

Protocol for Creating Accessible OER

By National AEM Center at CAST

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Contents

Defining Open Educational Resources	3
Equity & OER: The Role of Accessibility.....	3
Background	3
Purpose & Use	4
Section 1. Styles and Document Structure	4
Section 2. Links and Navigation	9
Section 3. Image Description with Alt Text	11
Section 4. Design with Color and Typography.....	13
Section 5. Evaluation with an Accessibility Checker	16
Additional Resources from the National AEM Center	18
Acknowledgments.....	19

Defining Open Educational Resources

In the [2017 National Education Technology Plan](#), the U.S. Department of Education defines open educational resources (OER) as teaching, learning, and research resources that reside in the public domain or have been released under a license that permits their free use, reuse, modification, and sharing with others. OER can include complete online courses, textbooks, documents, images, videos, and assessment items. This protocol itself is an example of an OER. It is licensed under a Creative Commons license ([CC BY-SA 4.0](#)). This license allows anyone to freely share and adapt the protocol as long as there is proper attribution to the authors and any new versions include the same license as the original.

Equity & OER: The Role of Accessibility

The availability of high-quality OER plays an important role in addressing equity issues in education. For its full potential to be realized for every learner, OER must be usable across the variability that learners bring to any learning environment. For this to be the case, OER must be designed according to accessibility best practices that ensure they will work with the assistive technologies many learners with disabilities use to access the curriculum. As an added benefit, accessible OER are also often mobile-friendly, which is an important consideration for increasing participation by students who primarily use smartphones either at school or home. The AEM Center article [Open Educational Resources: Ensuring Inclusive Learning in Uncertain Times](#) explores the relationship between OER, accessibility, and equity in more detail.

Background

During 2019 and 2020, the AEM Center facilitated an Accessibility Community of Practice (CoP) with members of the #GoOpen Network. The goal of the CoP was to seek creative solutions to OER accessibility challenges. The work of the CoP contributed to the development of a curation protocol, which was based on the best practices outlined in the Accessibility Checklist in [ISKME's School Librarian OER Curation Framework](#).

The expansion of remote and hybrid learning offerings, and the challenges school districts will continue to face in making sure students with disabilities have accessible materials in a timely manner, make a protocol for creating accessible OER even more relevant and urgent for educators and families. OER are often created to meet a need not addressed by existing curriculum resources, and this protocol will provide guidance to ensure these materials are created with accessibility in mind from the start. As companion documents, the two protocols provide educators with options for addressing

the two pathways through which most OER are made available to learners - through either curation or creation.

Purpose & Use

The purpose of the Protocol for Creating Accessible OER is to provide detailed yet easily implemented techniques for creating accessible OER with Microsoft Office and Google Workspace. These are the two most commonly used authoring suites in schools, and documents created with them are often the source files for other formats, such as PDF and EPUB publications. The techniques presented can be implemented by any educator who creates or adapts materials for use by students and families.

The protocol is organized into five areas that are relevant to accessibility practices. The mnemonic, “**SLIDE**,” makes these practices easy to remember:

1. [Styles and Document Structure](#)
2. [Links and Navigation](#)
3. [Image Description with Alt Text](#)
4. [Design with Color and Typography](#)
5. [Evaluation with an Accessibility Checker](#)

Each practice has its own section of the protocol, which begins with its importance for OER accessibility. Step-by-step instructions with screenshots then show you how to apply specific accessibility practices as you create your OER.

This protocol is not intended as a substitute for a full audit of conformance to accessibility standards. No conformance claims should be made based on the use of this protocol.

Should you have any questions or suggestions for improving this resource, please contact the AEM Center team at aem@cast.org.

Section 1. Styles and Document Structure

A style is a formatting instruction in a word processing application that applies a consistent appearance to selected text. A style also “tags” the selected text based on the function it performs in the document, such as paragraph text or a section heading. The styles in a document make up its structure.

Why Are Styles and Document Structure Important?

A document with a clear and logical structure can improve understanding for everyone. Section headings “chunk” information into smaller segments that are easier to identify and process. Concise and descriptive section headings can also help with reader comprehension by highlighting the main ideas and relationships in a document. A bonus of properly using styles to create section headings: You can use the styles to automatically create a table of contents that not only reveals how the information is organized but also improves navigation, which is especially helpful on longer documents. The table of contents for this document was created by this method.

For learners who are blind and use screen reader technology, properly styled headings are necessary for efficient navigation. Screen reader users do not always read a document from beginning to end in a linear way. A screen reader provides robust navigation options in addition to reading content aloud. Most screen readers support a keyboard shortcut or gesture that provides a list of the section headings. By selecting a heading from this list, learners can jump to specific sections of a long document. This capability significantly improves the efficiency with which learners can navigate the content using their assistive technology, allowing them to focus more of their energies on learning.

What to Do: Styles and Document Structure

When creating an accessible OER, here’s how to use styles to create a proper document structure:

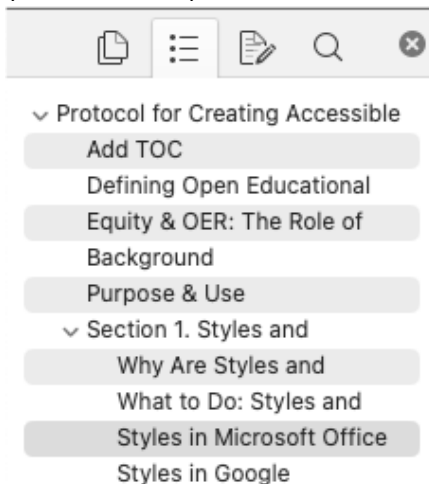
- Organize content into sections, and make sure each section starts with a unique heading or subheading that succinctly describes what the section is about.
- Create section and subsection headings with proper markup. This means that you use styles rather than only formatting options, such as making the text bigger and bold.
- Use headings and subheadings sequentially (e.g., Heading 1, Heading 2, etc.). Typically, a web page or document should have only one Level 1 Heading (H1) for the page/document title, with a Level 2 Heading (H2) used for the major sections, a Level 3 Heading (H3) for the subsections, and so on. You can think of this as an outline structure.
- For slide decks, make sure each slide has a unique slide title and the title concisely and accurately describes the contents of the slide.
- Make sure the slide title is the first item in the reading order for each slide. This will help users of assistive technology quickly determine where they are in the presentation, which will assist with navigation.

Styles in Microsoft Office

In Microsoft Word for Office 365, place your cursor anywhere in a section heading's text and select the appropriate heading style (Heading 1, Heading 2) from the Styles pane available in the **Home** tab of the Ribbon.

To check the logical organization of the headings:

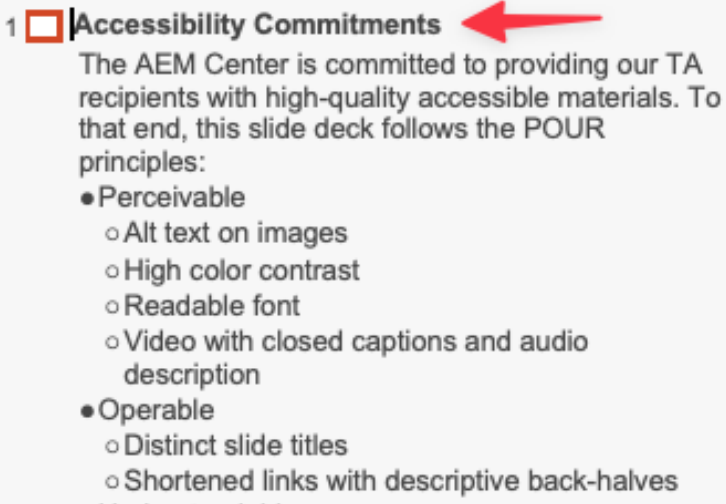
1. Open the **Navigation Pane (View, Navigation Pane)**.
2. Choose the **Headings** tab (Windows version of Word) or **Document Map** tab (Mac version).



3. Confirm that every item that is styled to look like a heading in the document is listed in the Navigation Pane (i.e., has a heading style applied to it). As you select each heading in the **Headings** or **Document Map** tab, you should be able to navigate to the corresponding section/subsection in the document in much the same way a screen reader user would. Note: Most screen readers support a keyboard shortcut to skip from one heading to the next.

Another way to check the document structure in Microsoft Word is to add a table of contents based on the section headings by choosing **References, Table of Contents**. The table of contents should provide a logically organized outline of the document's content. A table of contents is especially helpful for navigating longer documents.

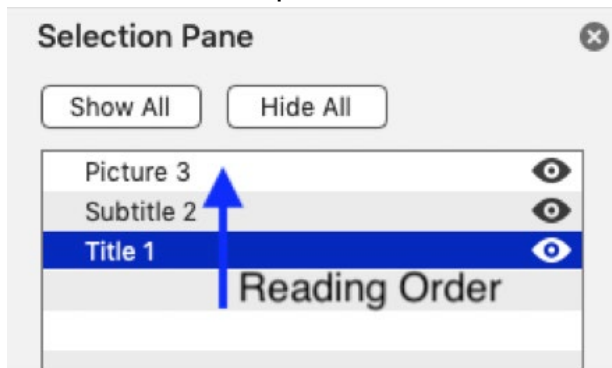
On a PowerPoint slide, the use of descriptive slide titles performs a similar function as the section headings in a Word document. Use the **Outline View (View, Outline View)** to confirm each slide has a descriptive and unique title. If you need to split the content into two or more slides, you can include text in parenthesis to make the slide titles unique (e.g., "Continued" or "Step X of X").



The slide title should be the first item in the reading order. The reading order is the order in which items will be read aloud to someone using screen reader technology. You can quickly test the reading order of a slide by pressing the Tab key on your keyboard to move the focus from one item to the next. When the slide title is the first item in the reading order it helps users of screen reader technology orient themselves to where they are in a presentation.

There are two other ways to check the reading order in Microsoft PowerPoint:

- Open the **Selection** pane (**Home, Arrange, Selection Pane**). Items listed **near the bottom** of this pane **are read first**.



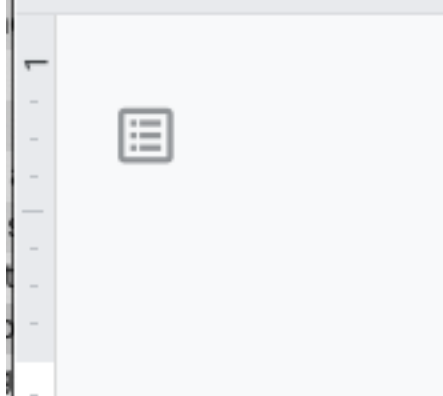
- Use the **Reading Order** pane if it is available in your version of Office (**Review, Check Accessibility**). Items listed **near the top** of this pane **are read first**.

Once you open the appropriate pane, move items to change their reading order in accordance with how each pane works: **bottom-first** for the **Selection** Pane, **top-first** for the **Reading Order** pane.

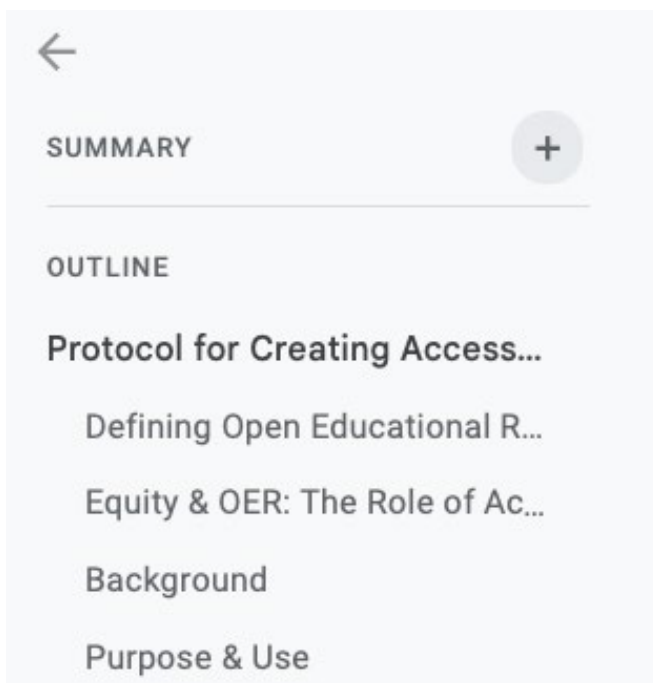
Styles in Google Workspace

To make sure each section heading has the proper style applied in Google Docs, place the cursor anywhere inside the section heading text and select the appropriate style from the Styles dropdown menu in the toolbar (or choose **Format, Paragraph styles** followed by the appropriate style from the menus).

To check the logical structure of a document in Google Docs, choose **View, Document Outline**. This will display a “Show document outline” icon on the left margin.



By selecting this icon, you can see the outline created from the styles applied to the section headings in the document.



As with Microsoft Word, you can add a table of contents based on the section headings by choosing **Insert, Table of Contents**.

Google Slides does not have an outline view or a selection pane like the one available in Microsoft PowerPoint. For the best results, use the placeholders provided in the various templates to make sure each slide has a unique slide title and a reading order that makes sense.

Section 2. Links and Navigation

Hyperlinking is a foundational concept of the web. Links allow authors to reference additional online resources that enhance the richness of OER. They can also improve the usability of long documents by providing navigation among sections.

Why Are Descriptive Links Important?

Descriptive link text replaces a web address with a description of the link's destination. The use of descriptive link text improves usability for all learners. The link text sets expectations about not just the content on the other side of the link but also any actions that might take place when it is selected: Will a new window or tab open? Will a file be downloaded? By helping learners quickly answer these questions, descriptive links improve the navigation and overall usability of OER for everyone.

Descriptive links are helpful for learners who are blind and use screen reader technology to listen to the content of a web page or document. Most screen readers support a keyboard shortcut or gesture that brings up a list of all the links in a document to assist with navigation. If a link reads as "click here" or "learn more" when presented on a list, it will be difficult to determine what will happen when the link is selected. For this reason, links need to be meaningful on their own, without relying on the surrounding content to provide context.

What to Do: Descriptive Links

When creating an accessible OER, here's how to make your links descriptive:

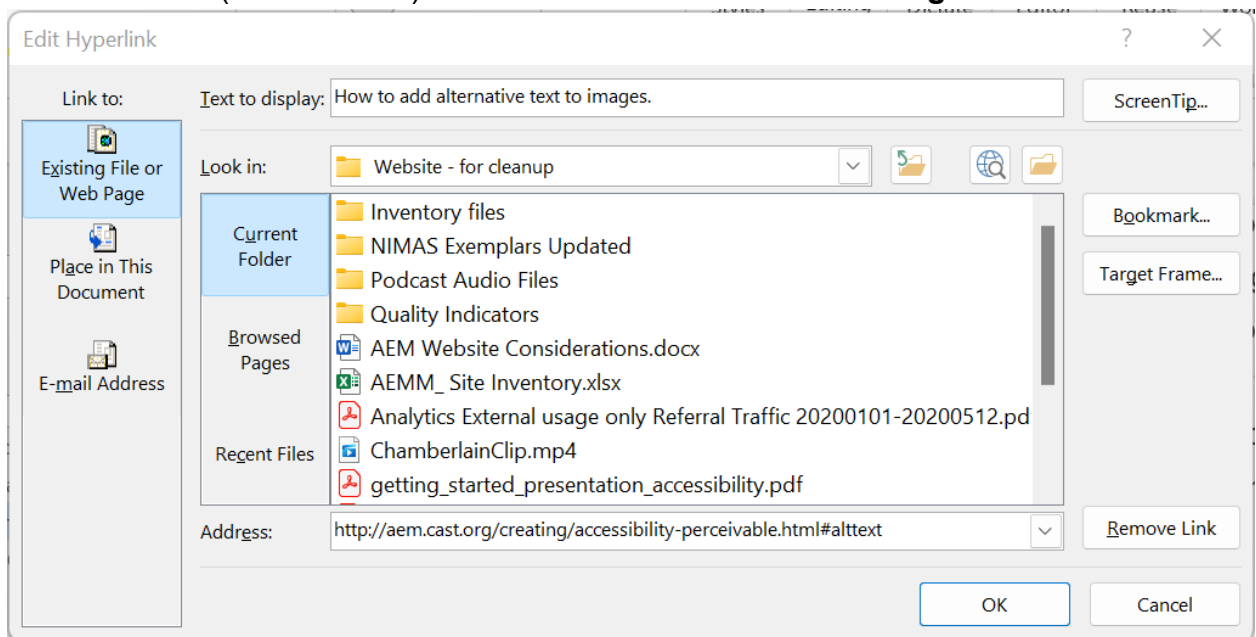
- Make sure links make sense on their own, without the surrounding text for context, and do not use generic language such as "click here," "about," or "learn more." Links should also prepare the reader for any unexpected actions such as the opening of a new window or tab, or the downloading of a file.
- Avoid the use of full web addresses as the link text. To provide a better experience for all learners, including those listening with screen readers, hide the full web address behind more descriptive link text or use a link shortener (with a descriptive custom ending for the shortened link).

- For resources that are also going to be printed (e.g., handouts for presentations, instructions, etc.) use a link shortener and include the shortened version of the full web address (with a custom ending) in parenthesis after the more descriptive link text.

Descriptive Links in Microsoft Office

To create a descriptive link in Microsoft Office:

1. Select the desired link text, which should concisely describe the resource that the link will open (document, website, etc.), or the action that will take place (e.g., to download a file or open a window in a new tab).
2. Choose **Insert, Link** or right-click the selected text and choose **Hyperlink** from the contextual menu.
3. Enter the URL (web address) in the **Address** field of the **Web Page or File** tab.



4. Choose **OK**.

Descriptive Links in Google Workspace

The steps for creating a descriptive link in Google Workspace are very similar to those for Microsoft Office:

1. Select the desired link text.
2. Choose **Insert, Link** or right-click the selected text and choose **Link** from the contextual menu.
3. Choose one of the recommended web addresses or paste one in the **Search** field.

4. Choose **Apply**.

Section 3. Image Description with Alt Text

Images can make content in OER more understandable, visually appealing, and engaging, particularly when those images are relevant to the information. Images can also support understanding by providing multiple representations of the information.

Why Is Image Description with Alt Text Important?

Not everyone uses sight to gain information from images. Alternative text or “alt text” is a concisely written summary of the information an image conveys. Someone who is blind can enjoy equivalent access to this information by having the summary read aloud to them with screen reader technology. Another reason to provide alt text relates to connectivity issues, particularly in situations of remote learning: Turning images off will increase browsing speed on a slow connection and saves bandwidth while accessing the content on a mobile device with a limited data plan.

What to Do: Image Description

There are three broad categories of images you may consider including in your documents and slide decks:

1. Images that convey information and need to include appropriate alt text. The alt text should be brief (no more than 125-150 characters, or a couple of sentences). Screen readers announce when an image is selected. It is not necessary to include “image of” or “graphic of” in the alt text.
2. Images that are purely decorative and should be marked up in such a way that they can be skipped by a screen reader. Not all authoring tools provide the option to indicate an image is decorative. For those that do not, the use of the word “decorative” for the alt text is recommended.
3. Images that are functional (included in a link) and should have alt text that reflects the action that will take place when the link is selected (e.g., the title of the website that will open).

More complex images (e.g., diagrams, charts) may need a long description that explains the image in more detail than is possible with just the alt. Long description should be provided in the surrounding body text whenever possible, as everyone can benefit from the more detailed explanation. If space is an issue, the long description can be provided in another section of the document that can be reached from a link near the image.

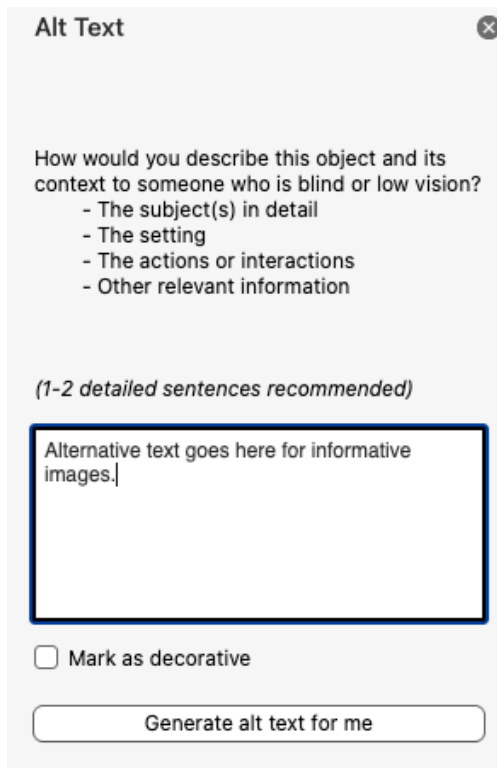
Creating accurate and useful alt text and long descriptions is both an art and a science. It requires some subjectivity because the appropriate alt text will require consideration of the purpose for selecting an image and the context in which it is used. Given that, creating high-quality alt text is a skill that is improved with practice and collaboration. For more complex images such as charts and diagrams, we recommend approaching long descriptions as a group activity that takes multiple interpretations into consideration to arrive at the best description.

Alt Text in Microsoft Office

The built-in accessibility checker (found in Review, Check Accessibility) can be used to quickly identify images that are missing alt text. Selecting an item listed in the checker will highlight the image with the error. The steps for adding appropriate alt text will depend on the version of Office you have installed.

In Microsoft Word and PowerPoint for Office 365:

1. With the image selected, choose **Alt Text** in the **Picture Format** tab of the Ribbon (or right-click the image and choose **Edit Alt Text**). This will open the **Alt Text** pane on the right side of the screen.
2. Make sure the image has an appropriate description or, if the image does not add any meaning and is used purely for decoration, check the box for “**Mark as decorative.**”



Alt Text

How would you describe this object and its context to someone who is blind or low vision?

- The subject(s) in detail
- The setting
- The actions or interactions
- Other relevant information

(1-2 detailed sentences recommended)

Alternative text goes here for informative images.

Mark as decorative

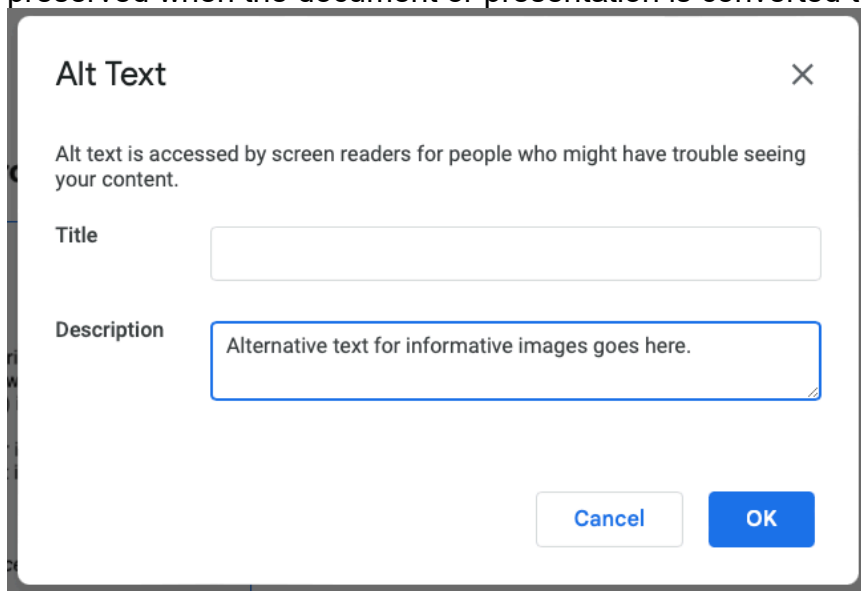
Generate alt text for me

For older versions of Microsoft Office:

1. With the image selected, choose **Format, Picture** (or right click on the image and select "**Format picture**").
2. Choose the **Layout and Properties** pane.
3. Expand the **Alt Text** section.
4. Make sure appropriate alt text is included in the **Description** field and that the **Title** field is left blank. This will ensure the alt text is properly preserved if the document or presentation is converted to PDF.

Alt Text in Google Workspace

To add appropriate alt text to an image in either Google Docs or Google Slides, right-click on it and choose **Alt Text**. Enter the appropriate alt text in the **Description** field and leave the Title field empty. Only the text entered in the **Description** field is preserved when the document or presentation is converted to PDF.



Alt Text

Alt text is accessed by screen readers for people who might have trouble seeing your content.

Title

Description

Alternative text for informative images goes here.

Cancel OK

Section 4. Design with Color and Typography

The effective use of color and typography can add aesthetic appeal and make content more inviting and engaging for learners. It can also mean the difference between a design that is easy to read and one that presents barriers that impact a learner's ability to access the content.

Why is Choice of Color and Typography Important?

Text with low contrast may be difficult to perceive for some learners, including those with low vision or those viewing the content in poor lighting conditions, such as where glare is an issue. Some learners may also have difficulty seeing certain colors due to color blindness. With good color contrast, learners can focus more of their energies on understanding the information, rather than on overcoming barriers to perception.

As with the use of color, typography can have an impact on how much energy learners spend to perceive and process information. Preferences for fonts and spacing vary by learner, and ideally the reading application provides options for personalizing adjustments to meet the unique needs of each individual (see the AEM Center's [Personalizing the Reading Experience](#) web page for examples). Starting with a good baseline selection for font, text size, and other typography elements can provide a good learning experience by default.

What to Do: Use of color

When creating accessible OER, here's how to optimize the use of color:

- Select colors that meet a minimum color contrast requirement of 4.5:1 for body text and 3:1 for large text (18 pt. or larger, typically the text used in section headings). Body text only needs to meet the lower 3:1 contrast ratio if it is 14 pt. or larger and bold.
- Do not rely on color alone to convey meaning. An additional cue, such as symbols, should be used to distinguish between different colors or between shades of the same color.
- If your OER includes instructions, make sure they do not refer to color and other visual characteristics (e.g., shape, size, or location).

What to Do: Typography

When creating accessible OER, here's how to optimize the use of typography:

- Use sans-serif fonts for body text. Sans-serif fonts, such as Arial or Verdana, lack any ornamentation at the end of their strokes. This lack of ornamentation increases the space between the letters and makes the text easier to read, especially at smaller text sizes.
- Avoid the use of formatting alone for emphasis (e.g., bold or italics). Use text instead (e.g., "Important:" or "Note:") to highlight information that needs focused attention from learners. Screen readers do not always announce changes in styling by default.

- Left-align blocks of text. Full justification can add uneven spacing between words, resulting in “rivers of whitespace” that run down the page where extra spacing has been added.
- Begin with a good baseline text size. For documents, a baseline text size of 12 pt. for body text is recommended. For slide decks, 22-24 pt. for the body text is recommended as a minimum text size.

Checking for Color Contrast

Use a free color contrast checker such as the [Colour Contrast Analyser from TPGi](#) to make sure the choice of background and foreground colors meets the minimum contrast ratio requirements.

On Windows, the Colour Contrast Analyser includes a color picker for selecting the foreground and background color combination. On the Mac, the Colour Contrast Analyser will open the Mac’s color picker tool when a color swatch is selected, but the functionality will be the same as on Windows. **Note:** You may need to provide additional permissions for the Colour Contrast Analyzer to accurately sample the colors on the Mac. This is done by going to **System Preferences, Security and Privacy**, choosing the **Screen Recording** option and checking the box for Colour Contrast Analyzer.



This [tutorial video on using the Colour Contrast Analyser](#) from the AEM Center demonstrates the use of the tool to check color contrast on both Windows and the Mac.

Checking for Use of Color and Typography

The use of colors and other visual characteristics (shape, size, and location) in instructions provided in an OER will require a content review. The same is true for checking the typography (text size, fonts and spacing) used in a resource.

One way to check that color isn't used alone to convey meaning is to turn on the grayscale view in your operating system and confirm the content makes sense when color is removed. This option is especially helpful for reviewing charts and diagrams to make sure they include additional cues and do not rely on color alone for meaning.

The option to switch to a grayscale view will typically be found in the settings or system preferences of your operating system:

- Windows 10: **Settings, Ease of Access, Color Filters.**
- Windows 11: **Settings, Accessibility, Color Filters.**
- iOS 13 or later (iPad and iPhone): **Settings, Accessibility, Display and Text Size, Color Filters.**
- Mac: **System Preferences, Accessibility, Display.**
- At the time of this writing, Chromebooks don't have a grayscale option. An [extension such as High Contrast](#) can provide similar functionality for any content accessed through the Chrome browser.

Section 5. Evaluation with an Accessibility Checker

Some authoring tools now include a built-in accessibility checker to make it easier to identify and correct accessibility issues. Even the best automated accessibility checking tools have their limitations due to the subjective nature of many accessibility practices. For example, an automated checker may reveal that an image has alt text, but it may not be able to determine if that alt text accurately describes the content of the image. This determination will often require subject matter knowledge, as well as a consideration of the context and the purpose for using the image.

Why is Evaluation with an Accessibility Checker Important?

As long as you don't use accessibility checkers as a replacement for learning best practices, they can make a valuable contribution to your evaluation of OER. Whenever possible, automated checkers should be used as a starting point for authentic evaluation. This includes usability testing with a range of learners who can test how well

the content works with a variety of tools, such as assistive technologies and mobile devices.

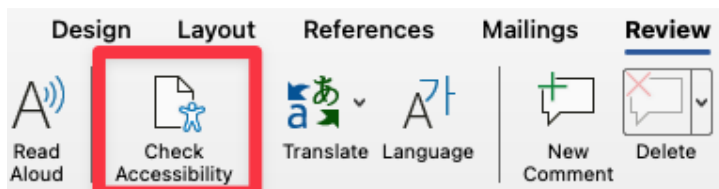
What to Do: Using an Accessibility Checker

The following list presents effective ways to check the accessibility of an OER:

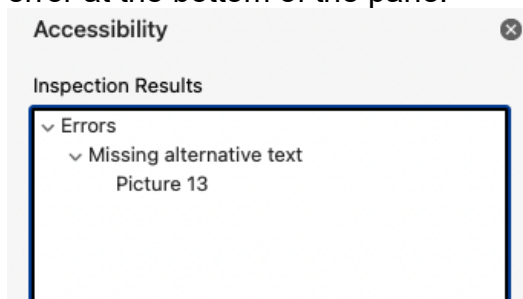
- Use an accessibility checker to verify that an OER conforms to those accessibility practices that can be assessed with an automated check (e.g., missing alt text).
- Review the guidance provided by the accessibility checker (if any is available) to help you understand any recommended fixes and build up your knowledge of accessibility best practices.
- Review the content of the OER on a mobile device to ensure it is not only accessible but also mobile-friendly.
- Identify learners who can provide authentic feedback about the usability of resources and compatibility with the technologies they use (including assistive technology).

Use an Accessibility Checker in Microsoft Office

The Accessibility Checker for Microsoft Office 365 applications is found in the **Review** tab of the Ribbon.



Launching it will open an Accessibility Checker pane. Select any of the errors listed in this pane to highlight the element (image, heading, etc.) with the accessibility error in the document. Selecting an error will also display an explanation with steps for fixing the error at the bottom of the pane.



The Windows version of the Office Accessibility Checker also provides Recommended Actions for quick fixes from a dropdown menu (e.g., verifying an image description).

Note: On older versions of Office, the Accessibility Checker may not be in the Ribbon. In this case, choose **File, Info, Check for Issues** to launch it.

Use an Accessibility Checker in Google Workspace

The [Grackle add-on for Google Workspace](#) identifies accessibility errors in Google Workspace applications (Docs, Sheets, and Slides). To install Grackle, open the appropriate Google Workspace application, choose **Extensions, Add-ons, Get Add-ons**, and do a search for Grackle.

Once Grackle is installed, launch it by choosing **Add-ons, Grackle (Docs, Sheets or Slides, depending on the Google Workspace application), Launch**. This will perform a check and list any errors in a pane to the right of the document. Select an error to expand it and read an explanation with a list of all instances of that error in the current document. For example, if there are multiple images with missing alt text, Grackle will list each as a separate error so that you can directly move to that image in the document and perform a fix.

Additional Resources from the National AEM Center

The following resources on the AEM Center website provide additional information on accessibility best practices:

- [Vetting for Accessibility](#)
- [Designing for Accessibility with POUR](#)
- [Creating Accessible Documents](#)
- [Creating Accessible Publications with EPUB](#)
- [Creating Accessible Video](#)

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