

Accessibility
Display, interaction,
audio

Android Accessibility Hands-On Training



Hi, I'm Carrie Morales!

I was born with Aniridia Syndrome and legally blind since birth.

I'm the creator of "Carrie on Accessibility" on YouTube. I've created over 400 videos about technology, accessibility, and more.

Also an accessibility/usability tester at Fable, beta tester, and Google Trusted Advisor.





Please introduce yourself!



Android Accessibility



Major Android Accessibility Features

Android Feature 	Similar iOS feature 
TalkBack	VoiceOver
Select to Speak	Speak Screen / Spoken Content
Magnification	Zoom
Display Size / Screen Zoom	"Zoomed" view in display settings

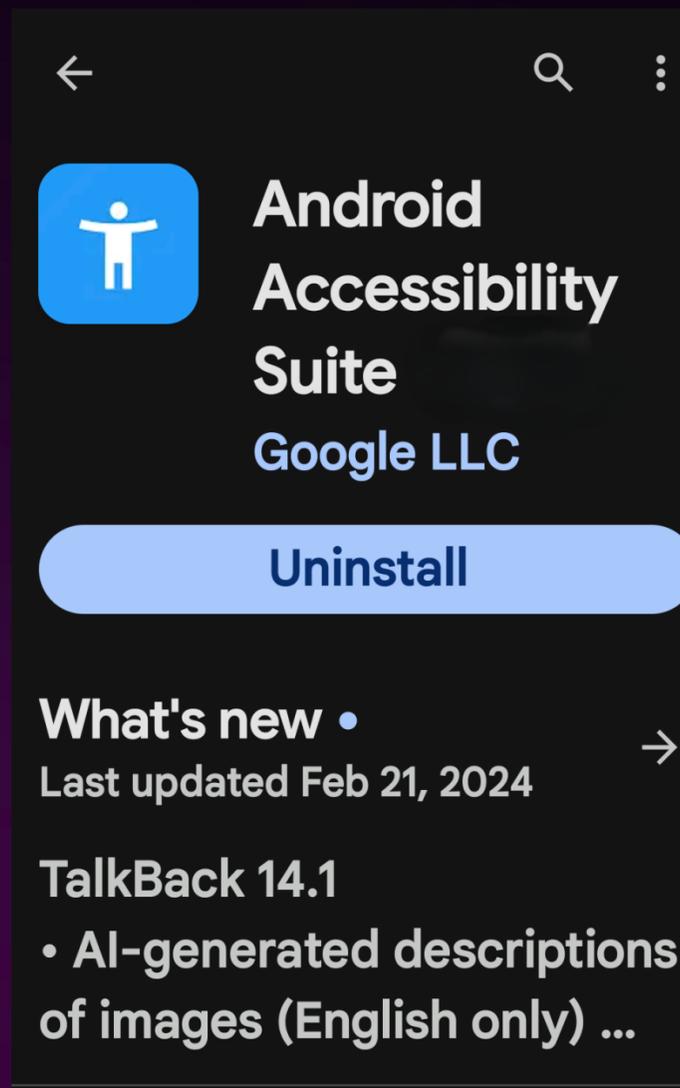
More Accessibility Features



- Font size
- Bold Text
- High Contrast Text
- Extra Dim
- Dark Mode
- Color Inversion
- Color Correction
- Audio Description Toggle
- Live Transcribe
- Live Captions
- Sound Notifications
- Sound Amplifier
- Voice Access
- Switch Control
- Accessibility Menu

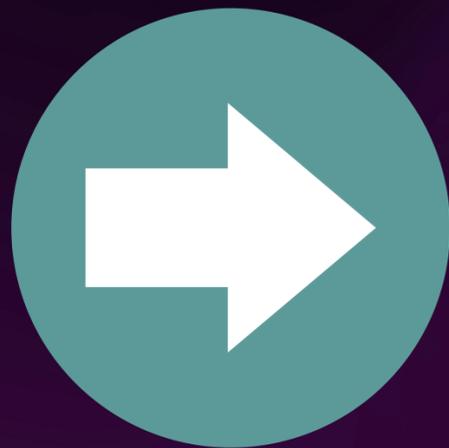


Android Accessibility Suite



Pre-installed app that helps keep Accessibility features stay updated.

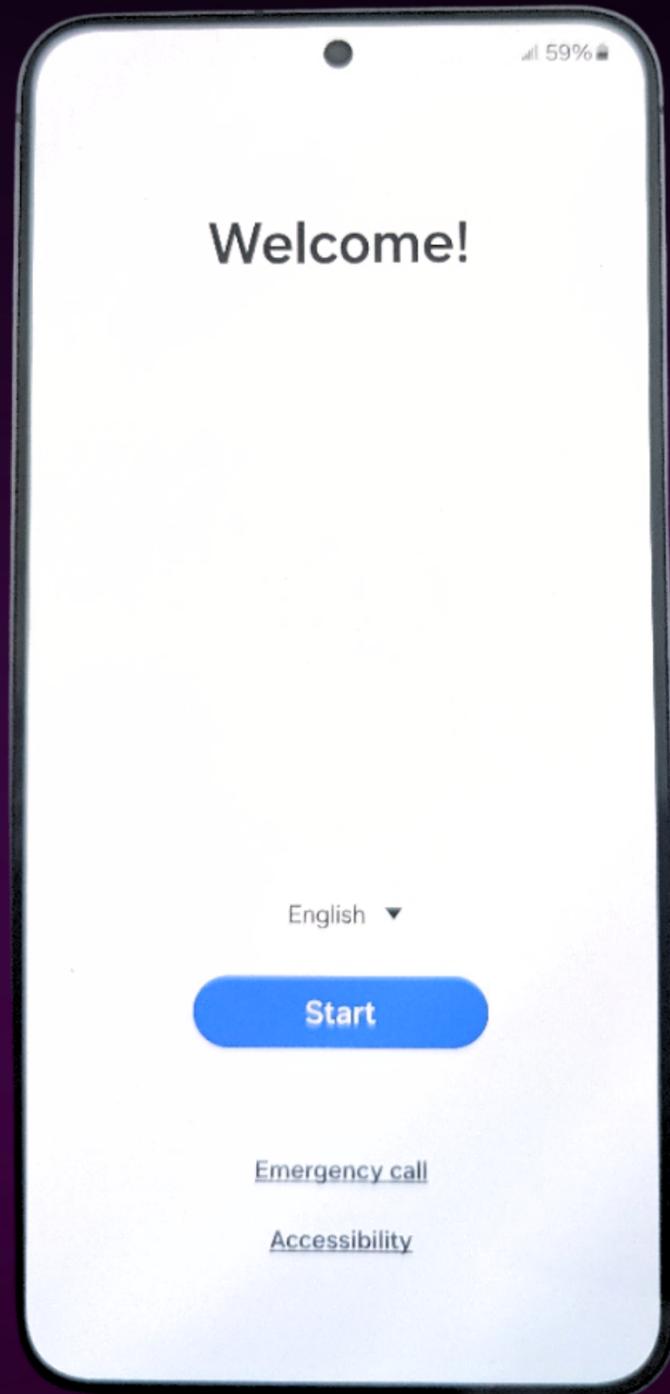
- Can't uninstall
- Updates independently from OS
- Keep this updated
- This will keep TalkBack and some other accessibility features updated
- Samsung Devices - it is not pre-installed, but you can install it



Accessibility Shortcuts



Setting Up

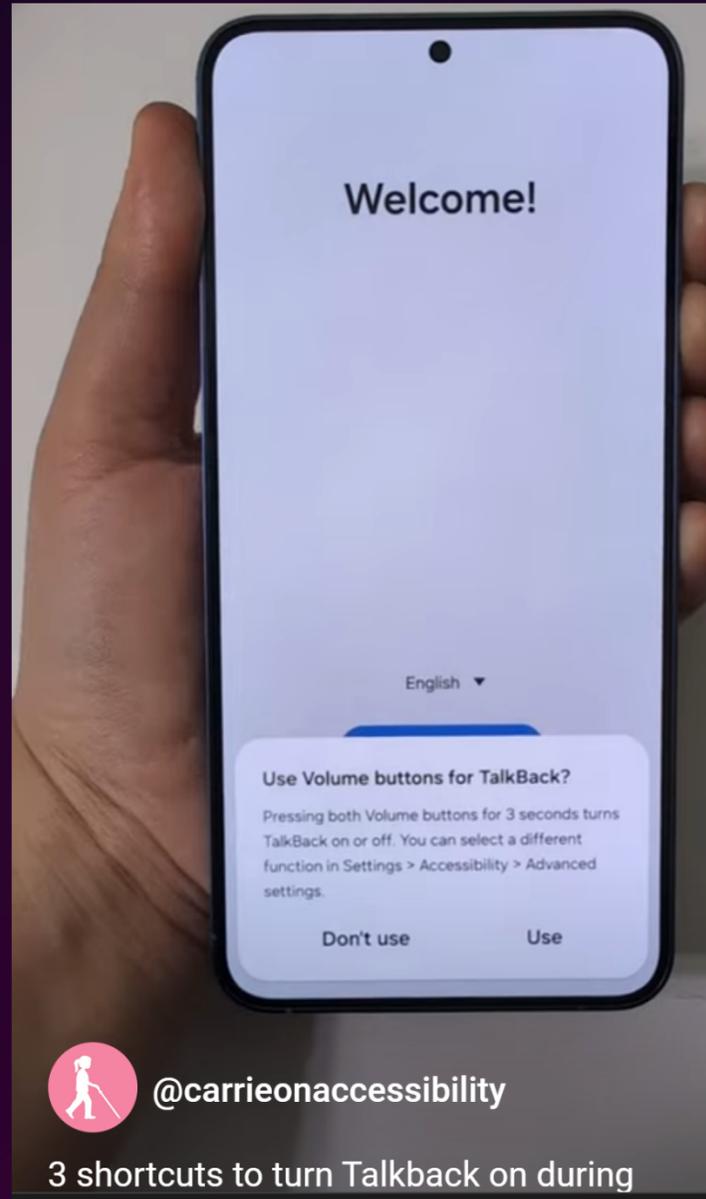


Turning on TalkBack

- Press and hold volume buttons (twice)
- Tap and hold with 2 fingers
- Samsung only - Quick press volume up and side buttons (twice)

Tap Accessibility to adjust other settings

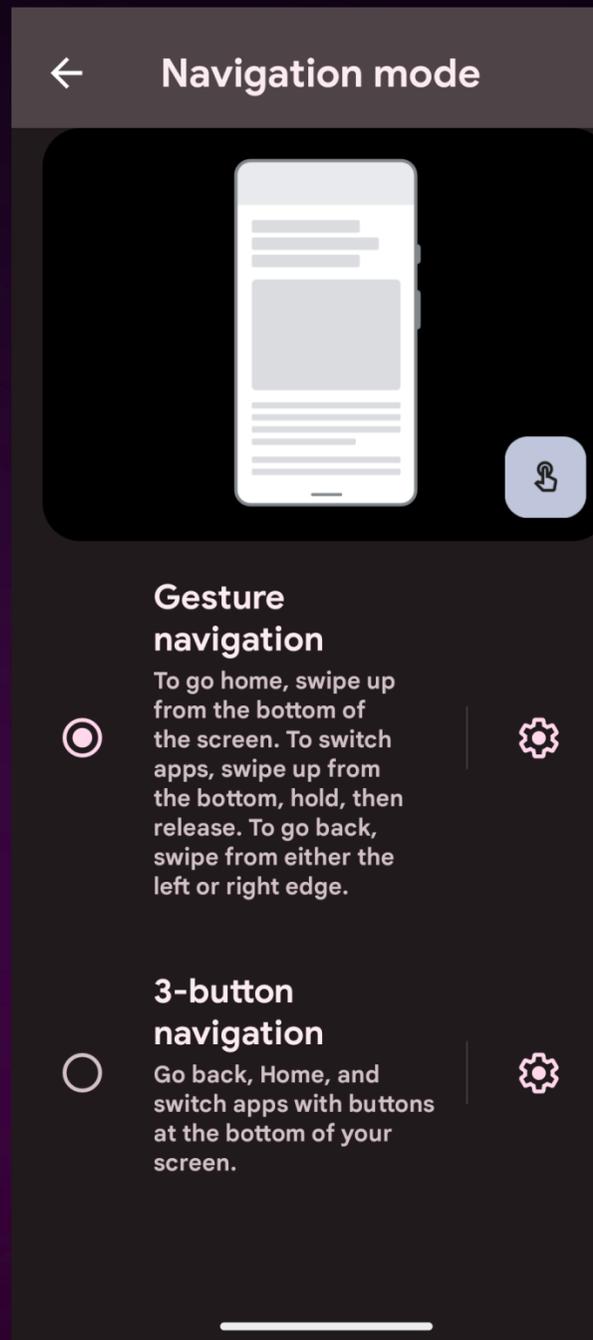




How to Turn on TalkBack During Android Set Up



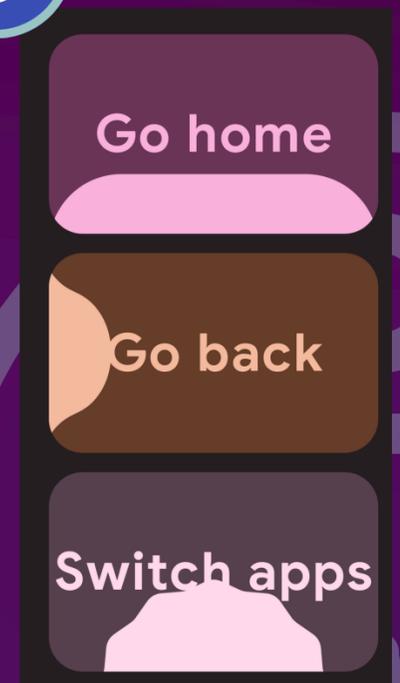
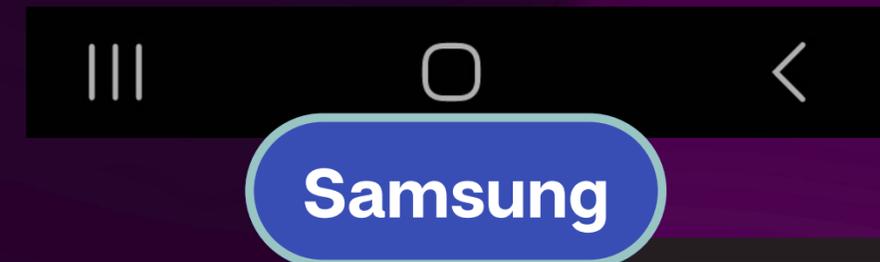
Choose a Navigation Mode



Go to settings > system > navigation mode

Choose a navigation mode

- Gesture navigation
- 3 button navigation
- Gesture navigation
 - Swipe up for home
 - Swipe from the edge for back
 - Swipe up and hold for recent apps
 - Use two fingers with TalkBack



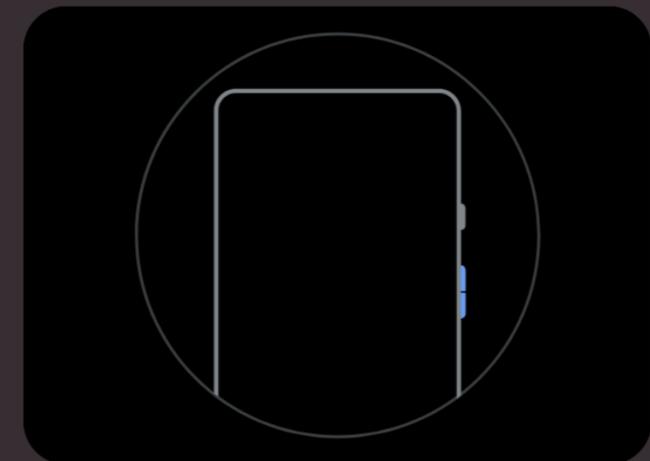
Volume Key Shortcut

Automatically set to TalkBack

- Will ask for confirmation for first time use
- Can set for other accessibility features
- Can set multiple features to this shortcut, but it will show a menu
- Samsung phones - hold buttons for an extra 1-2 seconds

Hold volume keys

Press & hold both volume keys



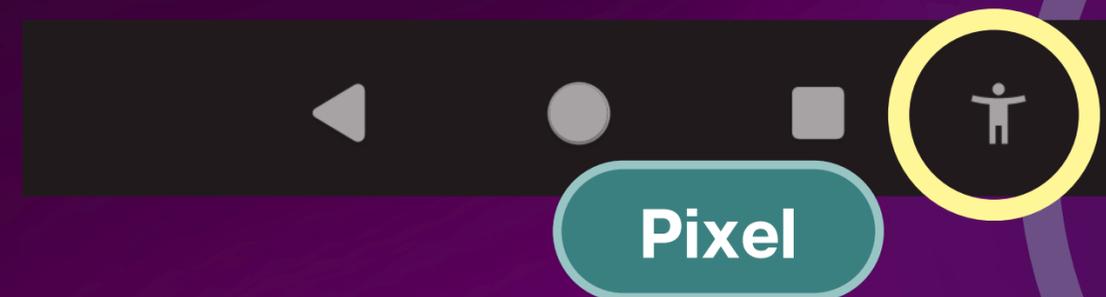
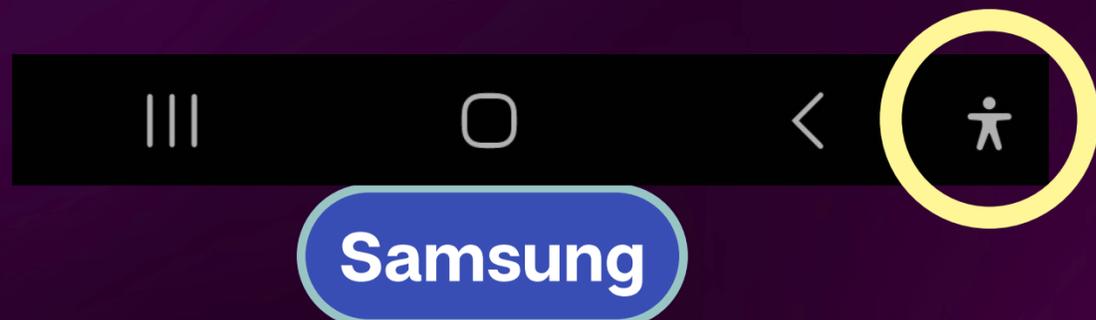
LET'S TRY IT!

**Let's all try the volume key shortcut
and try turning TalkBack ON and OFF**

Accessibility Button (nav bar)

When using 3 button navigation

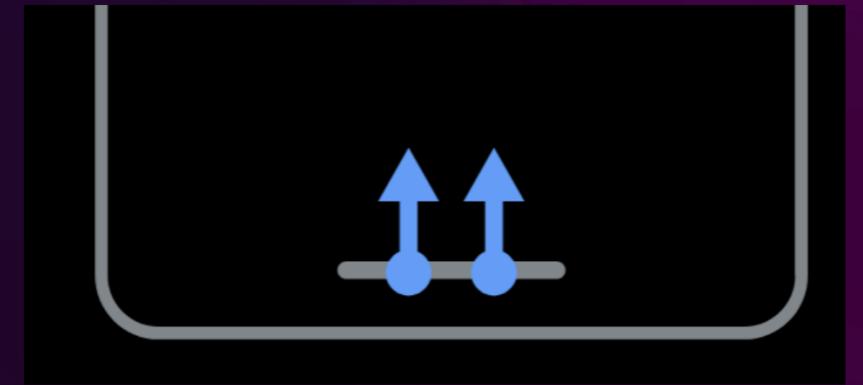
- Icon on bottom right corner (nav bar)
- Can assign multiple features to this shortcut
- Choose 1 feature and quick tap to activate that feature
- Tap and hold to switch to another feature
- Samsung phones - if multiple features are assigned, a menu will always show



Accessibility Gesture

When using gesture navigation

- Swipe up with two fingers from the bottom edge
- With TalkBack, swipe up with three fingers from bottom edge
- 2 finger swipe up and hold, then release to switch accessibility feature
- Samsung phones: if multiple features are assigned, a menu will always show



Choose a feature to use with the accessibility gesture (swipe up from the bottom of the screen with two fingers):



Live
Transcribe



Reading
mode



Acces
sibility



Select to
Speak

Pixel

Speak
keyboard
input aloud
Off

Color
inversion
Off

Relumino
outline
Off

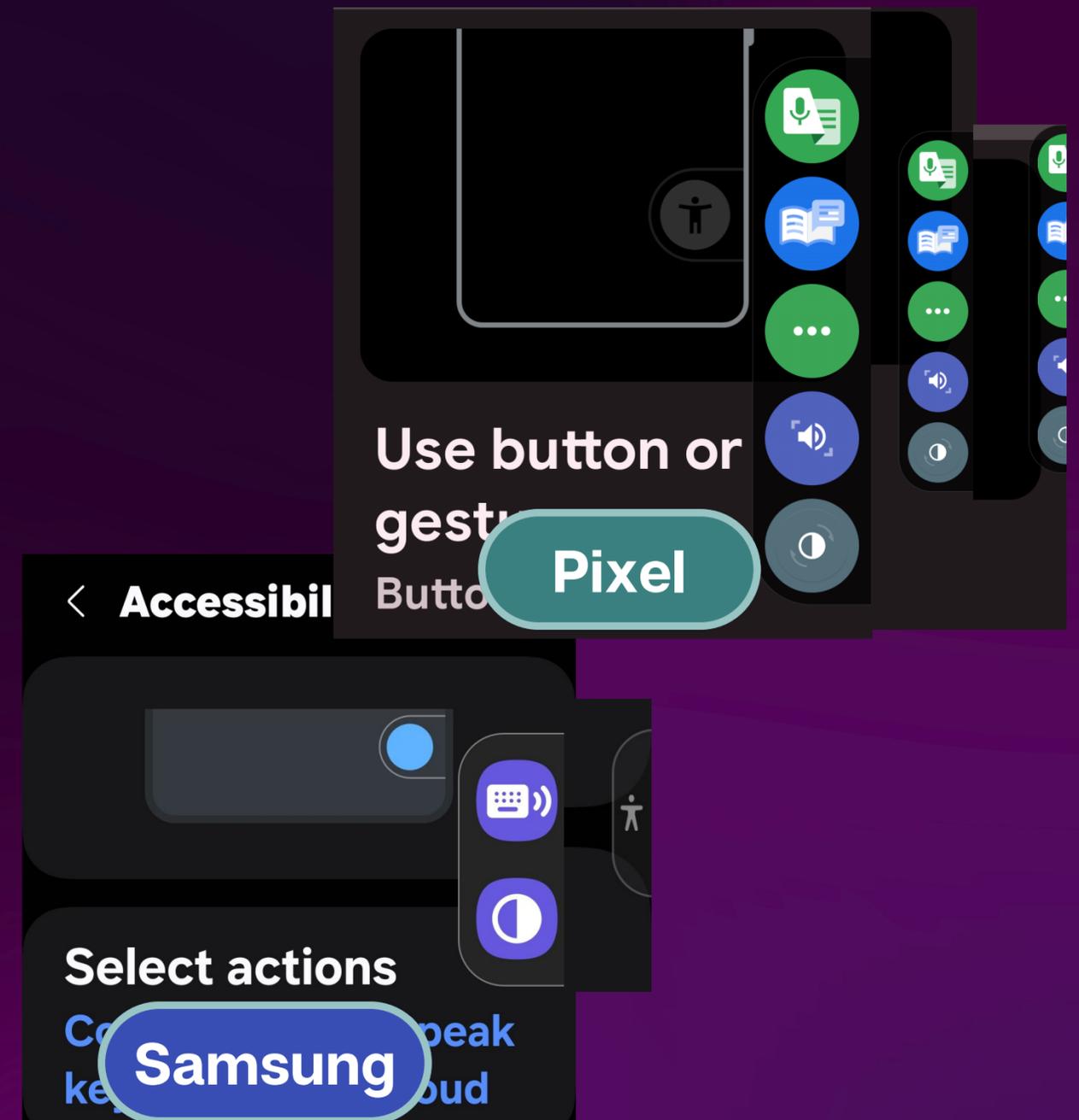
Magnificati
Edit shortcuts

Samsung

Accessibility Button (floating)

When using gesture navigation

- Icons will appear floating above other apps
- Can change size and opacity
- Can assign multiple features
- Swipe to edge to hide
- Samsung phones: swipe to edge to hide buttons (will collapse into menu)



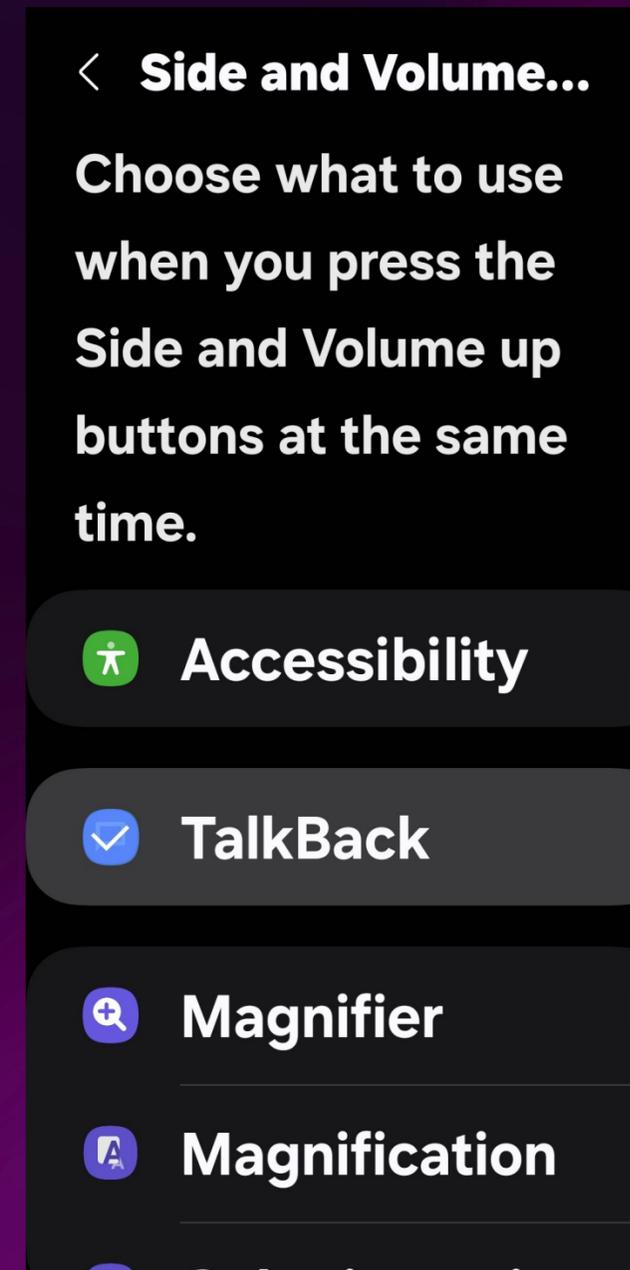


When using gesture navigation, you can only choose one: accessibility floating button OR accessibility gesture, not both

Samsung Only: Volume Up and Side Key Shortcut

Automatically set to TalkBack

- Quickly press the volume up and side key at the same time
- Can assign multiple features
- If multiple features assigned, a menu will always show



LET'S TRY IT!

On Samsung devices, try the volume up and side key shortcut and try turning TalkBack ON and OFF

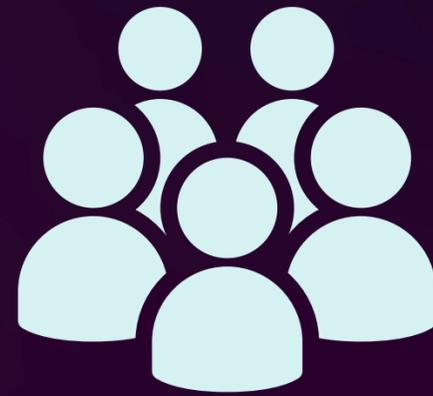


4 Android Accessibility Shortcuts - Explained



Navigating Accessibility Settings



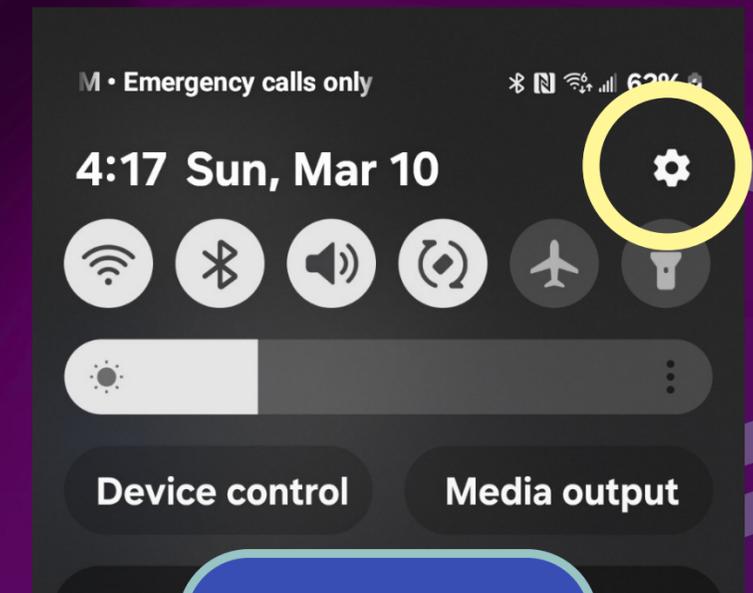


**Let's Explore the Accessibility
Settings Together!**

Explore the Android Accessibility Settings!

Navigate to settings:

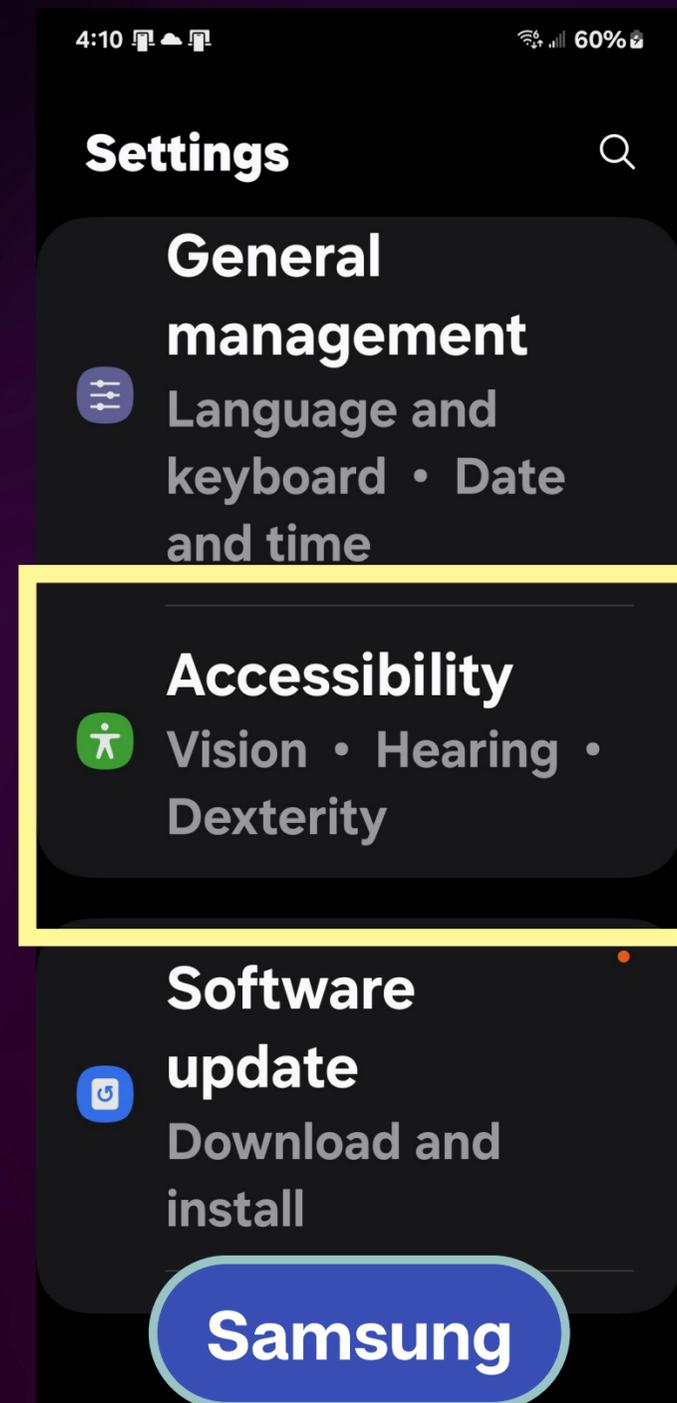
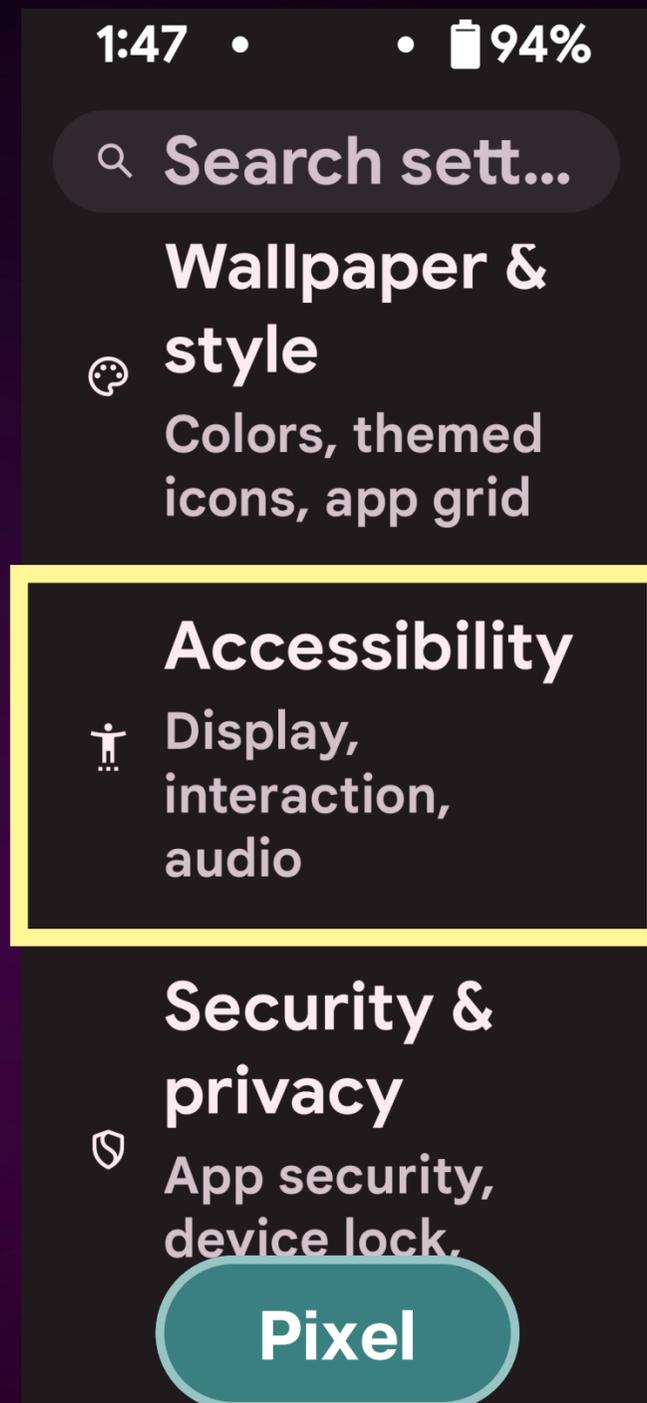
- Icon on home screen
- Quick settings shortcut
- Use Google Assistant
- Samsung phone - settings icon in notification shade & quick settings



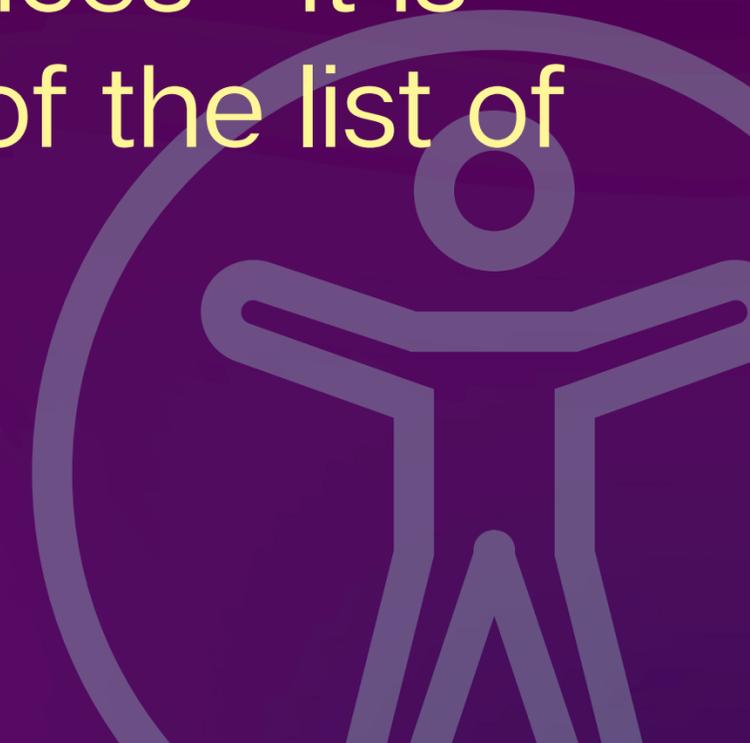
Samsung

Pixel

Select Accessibility



- Use “settings search”
- Tell Google Assistant: “Open Accessibility Settings”
- Samsung devices - it is near the end of the list of settings

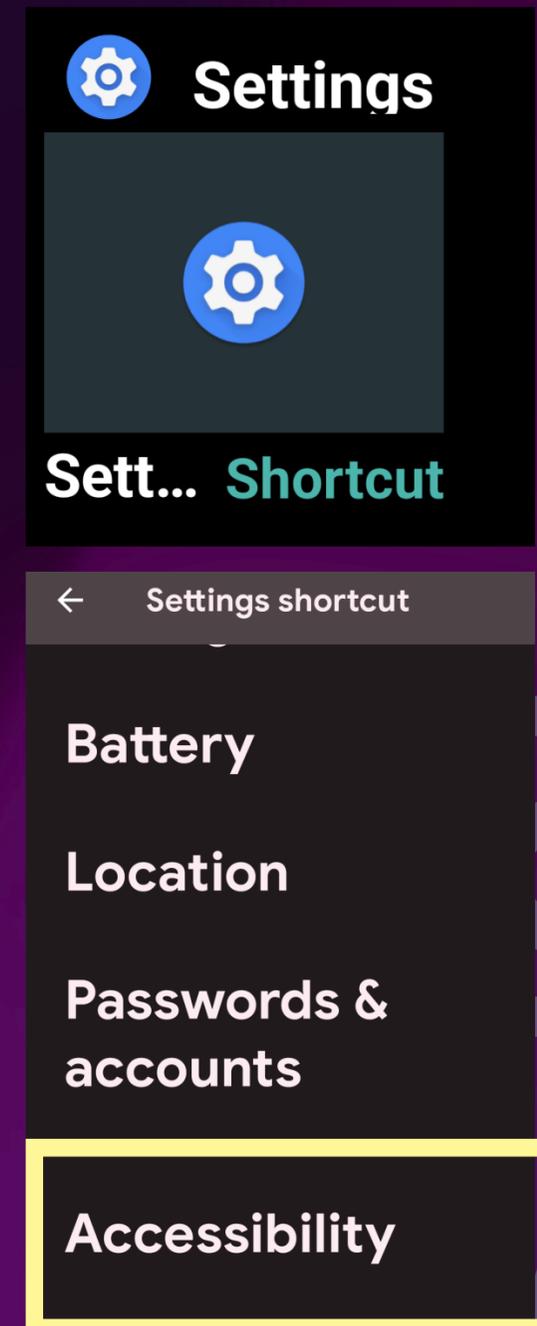


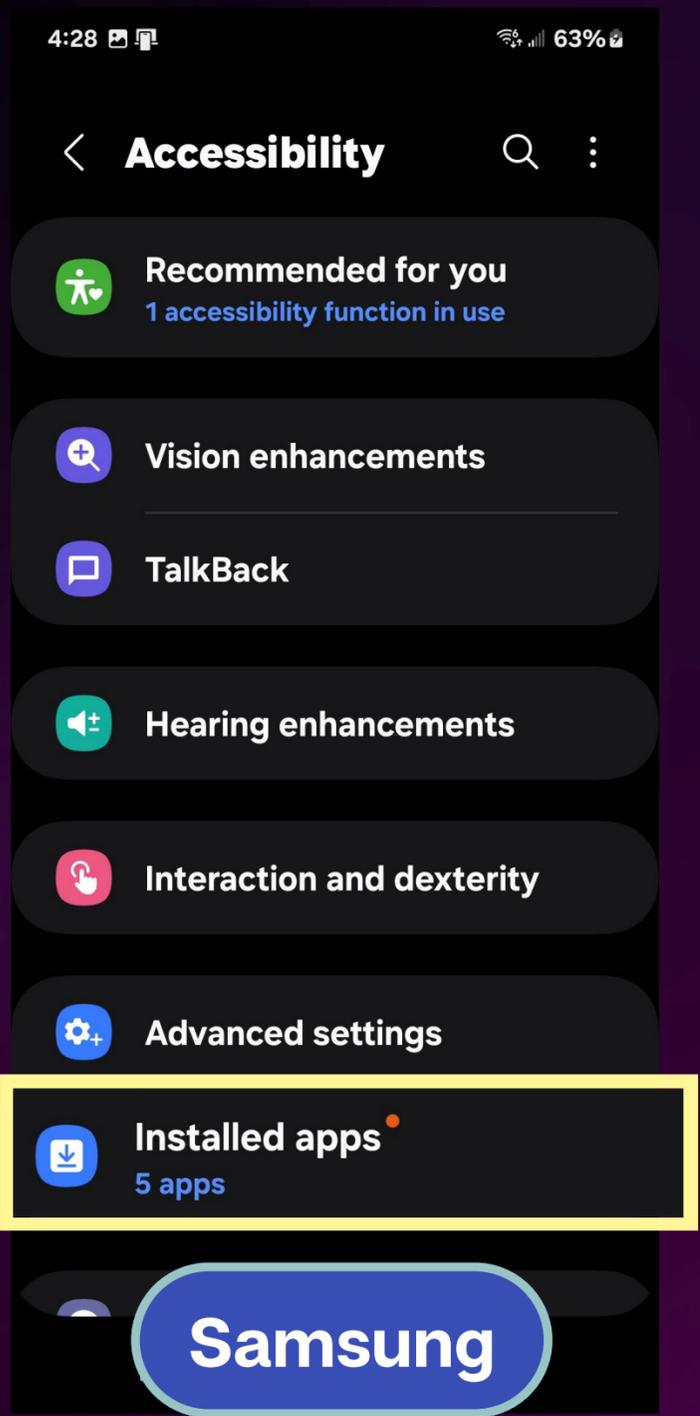
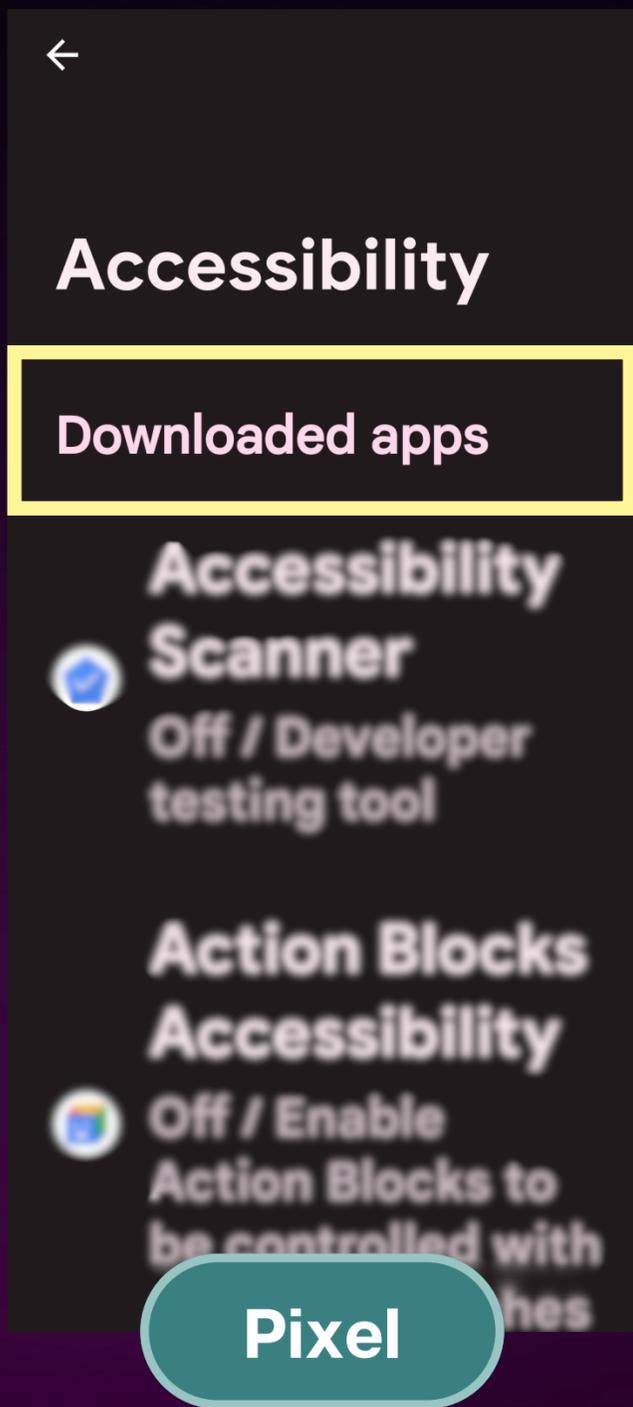
Accessibility Settings Shortcut Widget



You can also add a “accessibility settings shortcut widget” to home screen

Select settings shortcut from widget list, then select accessibility from the list





“Downloaded Apps” in Accessibility settings

- These have access to accessibility permissions
- Enables accessibility shortcuts

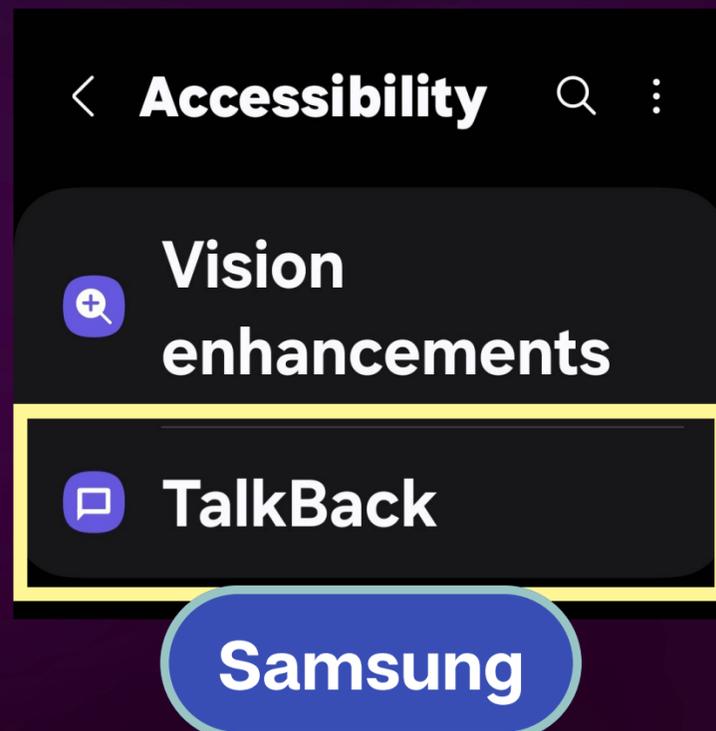
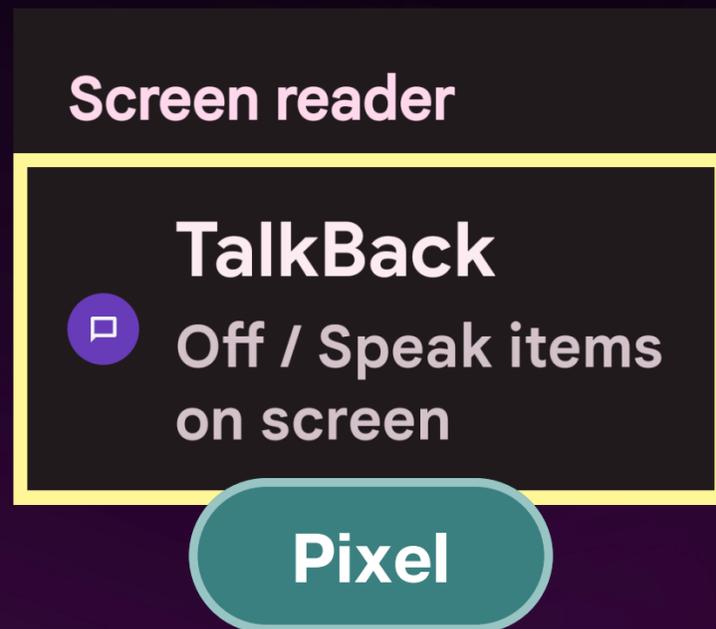




Common Android Accessibility Features for Vision Impairments

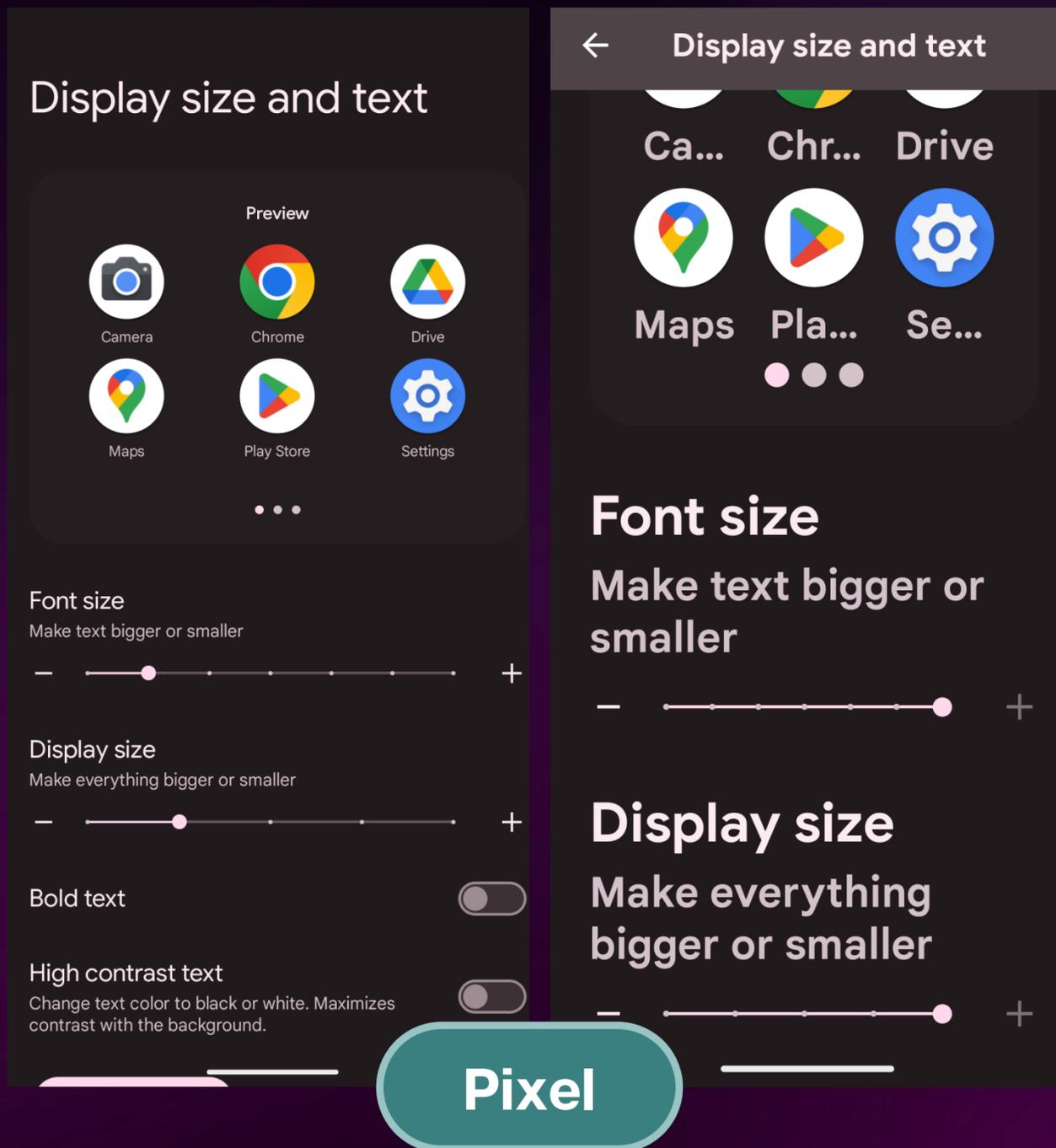


Screen Reader



- TalkBack is the built in screen reader on Android
- Other screen reader: CSR (Commentary Screen Reader / Jieshuo)
- Samsung has its own version of TalkBack which is slightly different
- Updates from Galaxy store

Display and Text Size



- Text Size
- Display size: increase size of layout items like buttons and icons
- Bold Text
- High contrast Text: Outlines text

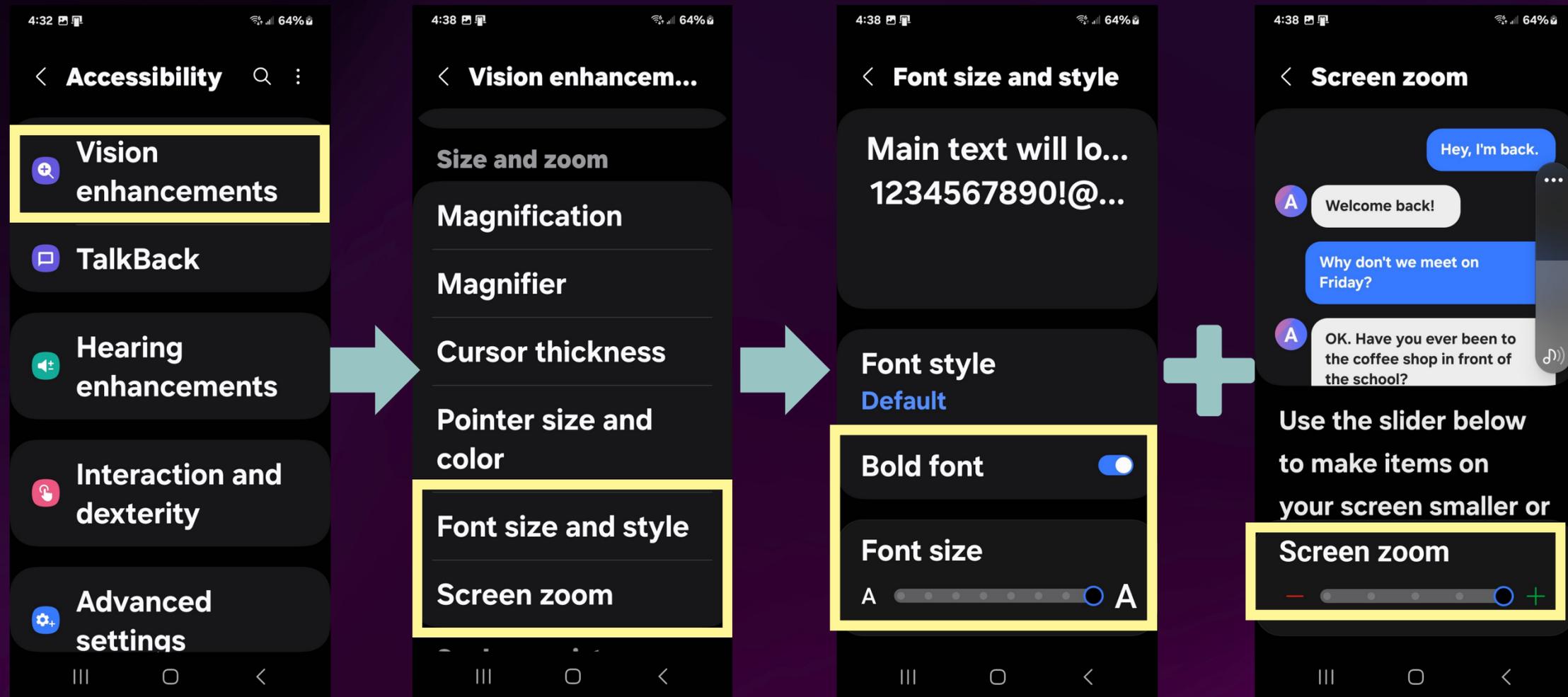
Display

 Display size and text



Samsung Vision Enhancements

Samsung



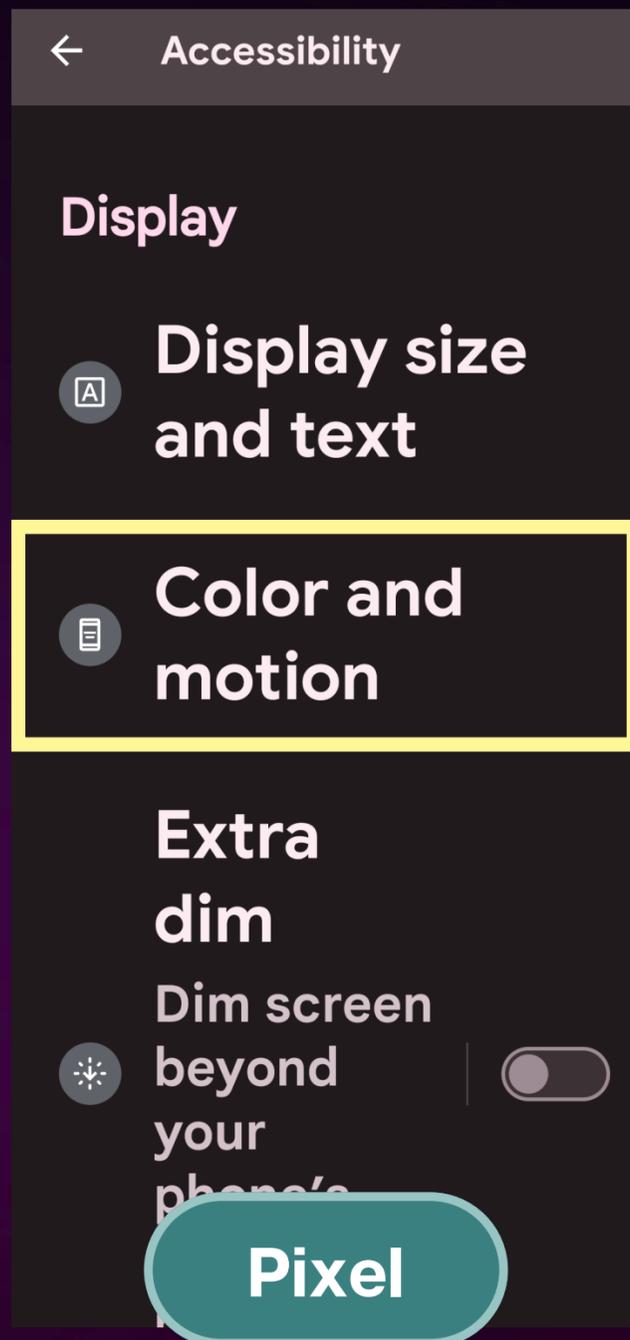
Samsung Settings > Accessibility > Vision Enhancements

Display Size is called Screen Zoom on Samsung

LET'S TRY IT!

Adjust the display and text size options and see what it looks like

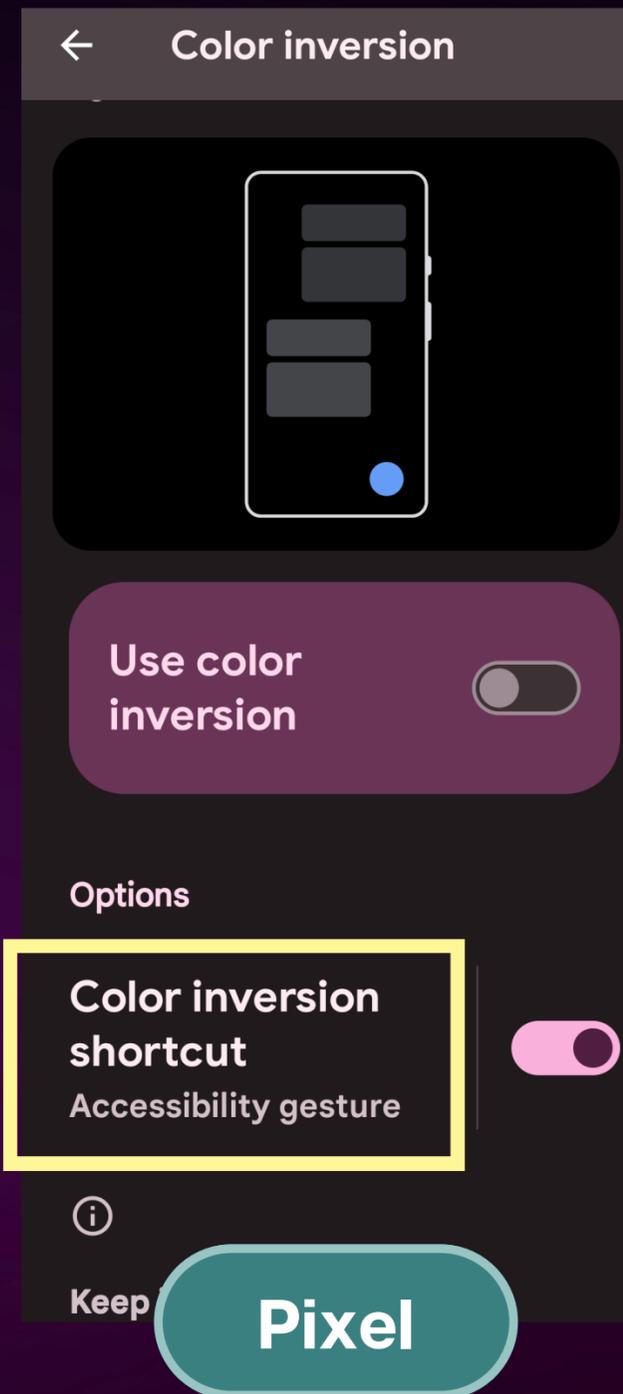
Color and Motion



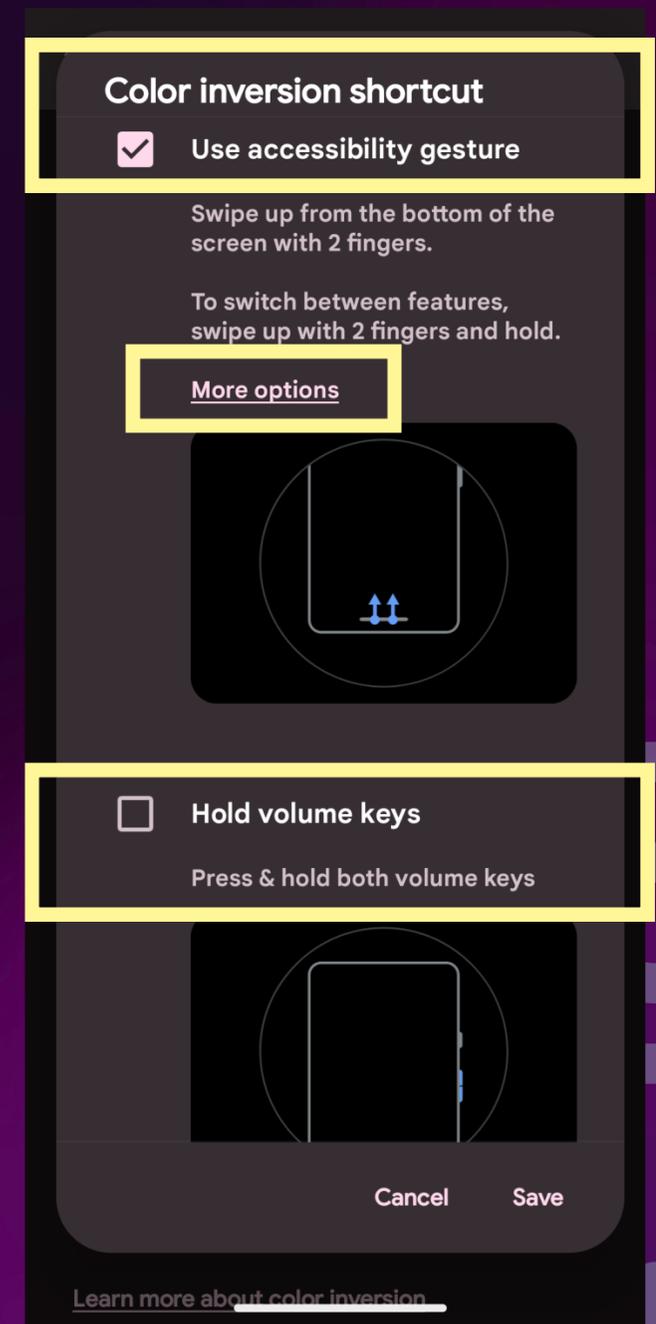
- Color correction: color filters including grayscale
- Color Inversion
- Dark theme
- Remove animations
- Large mouse pointer



Setting Up a Shortcut



1. Navigate to an accessibility feature
2. Tap on the LEFT of the toggle
3. Choose a shortcut
4. Tap “more options” to choose button or gesture



LET'S TRY IT!

**Set color inversion to the accessibility
button or accessibility gesture**

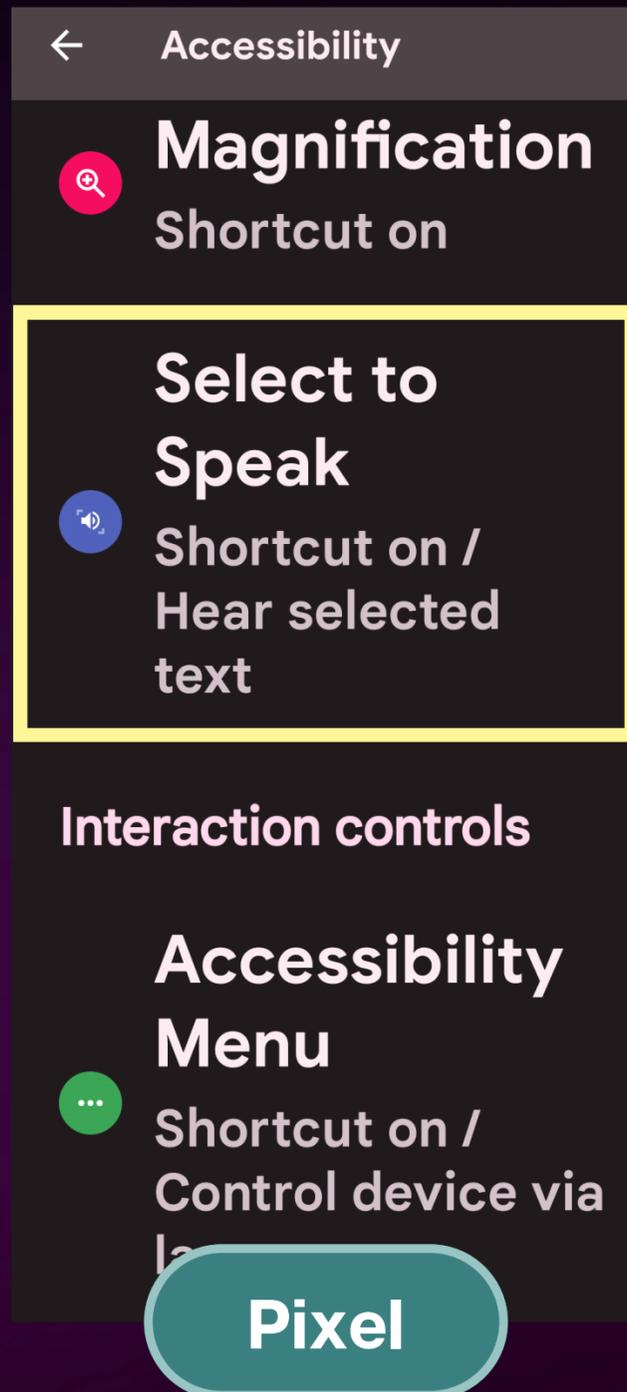
Extra Dim & Magnification



- Extra dim - decreases screen brightness (may be helpful for light sensitive users)
- Magnification - zooms in on the display



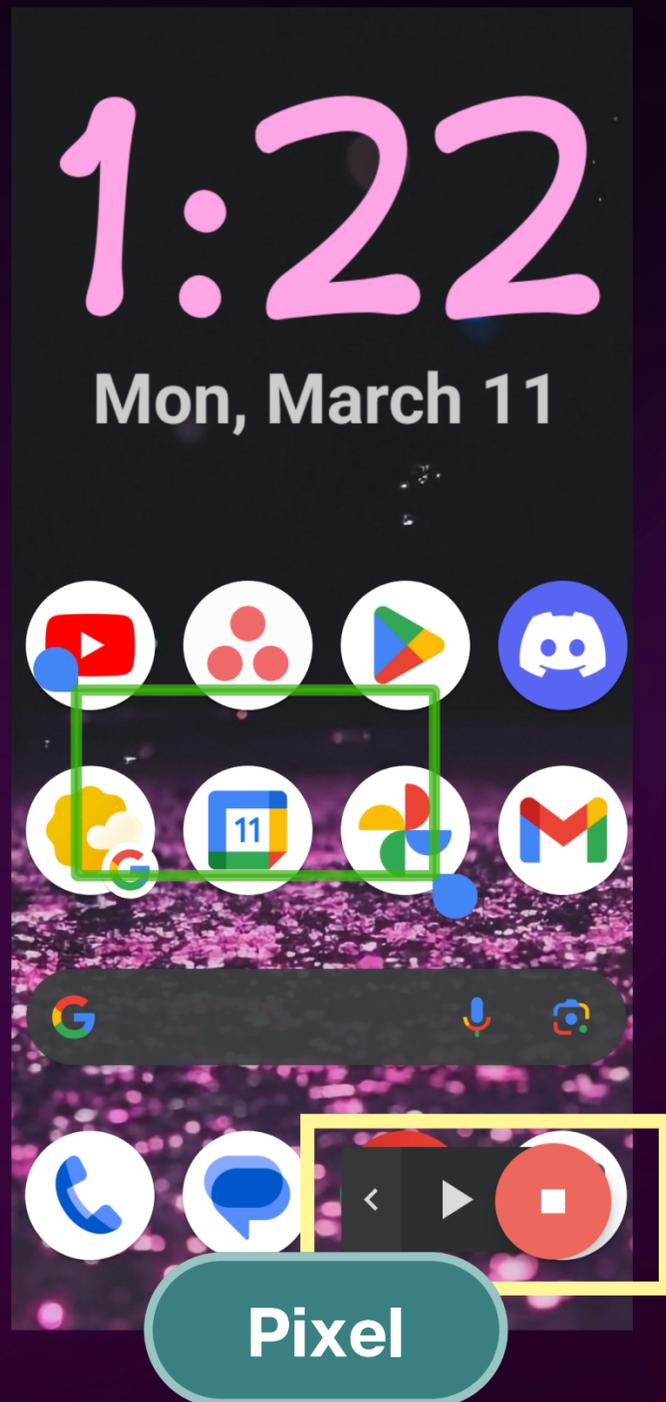
Select to Speak



- Reads text on screen without turning on a screen reader
- Can read in the background while using other apps



Select to Speak



- Tap on play to read all
- Tap on an item to have it read aloud
- Select what you want read by drawing a box around it
 - Drag from top left to bottom right
- Move controller around
- Tap “<” to expand menu



LET'S TRY IT!

**Set select to speak to a different
shortcut and use it to read something
on the screen**



More Android Accessibility Features

Interaction Accessibility Settings

Accessibility Menu - large on screen buttons. (Brightness up/down, volume up/down, and more)

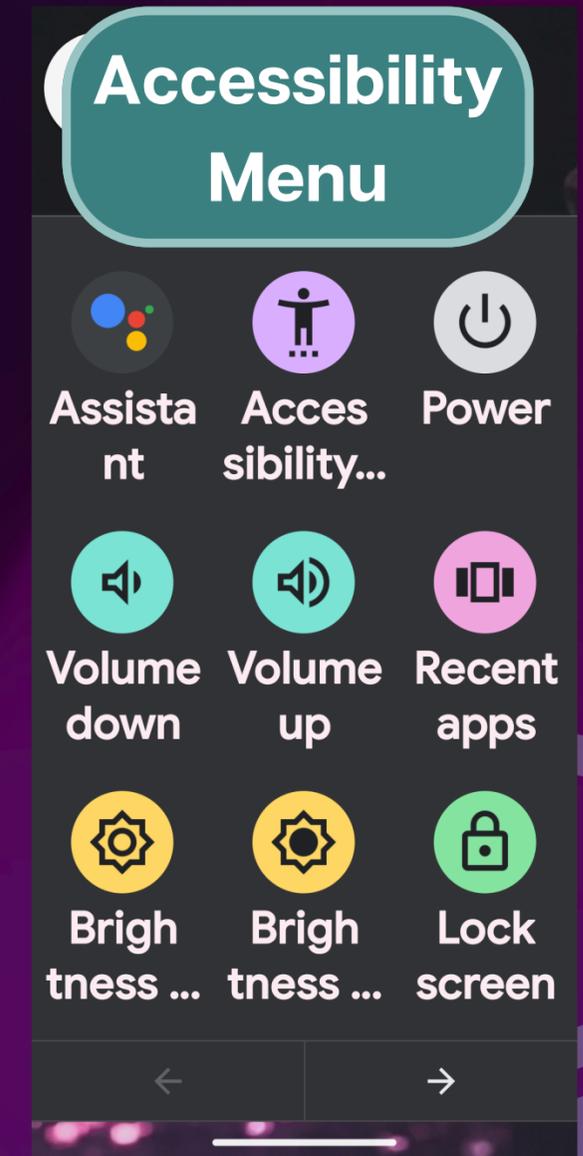
Voice Access - Use voice to control device

Vibration and Haptics - adjust intensity

Switch Access - control device with switches and front camera

Timing Controls - adjust time for interactions

System Controls - change navigation mode, power button to end calls, auto rotate toggle



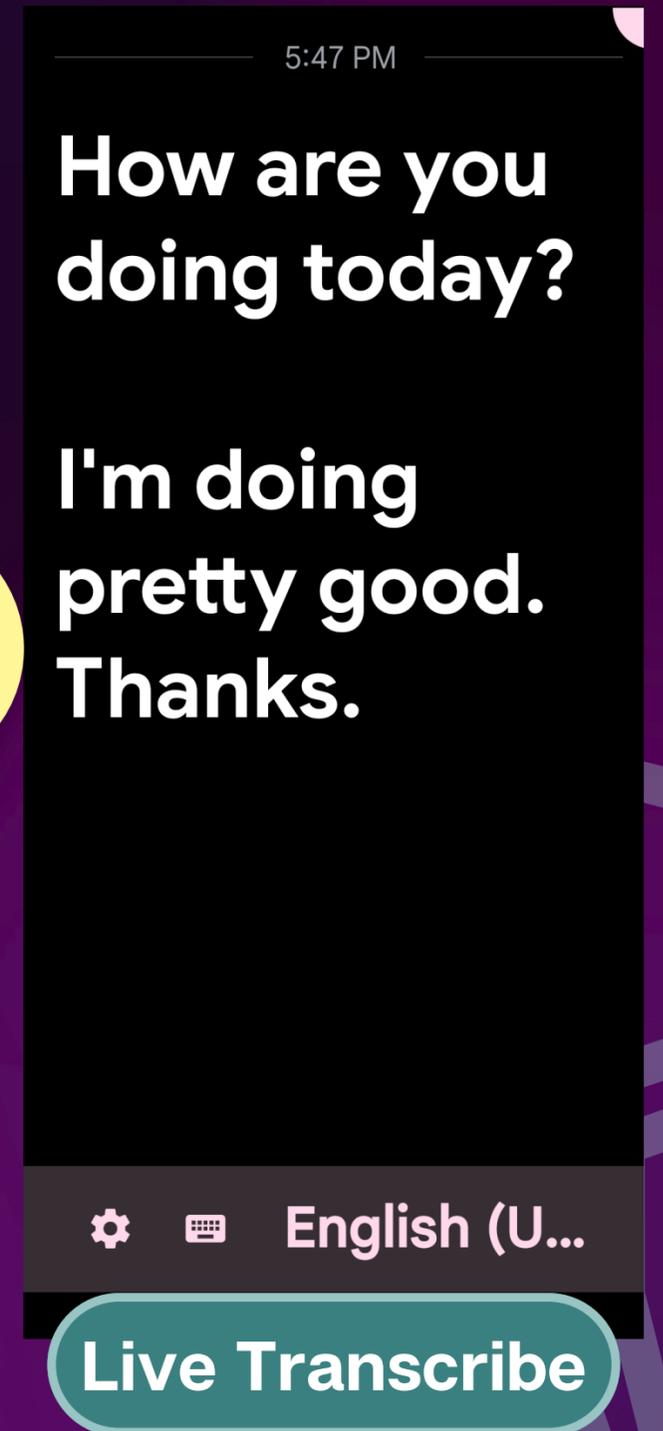
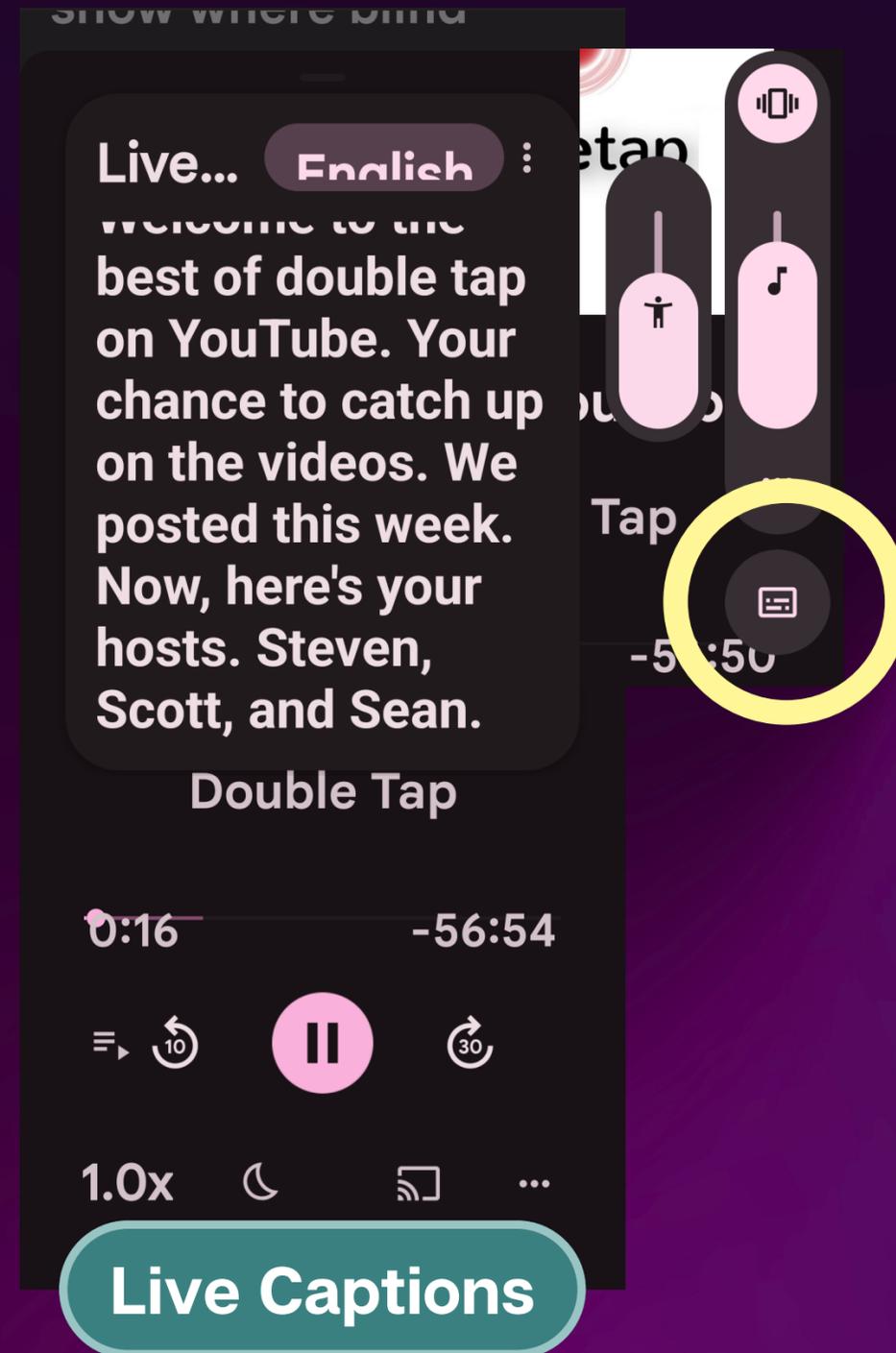
Captions Accessibility Settings

Live Captions - Captions from device audio (can access from volume panel)

Live Transcribe - Transcribe spoken content from device microphone

Caption Preferences - Adjust size and color

Real Time Text (RTT) - Show or hide for calls



Audio Accessibility Settings

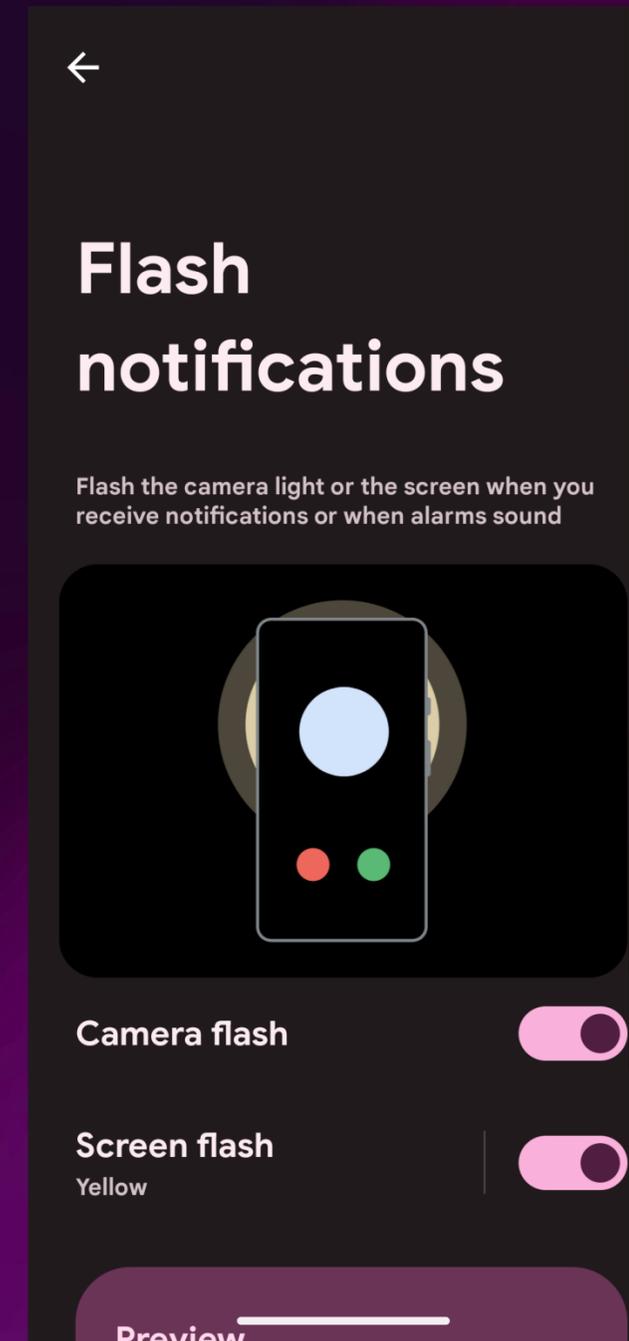
Audio description - Toggle attempts to automatically turn on audio descriptions

Sound amplifier - use headphones to improve audio

Sound notifications - Get notifications about important sounds

Flash notifications - flash the screen or flashlight for notifications

Audio adjustments - mono audio or adjust left/right balance



Samsung Only Vision Enhancements

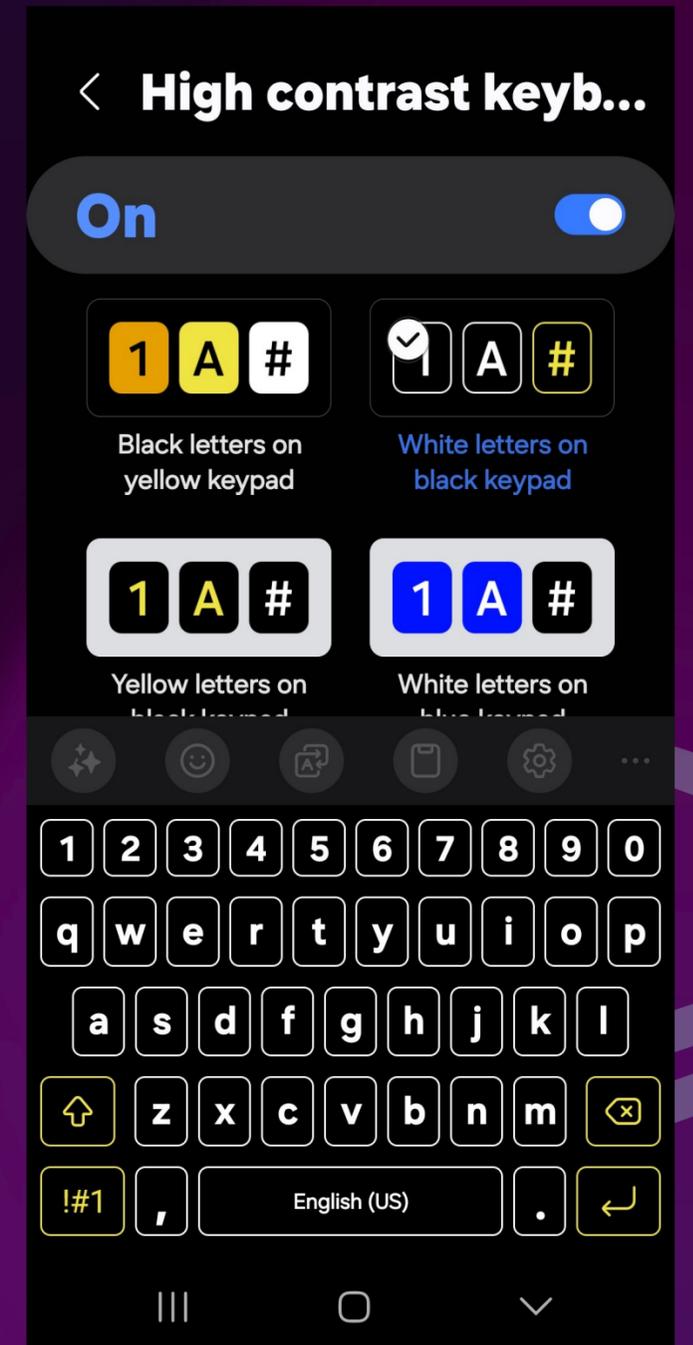
High Contrast Themes

High Contrast Keyboard

Highlight Buttons - Buttons will have a background fill

Color Filter - Overlays a color of choice and can adjust opacity

Relumino Outline - adjust color and thickness of text and images outline



Relumino Outline Examples

< Relumino outline

On



See objects in images and videos more clearly with strong outlines. Adjust the color and thickness of the outlines to make them stand out.

< Relumino outline

On



See objects in images and videos more clearly with strong outlines. Adjust the color and thickness of the outlines to make them stand out.

< Relumino outline

On



See objects in images and videos more clearly with strong outlines. Adjust the color and thickness of the outlines to make them stand out.

< Relumino outline

On

Relumino outline shortcut

Use Accessibility gesture

Outline thickness

— +

Adaptive

Black

Samsung Only Vision Enhancements

Reduce transparency and blur

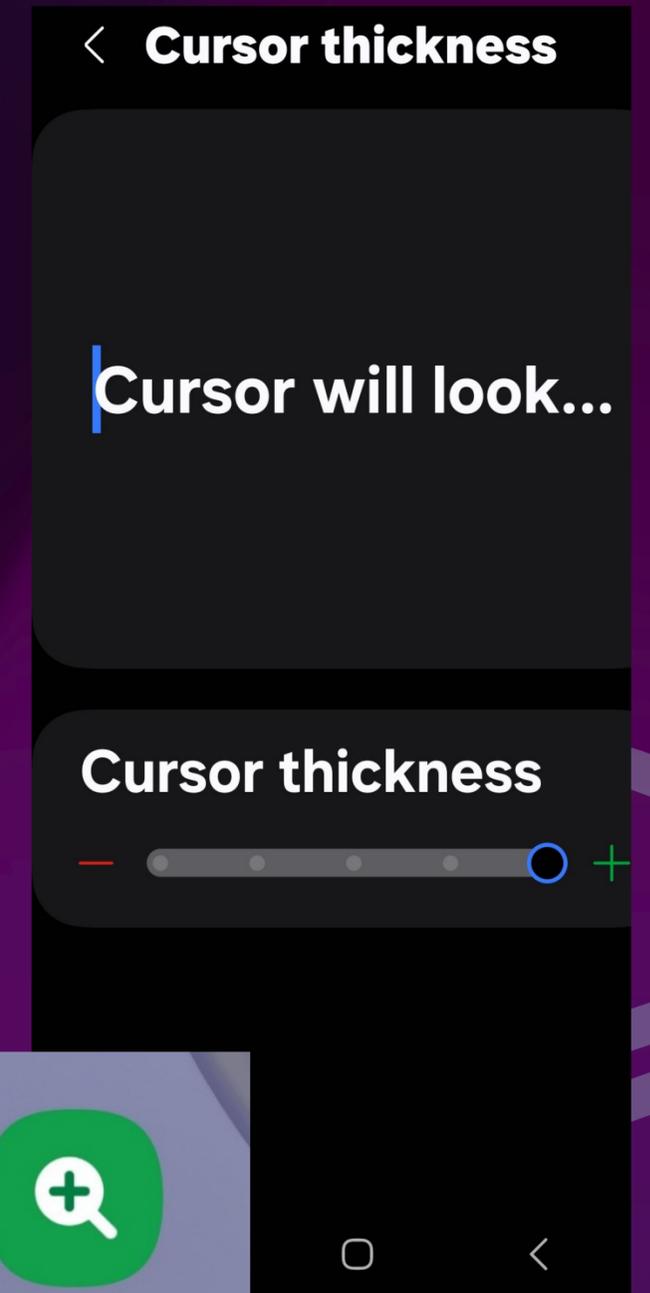
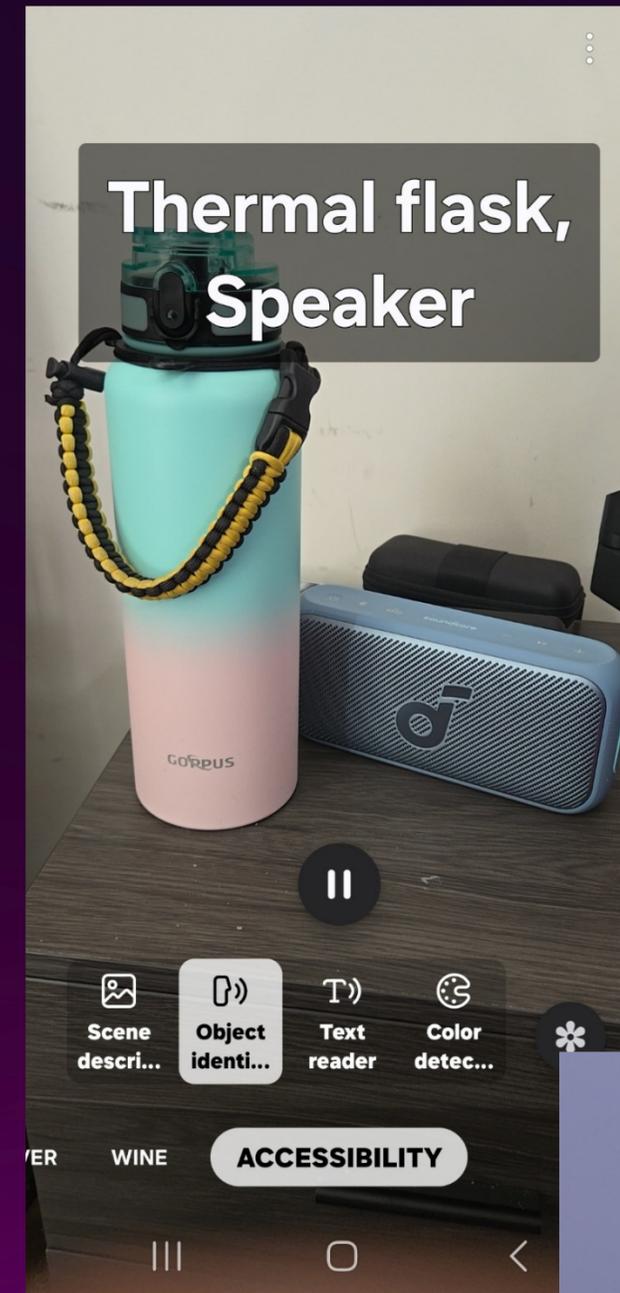
Magnifier - Samsung only

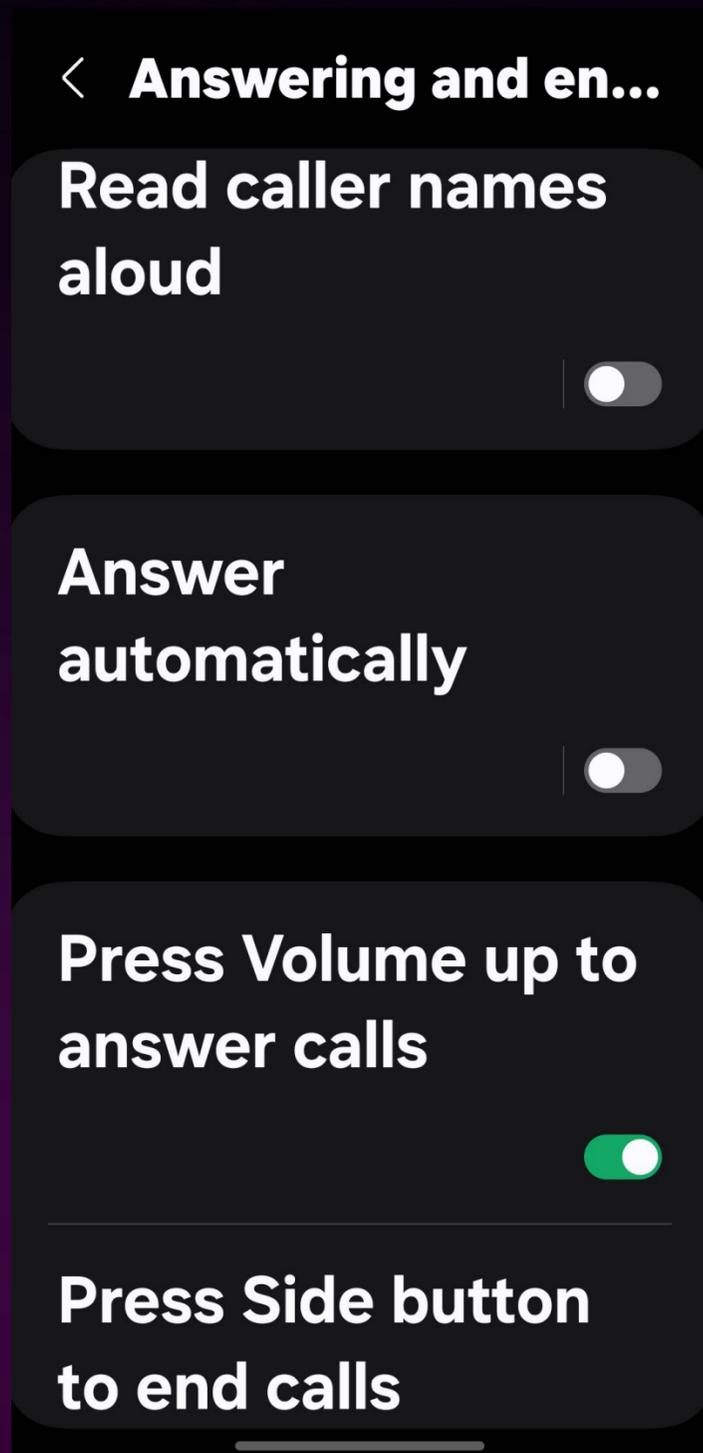
Cursor Thickness - Adjust thickness of the text cursor

Speak keyboard input aloud - announce characters, words, or both without TalkBack

Bixby Vision - similar to Lookout

Voice Labels - Uses NFC tags

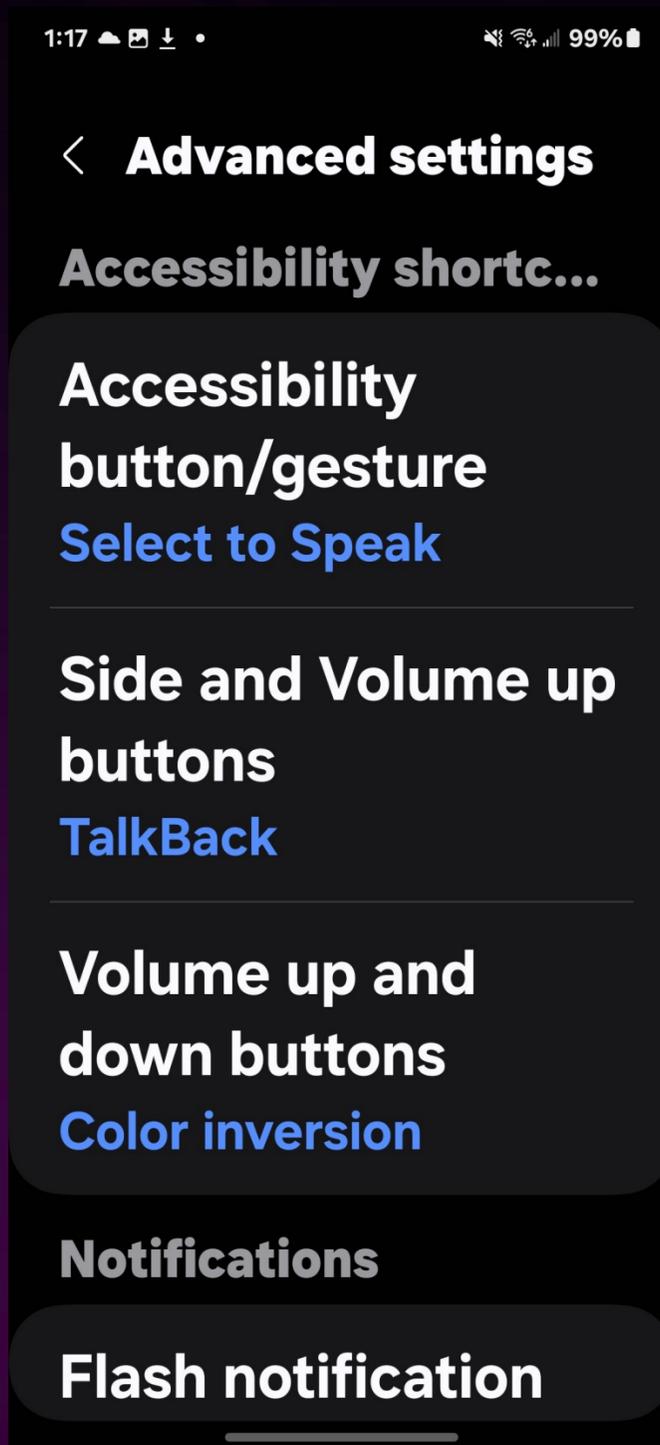




Samsung Only Settings under “interactions and dexterity”

Read caller names aloud - **even** without TalkBack on
Answer Automatically
Use volume up to answer calls





Assigning Accessibility Shortcuts

Most Android Devices

1. Navigate to accessibility feature
2. Set accessibility shortcut one at a time

For Samsung Devices

1. Go to Advanced Settings and select shortcut you want to customize
2. Check all features to assign to shortcut

QUESTIONS?

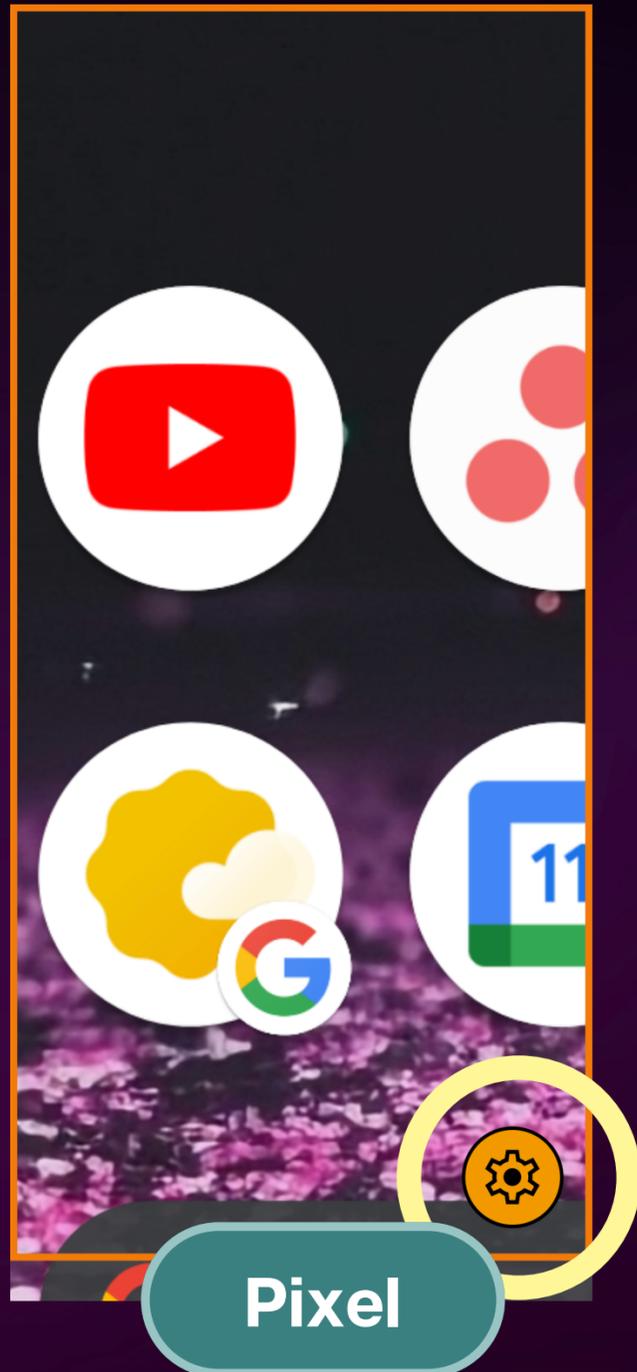
**Does anyone have any questions
about what we've covered so far?**



Magnification

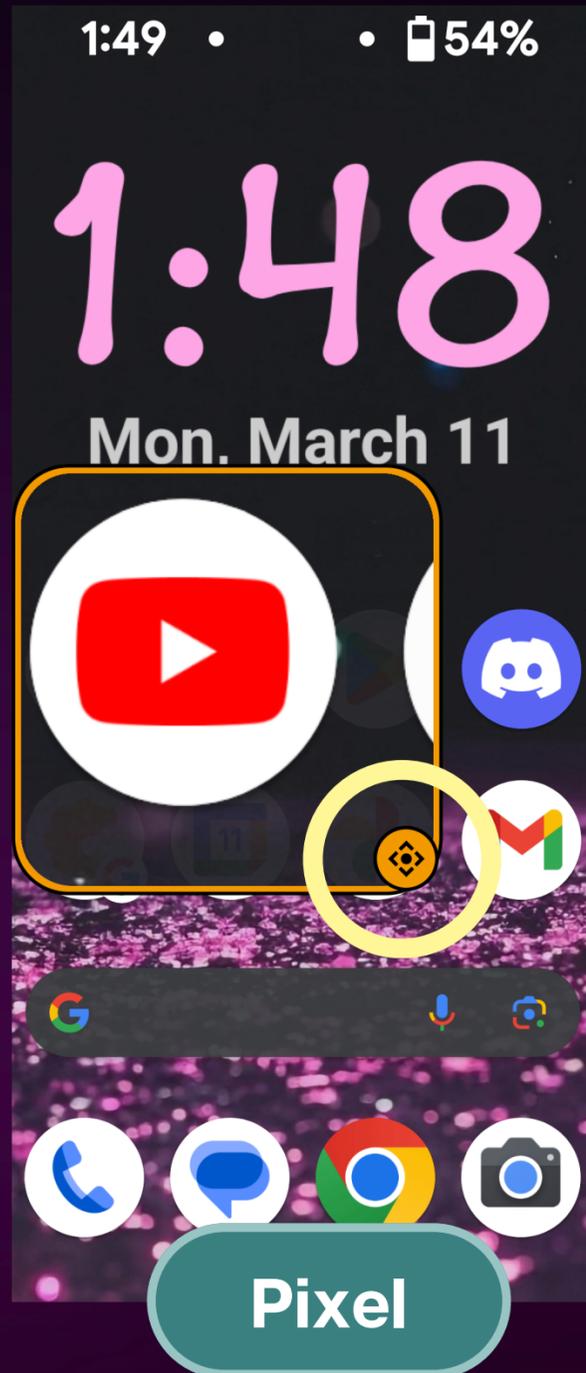


Android Magnification



- Select magnification shortcut
- Triple tap is under “advanced”
 - This may slow down device responsiveness, but is very easy
- Drag 2 fingers to pan
- Triple tap and hold, then drag to pan quickly
- You can set magnification to full screen or partial or have an icon to easily switch
 - Tap settings gear on bottom right

Android Magnification



Partial Magnification

- Use 2 fingers to pan or tap and drag on bottom edge of lens
- You can adjust size or switch to full
- Allow diagonal only for partial mag



- Tap lens icon for magnifier options (bottom right of lens)
- Adjust zoom
- “Edit” to adjust window size

Android Magnification



How to Use Magnification on Android & Everything You Need to Know! #accessibility.

LET'S TRY IT!

Choose triple tap for magnification

Try zooming in, panning, and quick panning

Try full screen and partial magnification

Adjust partial lens size



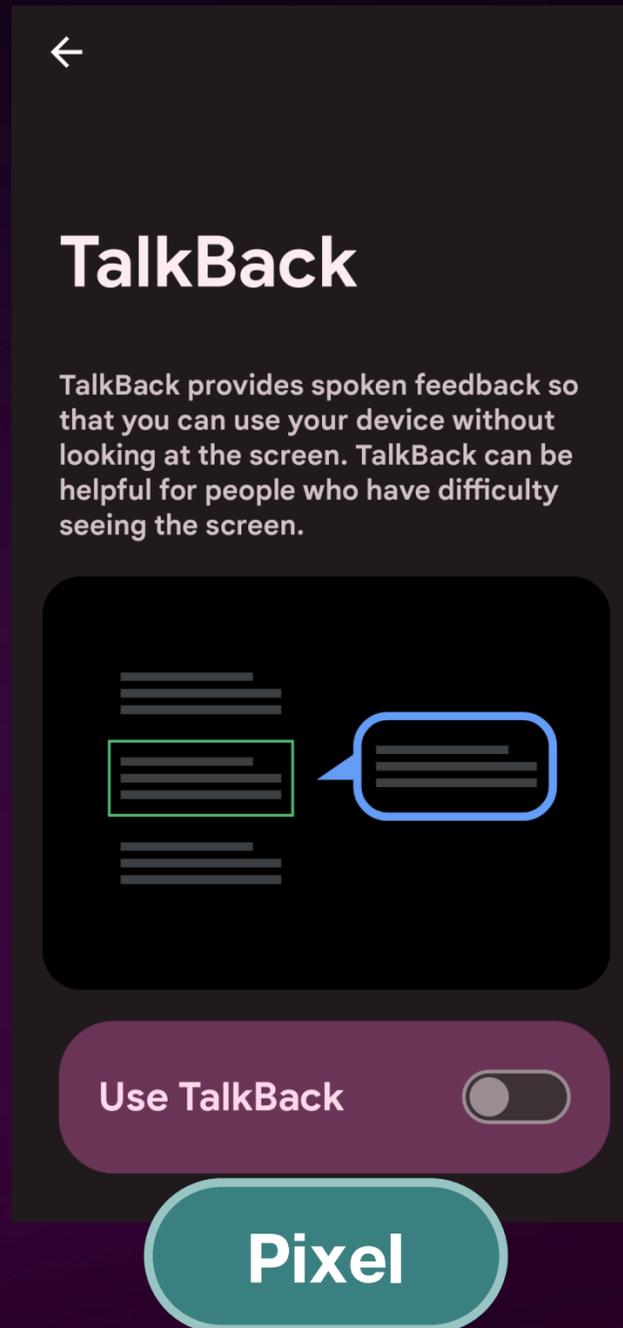
**Let's all take a
quick break!**



TalkBack



Talkback Basics



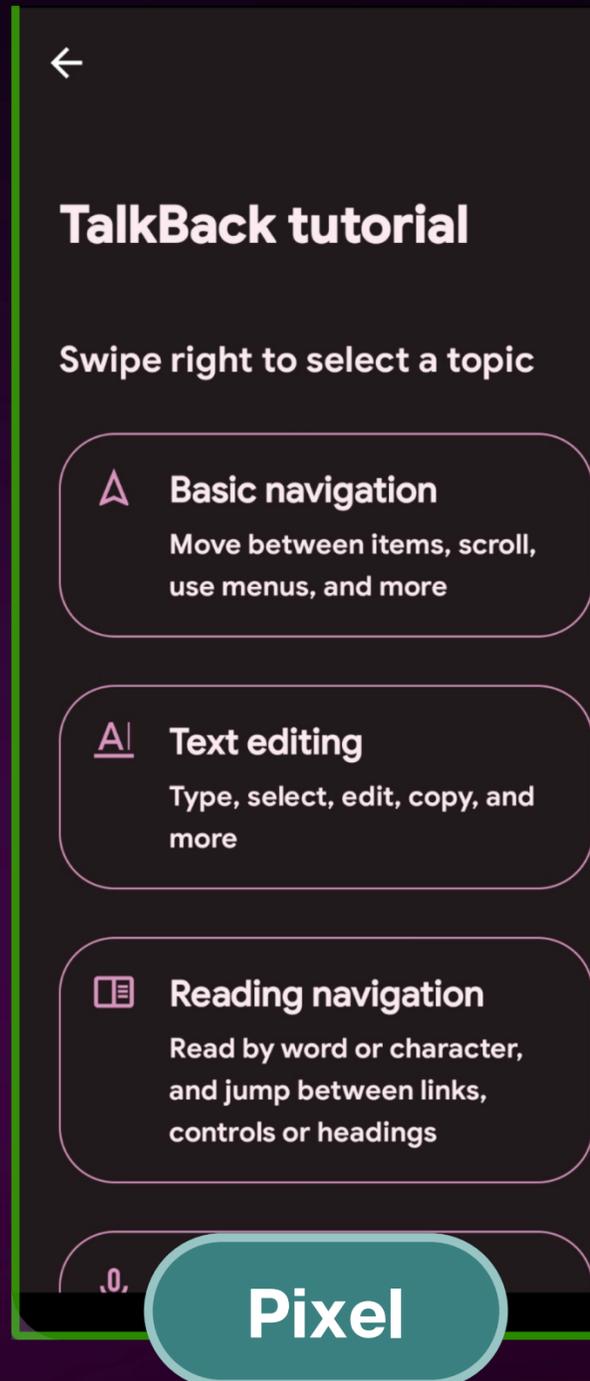
TalkBack is Android's screen reader

You can use Google Assistant to turn it on (Sometimes, this does not work because it's not set up or can be glitchy on some Samsung devices)

It will not feel the same as VoiceOver and may not feel as responsive



Talkback Basics (continued)



TalkBack has a “tutorial” which can be very helpful for new users.

- Auto launches for first time users
- It’s also accessible if you go to TalkBack > Settings > “Tutorial and help”
- There’s also a place to practice gestures in this menu

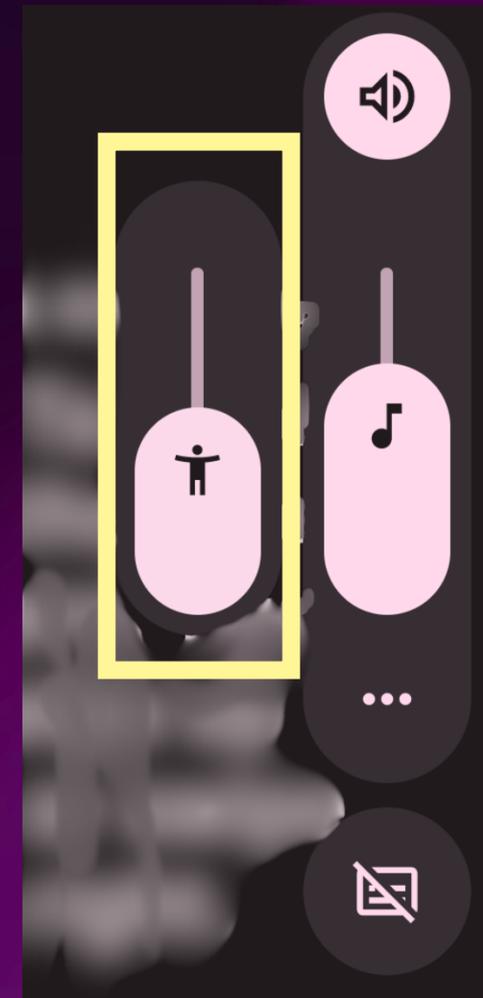


TalkBack/Accessibility Volume

To adjust TalkBack's volume, adjust accessibility volume
Tap and hold with one finger on the screen while pressing the volume buttons

You can also add “accessibility volume” to reading controls in TalkBack settings under “customize menus” > “customize reading controls”

You can also use the volume panel (opens when volume button is pressed)



TalkBack Basics Gestures

Explore by touch - drag one finger across the screen to announce item under your finger

Swipe right - next item

Swipe left - previous item

Double tap - activate focused item

3 button navigation - double tap on buttons

Gesture navigation

- 2 finger swipe up for home
- 2 finger swipe from edge for back
- 2 finger swipe up and hold for recents



LET'S TRY IT!

Turn on TalkBack

Navigate through home screen

Open an app

Go back to home

TalkBack 2 Finger Gestures

2 finger gestures “pass through” to system

2 finger swipe down from edge - notification shade

2 finger swipe left - next page / scroll next

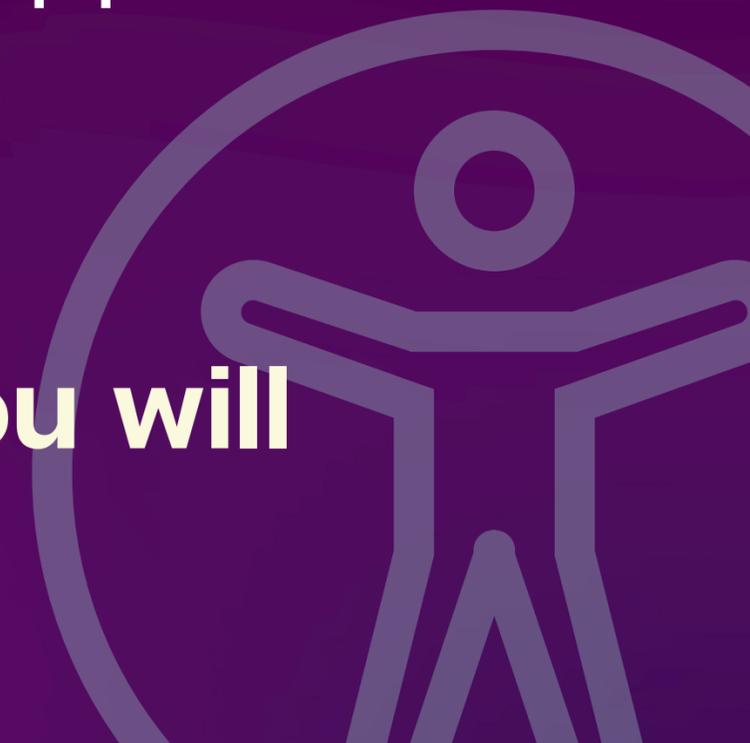
2 finger swipe right - previous page / scroll previous

2 finger swipe up in middle of home screen - app drawer

2 finger drag up - scroll down

2 finger drag down - scroll up

The faster you drag up or down, the more you will scroll up or down



LET'S TRY IT!

Open notification shade

Swipe to next and previous home screen pages

Open app drawer

Scroll up and down the app drawer

TalkBack Rotor - “reading controls”

3 finger swipe down/right - next reading control

3 finger swipe up/left - previous reading control

1 finger swipe up/down - Adjust or navigate by reading control **OR move to next/previous action**

Double tap on desired action

Older phones without multi finger gestures:

Swipe up, then down - Previous reading control

Swipe down, then up - Next reading control



LET'S TRY IT!

- Choose words from reading controls**
- Navigate by words**
- Change speech rate**
- Try TalkBack actions on homescreen**
- Try TalkBack actions on recent apps**

Some TalkBack Multi Finger Gestures

3 finger tap - open the TalkBack menu

2 finger tap - pause speech

2 finger triple tap and hold - toggle speech

2 finger double tap - pause/play media or answer/end calls

4 finger tap - practice gestures

4 finger double tap - tutorial & help menu



LET'S TRY IT!

- Open the TalkBack menu, then close it**
- Toggle speech ON and OFF**
- Open “tutorial & help” using gesture**
- Open “practice gestures” using gesture**

Some Talkback Angle Gestures

When performing gesture, make one continuous movement with a sharp corner (like writing an L) **Make sure to begin gesture as soon as you touch the screen**

Swipe up, then left - home

Swipe down, then left - back

Swipe right, then down - notifications

Swipe left, then up - recent apps

Swipe down, then right or swipe up, then right - Open talkback menu

Swipe right, then up - voice commands



LET'S TRY IT!

Open “practice gestures”

Try to do some angle gestures

Dismiss “practice gestures”

Try to go home, back, notifications, recents,

TalkBack menu, and voice commands

TalkBack Back and forth Gestures

When performing gesture, make one continuous movement with a sharp reverse turn (You can also think of it like drawing an arrow ^) **Make sure to begin gesture as soon as you touch the screen**

Swipe up, then down - previous reading control

Swipe down, then up - next reading control

Swipe right, then left - scroll back

Swipe left, then right - scroll previous



LET'S TRY IT!

Open “practice gestures”

Try some back and forth gestures

Dismiss “practice gestures”

Use reading controls with back and forth gestures

**Scroll to next and previous home screens with back
and forth gesture**

TalkBack Voice Commands

There will be an accessibility sound unless device is set to vibrate/mute.

Swipe right, then up - Start TalkBack voice command

- Help (all commands)
- Home
- Back
- Recents
- Notifications
- Quick settings
- Speak faster
- Speak slower
- Next [heading]
- [Words] navigation
- Find [item]
- Read from next
- Label [say label]
- Actions
- TalkBack settings
- Text editing
- Type [say what you want to type]

LET'S TRY IT!

Try some TalkBack voice commands

Navigate home, recents, back, notifications, all apps

Try speak faster and slower

Show and hide screen

Open help and look through the different options

Navigating to TalkBack Settings

Ways to get to TalkBack Settings

- Navigate by going to settings > accessibility > TalkBack > settings
- Open TalkBack menu (3 finger tap), and select TalkBack settings
- Use voice command “TalkBack settings”

LET'S TRY IT!

Try different ways to open TalkBack settings

TalkBack Settings

RECOMMENDED: Turn off “use proximity sensor”!
(not available on Samsung)

- **Text-to-speech settings** (many ways to get here)
- **Verbosity** - how much information will Talkback give?
- **Sound and vibration** - toggle sounds, toggle vibration, toggle audio ducking, adjust volume of sounds
- **Customize focus** - thickness and color of focus indicator
- **Customize Gestures** - View/change actions of gestures
- **Customize Menu** - choose what appears in talkback menu and reading controls

TalkBack Settings (continued)

- **Automatic Descriptions** - describe icons, images, and text on images
- **Braille Keyboard**- on screen keyboard (like braille screen input, but it has extra gestures for text editing!)
- **Braille display** - connect/customize a braille display
- **Tutorial & help** - Use “practice gestures”, tutorial, or help
- **Advanced Settings** - Element description order, speak passwords toggle, and **typing preferences**

LET'S TRY IT!

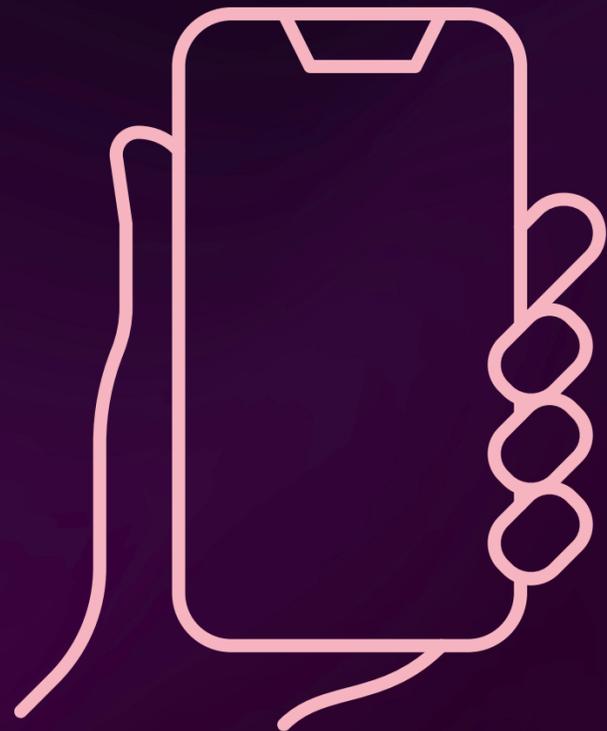
Look through TalkBack settings

Customize gestures

Customize menus

Change typing preference

TALKBACK ACTIVITIES



Here are some ideas:

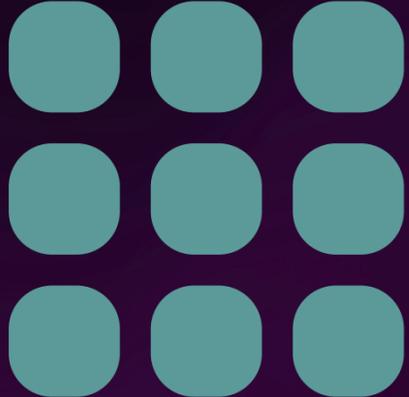
- **Type a message or note**
- **Try navigating and playing some videos on YouTube**
- **Try creating a contact**
- **Anything else you'd like to try!**

QUESTIONS?

**Does anyone have any questions
about what we've covered so far?**



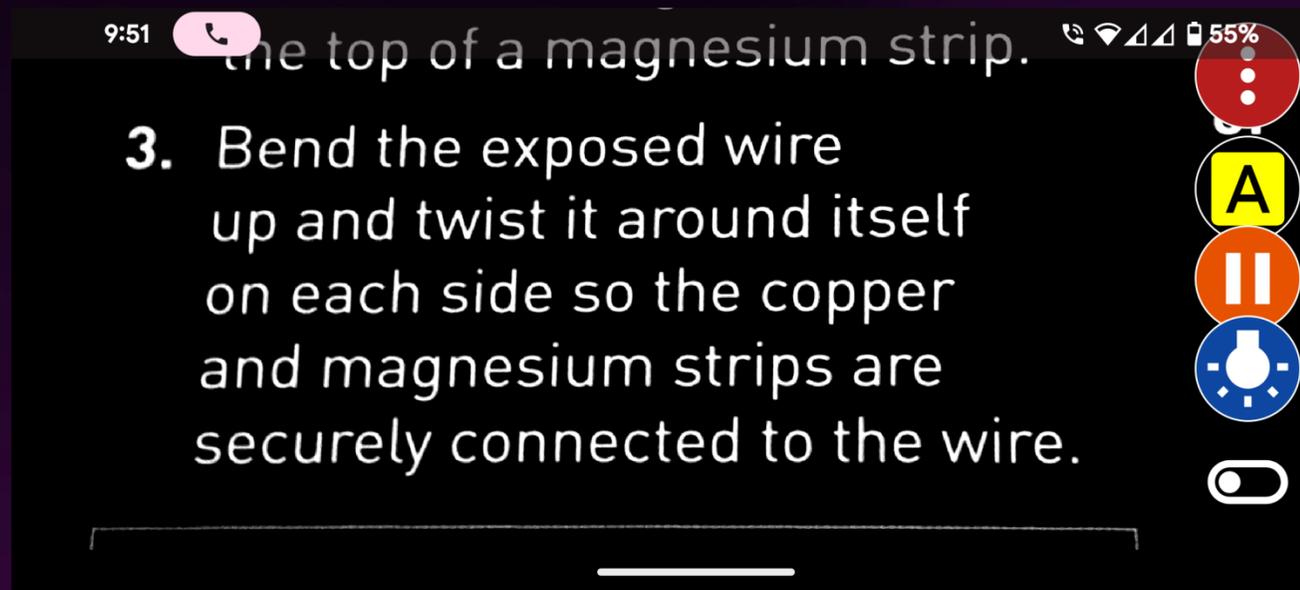
**Let's all take a
quick break!**



Accessibility Apps



WeZoom

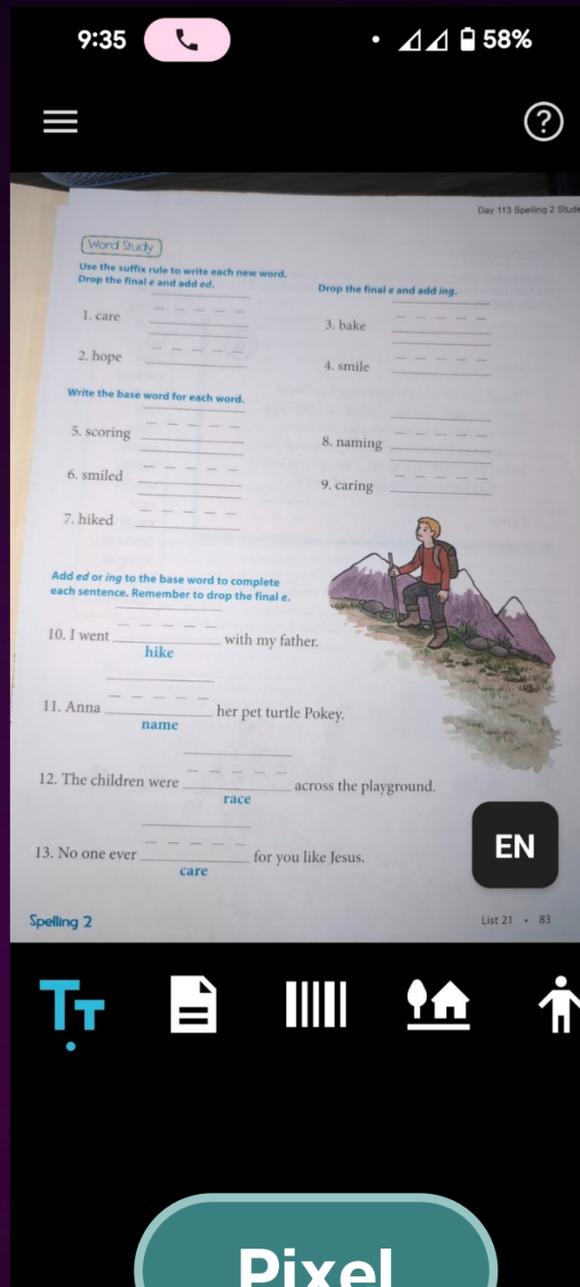


Best magnifier app on Android (No ads!)

- Color filters
- Buttons (can choose colorful buttons)
- Adjust brightness and exposure
- Has “advanced gestures” mode
- Customize volume keys action
- ...and more!



Seeing AI

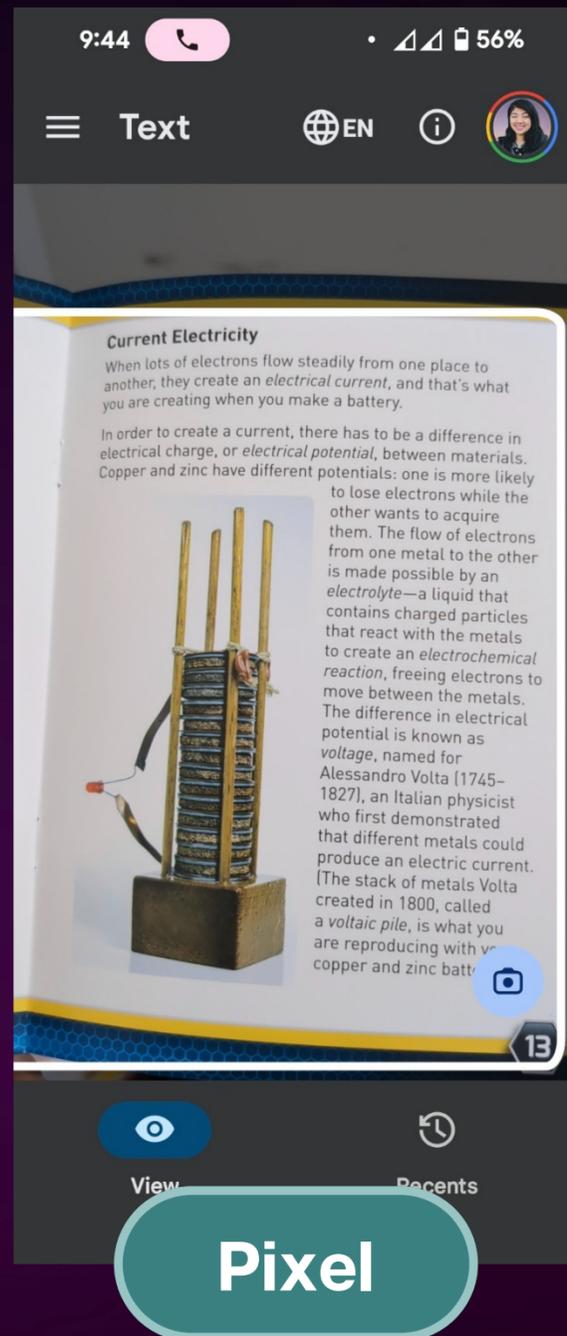


Seeing AI is now on Android!

This is my top recommendation!

Though you cannot add this to an accessibility shortcut, you can use an Android shortcut like “quick tap”, add an icon, use Google assistant or use a shortcut app.

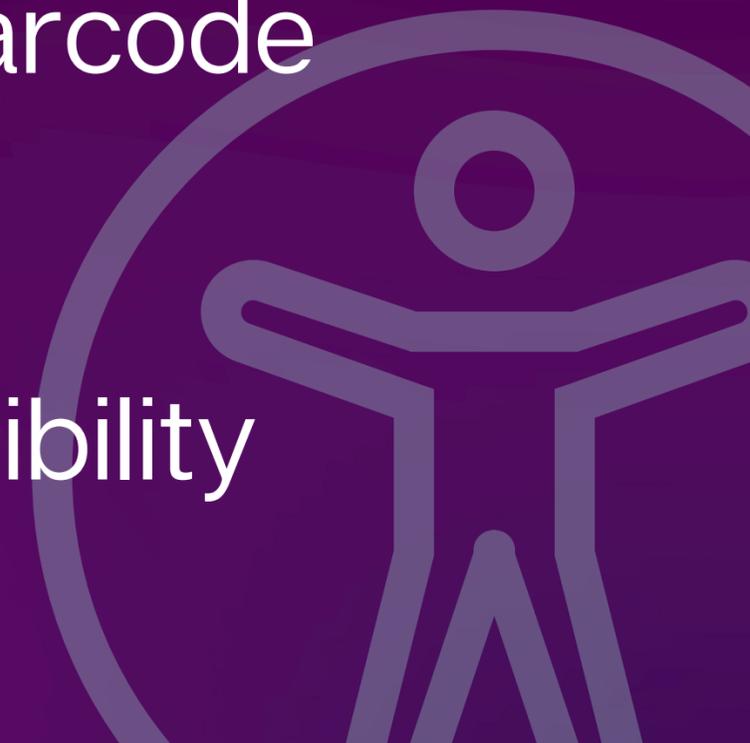
Google Lookout



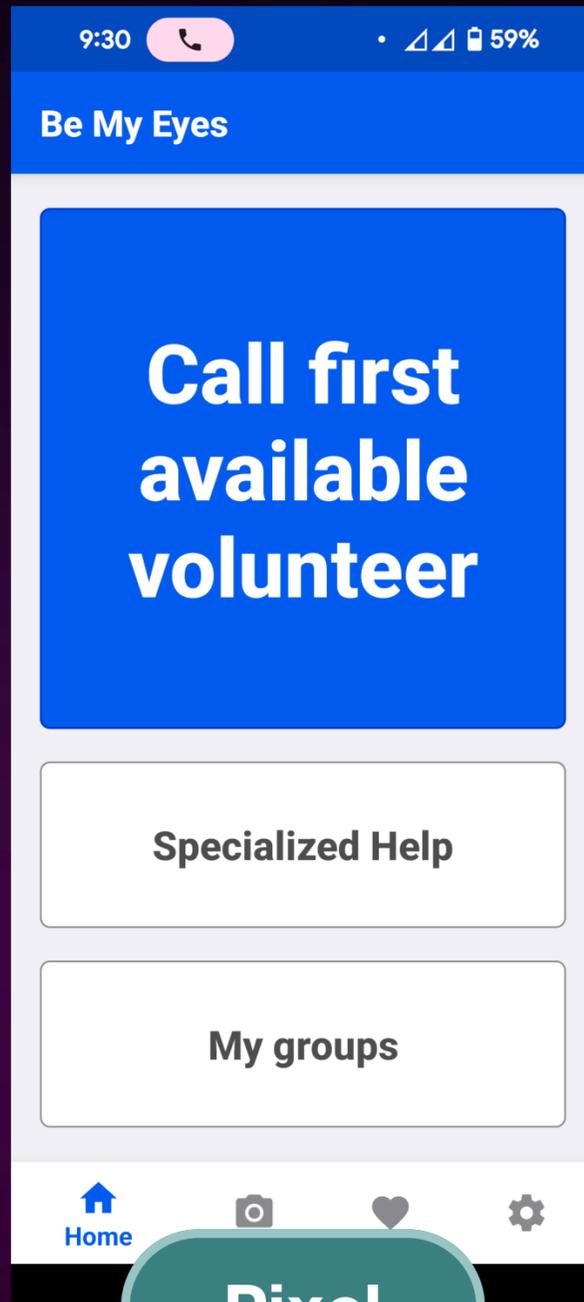
Google Lookout is similar to Seeing AI. A few key differences:

- Live “Explore” mode announces both text and recognized objects
- Food labels mode can recognize some foods by image, not barcode
- Uses menu navigation

You can assign this to an accessibility shortcut.



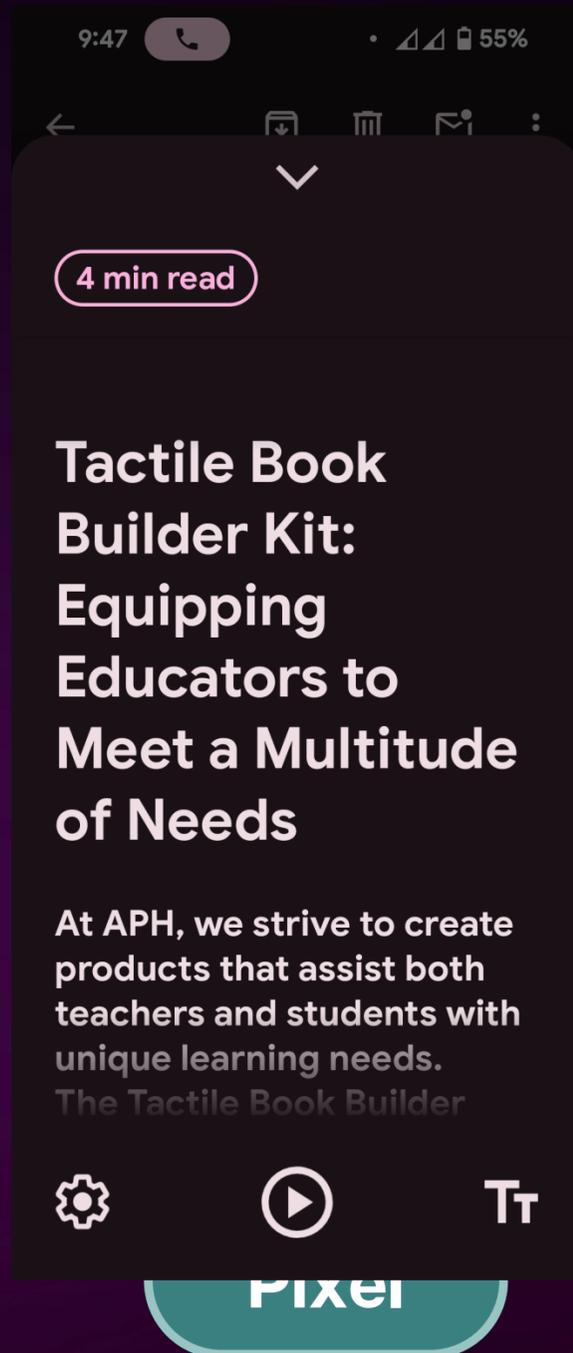
Be My Eyes / Be My AI



Use Be My Eyes to connect with a volunteer, specialized help or use Be My AI!

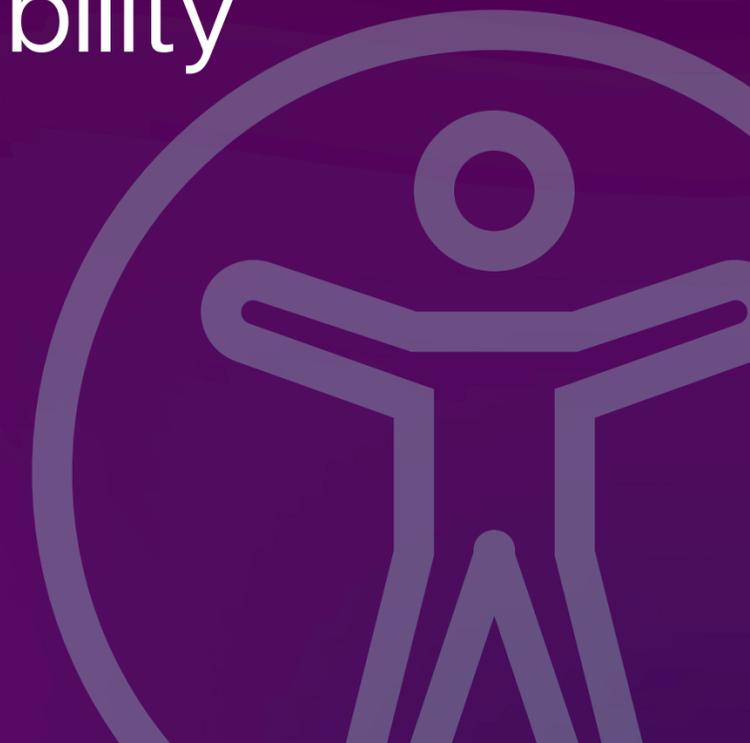


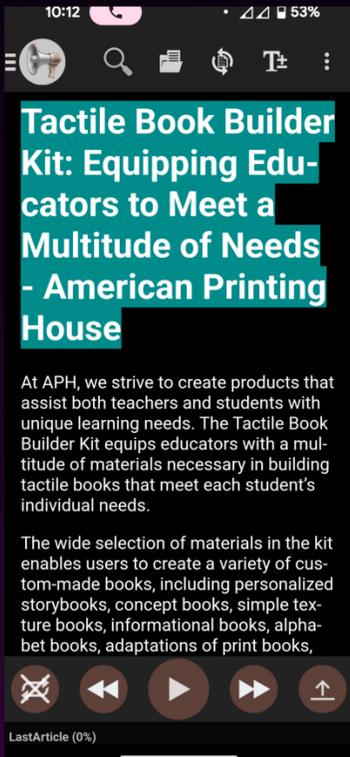
Reading Mode



Have articles and emails read aloud, customize the format, and listen in the background.

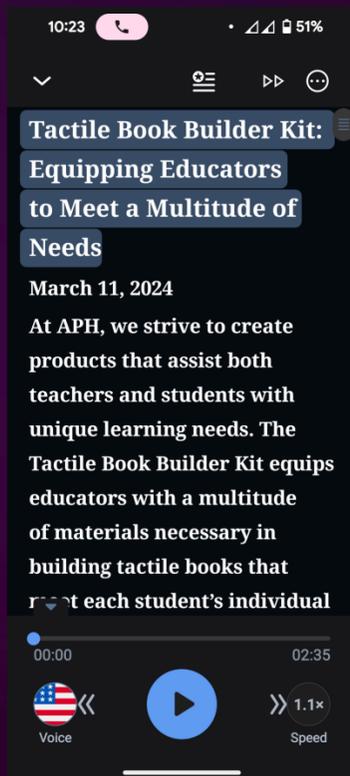
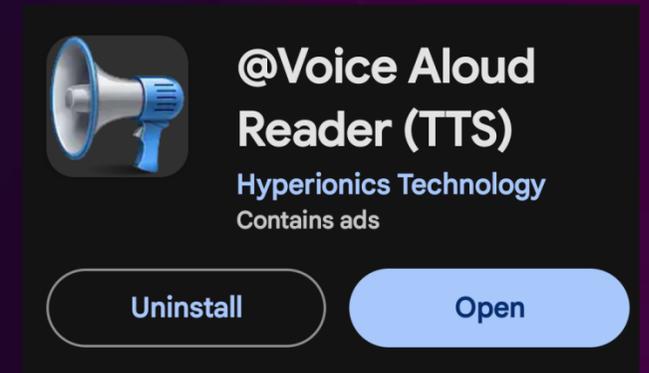
You can assign this to an accessibility shortcut.





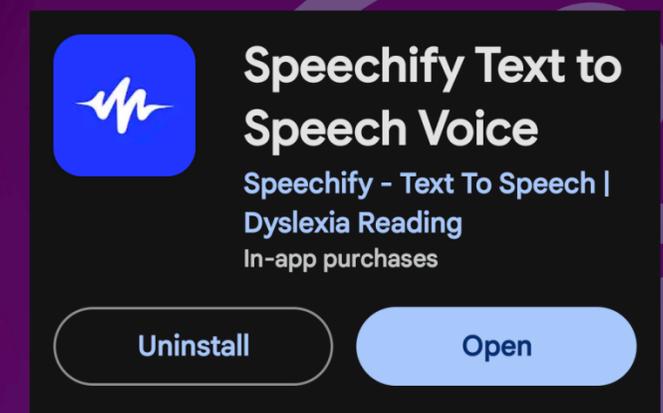
@Voice Aloud Reader

FREE Alternative to Reading mode. It is free, but the interface is a bit clunky as there are a lot of features.

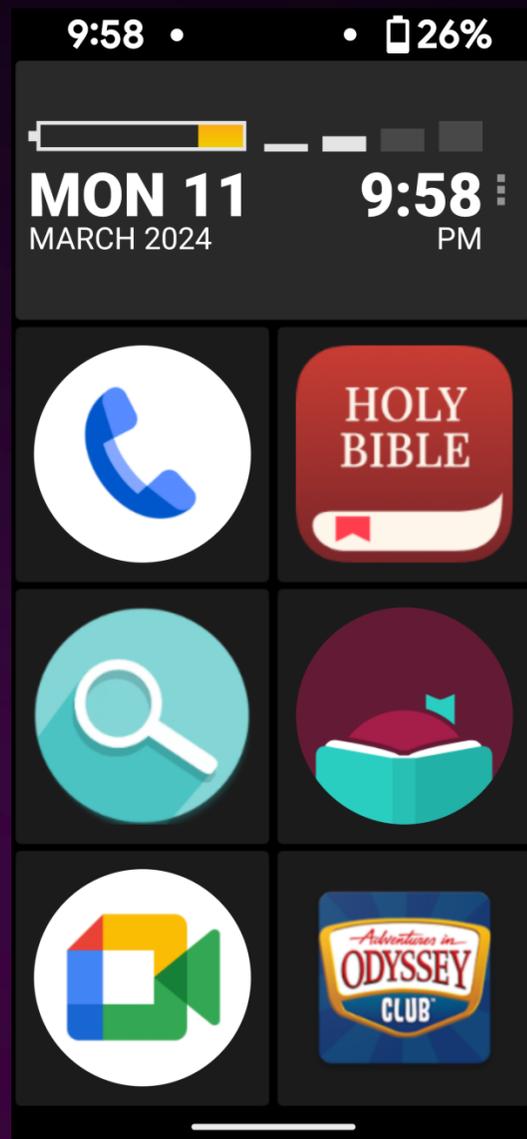


Speechify

PAID (has free version) alternative to reading mode. It has nice voices and cleaner layout.



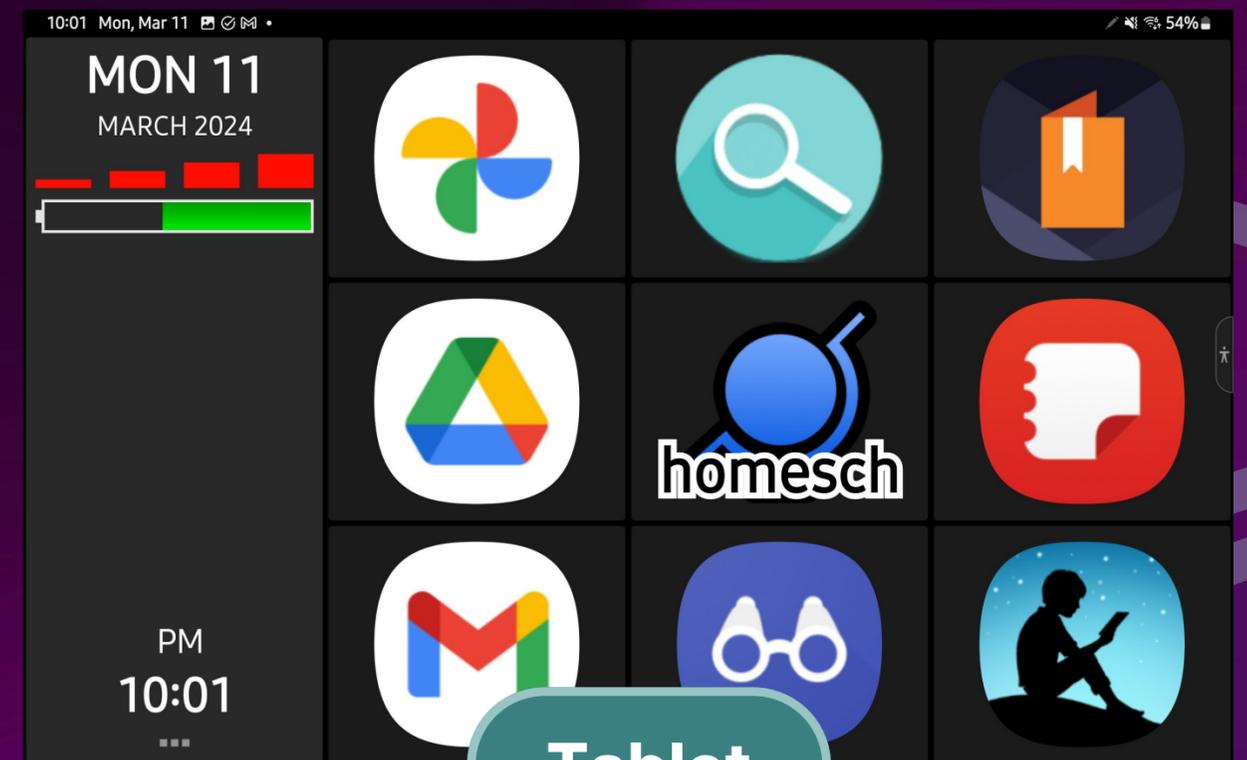
Big Launcher



Pixel

Home screen replacement: Make your home screen icons and more extra large!

- Tap and hold to read aloud
- Choose grid size
- Big Phone and Big SMS also available
- **Paid app**

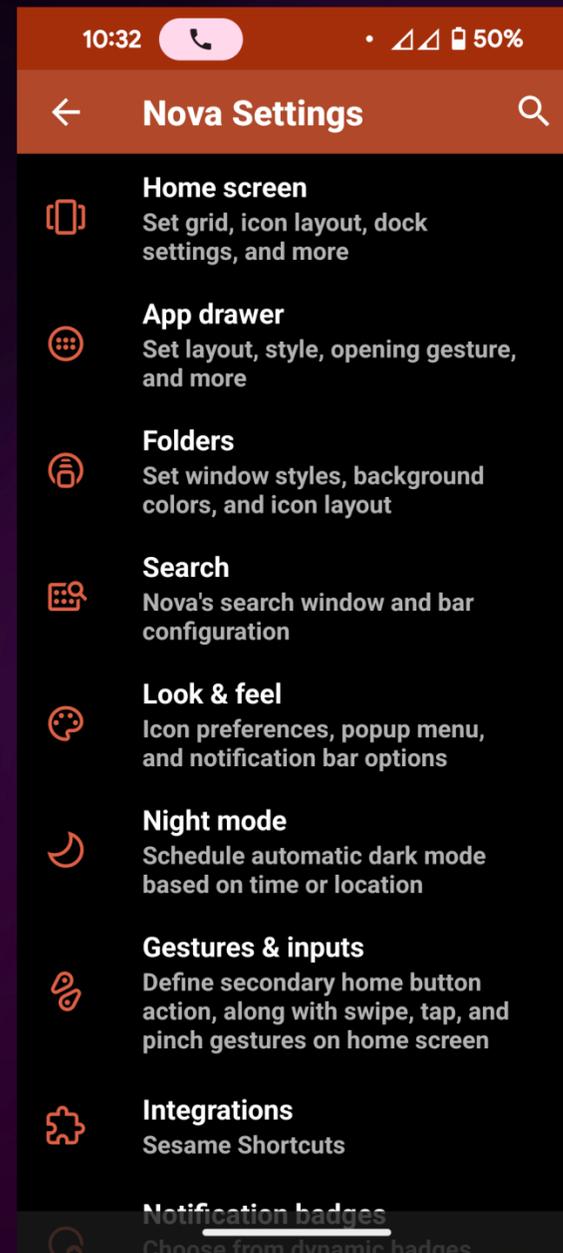


Tablet

Nova Launcher



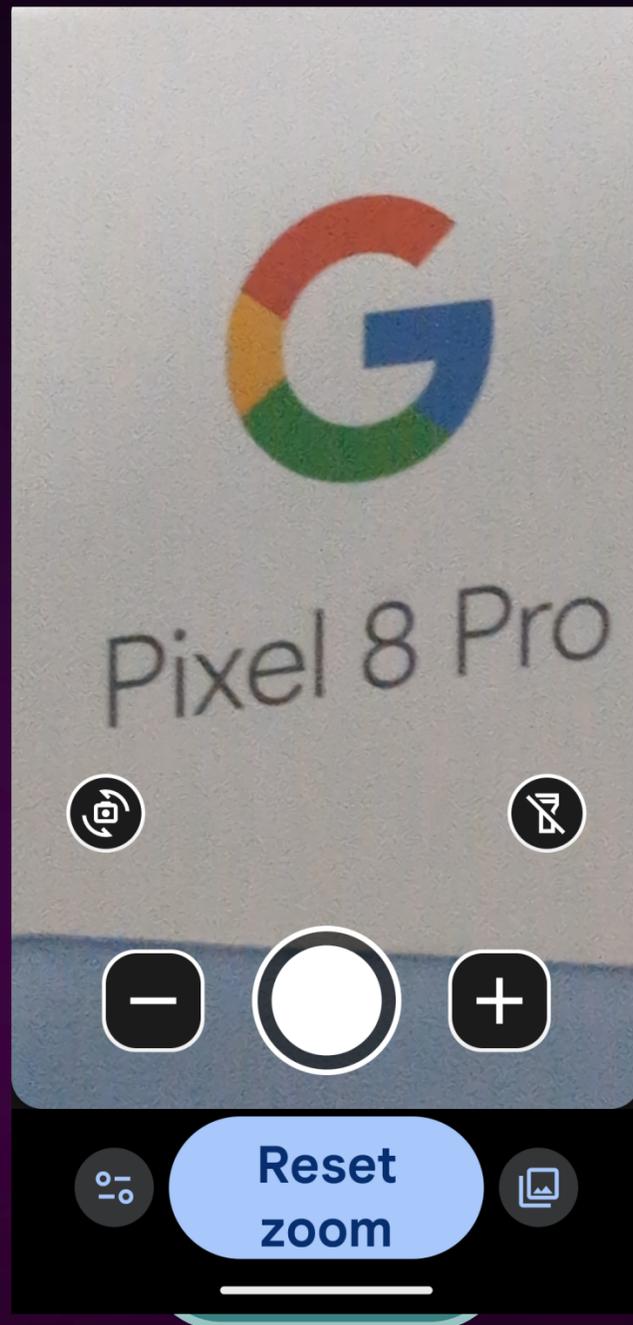
Pixel



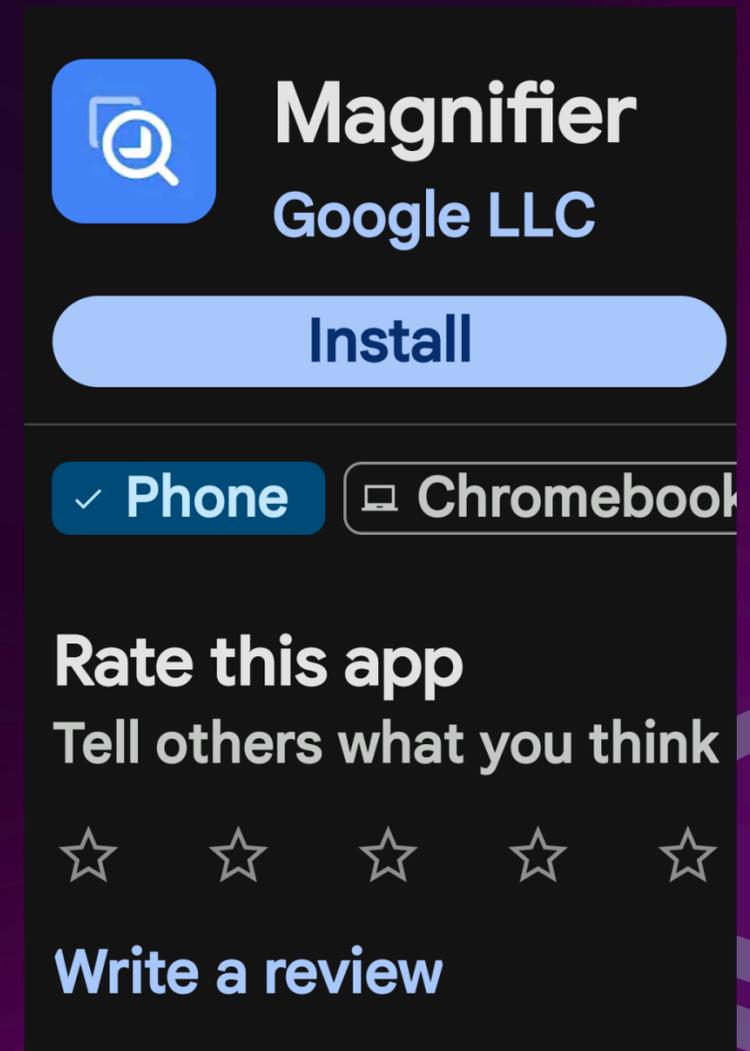
Home screen replacement that is very customizable and accessible with a screen reader.

Has customizable gesture shortcuts like pinch in or out and 2 finger twist clockwise (similar to iOS rotor!)

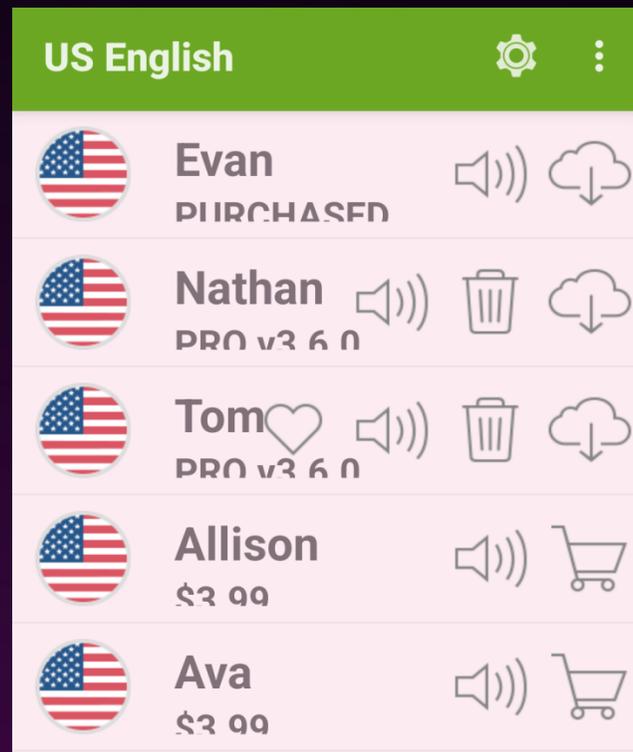
Pixel Only Magnifier



Pixel now has its own magnifier available on the Google Play store

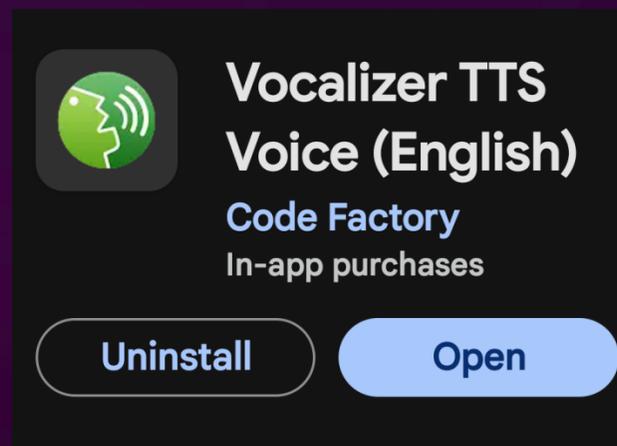


Vocalizer TTS

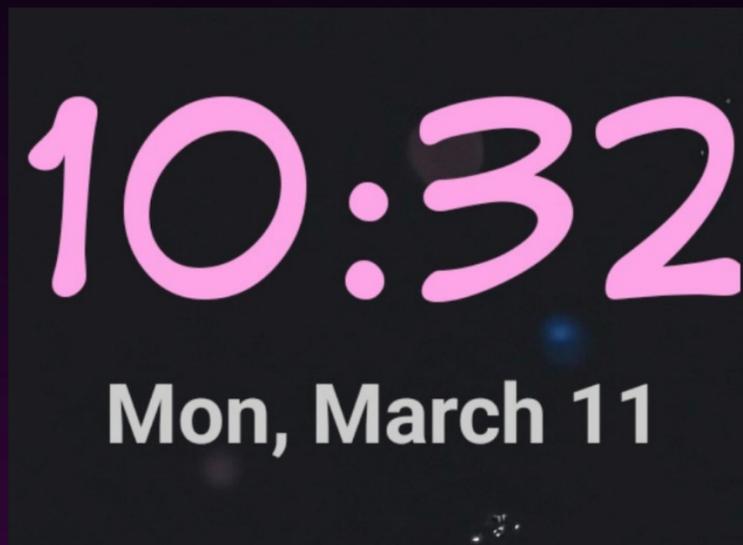


Use a different voice for TalkBack and other apps that use a TTS (text to speech)

\$3.99 per voice



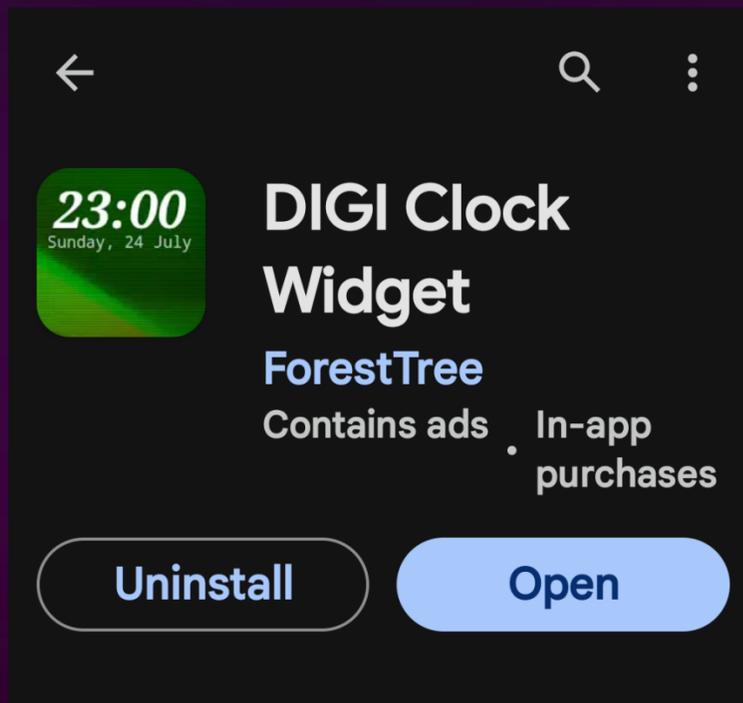
Digi Clock Widget



Add the largest possible clock widget on the home screen.

Fully customizable and also has advanced shortcuts.

FREE with in app purchases (no compelling reason to purchase IMO)

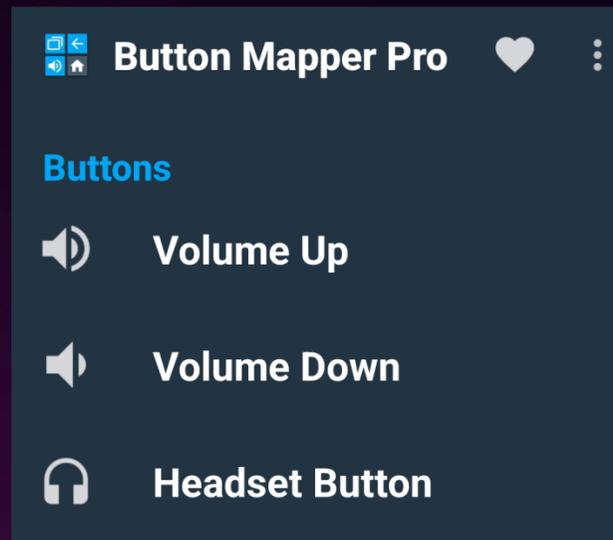




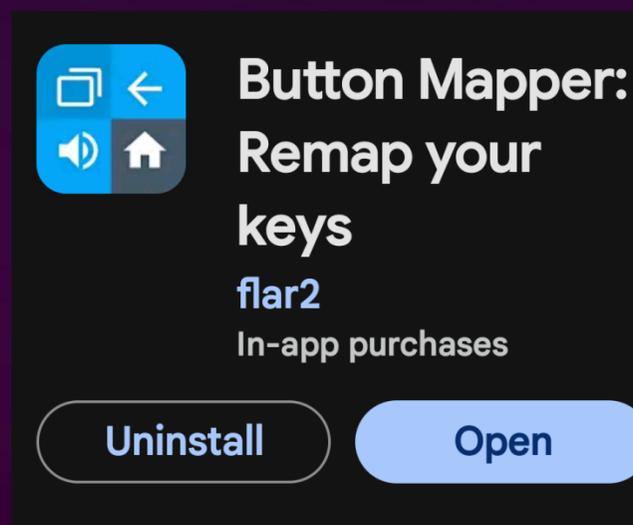
More Advanced Apps



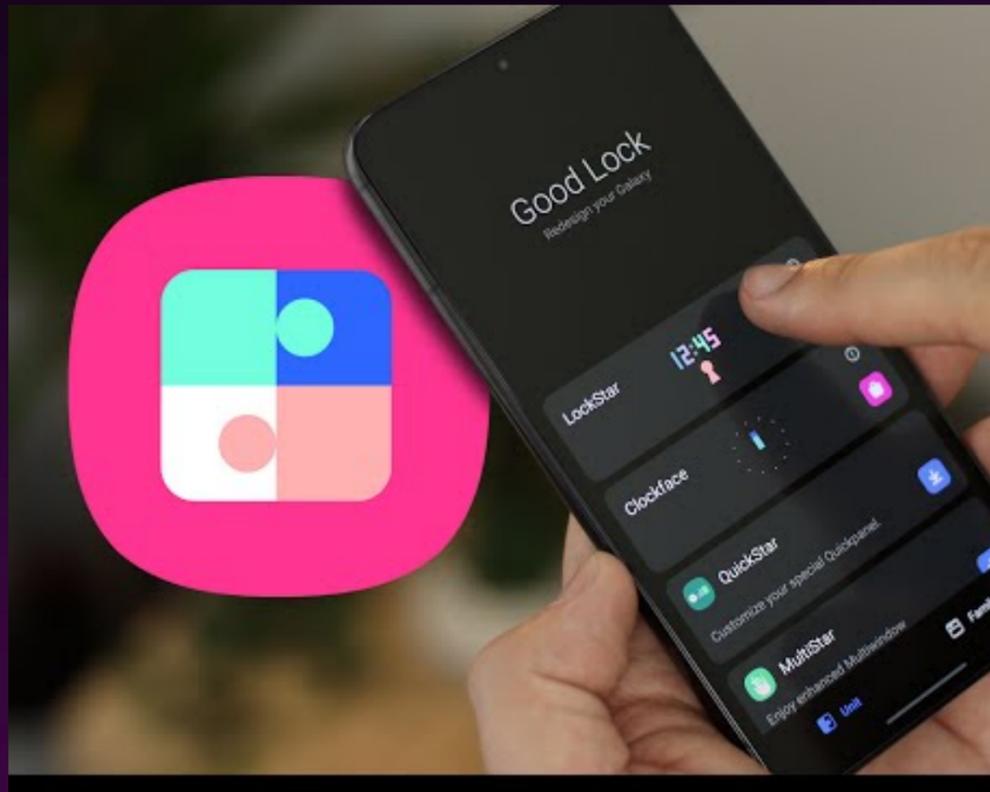
Button Mapper



Customize the volume buttons. I recommend only using “long press” and not changing other settings.



Goodlock



For Samsung devices only

Add extra customization to your phone. For example, set volume keys to skip to next or previous tracks even when the screen is off.



More Android Apps

- BARD mobile
- Aira Explorer
- Envsion AI
- Supersense
- Lazarillo
- RightHear
- Bookshare
- Bing (Co-Pilot)
- Action Blocks
- Live Transcribe
- Audible
- Libby
- Librivox
- Tile
- Recorder
- Alexa App
- Action Blocks



Other Helpful Android Tips

- **Pixel “quick tap”** - double tap the back of the phone to open apps, toggle flashlight, play/pause media and more.
- **Double press side button** - launches camera
(Samsung: you can customize this to open any app.)
- **Customize Lock Screen** - add shortcuts and make the clock very large
- **Direct Call or Direct Message widgets** - tap widget to call or message from the home screen



Other Helpful Android Tips (cont.)

- **Use Gboard** - best keyboard with clipboard and dictation is better on Gboard. (Use Samsung keyboard is high contrast keyboard and read keyboard input aloud is important for user)
- **Customize Quick Settings** - organize quick settings in order and position best for user. Tiles like dark mode, reading mode, text size, color inversion, and flashlight may be helpful to add



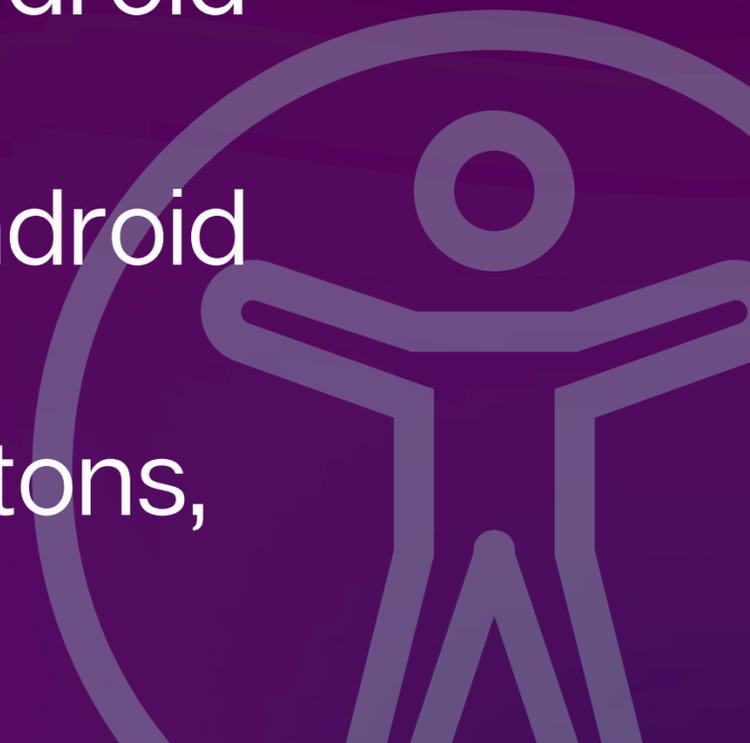


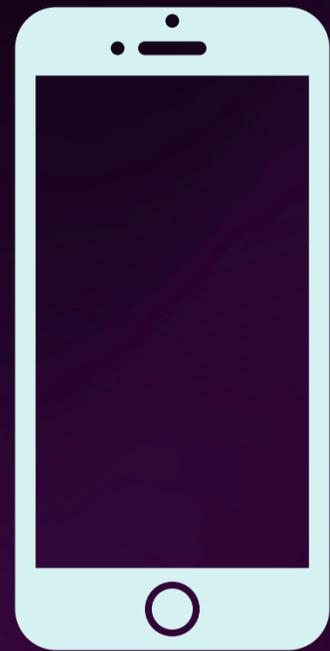
Why choose Android?



Reasons to choose Android

- **Price** - For TalkBack users, it is recommended to NOT use budget phones!
- **Customization** - The device can be customized more than an iPhone, especially for more advanced users. There are also many device choices.
- **Comfort / familiarity** - Some started with an android and know it very well
- **Ecosystem** - Easier to use Google products, Android devices, and PC connectivity
- **Great for low vision/VI users** - Text, layout, buttons, and icons can be larger in more apps





Choosing an Android phone



Choose an Android phone

I recommend Pixel or Samsung

- Pixel 8 has up to 7 years of OS updates
- Samsung S24 has up to 7 years of OS updates
- Pixel and Samsung A series are alright, though I would wait for the newest ones coming this year to have 7 years of updates

I recommend NOT getting

- OnePlus or Xiaomi - Accessibility is “hidden”
- Budget phones = TalkBack will be SLOW





Resources



Android Accessibility Resources

Carrie on Accessibility - I go over a lot of Accessibility, tech, and more!, and more!

- [Android Accessibility Playlist](#)

Blind Android Users Podcast - Great podcast and large community ready to answer questions!

- [TalkBack highlights playlist](#)

Live Accessible - My old channel, some TalkBack videos though a bit outdated. (Working on new videos!)

- [Talkback 101 Playlist](#)

The Blind Life - Sam has some videos on Android, too!

- [TalkBack 101 Playlist](#)





Any questions?



THANK YOU!

Email: email@carrieonaccessibility.com

You can follow

Carrie on Accessibility:

