



ArcGIS Online: Accessibility Best Practices for Web Apps

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Session Agenda

ArcGIS Online: Accessibility Best Practices for Web Apps

- Esri Accessibility Program
- Accessibility and Disability Background
- Accessibility Testing Principles
- Building Maps for Accessibility
- Configuring Web Apps
- Esri Accessibility Resources
- Open Discussion

Esri Accessibility Program

What does Accessibility mean to Esri?

Support and Inclusion for
people of all abilities

Promote product accessibility
across Global Standards

Compliance for government
accessibility requirements

Deploy cross-platform strategy to

- drive **accessibility innovation** in our product development
- **make a difference** in our global culture
- support our users in **successful implementation of GIS** with robust and accessible software.

Introduction to Accessibility

Why is accessibility important?



1 billion

people worldwide are living with a disability

2030



by this year, 2 billion people will need at least 1 assistive technology

25+



countries currently have web accessibility laws and policies



20%

of web traffic could come from a person with a disability

Accessibility Standards & Guidelines

US Section 508

US standards for ICT accessibility
for federal agencies

ADA

Civil rights law for businesses
in private or public sector

WCAG

Web
Content
Accessibility
Guidelines

Internationally recognized
accessibility standards;
2.1 AA is industry standard

European Union

Japan

Canada

Australia, New Zealand

United Kingdom

ArcGIS Accessibility Conformance Reports

VPAT

Voluntary Product Accessibility Template;
Commonly used template

ACR

Accessibility Conformance Report;
Documentation for product accessibility details;
May use VPAT template as part of ACR report

Esri Accessibility C

Product Information

Product Name/Version: Arc

Report Template: Revised S

Product Release Date: Dec

Report Date: January 05, 20

Product Description: ArcGIS
presenting location-based i
a single screen. Every orga
visualize trends, monitor sta

Notes: This report is written
authoring environment as w

Evaluation Methods Used: 1
manual and functional testi
accessibility professionals o
Dashboards using, among c
exclusive use of the keyboa
typical user workflows was i

Contact Information: Enviro

For more information regard
<https://www.esri.com/en-us/le>

Specific inquiries may be er
Contracts and Legal Depart

Web Content Accessibility Guidelines (WCAG) Report

WCAG Principle 1: Perceivable

Information and user interface components must be presentable to users in ways they can perceive. Report contains Level A and AA only (Revised Section 508 does not apply to AAA).

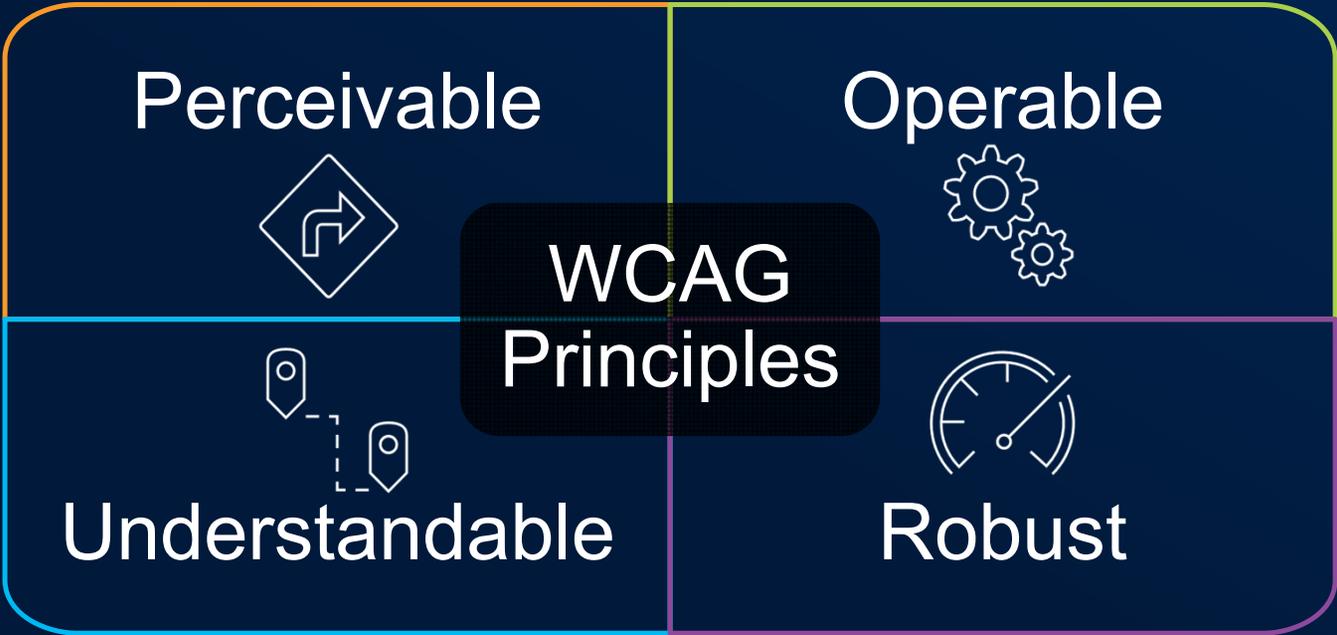
Table 4: WCAG Principle 1 Success Criteria - Perceivable

Criteria	Conformance Level	Remarks and Explanations
1.1.1 Non-text Content (Level A) All non-text content that is presented to the user has a text alternative that serves the equivalent purpose, except for the situations listed below.	Partially Supports	Some non-text content that is presented to the user has a text alternative that serves the equivalent purpose. However, a rating of Partially Supports has been given for the following reasons: <ul style="list-style-type: none"> Most SVG elements are not marked as decorative images. Some custom controls do not provide proper textual name, role, and state information. In some cases, content intended to be hidden from all users is exposed to assistive technologies. Additional information specific to the output of this product: <ul style="list-style-type: none"> There are rare instances where content is not visible to assistive technology. In some cases, meaningful images and charts lack a textual equivalent.
1.2.1 Audio-only and Video-only (Prerecorded) (Level A) For prerecorded audio-only and prerecorded video-only media, the following are true, except when the audio or video is a media alternative for text and is clearly labeled as such:	Supports	The product does not have pre-recorded audio-only or pre-recorded video-only content.
<ul style="list-style-type: none"> Prerecorded Audio-only: An alternative for time-based media is provided that presents equivalent information for prerecorded audio-only content. Prerecorded Video-only: Either an alternative for time-based media or an audio track is provided that presents equivalent information for prerecorded video-only content. 		
1.2.2 Captions (Prerecorded) (Level A) Captions are provided for all prerecorded audio content in synchronized media, except when the media is a media alternative for text and is clearly labeled as such.	Supports	The product does not contain prerecorded content requiring synchronized captions.
1.2.3 Audio Description or Media Alternative (Prerecorded) (Level A) An alternative for time-based media or audio description of the prerecorded video content is provided for synchronized media, except when the media is a media alternative for text and is clearly labeled as such.	Supports	The product does not contain prerecorded content requiring synchronized audio description.
1.2.4 Captions (Live) (Level AA) Captions are provided for all live audio content in synchronized media.	Supports	The product does not have live video or audio content.



Testing for Web Accessibility

Web Content Accessibility Guidelines



Testing for accessibility

Color and Contrast

- Elements in the foreground (especially text) need to stand out clearly and be legible against the background
- Can test with [WebAIM Contrast Checker](#) (should be 4.5:1 or greater for maximum accessibility)

The image shows a screenshot of a color contrast checker tool. It features two color selection panels and a contrast ratio display. The foreground color panel shows a dark red color with hex code #620028 and a lightness slider. The background color panel shows a white color with hex code #FFFFFF and a lightness slider. The contrast ratio is displayed as 13.54:1, which is significantly higher than the 4.5:1 minimum required for maximum accessibility.

Color Type	Hex Code	Lightness Slider Position
Foreground Color	#620028	Low (dark)
Background Color	#FFFFFF	High (light)

Contrast Ratio: **13.54:1**

Testing for accessibility

Color and Contrast

- As many as 1 in 20 people worldwide have some form of Color Vision Deficiency (CVD)
 - Deuteranopia (green-blind)
 - Protanopia (red-blind)
 - Tritanopia (blue-blind)
- Test your content's color palette to check for forms of CVD



Full-color vision



*Deuteranopia
(red-green CVD)*



*Protanopia
(red-green CVD)*



*Tritanopia
(yellow-blue CVD)*

Testing for accessibility

Keyboard Navigation

Who does this impact?

- Individuals using keyboards may have mobility disabilities
- Many consumers of online content use the keyboard (or any other text entry devices) rather than a mouse to navigate through web pages, apps, etc.
- Consider the Permanent, Temporary, and Situational conditions that could impact ability to use a keyboard

Testing for accessibility

Keyboard Navigation

Why is testing for keyboard navigation important?

- Keyboard navigation maps to other types of navigation interfaces (e.g. voice recognition software, switch controllers, pedals, etc)
- Optimizing for keyboard support takes you a long way in optimizing for other assistive technologies
- Relatively easy to test and confirm navigability of your technology

Testing for accessibility

Keyboard Navigation

Tab	move forward through interactive elements (e.g. link, button, form)
Shift + Tab	move backward through interactive elements
Arrow keys	move between parts of composite UI elements
Enter	activate the current selection (e.g. links, buttons)
Space	check/uncheck, and activate the current selection
Escape	close the current selection and return focus to the element that opened it
Shift + Arrows	expand/close dialog divider
Shift + F10	open a context menu (pop-up menu)
Alt + Down Arrow	opens a combo box

Testing for accessibility

Screen Readers

Who does this impact?

- Upwards of 2.2 billion people have vision impairment (as of 2022)
- More than 12 million people in the US (over 40) have vision impairment (as of 2021)
- Screen reader users are often blind, but also include users with low vision, cognitive or learning disabilities, and those who prefer voice assistants
- Consider the Permanent, Temporary, and Situational conditions that could impact a human's sight

<https://www.who.int/news-room/fact-sheets/detail/blindness-and-visual-impairment>

Testing for accessibility

Screen Readers

SCREEN READER	BROWSER	OS
<u>NVDA</u>	Firefox, Chrome	Windows
<u>JAWS</u>	Chrome, IE	Windows
<u>Narrator</u>	Edge, Chrome	Installed in WIN 10
<u>VoiceOver</u>	Safari, Chrome	MacOS, iOS
TalkBack	Chrome	Android mobile

Data from WebAIM 2019 Survey on Screen Reader Preference

Testing for accessibility

Automated testing tools – Web Scanners

Accessibility Insights

Optimized for various environments:

- Web browser extensions
- Windows OS version
- Android apps (run on desktop)
- Created by Microsoft

Axe Dev Tools

Optimized for web and desktop:

- Web browser extensions (free and upgraded modes of operation)
- Axe-core API for testing (open source)
- Created by Deque

An abstract graphic on the left side of the slide. It features several overlapping, semi-transparent map patterns in various colors: teal, orange, yellow, and dark blue. These patterns are layered over a dark blue background. Overlaid on these maps are numerous colorful, flowing ribbons in shades of teal, yellow, green, and blue, creating a sense of movement and connectivity. The overall composition is dynamic and visually rich.

Building Maps for Accessibility

Building Maps for Accessibility

Combined Approach

Enhanced Contrast
Basemaps in basemap gallery

Map navigation keyboard shortcuts in Map Viewer

Map description in ArcGIS Instant Apps



Map accessibility: Add a description to provide a text equivalent of your map and its content for app viewers with vision impairment.

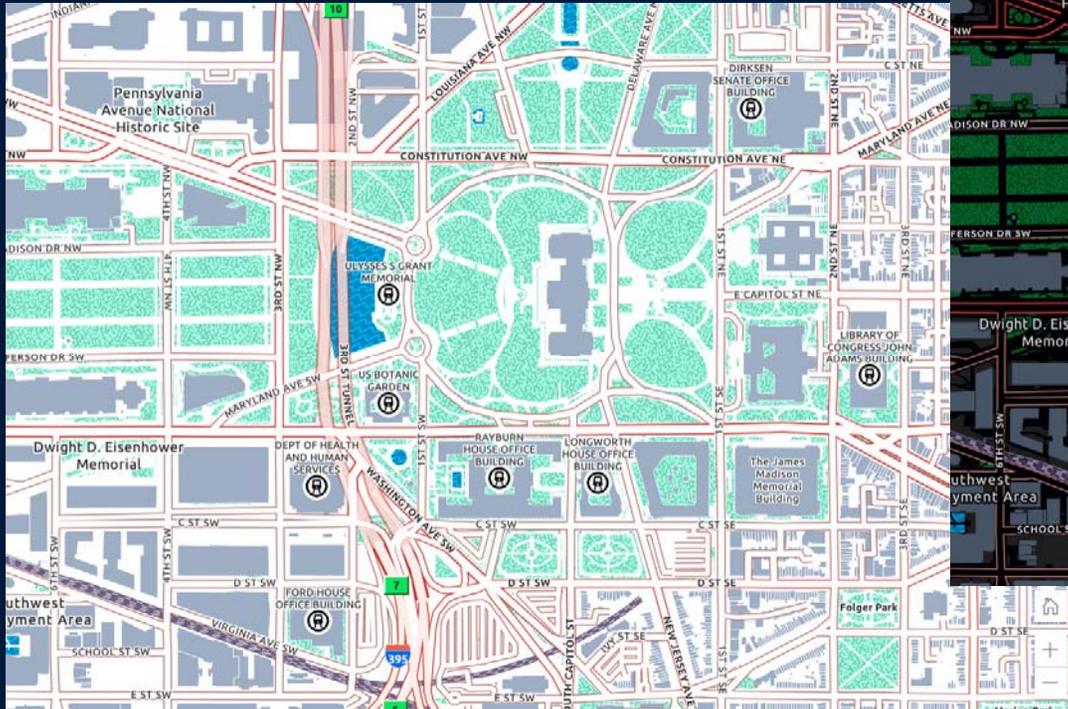
Map description 

When map view is in focus	
Nudge the view to left, right, up, or down	Arrow keys
Adjust view to point north	N
Rotate map counterclockwise	A
Rotate map clockwise	D
Zoom in to center of the map	+
Zoom out from center of the map	-

Building Maps for Accessibility

Enhanced Contrast Basemaps

Enhanced Contrast Map



Enhanced Contrast Dark Map



Building Maps for Accessibility

High Contrast Basemaps

ArcGIS Living Atlas of the World

Home Browse Apps Blog

Enhanced Contrast Map

Search

All Trending Basemaps Imagery Boundaries People Infrastructure

All content types All time All regions Esri-only content Authoritative-only content

Enhanced Contrast Map

Web Map By esri_vector

This web map provides a detailed vector basemap for the world with enhanced contrast that aim to meet the standards for WCAG and US Government Section 508 compliance. The map detail is built with higher contrast and color-vision-deficient-safe colors. This item is in beta.

Enhanced Contrast Map (WGS84)

Web Map By esri_vector

This web map provides a detailed vector basemap for the world with enhanced contrast that aim to meet the standards for WCAG and US Government Section 508 compliance. The map detail is built with higher contrast and color-vision-deficient-safe colors. It uses WGS84 Geographic, version 2 tiling scheme. This...

Enhanced Contrast Reference (WGS84)

Tile Layer By esri_vector

This (v2) vector tile layer is the base layer for a basemap that displays features

Enhanced Contrast Base (WGS84)

Tile Layer By esri_vector

This (v2) vector tile layer is the base layer for a basemap that displays features

Rio de Janeiro

ArcGIS Living Atlas

Working with Enhanced Contrast basemaps to improve accessibility.

Mapping June 30, 2022

Andy Skinner

Color Ramps for Color Vision Deficiency

- [Esri color ramps](#)
- [Designing Apps with Color Blind Users in Mind](#)
- <https://colorbrewer2.org>
- Testing tools
 - Colorblindly
 - Color Oracle



Data and Information

- Avoid information overload
- Clear concise language
- Avoid visual clutter
- [Tips from the W3C](#)
- [Writing for Web Accessibility](#)

1230-1698 Quest Rdg, Sylva, North Carolina, 28779

0 6.6 mi 10

Results: 1

2022 Current Open Sites Operating 1

Scotts Creek Elementary (3.27 mi)

Program Type	SSO
Site Name	Scotts Creek Elementary
Site Status	Open
Site County	Jackson
Site Address 1	516 Parris Branch Road
Site Address 2	
Site City	Sylva
Site State	NC
Site Zip	28779
Site Supervisor Last Name	Grasty
Site Supervisor First Name	Ali
Site Supervisor Phone	(828) 631-2740
Sponsoring Organization	Jackson County Schools
Site Start Date	9/30/2021, 5:00 PM
Site End Date	7/28/2022, 5:00 PM
Meal Types Served	B,L



Configuring Web Apps for Accessibility

ArcGIS Instant Apps

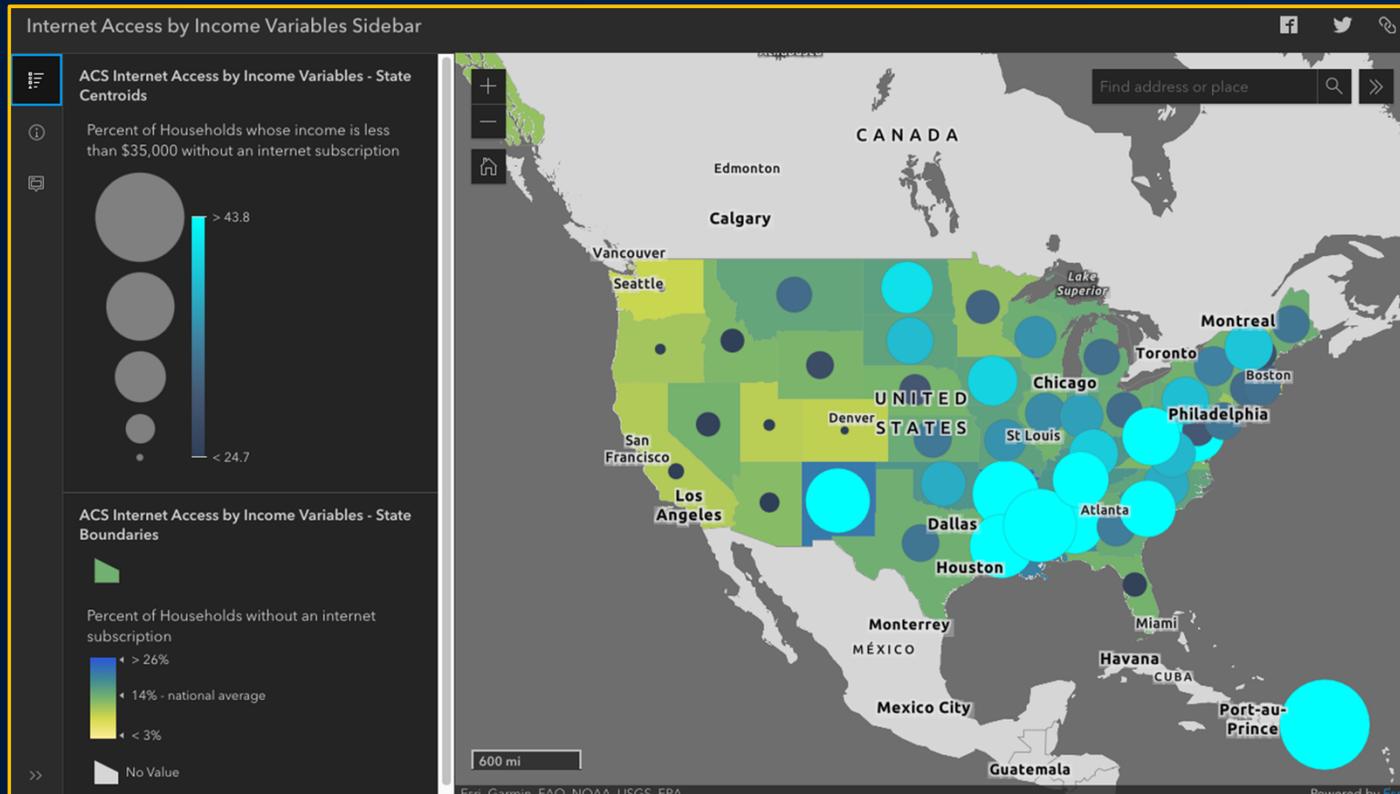
Configuring apps for accessibility



The image displays the ArcGIS Instant Apps configuration interface. On the left, the 'Express' settings panel is visible, with a search bar and a list of steps: Step 1. Map, Step 2. Countdown, Step 3. About, Step 4. Interactivity, and Step 5. Theme & Layout. The 'Theme & Layout' step is highlighted with a pink box. In the center, a 'Select a preset theme' dialog is open, showing various theme options: None, Custom, Shared theme, Forest, Beach, and Ocean. The 'Shared theme' option is highlighted with a pink box. On the right, the 'Theme & Layout' settings panel is shown, with a search bar and sections for Theme, Logo, and Position manager. The 'Theme' section is highlighted with a pink box. At the bottom right, a preview of the Instant App interface is shown, featuring a map and an 'Imagery Viewer' control.

ArcGIS Instant Apps

Configuring apps for accessibility



ArcGIS Instant Apps

Configuring apps for accessibility

Map accessibility:
Map description ⓘ

Shortcuts menu ⓘ



Shortcut	Action
Option + M	Select the map

Select the map

Shortcut	Action
Arrow keys	Nudge to left, right, up, or down
N	Adjust to point north
A	Rotate counterclockwise
D	Rotate clockwise
+	Zoom in at the center
-	Zoom out at the center

ArcGIS Instant Apps

Configuring apps for accessibility



Select a font ⓘ

Avenir Next ▼

Select a preset theme ⓘ

Forest ▼

Colors and contrast ratio ⓘ

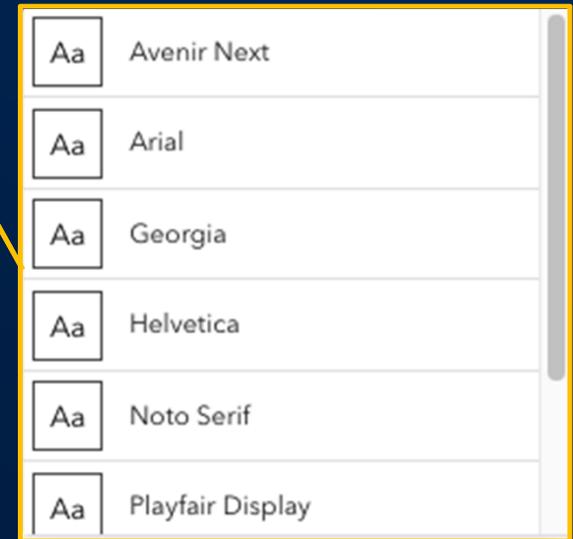
Primary ^

Background #0D3F14

Text #FFFFFF 12.1

Secondary ▼

Accent ▼



ArcGIS StoryMaps

Configuring apps for accessibility



ArcGIS StoryMaps

Configuring apps for accessibility

ArcGIS StoryMaps has been evaluated for conformance with WCAG 2.0 AA, WCAG 2.1 AA, and Section 508 standards. This evaluation, the Voluntary Product Accessibility Template (VPAT), can be found [here](#).

The StoryMaps team has also put a lot of effort into giving authors the ability to produce maximally accessible stories through a variety of features.



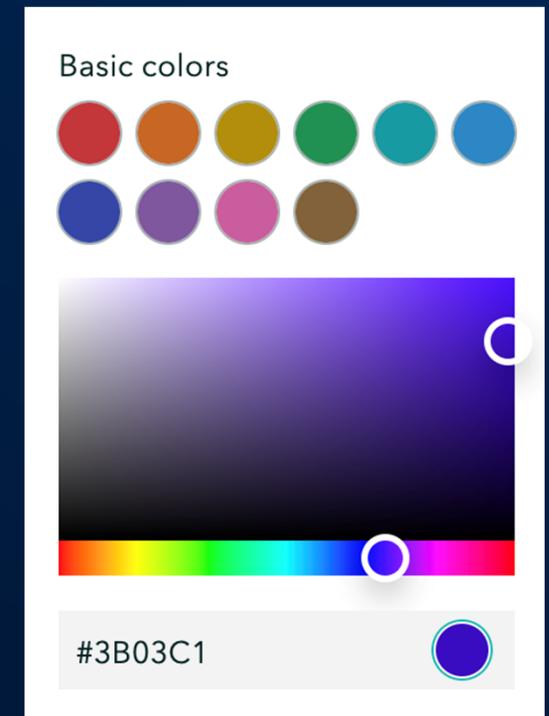
ArcGIS StoryMaps

Story Theming

Theme Builder — Gives authors a lot of control over the aesthetic look and feel of their story

- Color

- Theme builder's color picker lets users input any hex code (or drag selector to desired spot on color ramp)
 - Can control the story's background color, primary and secondary accent colors, text colors, and colors of other elements such as separators and button links
- As mentioned earlier, check for accessible contrast ratio and compatibility with CVDs!

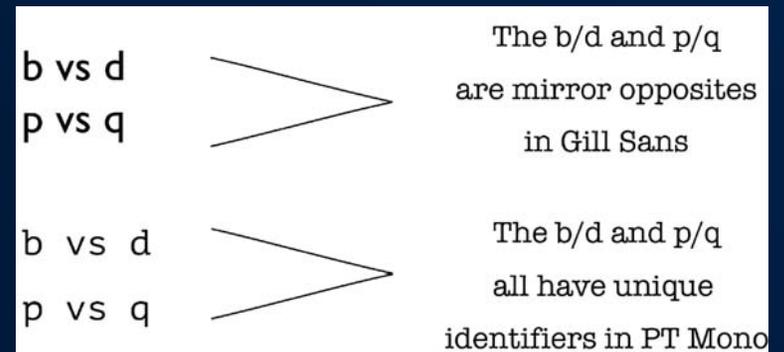
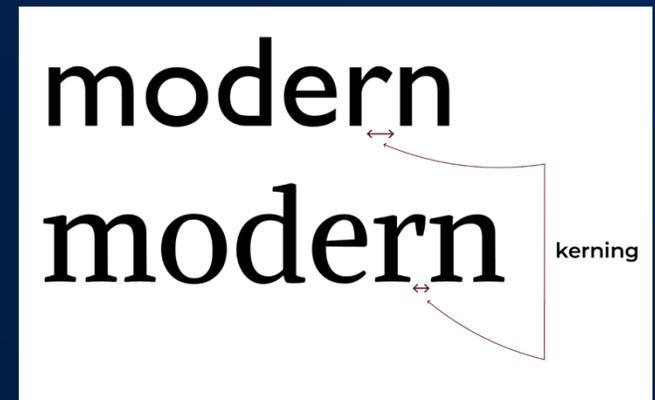


ArcGIS StoryMaps

Story Theming

• Typography

- Theme builder allows authors to select from the entire library of Google Fonts (over 1,000 fonts). Many of these can be difficult to read for consumers with vision impairments or conditions such as dyslexia.
- Some considerations when selecting an accessible font:
 - Sans serif fonts tend to be more legible in digital formats
 - Kerning (spacing between characters in a given typeface). If it's too tight, multiple characters can blend together and look like one letter (ex: "cool" can read as "cod")
 - Fonts with all unique characters are most accessible (tip: compare capital l (eye), lower-case l (ell), and number 1)
 - Use display fonts judiciously: they can be fun, but also not very accessible



ArcGIS StoryMaps

Media

Media: photos, videos, audio, embedded content

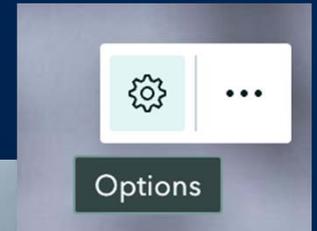
- Videos or audio clips with speech should be captioned or have a transcript made available through a link
- Limit use of graphics that have text within them (especially if the text is important)
 - Screen readers won't pick up on words within graphics
 - Real text is more adaptable by consumer (can be enlarged, copy/pasted, available in reader modes, etc.)

ArcGIS StoryMaps

Media

- Alternative text

- Describes media for screen readers or if the media doesn't load
- ArcGIS StoryMaps allows adding alt text for all forms of media (videos, maps, audio clips as well as images)
- Most effective alt text finds a balance between too much description and not enough



Too much	Not enough	Just right
A person in a neon red jacket and a hefty backpack kneels in the snow beneath a granite sky, peering through the telescopic lens of a tripod-mounted camera. Their target is cluster of penguins camping out on a rocky outcropping several yards away	Person in a red jacket in the snow	A person in a red jacket kneels in the snow, photographing some penguins on a nearby rock

ArcGIS StoryMaps

Story Structure/Language

- Use heading and subheading text types properly
 - Should be used to break story into logical sections and sub-sections, NOT for effect
 - Helps optimize the story for assistive technologies
- Try to avoid paragraphs that are too long or many short paragraphs in a row
 - Both a wall of text and a lot of line breaks can be disorienting
- Use descriptive language for hyperlinks and button links
 - e.g., “Learn more about rainforest conservation” rather than “Click here to learn more.”



ArcGIS StoryMaps

Story Structure/Language

- Be mindful of using **inclusive language**

- Many commonplace words and phrases have roots in bias (ableism, racism, sexism, etc.) or violence

- Here are some resources to learn more about inclusive language and substitute phrasing for less inclusive terms:

- Linguistic Society of America's [guidelines for inclusive language](#)

- American Psychological Association's [style guide for bias-free language](#)

- National Center on Disability and Journalism's [disability language style guide](#)



Accessibility Resources

Esri Accessibility Resources Site

- Customer information and resource site dedicated to Accessibility at Esri
- Product accessibility best practices, articles, documentation, and general resources
- Contact Esri Accessibility Form

The screenshot displays the Esri Accessibility Resources website. At the top, there is a navigation bar with the Esri logo and links for Home, Products, Support & Events, News, and About. Below the navigation bar, the main content area is divided into several sections:

- Esri Accessibility:** A large banner featuring a man with glasses and a headset, with the text "We are committed to creating accessible GIS technology for everyone." Below this, a paragraph states: "Esri is a pioneer in creating and testing analysis software, and we understand our responsibility to uphold our values based on inclusion, diversity, and equality throughout the company and ArcGIS system. We believe there should be no barriers to what users can achieve with our software. We are committed to creating accessible products and services compatible with the latest assistive technologies that conform to current software accessibility standards and guidelines."
- Our approach to accessibility at Esri:** A section with four sub-headers: "Inclusive design", "Conferences and events", "Training and education", and "Heuristic testing". Each sub-header is accompanied by a small image and a brief description of the approach.
- Accessibility Conformance Reports:** A section with the heading "Accessibility Conformance Reports" and a sub-heading "Esri recognizes the importance of adhering to accessibility guidelines and standards for all users of our products, including users with disabilities. We also create an Accessibility Conformance Report."
- Accessibility Resources:** A section with the heading "Accessibility Resources" and a sub-heading "Stay informed about accessible technology". Below this, a paragraph states: "Whether you are creating, managing, or analyzing data, your projects are important to us. We want to ensure that you are equipped with appropriate resources to understand and improve your accessibility. Read the articles and blogs about various accessibility topics and ArcGIS products. View presentations and videos ranging from the basics to advanced accessible topics. Get inspiration to products and services is directly inspired by our customers, so we encourage you to connect with us about accessibility resources or information via EsriAccessibility@esri.com or the form below."
- Esri Accessibility articles and blogs:** A grid of article thumbnails, each with a title, a small image, and a "Read this blog" link. Titles include "Download an Accessibility Best Practice Checklist", "Download an Accessibility Best Practice Checklist", "Building an accessible product or service", "Using accessibility best practices in ArcGIS", "New online training: Map Viewer Beta", "How accessibility features work in ArcGIS", "ArcGIS: Follow the ArcGIS map style", "Managing accessibility in ArcGIS", and "Making an Accessible PDF".
- Esri Accessibility videos and presentations:** A grid of video thumbnails, each with a title, a small image, and a "Read this blog" link. Titles include "Accessible Web Mapping Apps: ADA, WCAG, and 508 Compliance", "ArcGIS StoryMaps", and "508 Accessibility".

At the bottom of the page, there is a "Contact Esri Accessibility" form with fields for First Name, Last Name, Email, Country (set to United States), and a text area for "How can Esri help?". A "Submit" button is located at the bottom right of the form.

Accessibility Community

Esri Legal Accessibility

Core products	Apps	Services, tools, and extensions	
ArcGIS Pro 2.8 (2021)	ArcGIS Desktop 10.7.1 (2019) 10.6 (2018) 10.5.1 (2017)	ArcGIS Enterprise 10.8.1 (2020) 10.7.1 (2019) 10.6.1 (2018)	ArcGIS Online March 2022

Esri Accessibility Resources

- Esri Accessibility Site
 - <https://www.esri.com/en-us/accessibility/overview>
- Esri Legal Accessibility
 - <https://www.esri.com/en-us/legal/accessibility/conformance-reports>
- Esri Accessibility Community
 - <https://community.esri.com/t5/accessibility/ct-p/accessibility>
- EsriAccessibility@Esri.com
 - Email alias for issues and request for assistance



Esri Accessibility Resources (cont)

- ArcGIS Instant Apps resources:
 - <https://www.esri.com/en-us/arcgis/products/arcgis-instant-apps/resources>
- ArcGIS StoryMaps resources:
 - <https://storymaps.arcgis.com/stories/02670c9018f14cfbbaef7cba5c54d453>





Questions and Discussion



esri[®]

**THE
SCIENCE
OF
WHERE**[®]