps for Creating Accessible ePub Books

There are several sources for accessible digital (EPUB) books that are compatible with a braille display. Bookshare books (See section 6.3) are mainstream published print books available in accessible digital format to qualified print disabled readers. Another source of accessible digital books is teacher-created or family-created ePub books. These custom-made books can be created using various apps such as Book Creator, iBooks Author, and Tar Heel Reader. These three popular apps will be discussed below. Books created with these apps are opened in the free Apple Books app (previously called iBooks). Custom-made books can be shared and downloaded at no cost from the *Paths to Technology* website. View the currently available custom-made Apple Books here. Check back often, as new books are regularly being added. **Please share your custom-made books with others through Paths to Technology!** Contact Technology@Perkins.org for more information. (See section 3.2d for additional information about digital books available on *Paths to Technology*.)

Note: Mainstream interactive children's book apps, such as the Five Little Monkeys app by OM Books (see section 2.2a) are not compatible with VoiceOver or with a braille display. (The pages in these books are images – including the text – making them inaccessible with VoiceOver.)

Book Creator
Book Creator is $4.99 in the App Store. This app is a simple tool for creating accessible digital books. Young children with visual impairments love to read books about themselves! Quickly create your student's story using pictures of familiar things and your student's own words. Audio and video can be added to these digital books! Be sure to add image descriptions to your pictures so that the screen reader will announce what the picture is. Books created in Book Creator can be opened in Apple Books.

Resources
Aeden Intro: Reading the Book video: Aeden is a 6-year old, totally blind student who is learning the tap gesture to turn pages in a teacher-created Pictello book about Aeden's school day. (The Pictello app is similar to Book Creator app.)
Aeden: Introduction to the iPad and VoiceOver post

iBooks Author
iBooks Author is a free app for Mac computers; this app is not available for iPads. Books created using iBooks Author can be opened in Apple Books on an iPad. iBooks Author is a robust tool for creating accessible digital books, with additional features. It is the only app that enables users to create accessible multiple-choice questions within the book. Digital multiple-choice questions build the student's comprehension skills and tech skills, preparing the student for online testing/assessments. Audio and video clips

can also be added to iBooks Author. (Instructions on [how to create digital books using iBooks Author here](#) – including how to add image descriptions.)

Tar Heel Reader

[Tar Heel Reader](#) is a free website designed for educators/families to find or create accessible digital books geared for beginner readers of all ages. Educators, families and students can create digital books and upload them to the website. The books are organized by topics and anyone can download the books at no cost. Books are available in 9 languages. The website is fully accessible, and most books are accessible. (Note: These are custom-made books, so it is up to the individual author to add image descriptions.) The books can be opened in Apple Books and are compatible with VoiceOver and a braille display. Tar Heel Reader books are accessible with switches. Tar Heel Reader was launched 10 years ago and has over a million books available!

Activity 6.4a Reading Teacher-Created Accessible ePub Books

- Go to [Paths to Technology's iBooks section](#) and choose a book.
- Open the post about the desired book.
- Click on the desired book's link.
- Click on Open in "Books".
  - The digital books will open automatically in the Apple Books app.
- Mute VoiceOver and read the story in braille on the braille display; (M-chord).
- Pan to the next braille page using the panning button.

Be sure to create custom-books for your student! Create books that correspond with current classroom topics. Involve your student - the budding writer - when creating books. Encourage friends, family members – including siblings and extended family members – to create books. Please share these accessible books on *Paths to Technology*!

Resources
[Creating and/or Using Simple Digital Books post](#)
[Book Creator App: Create Your Own Accessible Books on iOS, Android and Windows Tablets post](#)
[How to Create an iBook using iBook author App post](#)
[Tar Heel Reader: Create and Read Accessible Books post](#)
[Download free Teacher-Created Accessible iBooks here](#)

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Reading Adventure Time

Reading Adventure Time App is a free iOS app designed specifically for braille students who are using an iPad with a refreshable braille display.

Purpose

This app is a literacy assessment and instructional tool. This reading app provides evidence-based instructional strategies to support development of literacy skills and tech skills. Students need to be familiar with VoiceOver and with a braille display to use this app. The app scaffolds and is designed for 1st through 12th grades. Example: Apprentice Level 1 & 2 are first grade level; Apprentice Level 3 & 4 are second grade level. There is a placement test (assessment) and various activities that gather and monitor student progress. For more information, go to the Reading Adventure Time app website.

Activities

In the Assessment, the student reads the passage aloud and the app records the student's voice. The student answers questions at the end of the passage. The reading comprehension is aligned with Common Core State Standards. When completed, the teacher scores the passage.

The Apprentice Activities include Braille Hunt, Deductive Reasoning and Repeated Readings. Braille Hunt is a game to find a specific letter in a short string of letters. The student uses the router button to move to the desired letter and then types a hyphen (dots 3 + 6) and space.

Note: APH's Orbit Reader braille display does not have routing buttons.

Deductive Reading and Repeated Readings include reading a simple short story on the braille display and answering multiple choice questions.

Writing Adventure Time

Writing Adventure Time is a free iOS app that supports braille *writing* skills for students who are visually impaired who are using an iPad with a refreshable braille display.

Purpose

This app is a literacy assessment and instructional tool and supports Unified English Braille (UEB). This writing app provides evidence-based instructional strategies to support development of literacy skills and tech skills. Students need to be familiar with VoiceOver and with a braille display to use this app. The app scaffolds and is designed for 1st through 12th grades. Example: Apprentice Level 1 & 2 are first grade level;

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Apprentice Level 3 & 4 are second grade level. There is a placement test (assessment) and various activities that gather and monitor student progress. For more information, go to the Reading Adventure Time app website.

Activities

In the Assessment, the student listens to words, phrases and sentences and accurately braille what he heard. The student is also asked multiple choice questions about the student's knowledge of grammar, spelling, braille code, and writing conventions. The writing comprehension is aligned with three of the language Common Core State Standards. When completed, the teacher scores the passage.

There are three writing activities: Repeated Writings, Blinking Braille and Braille Scramble. Note: The braille settings on the iPad must be set to Contracted Braille Input and Output.

Resource

Reading Adventure Time and Writing Adventure Time Apps post

6.6 Accessible Questions: Google Forms

Previously in this manual, we have discussed reading and writing – an integral part of classroom work. Students can read and write on the iPad using the Pages app or Google Docs; classroom teachers can send word documents/educational materials that your student can access. Your student can also independently write words, sentences and stories on the iPad and share these documents with his teacher. (Note: Teachers of the visually impaired should take a few minutes to show the classroom teacher how to make Word documents accessible, including how to add alt tag image descriptions. For detailed information, including adding alt text, go to Creating Accessible Word Docs & PowerPoints: Teacher Resources post.) When created with accessibility in mind, educational materials no longer require a specialist to translate materials into braille or to transcribe braille materials into print.

Answering questions in Pages or Google Docs is challenging, as these word documents are editable – meaning that the student can accidently make changes or delete any part of the document, including the questions. There are better app options for answering questions. Google Forms is a popular app for creating accessible questions, quizzes and tests. Google Forms is a way to create accessible questions in a variety of formats: multiple-choice, short answer, paragraph, dropdown menu options, linear scale (rating scale 1-5), multiple choice grid, checkbox grid, date and time. Google Forms can be created and completed on any device and can be shared between any computer, tablet or smart phone. Google Forms is accessible with VoiceOver. Alt text descriptions need to be added to images in order to make the images accessible. When embedding a video, be sure that the video was created with good verbal descriptions and/or is audio described.

On-line tests and assessments will have multiple types of questions. Your students – especially those using a screen reader – need to be familiar with various question types and be comfortable with navigating and answer these questions. **Students should be exposed to a variety of question types on a regular basis!**

For step-by-step instructions with screenshots go to the *Paths to Technology* post, How to Create Accessible Google Forms.

Note: When creating a Google Form assignment using an iPad, you cannot access Google Forms by going through Google Drive; you must go through the Google Forms from the web browser. From your iPad:
- Open Safari
- Type in drive.google.com
- Sign in
- Click on the three horizontal bars (to the left of My Drive)
- Select Desktop version

- Select New button (Located on the left: button has a blue background)
- In the dropdown menu, select More > Google Forms

The next activity requires creating an assignment in Google Forms and then emailing the assignment to the student. Take a classroom worksheet and recreate that worksheet in Google Forms. A short story with multiple-choice questions is a perfect assignment to start with. Or, you can create a simple story about the student, an upcoming holiday, fun facts about an animal, or any topic that is of interest to your student. Add the story at the beginning of the Google Form then add a few questions to the form. You can use the following Ladybug story which is appropriate for an emerging reader (using VoiceOver) or a young reader (using a braille display). Simply copy and paste the Ladybug story below or type the story into Google Forms.

Note: Add the short story at the top of the Google Form in the Form Description editable text field.

Ladybug Story and Questions

Ladybugs are small round bugs with red wings. The wings have black spots on them. Ladybugs have two sets of wings. The outer set is a hard shell that protects them. The inner set of wings are used to fly. Ladybugs are helpful in the garden because they eat tiny bugs called aphids and mites. These tiny bugs eat plants. Ladybugs can eat up to 50 aphids each day. When startled, ladybugs release a foul smell.

Question 1: Name (short answer)

Question 2: What does a ladybug eat?
1. Plants
2. Aphids and mites
3. Worms

Question 3: What does the Ladybug use her outer wings for?
1. For flying
2. To release a foul smell
3. As a hard-shell protection

Question 4: What does the word "foul" mean in this story?
1. Bad
2. Dirty
3. Good

Below is a screenshot of the Ladybugs quiz in Google Forms. Note that the Name question is a textbox and the multiple-choice questions are accessible radio buttons (circles that can be checked).

Activity 6.6a Complete a Google Form

When the Google Form is emailed to the student's iPad, the form is found in the Mail app. Select Fill Out in Google Forms button. The form will automatically open in docs.google.com/forms. **For young readers, close internet tabs before opening the Google Form;** otherwise, the student will have to right swipe numerous times through all the open tabs. We will use the Ladybugs assignment in this example:

- Read the title: (Right swipes will navigate to the title).
    - o Or, touch the top 1/3 of the screen (below the tabs but above the google form).
- Read the short story: (Right swipe – the entire paragraph will be read).
    - o Note: Reading by paragraph helps the student have to process the information and helps him organize his thoughts into sections – this is a critical skill when reading longer stories. Do NOT use the Read All commands to navigate Google Forms!
- Type in your name:
    - o Navigate to the Name, text field: (Right swipe twice)
    - o Double tap to edit
    - o Type in your name

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- Read the first question: (Right swipe).
- Read the answer options: (Right swipe multiple times)
  - Multiple-Choice: VoiceOver reads the multiple-choice answers as, "announces the answer, Radio button, unchecked one of (number)." Select the correct answer with a double tap. When you select a radio button, VoiceOver announces it as "checked".
  - Fill in the blank: (Double tap to activate the text field. Then type in the desired answer.)
  - Answer all the questions.
  - When you have completed the form, select Submit. The form is automatically sent back to the author of the form (or wherever the author designated).

Resources
How to Create an Accessible Digital Worksheets and Quizzes: Google Forms
Creating Accessible Word Docs and PowerPoints: Teacher Resources
Ladybug: ePub Book post (download the Ladybug book)

6.7 Ballyland Code 1: Say Hello 🐢

Ballyland Code 1: Say Hello ($2.99) is an accessible iOS app that teaches beginning coding logic skills to young children. The game is played without VoiceOver (self-voicing); the settings are accessible with VoiceOver.

Purpose
Ballyland Code teaches basic coding logic; the game also improves perseverance and problem-solving skills. Students with visual impairments use coding apps to develop spatial concepts and mental mapping. The Ballyland Code app has a grid layout and the player is encouraged to drag his finger around the screen – paying attention to the grid's row and column numbers/locations – in order to find items in individual squares and to determine a route through the grid/maze.

The app includes an interactive tutorial and three game challenges.

Play
The Tutorial: The tutorial begins by asking the student four questions. The student chooses which character, what the character will do, how many times he will do it, and what to do last.

The student uses a right swipe to navigate to each question and a down swipe to hear options. (Stop on the desired option; this option will automatically be used.) Double tap will run the code. The game will play auditory clips that represent the student's choices (code). Play the tutorial again and choose different answers!

The Challenges: In the Challenge games, the student will plan a route for Wheelie to travel to TinkleBall. Wheelie has to avoid the squares with the rubbish bin and pond!

Prior to playing the Challenge games, review rows, columns, and grids. Create a tactile 3x3 grid using Wikki Styks, a small car (Wheelie), a small ball (TinkleBall), a bottle cap (pond) and a block (rubbish bin). Place Wheelie on the grid and ask the student to name the row and column numbers. Ask the student to place TinkleBall on the grid and you name the row and column numbers. Add the pond and rubbish bin. Ask the student to name where these are located. Determine Wheelie's route to Tinkle Bell. Discuss turns – keep in mind that **Wheelie can only make right turns**! Once the student is comfortable with the tactile grid, play the game. If necessary, pair the tactile grid with the digital game.

When playing the Challenge games, make sure that the student carefully listens to the directions! A right flick will start the game. The student should first systematically drag his finger across the screen (in row 1, then move down to row 2) to locate Tinkleball, the rubbish bin and the pond. Once the student has a mental map and has planned his

route, double tap on the screen to bring up the coding menu. Swipe right through the questions and swipe down to hear the options. Double tap to run the code. As the code runs, listen for the earcons that indicate when Wheelie runs into the pond, rubbish bin or hedge (edge of grid). Correct the code if necessary. A song is played when the Code runs correctly.

Additional App
Ballyland Code 2: Give Rotor is the second app in this series of apps. The developers said to stay tuned for Ballyland 3!

Resources
Ballyland Code 1: Say Hello (iOS App)
Ballyland Code 2: Give Rotor

6.8 Blindfold Game Apps that Teach Educational Concepts 🐸 🐢

There are additional accessible games that can be used to teach basic concepts and tech skills. Blindfold Games are auditory games designed specifically for players who are visually impaired. With over 80 games available, there are games for every age and ability. (See list of Blindfold games here.) A number of the games have been specifically created for young students. These games teach a variety of concepts including spatial concepts/mental mapping, listening and more. There are a wide variety of favorite card games, board games, and game shows. Be sure to browse the full list of games as your student progresses! Some games are designed to play individually or with other people. The games are free with in-app purchases; allowing players to try the game before purchasing. Previously mentioned were **Blindfold Bop Gesture** (teaches VoiceOver Gestures. Section 2.3d) and **Blindfold Barnyard** (move your animals to the fence; teaches cardinal directions, spatial concepts and drag. Section 2.2d)

Here are *a few* favorite Blindfold Games for young children:

Blindfold Sound Search
Blindfold Sound Search is a matching game that use common animals, musical instruments, every day sounds and other sound packs. There are two games: Name that Sound (matching game – find two sounds in the grid that match) and Find that Sound (two columns; animal/item is named in the first column and matched with the corresponding sound in the second column).

Blindfold Braille Fortune Wheel
Braille Fortune Wheel: Practice your braille contractions by spinning the wheel and guessing a letter or contraction.

Blindfold Bowling
Blindfold Bowling: Ten pin bowling just like in the bowling alley! Read the Blindfold Bowling: iOS Spatial Concepts post to learn more about spatial concepts taught through this game!

Blindfold 3D Tic Tac Toe
Blindfold 3D Tic Tac Toe is not your average Tic Tac Toe game – this game is played in three dimensions. Three-in-a-row can be on any of the individual three planes or a line that intersects all three planes! Read Blindfold Tic Tac Toe: Digital Math Game post.

Blindfold Simon
Blindfold Simon: Memory game similar to the classic electronic Simon game. Students listen to words/sound patterns and try to recreate those patterns. Blindfold Simon

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teaches/reinforces memory skills, 6 gestures, right, left, up, down, patterns, following directions, etc. Blindfold Simon: Educational App Review

The following Blindfold games are wonderful games that can be used for educational purposes. These student games are slightly more complex and may not be appropriate for all young students. This list of favorite Blindfold games is for slightly more advanced students – it is not a complete list of all the available Blindfold games for students.

Blindfold Connect: Classic Connect 4 game
Blindfold Sea Battle: Classic Battleship game; great for mental mapping and grids!
	Read Blindfold Sea Battle: Accessible iOS Battleship Game that Reinforces Grid Concepts post.
Blindfold Snakes and Puzzles: Classic Snakes and Ladders game
Blindfold Racer: Drive your car using your ears, not your eyes
Blindfold Suduko Mini: Classic Suduko game with a mini 4x4 grid
Blindfold Word Games: Series of classic games - Hangman, Word Ladder, Scramble and Word Flick
Blindfold Word Search: Classic word search game

Many of the Blindfold games listed above include an accessible grid; grids are a foundation concept for digital math. Learn more about how to transition your student from traditional tactile graphs to digital graphs: Digital Transitions #2: Math Grids Activities post.

Resources are listed with each app above.

ABCs of iOS Manual

Unit 7: Next Steps and Appendix
iOS 12

Objectives

Objectives
Overview

7.1 Next Steps with iOS
- Introducing New Apps
- Problem Solving
- Apps that Are Not Accessible
- Additional Advanced Commands
    - Drag-and-Drop
    - Picker Item
    - Scrub Gesture

7.2 Resources
- Basic VoiceOver Gestures Chart
- Refreshable Braille Display Commands Chart
- Bluetooth Keyboard Commands Chart
- Bluetooth Keyboard Navigating Commands Quick Nav Off Chart
- Apps in iOS Manual
- iOS Skills Checklist
- *Paths to Technology* website

Overview

This unit focuses on suggestions on how to apply skills learned in the ABC's of iOS Manual to new apps, how to support your student's independence and additional resources. The Resource section contains the iOS skills checklist, and quick reference guides and a list of apps used in the manual.

7.1 Next Steps with iOS

Congratulations! Your student should now have the basic gestures and commands – including braille display commands and Bluetooth keyboard commands – to successfully and independently complete tasks on an iPad running VoiceOver. As apps update and new educational apps become available, your student should be able to apply his tech skills to any app. The next steps will vary according to your student's age and abilities. Look at what your student's peers are doing with technology and/or will be doing with technology – this will guide you as you prioritize your next tech goals. Remember, your student should be taught the specific tech skills – accessibility skills – before those skills are required to complete the task. Example: **Your student should be comfortable using VoiceOver before the class uses an iPad. That your student should be introduced and basically independent with an iPad running VoiceOver BEFORE kindergarten!**

For some students, the next step might be to learn how to share a Pages/Google document through email or through a cloud sharing app such as Dropbox/Google Drive. Other apps used in the classroom might be learning to use and/or create basic PowerPoint/Keynote presentations or using the Internet. What educational apps are your student's peers using in the classroom?

Introducing New Apps

Now that your student has basic tech skills, encourage your student's curiosity. Ask him to dive deeper into familiar apps by exploring the Tool bar and settings options. What new feature is available after an app update or software update?

When exploring a new app, keep in mind the general layout of the app and what is in the tool bar.

When introducing new apps, quickly check the initial layout. While most apps geared for young students cover the whole screen, other apps have a 1/3rd and 2/3rds layout.

> Example: The Mail app has a column on the left side of the screen containing a list of the most recent emails. The right 2/3rds of the screen is the content of the opened email. Knowing the spatial layout is critical! When a student wants to read the open email, he should not right swipe or use the Read All command to navigate through the long list of emails on the left side. Instead, simply touch the screen on the right side to move the focus to that area. Students should know where the Tool bar is located. (Tool bars are typically across the top of the screen, but the Tool bar can be at the bottom of the screen.)

The Tool bar typically contains drop down menus, options and features. When in a Pages document, the Tool bar at the top of the page has the following buttons: Back Button, View Options Button, Undo Button, Format Button, Insert Button and More Button. These buttons provide easy access to drop down menus that enable the user to

change the format, share the document, etc. Encourage your student to explore these buttons and the features available in the button's dropdown menus.

Problem Solving

With all technology, there will be times that things do not work as expected. How YOU – the teacher – respond to bugs and problems will impact on how your student responds. Become a tech detective and try to figure out the problem! Is your app not working as anticipated? Repeat the gesture/command. Are you creating the gesture correctly? Are you using the correct gesture?

If the issue continues, try closing out the open apps (use the App Switcher – press the Home button two times quickly). Reboot your iPad (press and hold the on/off button until the arrow appears and swipe right). Now try the app again.

Is your keyboard typing incorrect letters or doing odd things? Recharge the Bluetooth keyboard. (Bluetooth keyboards tend to have strange reactions when their battery power is low.)

Do an Internet search about the issue. Learn more about the app/commands. Are others having the same issue? If the issue is truly a bug, determine if it is an iOS problem (Apple issue) or if it is an issue within a specific app. Contact the developer and let them know what device you are using, what iOS version, and if appropriate what app version. Briefly describe the issue and if appropriate, explain the anticipated/desired reaction. **As teachers, we need to advocate on behalf of our student's needs and when appropriate, encourage students to advocate too.** Network with others; find a tech savvy person - colleague, end user, or even a student – who can answer your question. Be sure to contact developers about accessibility bugs!

- For an accessibility issue related to iOS or an Apple app such as Pages, contact Accessibility@apple.com
- For an iPad issue (not related to accessibility), fill out Apple's feedback website form.
- For an issue related to a specific app, contact the app developer. (Do an Internet search on the app and contact the developer through the developer's website.)
- CNIB is working with app developers and educators to increase accessibility. Contact your local CNIB office for assistance in advocating for accessibility.
- To support a developer, rate and write a review in the app in the App Store. Be sure to specifically mention appreciation for the app's accessibility!
  - Share your favorite app with colleagues. (App developers want their app to be used; this also helps with funding support for the app and for future apps.)
  - Participate in beta testing of apps and provide feedback when developers ask for input!

Apps That Are Not Accessible

Unfortunately, currently many educational apps are not accessible with a screen reader. When an app is not accessible, contact the developer. Work with the classroom teacher to find alternative ways to complete the assignment and/or determine the goal of the activity and look for alternative apps that are accessible. If the app is a school-wide or district-wide app (such as a textbook or assessment), work with the curriculum specialists to include accessibility in their contracts with the publishers. Be sure to support developers and publishers who make their apps accessible!

Additional Advanced Commands

There are additional commands that were not discussed in the iOS ABC Manual. While commands such as drag-and-drop are frequently used in online assessment for early grades, the current accessible apps for this age group do not incorporate these commands. Note: Several educational app developers who develop accessible apps are working on embedding these more advanced commands. New accessible educational apps are being developed and released, so stay tuned!

- **Drag-and-Drop**: Double tap and Hold. Listen for the VoiceOver earcon (triple tone), then drag the item. When dragging the item over another item, VoiceOver should announce what item is under the dragged item. Drag-and-drop works correctly on the Home screen. Practice drag-and-drop by moving apps around the screen or drag one app over another app to create a folder.
    - o Note: Drag and Drop with gestures is simple, three-step process. Currently there is not a designated braille display or Bluetooth keyboard command. It is possible to use the rotor with numerous steps to drag and drop with a braille display or external keyboard; however, this clunky method is very challenging for young students.
- **Picker Item**: A Picker Item is a way to adjust value. Visually, the picker looks like a vertical spinning wheel with the picked item in normal font and the optional items are dimmed. VoiceOver will announce the item, picker item, the number of items in the picker, and the hint, "swipe up or down to adjust the value". Practice the picker item by setting the timer in the native Clock app.
- **Scrub Gesture**: The scrub gesture is sometimes called the Back gesture. When in an app, the scrub gesture will take you back to the previous screen. When on a drop-down menu, the scrub gesture should close the drop-down menu. (Note: Not all apps have been designed correctly; sometimes the scrub gesture will not work.)

Note: The iOS ABC Manual does cover the main iOS gestures and commands appropriate for young students; however, there are additional commands that are not addressed this manual.

Resource
Dr. Seuss: Hope on Pop Interactive eBook post includes a video demonstrating a matching activity that includes an accessible Drag-and-drop activity.

Resources

Are you using additional accessible apps with students ages 3-8 years old? Do you have additional resources and/or activities? Please share your ideas! Contact Diane Brauner: <mark>dianebrauner@me.com</mark>

Basic VoiceOver Gesture Commands

Action	VoiceOver Gesture
Move focus to any item on the screen	Touch item with one finger
Move focus to next item	One-finger swipe right from anywhere on the screen
Move focus to previous item	One-finger swipe left from anywhere on the screen
Activate the item that has focus	One-finger double tap anywhere on the screen
Drag and Split tap	One-finger drag, stopping on desired item; tap another finger to activate the item
Read All starting from the top of the page	Two-finger swipe up
Read All from current position	Two-finger swipe down
Pause or resume reading at current location	Two-finger single tap
Scroll down to the next page	Three-finger swipe up
Scroll up to the previous page	Three-finger swipe down
Scroll right to the next page	Three-finger swipe left
Scroll left to the previous page	Three-finger swipe right
Move focus to the first item on the screen	Four-finger single tap near top of screen
Move focus to the last item on the screen	Four-finger single tap near the bottom of the screen
Cancel or go back to previous screen (scrub)	Two-finger scrub back and forth
Mute VoiceOver	Three-finger double tap; three-finger triple tap if Zoom is on
Turn VoiceOver Screen curtain on or off	Three-finger triple tap; three-finger quadruple tap if Zoom is on
"Magic Tap": Answer call, hang up call, pause or resume multi-media playback	Two-finger double tap
Take a screenshot	Press Home button and power button at the same time
Drag-and-Drop	Double tap and hold, then drag

Refreshable Braille Display Commands Chart

'Chord' = (spacebar)

Action/Gesture	Braille Display Command
Move to next item/right swipe	Dot 4 + space (or joy stick right)
Move to previous item/left swipe	Dot 1 + space (or joy stick left)
Activate item/Double tap	Dots 3 + 6 + space (or push joystick in)
Read All from the top/two-finger swipe up	Dots 2 + 4 + 5 + 6 + space
Read All from current position/two-finger swipe down	R Chord (Dots 1 + 2 + 3 + 5 + space)
Pause or resume speech/two-finger tap	P Chord (Dots 1 + 2 + 3 + 4 + space)
Scroll down to the next page/three-finger swipe up	Dots 1 + 4 + 5 + 6 + space
Scroll up to the previous page/three-finger swipe down	Dots 3 + 4 + 5 + 6 + space
Scroll right to the next page/three-finger swipe left	O Chord (Dots 1 + 3 + 5 + space)
Scroll left to the previous page/three finger swipe right	Dots 2 + 4 + 6 + space
Move focus to the first item on the screen/four-finger tap at top of page	L Chord (Dots 1 + 2 + 3 + space)
Move focus to the last item on the screen/four-finger tap at bottom of the page	Dots 4 + 5 + 6 + space
Go to the Home screen/press the Home button	H Chord (Dots 1 + 2 + 5 + space)
Access the rotor/two-finger twist	5 + 6 + space
Select the next item in the rotor/one-finger swipe down	6 + space
Select the previous item in the rotor/one-finger swipe up	3 + space
Cancel or go back to previous screen/two-finger scrub	1 + 2 + space
Mute VoiceOver Speech (three-fingers triple tap) Note: If Zoom is also on, mute changes to a three-finger quadruple tap.	M Chord (Dots 1 + 3 + 5 + space)
Turn VoiceOver Screen Curtain on or off	1 + 2 + 3 + 4 + 5 + 6 + space
Magic Tap	1 + 5 + 6 + space

Bluetooth Keyboard Commands Chart

VO = Control + Option keys are pressed simultaneously

Action/Gesture	Bluetooth Keyboard Command
Move to next item/right swipe	Right arrow
Move to previous item/left swipe	Left Arrow
Activate item/Double tap	Up + down arrows
Read All from the top/two-finger swipe up	VO + B
Read All from current position/two-finger swipe down	VO + A
Pause or resume speech/two-finger tap	Control
Scroll down to the next page/three-finger swipe up	Option + up arrow
Scroll up to the previous page/three-finger swipe down	Option + down arrow
Scroll right to the next page/three-finger swipe left	Option + right arrow
Scroll left to the previous page/three finger swipe right	Option + left arrow
Move focus to the first item on the screen/four-finger tap at top of page	Control + up arrow
Move focus to the last item on the screen/four-finger tap at bottom of the page	Control + down arrow
Cancel or go back to previous screen/two-finger scrub	Escape
Access the rotor/two-finger twist	Up + right arrow (quick nav on)
Select the next item in the rotor/one-finger swipe down	Down arrow (quick nav on) or VO + down arrow (quick nav off)
Select the previous item in the rotor/one-finger swipe up	Up arrow (quick nav on) or VO + up arrow (quick nav off)
Go to the Home screen/press the Home button	VO + H
Mute VoiceOver Speech (three-finger double tap) Note: If Zoom is also on, mute changes to a three-finger triple tap.	VO + S
Screen Curtain (three-finger triple tap) Note: if Zoom is also on, screen curtain changes to three-finger quadruple tap.	VO + Shift + S
Magic tap/two-finger double tap	VO + -
Move to Status Bar	VO + M
Quick Nav On/Off (Only Bluetooth keyboard command)	Left + right arrow keys

BTK Navigating Commands for Quick Nav Off

Toggle Quick Nav ON/OFF with right + left arrows

Action	Keyboard with QuickNav OFF
Move to first item in the document	Cmd + up arrow
Move to last item in the document	Cmd + down arrow
Move to the end of the current line	Cmd + right arrow
Move to the beginning of the current line	Cmd + left arrow
Read next character	Right arrow
Read last character	Left arrow
Read next word	Option + right arrow
Read next line	Down arrow
Read previous line	Up arrow
Read next paragraph	Option + down arrow
Read last paragraph	Option + up arrow

Apps in iOS ABC Manual

Here is the list of apps used in the iOS ABC Manual. Apps are listed under the unit that first introduced the app.

Apps in iOS ABC Manual

Unit 1: Explore and Touch

- Baby Musical Hands
- Baby Balloons and Bubbles
- Fun Bubbles
- My Baby Piano Lite
- Cause and Effect Sound Box
- Infant Zoo
- PeekABoo Barn
- Fisher Price Storybook Rhymes Volumes 1, 2, & 3
- Fisher Price Laugh and Learn: Learning Letters Puppy

Unit 2: Cause and Effect

- Laugh and Learn Animal Sounds
- See 'n Say
- Animal Band Nursery Rhymes
- The Very Hungry Caterpillar – First Words
- iSays Free (Simon)
- Five Little Monkeys Sitting in a Tree
- Wheels on the Bus
- My Baby Piano
- Blindfold Barnyard
- I Hear Ewe
- Ballyland Magic
- Ballyland Sound memory
- Blindfold Bop Gesture Game
- Zany Touch

Unit 3: Navigating, Listening and 'Reading'

- Pages/Google Docs
- Apple Books
- Ballyland Rotor App
- Blindfold Doggy App

Unit 4: Introduction to Refreshable Braille Displays and Bluetooth Keyboards

*Refreshable braille display and/or Bluetooth Keyboard required

Unit 5: Writing and Basic Editing Text

- Exploring Braille with Madilyn and Ruff
- Braille Tutor (Braille Tutor +)
- Pages/Google Docs
- Talking Typer

Unit 6: Classroom Educational Apps

- Math Melodies
- Math Robot
- Pages
- Bookshare
    - Read2Go
    - Easy Reader
    - Voice Dream Reader
- Book Creator
- iBooks Author (Mac application)
- Tar Heel Reader (website)
- Apple Books (previously iBooks)
- Reading Time Adventure
- Writing Time Adventure
- Google Forms
- Ballyland Code 1: Say Hello
- Blindfold Sound Search
- Blindfold Fortune Wheel
- Blindfold Bowling
- Blindfold 3D Tic Tac Toe
- Blindfold Simon
- Additional Blindfold games for advanced students:
    - Blindfold Connect
    - Blindfold Sea Battle
    - Blindfold Snakes and Puzzles
    - Blindfold Racer
    - Blindfold Suduko Mini
    - Blindfold Word Games (Hangman, Word Ladder, Scramble and Word Flick)
    - Blindfold Word Search

iOS Skills Checklist

Child's Name:
Date: Age:

Add date when skill was introduced. As student makes progress, add the percentage and date. (Example: 50% of the time created the gesture correctly.) Add the date when mastered. Note: Not all of these skills are appropriate for all young children! The numbers, such as 01, refer to the corresponding unit in the manual.

Skill	Introduced	% Good Progress	Mastered
01 Explore & Touch			
Appropriately handle iPad (gentle touch)			
Touch screen (multiple fingers)			
Touch screen (1-finger touch)			
Touch screen (1-finger drag)			
Intentionally tap screen for cause-and-effect			
Intentionally 'turn page' or go to next screen			
Actively listening to app's song, book, etc.			
Circle level of independence (physical prompt, verbal prompt or independent)			
02 Cause and Effect			
1-finger tap gesture			
Demonstrating spatial understanding: intentionally tapping in appropriate area to activate app			
Understands spatial terms (top, middle, bottom, right, left, corner)			
Right/left swipe gesture			
Drag gesture			
Drag and split tap gesture			
Double tap gesture			
Intentionally explore the screen			
Use age-appropriate speed to complete task			
Demonstrate understanding the concept of a grid			
Locate and activate desired app			
Close an app (Home button)			
Listen to and identify Earcons			
Complete activities that require tap, double tap, drag and split tap			

Skill	Introduced	% Good Progress	Mastered
Circle level of independence (physical prompt, verbal prompt, or independent			
03 Navigating, Listening, 'Reading' and Rotor			
Two-finger Swipe up or down gesture			
Two-finger tap gesture			
Use the Pages app (navigate to document, read, pause, close document)			
Understanding/exploring the Tool bar			
Three-finger swipe right or left gesture			
Three-finger swipe up or down gesture			
Close apps using the App Switcher			
Reboot the iPad			
Use the Apple Books app (navigate to book, read, close book)			
Four-finger tap at the top/bottom of the page			
Rotor gesture			
Swipe up or down (to adjust the rotor value)			
Adjust VoiceOver speaking rate (using the rotor)			
Increase VoiceOver speed (list child's current speed)			
Navigate by characters using the rotor			
Listening to VoiceOver Hints as needed			
Using Earcons to understand what is happening			
Circle level of independence (physical prompt, verbal prompt, or independent			
04 Introduction to Refreshable Braille Display			
Identify and name parts of the braille display			
Swipe right/left RBD command (joystick and chord)			
Double tap (RBD command)			
Go to Home screen (H Chord)			
Two-finger swipe up (R Chord)			
Two-finger tap (P Chord)			
Three-finger swipe right or left (RBD command)			
Three-finger swipe up or down (RBD command)			
Four-finger tap top or bottom (RBD command)			
Mute VoiceOver speech (M Chord)			
Panning (RBD keys)			
Rotor (RBD command)			
Swipe up or down to adjust rotor value (RBD command)			
Complete tasks using the Braille Display			

Skill	Introduced	% Good Progress	Mastered
Increase VoiceOver speed (list child's current speed)			
Circle level of independence (physical prompt, verbal prompt, or independent			
04 Introducing the Bluetooth keyboard			
Identify and name arrow keys			
Swipe right/left (arrow keys)			
Activate item/double tap (up + down arrows)			
Go to Home screen (VO + H)			
Understand and locate VO (Control and Options keys)			
Two-finger swipe up (VO + B)			
Two-finger tap (Control key)			
Three-finger swipe right or left (Option + right/left)			
Three-finger swipe up or down (Option + up/down)			
Four-finger tap top or bottom (Control + up/down)			
Rotor (up + right)			
Swipe up or down to adjust rotor value (VO + up/down arrow)			
Mute VoiceOver speech (VO + S)			
Quick Nav on/off (Left + right arrows)			
Complete tasks using the Bluetooth keyboard			
Increase VoiceOver speed (list child's current speed)			
Circle level of independence (physical prompt, verbal prompt, or independent)			
05 Writing & Editing with Refreshable Braille Display			
Create a new line (E Chord)			
Read braille letters			
Type braille letters			
Understand blinking cursor			
Delete character (D Chord)			
Move to insertion point to start/end (Joystick in)			
Move to first item on the page/Tool bar (L Chord)			
Move VoiceOver focus to desired location using routing buttons			
Correct misspelled words/Edit sentences			
Scroll through braille using panning keys			
Mute VoiceOver (M Chord)			
Circle level of independent (physical prompt, verbal prompt or independent)			

Skill	Introduced	% Good Progress	Mastered
05 Writing & Editing with Bluetooth Keyboard			
Turn Quick Nav On and Off (Left + right arrows)			
Understand and use Quick Nav correctly			
Create a new line (Return key)			
Delete a character (Delete key)			
Move insertion point to start/end (Quick Nav Off; Control + Up arrow or Control + down arrow); also works with Cmd + up			
Move to first item on the page/tool bar (Quick Nav On; Control + up arrow)			
Type characters			
Quick Nav Off **(Must activate text field with up + down arrow)**			
Move to first/last item in the document (Cmd + up arrow/Cmd + down arrow)			
Move to beginning/end of current line (Cmd + left arrow/Cmd + down arrow)			
Read next/previous character (right arrow/left arrow)			
Read next/previous word (Option + right arrow/Option left arrow)			
Read next/previous line (Down arrow/ up arrow)			
Read next/previous paragraph (Option + down/up arrow)			
Move VoiceOver to desired location using above commands			
Correct misspelled words			
Edit sentences			
Basic QWERTY touch typing skills			
Circle level of independent (physical prompt, verbal prompt or independent)			
06 Classroom Educational Apps (applying tech skills in these activities)			
Successfully complete Math Melodies games			
Successfully complete Math Robot game			
Successfully complete Counting Shapes/Stickers			
Successfully complete Bar Charts (Pages)			
Successfully use/read Bookshare books (Read2Go, Easy Reader, or VoiceDream Reader app)			
Successfully use/read Apple Books (iBooks)			
Successfully use/answer Google Forms questions			

Skill	Introduced	% Good Progress	Mastered
Successfully complete BallyLand Code 1 app			
Blindfold Game apps (list which games)			
Successfully self-familiarize with new or changed apps			
Successfully problem solve			
Successfully advocate			
Drag-and-Drop command			
Successfully complete activity using Picker Item			
Scrub gesture			
Circle level of independent (physical prompt, verbal prompt or independent)			

Observations:

Paths to Technology

Paths to Technology is a website designed to assist educators, families and students to learn about and stay current on ever-changed technology for students with visual impairments. While all the sections on *Paths to Technology* include beneficial posts for teaching young students about tech, two sections stand out:

- Early Intervention page
- iBooks page