Using a Refreshable Braille Display with the iPad

Chapter 1: Settings

This manual has been written for iOS 8.

Module Objectives

- 1.1 Update iOS software
- 1.2 Rotor Settings
- 1.3 Multitasking Gestures
- 1.4 Triple-Click Home
- 1.5 Speech Rate
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The *Using a Refreshable Braille Display with the iPad* manual is being shared on the *Paths to Technology* website with permission from SAS Institute Inc.

Overview

We recommend for each training participant to initially establish the same iPad settings so that all the iPads used in the training will react in same fashion. These settings are the most common settings used by students with visual impairments. *After* the training, you may choose to change some of the settings according to unique student needs. There are a few differences between various iPad generations. These differences will be discussed in this manual.

For detailed information about these settings – what they are, why you want these settings, and directions with screenshots on how to select these settings, please refer to the "Introduction to iPad Accessibility Features for Blind and Low Vision Students" manual.

iOS 7 now supports Nemeth Code – when the math is created properly using mathML. iOS 7 has also added more options for Refreshable Braille Displays (RBDs) and low vision features.

The iPad supports numerous brands of Refreshable Braille Displays. In this manual, we will use the APH 18 Refreshabraille, as it is the most common RBD for younger students in the school setting. The APH 18 Refreshabraille is available at no cost to schools in the US through APH Quota Funds.

The RBD is paired (connected through Bluetooth) with the iPad. Once the RBD is paired, the RBD will automatically mirror the text and content on the iPad, giving the student an instant braille translation that appears on the RBD. When the student produces documents using the Perkins-style keyboard, an immediate print translation appears on the iPad. Teachers and parents who do not know braille have instantaneous print access to what the student has just produced; Teachers and parents can type on the iPad and the student has instant access to a braille translation on the RBD.

Definitions

The iPad is intended to be a personal device – used by one person. Apple does a wonderful job of providing various options to maximize the individual user's success. Each person will use a unique combination of settings that best suits their individual needs.

Braille Codes Available on the iPad

The iPad currently supports a variety of braille codes that can be displayed on the refreshable braille display, including Uncontracted, Contracted, Nemeth, 6-Dot and 8-dot braille.

- Uncontracted Braille is literary Grade I braille. Each character (letter, literary number, and punctuation) is represented by a unique braille symbol.
- Contracted Braille is literary Grade II braille. Contractions are used like short hand in order to save space and time.
- Nemeth Code is the math code used by the United States.
- Unified English Braille Code (UEB) is the literary code that has been adopted by many countries. The Braille Authority of North America (BANA) has recently adopted the UEB braille code; the United States will be slowly transitioned to this literary braille code but will continue to use Nemeth for math. UEB is based on the current braille code; letters and numbers will stay the same. There will be some changes to punctuation and some rules for the use of contractions will change.
- ASCII Braille is sometimes referred to as "computer braille". ASCII letters are the same as uncontracted braille. Numbers correspond with Nemeth numbers without a number sign. ASCII Braille punctuation symbols are different than US literary braille punctuation symbols.

TEACHER HINT: IOS 6 (AND EARLIER) USED ASCII BRAILLE ON THE IPAD WHEN UNCONTRACTED BRAILLE WAS SELECTED – MAKING THE PUNCTUATION SYMBOLS DIFFERENT THAN US LITERARY GRADE I BRAILLE. IN IOS 7, IF YOU SELECT ENGLISH (US) BRAILLE AND UNCONTRACTED BRAILLE, PUNCTUATION SYMBOLS WILL BE CORRECT FOR US GRADE I BRAILLE.

- 6 Dot Braille is used for Literary Contracted, Literary Uncontracted, UEB, Nemeth and ASCII braille.
- 8 Dot Braille can be used for technical mathematics and sciences; however it is not commonly used in K-12 education.

- <u>Status Cell Braille</u> Users can set the Status Cell to display on the far left or far right cell on the refreshable braille display. The Status Cell can provide infomation about the buttons, text field, popups, announcements, low battery, and more.
- <u>VoiceOver Cursor on the Refreshable Braille Display</u> When editing, the "I-beam" or flashing print cursor on the iPad's screen is displayed on the refreshable braille display by the flashing Dot 8 and Dot 7. The VoiceOver Cursor is split between two braille cells. This enables the user to insert characters between those two braille cells.

To select your preferred braille code, go to Settings > General > Accessibility > VoiceOver > Braille then choose one of the following options:

To set Literary Contracted Braille (Grade II): Contracted Braille On, 8 Dot Braille Off, English (US) Braille.

To set Literary Uncontracted Braille (Grade I): Contracted Braille Off, 8 Dot Braille Off, English (US) Braille.

To set UEB Braille: Contracted Braille On, 8 Dot Braille Off, English (Unified) Braille.

To set Nemeth Code: Equations Use Nemeth Code On.

Refreshable Braille Display Definitions

- <u>Routing Keys</u> are the small round buttons located below or above the braille pins. When you press the routing key, the VoiceOver cursor and the I-beam (on the iPad screen) will move to that location in the text. If you are using Contracted Braille and you press the routing key below a word with contractions, that word – and only that word - will change to Uncontracted Braille.
- <u>Advanced Bars or Panning Keys</u> enable the reader to pan across the braille. On the APH 18 Refreshabraille, there are 18 characters – meaning that only 18 letters, spaces and punctuation can appear at any one time. To view the previous or next 18 characters, the user will press the Advanced Bar which is also called the Panning Key.

1.1 Update iOS Software

Apple iPads, iPad Minis, iPhones, and iPod Touches use the same operating system software called "iOS". As a consequence, most aspects of the user interface for all of those devices are identical.

Please make sure that your iPad is updated to the latest iOS version. This manual is currently using iOS 7. There have been numerous small updates since iOS 7 came out; Apple will continue to have small updates throughout the year. If your iPad needs to be updated, there should be a small red "1" displayed on the Settings icon.

Note: The iPad 1 can only be updated to version 5 of iOS.

To view or update your software, go to Settings > General > Software Update.

During this training, we will use the latest version of iOS 8.

1.2 Rotor Settings

VoiceOver – the iPad's built-in iOS screen reader – features an innovative virtual control called the "rotor". The rotor is only available when VoiceOver is turned on. Turn the rotor on by rotating your thumb and finger (or any two fingers) on the screen as if you were turning an actual dial. A popup dial will appear and you will hear a unique clicking sound. Continue to turn the rotor in order to move through the various rotor options. The options displayed within the rotor depend on the app you are using, the state of the app and the Rotor options you have selected within Settings.

The rotor allows you to configure the behavior of the one finger swipe up and one finger swipe down gestures. For example, when editing a document you can configure those gestures to move backwards or forwards by one character, word, or line. Alternatively, when using Safari to surf the web you can configure those gestures to move backwards or forwards by links, headings, buttons, and other types of elements that are commonly found on web pages.

To select your rotor settings, go to Settings > General > Accessibility > VoiceOver > Rotor then put a check beside the following rotor settings:
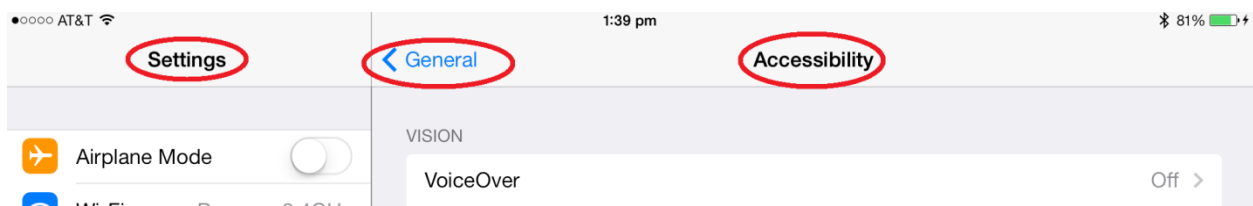
- Character
- Words
- Lines
- Speech Rate
- Containers
- Headings
- Links
- Form Controls
- Tables
- Lists
- Text Fields
- Punctuation

During this training, we will select the rotor settings above.

The "Tool bar" at the top of the screen indicates where you are. In the screenshot below, the Tool bar has "Settings", Back arrow with "General" and then "Accessibility". This tells you that you are in the Settings App and ar enow on the Accessibility Screen. You can go back to the General screen by tapping on the Back arrow with "General".
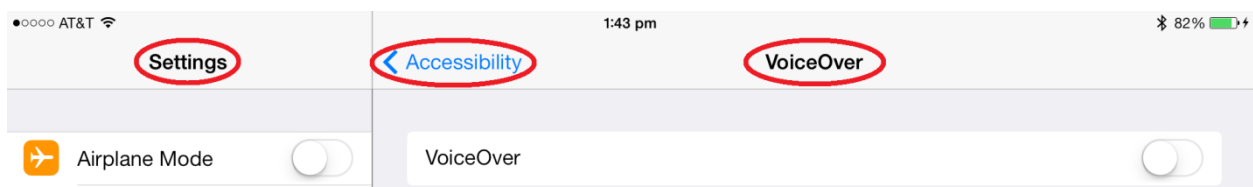
TEACHER HINT: IT IS IMPORTANT TO IMMEDIATELY INTRODUCE STUDENTS WITH VISUAL IMPAIRMENTS TO TOOL BARS IN EACH APP AND ON EACH SCREEN, AS THE TOOL BAR IS USED TO NAVIGATE WITHIN THE APP AND WHAT OPTIONS ARE AVAILABLE.

Figure 1 iPad screenshot of Tool Bar with Settings, General and Accessibility

In the screenshot below, the tool bar has "Settings, back arrow with Accessibility, and then "VoiceOver". This tells you that you are in Settings app on the VoiceOver page. You can go back to Accessibility page by tapping on the back arrow with "Accessibility". You are currently on the VoiceOver screen.

Figure 2 iPad screenshot of Tool Bar with Settings, Accessibility, VoiceOver

1.3 Multitasking Gestures

"Multitasking Gestures" are four or five finger gestures that easily allow you to:

- Pinch to the Home Screen
- Swipe up to reveal the Task bar (VoiceOver calls it the "app switcher")
- Swipe left or right between open apps

To turn on Multitasking Gestures, go to Settings > General > Multitasking Gestures and move the slider to ON.

During this training we will set Multitasking Gestures ON.

Note: The iPhone does not support multitasking gestures. However, you can open the Task Bar by double-clicking the Home button.

TEACHER HINT: IF YOU ARE USING THE IPAD WITH STUDENTS WHO HAVE MULTIPLE DISABILITIES, YOU MAY PREFER TO TURN MULTITASKING GESTURES OFF. SOME OF THESE STUDENTS ACCIDENTLY BRING UP THE TASK BAR IN THE MIDDLE OF AN IPAD ACTIVITY.

1.4 Triple-Click Home (Accessibility Shortcut)

"Triple Click Home" is a method of clicking the Home button three times in order to easily turn On/Off various accessibility features. You can choose to set Triple-Click Home to control VoiceOver, Invert Colors, Zoom, Assistive Touch or any combination of these features.

To set Triple-Click Home, go to Settings > General > Accessibility > Accessibility Shortcut and select your desired option(s).

With iOS 7, you can press and hold the Home button and tell Siri to enable accessibility options such as VoiceOver, Invert Colors, Assistive Touch, and Guided Access. Say, "Turn on VoiceOver" and Siri will do so. This option does not work with Zoom and some of the other accessibility features. You must have internet connection for Siri to work.

During this training, we will *initially* set the Triple-Click Home accessibility shortcut to Zoom, Invert Colors and VoiceOver.

1.5 Speech Rate

You can adjust the speech rate in VoiceOver to your preferred rate of speed.

To set the Speech Rate, go to Settings > General > Accessibility > VoiceOver > Speaking Rate. Move the sliding button to the left for slower and to the right for faster speech.

During this training, we will set the speed to 45%.

TEACHER HINT: USE THE ROTOR TO ADJUST THE SPEECH RATE ON THE FLY.

1.6 Larger Type

The iPad allows you to increase the text size from approximately 8 point font to 26 point font. The line just to the left of the middle A (on the slider) is approximately 11 or 12 point font.

The large text works with alerts, Calendar, Contacts, Mail, Messages and Notes.

Reading small email and text message print is frequently an issue for low vision students and for older adults. Changing the iPhone settings to a larger print size allows people – including seniors - to easily read their email/text messages without magnifying the entire app or require learning another set of gestures.

To change the print size, go to Settings > General > Accessibility > Large Text, turn Dynamic Type On then select your preferred text size.

*There is a Text Size option setting under General as well as under Accessibility.

Select your prefered text size.

1.7 Bold Text

iOS 7 has added a new low vision option – Bold Text. The default text in iOS 7 is thinner than the default text in iOS 6; however, you now have the option of Bold Text.

To turn on this option, go to Settings > General > Accessibility > Bold Text. This change requires reboot your iPad to apply the bold text. A popup appears asking if you want to cancel or restart.

During this training, we will turn Bold Text ON.

1.8 Increase Contrast

iOS 7 has added another new low vision option – Increase Contrast.   Images in iOS 7 often have less contrast than the images in iOS 6. Increase Contrast is an option that will improve contrast on some backgrounds to increase legibility.

To turn on this option, go to Settings > General > Accessibility > Increase Contrast.

During this training, we will turn Increase Contrast ON.

1.9 Reduce Motion

iOS 7 has added parallax and zooming effects - animation and movement features . For some people, this movement is causing motion sickness. The Reduced Motion option minimizes the animation and movement features.

TEACHER HINT:MANY STUDENTS WITH VISUAL IMPAIRMENTS – ESPECIALLY STUDENTS WITH NYSTAGMUS – ARE IMPACTED BY THE MOTION; OFTEN THESE STUDENTS DO NOT VERBALIZE THAT THIS MOTION IS AN ISSUE. IT IS RECOMMENDED THA TYOU TURN REDUCE MOTION ON FOR ALL YOUR STUDENTS.

To turn on this option, go to Settings > General > Accessibility > Reduce Motion.

During this training, we will turn Reduce Motion ON.

1.10 Large Cursor

Another new option in iOS 7 is the Large Cursor. When the Large Cursor is turned On the VoiceOver cursor box becomes a thick, bold box. When the screen background is darker, the VoiceOver cursor box also includes a white contrast line along with the bold black cursor box.

To turn on this option, go to Settings > General > Accessibility > VoiceOver > (scroll down) Larger Cursor.

During this training, we will turn Large Cursor ON.

1.11 Auto-Lock

The iPad default is set to auto-lock (turn off the display and lock the touch screen) after two minutes of inactivity. On the iPad, the auto-lock options are 2 minutes, 5 minutes, 10 minutes, or 15 minutes. On the iPhone, the auto lock options are 1 minute, 2 minutes, 3 minutes, 4 minutes, 5 minutes, or never.   If you select "never" you are at risk of draining your battery.

To change your auto-lock, go to Settings > General > Auto-Lock and check your desired time preference.

During the training, we will set the auto-lock to 15 minutes to allow for instruction between iPad activities.

1.12 Side Switch: Lock Rotation/Mute

There is a slider button on the outer edge of the iPad. This button can be used to either mute or lock rotation.

 If in the "Lock Rotation" setting, the iPad does/does not allow switching between portrait and landscape modes.

If in the "Mute" setting, the iPad is/is not muted. When muted, only certain sounds (alerts, notifications, typing clicks, sound effects, game audio) are muted; media playback (music, podcasts, movies, videos) are **not** muted.

To select your Side Switch preference, go to Settings > General > Use Side Switch to: and check either Lock Rotation or Mute.

During this training, we will select Lock Rotation.

TEACHER HINT: LOCK ROTATION SETTING IS OFTEN BENEFICIAL WHEN STUDENTS WITH VISUAL IMPAIRMENTS ARE USING THE IPAD, SO THAT THE IPAD SCREEN STAYS ORIENTED CORRECTLY. NOTE THAT SOME APPS DICTATE THE TYPE OF SCREEN ORIENTATION. VOICEOVER USERS NEED THE IPAD SOUNDS AND THEY DO NOT WANT TO ACCIDENTLY MUTE THE IPAD. HOWEVER, IF THE IPAD IS BEING USED BY THE TEACHER OF THE VISUALLY IMPAIRED, IT IS OFTEN BENEFICIAL TO SET THE SIDE SWITCH TO MUTE. THIS ALLOWS THE TEACHER TO UNOBTRUSIVELY USE THE IPAD IN THE CLASSROOM WITHOUT EMAIL ALERTS, KEYBOARD CLICKS, ETC.

For VoiceOver users:

To ensure that the sounds are On, you must initially set the Side Switch to Mute. Then, on the outside, top left edge of your iPad, slide the little round button to the left – you will see the bell symbol (without the line through the bell). Once the sounds are On, then in Settings set the Side Switch to Lock Rotation. Now when you slide the little round button on the outside edge of your iPad, a lock symbol appears or disappears.

TEACHER HINT: IF THE SOUNDS WERE MUTED WHEN THE SIDE SWITCH WAS SET TO LOCK ROTATION, THE CRITICAL VOICEOVER ALERT SOUNDS WILL STAY MUTED EVEN WHEN THE SIDE SWITCH IS SET TO LOCK ROTATION. IF THIS HAPPENED, GO INTO SETTINGS AND CHANGE THE SIDE SWITCH TO THE MUTE OPTION AND CHECK THAT THE BELL SYMBOL APPEARS. THEN, RESET THE SIDE SWITCH TO LOCK ROTATION.

1.13 Sounds and Alerts

The VoiceOver sounds and alerts (such as the "dddd" heard when dragging your finger through empty space on the screen) can also be turned on/off and the volume can be increased /decreased in Sound settings. These VoiceOver sounds are critical to users who are visually impaired.

To adjust the volume of the VoiceOver sounds and alerts, go to Settings > Sounds > Ringer and Alerts. Ajust the volume using the slider. The default setting is in the middle.

TEACHER HINT: IF THE VOLUME IS SET TOO LOW, YOU MAY NOT HEAR THE CRITICAL VOICEOVER SOUNDS AND ALERTS. MAKE SURE THE VOLUME IS SET IN THE MIDDLE OF THE SLIDER OR HIGHER.

1.14 Connect Wi-Fi

Many schools and businesses have guest Wi-Fi access allowing you to access free internet. Once you have joined an open network, your iPad will automatically join that network each time you are in range. If no known networks are available, you will have to manually select a network. Some Wi-Fi networks will be locked; these locked networks are indicated by the lock symbol. You will need a password to join a locked network.

To view or choose a network, go to Settings > Wi-Fi > Choose a Network and check the desired network.

HINT: THE WI-FI SLIDER MUST BE ON; IF THE WI-FI SLIDER IS OFF AVAILABLE NETWORKS WILL BE HIDDEN.

For this training, you will need Wi-Fi.

1.15 Passcode Lock

You can choose to keep your iPad private by adding a passcode. When the iPad is turned on or "wakes up", the screen will show a number pad. You must tap the correct numbers in order to unlock the iPad. You will choose your own password.

To set your Passcode Lock, go to Settings > General > Passcode Lock. A pop-up screen will appear. You will enter your personal 4 number code.

TEACHER HINT: IF YOU ARE USING AN IPAD AND YOU HAVE CONFIDENTIAL STUDENT INFORMATION ON THE IPAD, YOU WILL NEED TO USE THE PASSCODE LOCK.

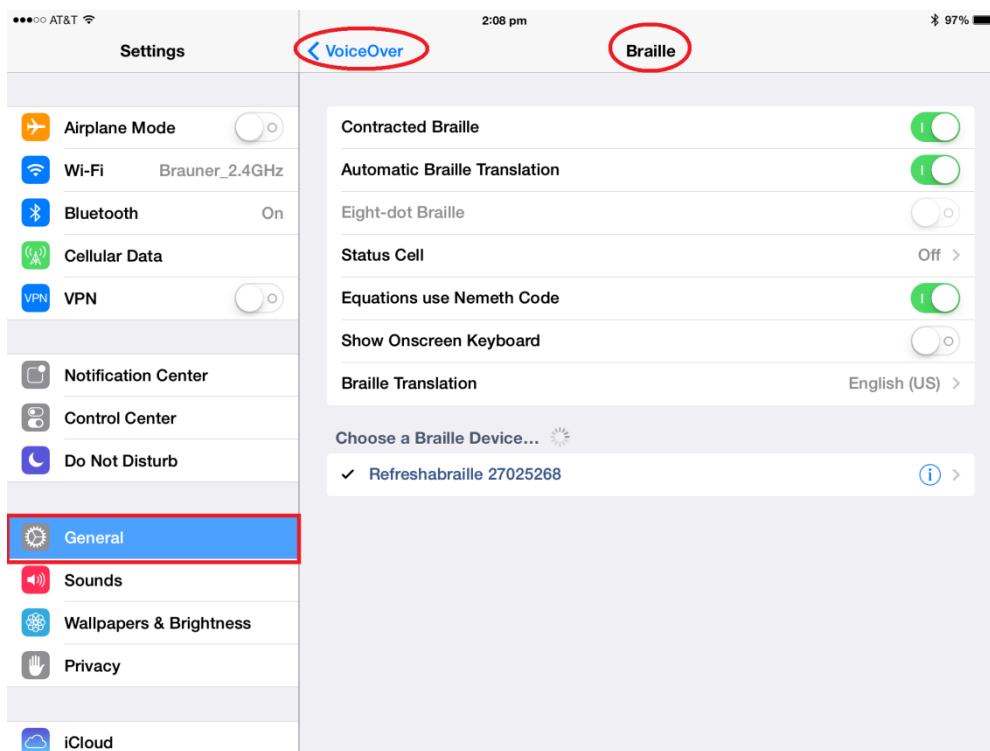**For this training, you will NOT need to set the Passcode Lock.**

1.16 Contracted Braille

The iPad supports both Grade II Braille (Contracted) and Grade I Braille (Uncontracted). For most students, Contracted Braille is the best option. There are easy options to instantly switch back and forth between Contracted and Uncontracted Braille, which enables a beginning braille student the ability to independently double check or learn new braille contractions.

To set Contracted Braille, go to Settings > General > Accessibility > VoiceOver > Braille > Contracted Braille

Figure 3 iPad screen shot showing RBD setting options

In this training, we will turn Contracted Braille ON.

1.17 Automatic Braille Translation

Prior to iOS 7, when using Grade II Braille and the RBD, students had to quickly type the full word followed by a space or by punctuation. If the student typed a braille letter slowly, the individual letters would automatically become whole word contractions. For many students, having to think about the word as a whole (instead of individual letters) and having to type the word quickly encouraged the students to type faster. However, slower students might become frustrated by the whole word substitutions; some of these students used to avoid the automatic translation by setting the iPad to Grade I Braille only.

When the Automatic Braille Translation is turned Off, students can take their time to produce Grade II braille without individual letters automatically becoming whole word contractions. The braille is not translated until the space bar or a punctuation command is given – individual letters are not automatically converted to whole word contractions.

Reminder: the braille word does not appear until the student presses the space bar.

To set the Automatic Braille Translation, go to Settings > General > Accessibility > VoiceOver > Braille > Automatic Braille Translation

In this training, we will turn Automatic Braille Translation ON. Most students quickly adapt to brailling words quickly and should be strongly encouraged to do so.

TEACHER HINT: IF YOU ARE WORKING WITH A BEGINNING BRAILLE STUDENT WHO TRULY HAS PROCESSING ISSUES OR PHYSICAL ISSUES AND NEEDS THE EXTRA TO PHYSICALLY PRODUCE GRADE II BRAILLE, YOU CAN CHOOSE TO TURN AUTOMATIC BRAILLE TRANSLATION OFF.

1.18 Eight-dot and Six-dot Braille

The RBD has the option of 8-dot braille or 6-dot braille cells; US students use 6-dot braille for literary English Braille Code and for UEB Braille Code. Students in the US will want to turn Eight-dot Braille Off.

However, when the RBD is paired with the iPad, we do use dots 7 and 8. These dots are used to indicated the "I-beam" or the position of the text cursor by flashing dot 8 of the first braille cell and dot 7 of the second braille cell.   This enables you to move the cursor to the desired position in order to edit. Example: To insert an "a" in the misspelled word "iPd", you would move the I-beam so that dot 8 is flashing under the "P" and dot 7 is flashing under the "d". When you type the letter "a", it will be inserted correctly and the word will now be "iPad".

To select Eight-dot Braille, go to Settings > General > Accessibility > VoiceOver > Braille > Eight-dot Braille.

During this training, we will use Six-dot Braille; Turn Eight-dot Braille Off.

1.19 Status Cell

VoiceOver has the option of using three status cells to provide additional information about what is on the iPad's screen. Each status cell provides a designated tye of information. Example: if you select the preference to show the general display status, dots 1 and 2 will indicate unread and read announcements. You can set the status cell to be located on the left or right side of the RBD screen or you can turn it off. For most younger students, the Status Cell should be Off.

To set the Status Cell, go to Settings > General > Accessibility > VoiceOver > Braille > Status Cell.

During this training, we will turn the Status Cell OFF.

1.20 Equations use Nemeth Code

iOS 7 now supports Nemeth Code! Remember, in order for the Nemeth Code to read properly and to appear properly on the RBD, the math must be correctly created using MathML.

To set Equations use Nemeth Code, go to Settings > General > Accessibility > VoiceOver > Braille > Equations use Nemeth Code.

During this training, we will turn Equations Use Nemeth Code ON.

1.21 Show Onscreen Keyboard

Typically, if you are using a RBD, you will not want the Onscreen keyboard to be displayed on the iPad's screen.

To set Show Onscreen Keyboard, go to Settings > General > Accessibility > VoiceOver > Braille > Onscreen Keyboard.

During this training, we will turn the Show Onscreen Keyboard OFF.

1.22 Braille Translation

There are currently three English braille code settings on the iPad: English (United), English (US), and English (United Kingdom). In the US, we currently use English (US).

To set the Braille Translation, go to Settings > General > Accessibility > VoiceOver > Braille > Braille Translation then select the desired English code.

During this training we will select English (US).

1.23 Home Screen Layout

There are several navigation commands that we will learn to use. For training purposes, please place the following apps on the first page of your Home screen in this order starting at the top left corner:

> Calendar Notes Reminders iBooks   Maps

Place the following apps on the first page of your Home screen in this order in the Dock (bottom) starting in the left corner:

> Pages   Numbers (or app of your choice) Settings   Dropbox   Safari