

Writing Effective Alt-text for Online Instructional Materials

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OVERVIEW

Instructional materials are increasingly created and made available within an online space. Engaging materials utilize various types of images to break up walls of text and enhance learning. Describing these images with effective alternative text (alt-text) is subjective and contextually-based, requiring a treatment and knowledge beyond a simple checklist. This lesson is aimed to support educators in becoming more accessibility-literate, and to build in robust alt-text at the moment of creation.

This lesson presents five different types of images. Each image type serves a distinct purpose within the context of online instructional materials. During the lesson, learners will work through each image type, with opportunities to practice examining HTML alternative tags and writing appropriate alt-text for each type of image.

Topics: Accessibility, Alt-Text, Alternative Text, Web Content Accessibility Guidelines

Time: One hour

MATERIALS

- Instructor Laptop/Computer & Projector
- Examples of five different types of images
- Learners need access to computers
- Learners need to bring at least one image-rich online learning object (e.g., digital/online picture)

SETUP

The instructor should prepare the room 5-10 minutes before the lesson. Remind learners in advance to bring a digital image or image-rich online learning object to improve the alt-text.

CONTEXT-AT-A-GLANCE

Setting

A medium-sized, urban Canadian university.

Modality

In-person

Class Structure

Lesson took place in a one hour private formal departmental training session in a computer lab.

Organizational Norms

The organization is committed to providing time and self-learning resources for improved accessibility to meet regional compliance requirements. This lesson was designed and delivered as part of this direction.

Learner Characteristics

Learners consisted of a group of around 15 librarians and library support staff, with a wide range of ages, varied experience with accessibility compliance in practice, and all with a desire to improve accessibility.

Instructor Characteristics

Instructors possessed a good grasp of [WCAG 2.1 accessibility standards](#) (W3C, 2018) related to alt-text, familiarity with HTML (to identify alt-text tags within coding), and a commitment to active learning approaches.

Design Framework

5E Model, Backwards Design, and Active Learning Principles (was delivered with some freedom for learners to lead the direction of content/learning through questioning)

STANDARDS

Accessibility standards vary by geographical jurisdiction, but many people and institutions in North

America draw on the world-wide Web Content Accessibility Guidelines (WCAG) standards (W3C, 2018). The [WCAG 2.1](#) Standards has three success criteria related to alternative text (alt-text):

- Success Criterion 1.1.1 Non-text Content (Level A)
- Success Criterion 1.4.5 Images of Text (Level AA)
- Success Criterion 1.4.9 Images of Text (No Exception; Level AAA)

WCAG standards are comprehensive and have broad applicability across many sectors. The expansiveness of web accessibility across varied contexts means there is a need for more targeted support in moving from a theoretical understanding of accessibility and WCAG to practical approaches for educators working specifically within an online learning object context.

CONTEXT AND SETTING

This lesson was presented as a holistic lesson in a single instance (one time) and subsequently divided into component parts for reinforcement and recall of learning.

Aimed at practicing educators who are pressed for time, this lesson was designed to be succinct, informative, and practical. Moving beyond a theoretical understanding of alt-text, the lesson foregrounded the idea that the presence of alt-text alone does not mean accessibility compliance. For accessibility compliance, alt-text must be robust and meaningful, necessitating reflection by the author of the online learning object to understand the intended purpose of image inclusion.

The presentation of five common image types used within online learning objects is a way to help learners reflect on the function of the image they are working with, and to provide direction on the type of information that needs to be included in the alt-text to make it more accessible.

This lesson focused on online educational material hosted within the LibGuides platform, a content management platform commonly used in libraries. Tailored instruction particular to the idiosyncrasies of coding alt-text within the platform was provided. Adopters of this lesson are encouraged to familiarize themselves with the mechanics of alt-text coding for

their online contexts (whether through a specific platform, or free-form HTML coding).

LEARNING REPRESENTATION

This lesson is rooted in the 5E learning cycle, which focuses on supporting student Engagement, Exploration, Explanation, Extension, and Evaluation (Balci et al., 2006). This approach emphasizes a check-in with students within the first 5 minutes of a lesson. As a STEM-based model, this approach complements the STEM focus of the institution (Duran & Duran, 2004). This lesson moves between the exploration and explanation multiple times, allowing learners to practice on their own (exploration) and then bring them back together for more instruction and directions (explanation).

INTRODUCTION (10-15 MINS)

During this lesson, italic text identifies questions or prompts for the learners.

PRE-INSTRUCTION CHECK-IN (ENGAGEMENT)

Consistent with the 5E Model, the Pre-Instruction Check-In activity connects student learning to prior knowledge and hooks them into the lesson (Engagement).

To start, learners were asked:

How confident do you feel about creating robust alt-text for images within your online instructional objects? Raise your fingers, 1 finger for least confident, five fingers for most confident.

REVIEW OF WCAG STANDARDS (EXPLANATION)

Consistent with the 5E Model, this Review of the WCAG Standards provides an Explanation of the material for the learner. The jurisdiction where this lesson was delivered requires compliance of level A and AA standards.

Review the three standards from the [Web Content Accessibility Guidelines \(WCAG\) 2.1](#) (W3C, 2018) related to alt-text:

- Success Criterion 1.1.1 Non-text Content (Level A)
- Success Criterion 1.4.5 Images of Text (Level AA)
- Success Criterion 1.4.9 Images of Text (No Exception; Level AAA)

HOW TO CHECK EXISTING ALT-TEXT (EXPLORATION)

Following the 5E Model, this activity has students Exploring.

In this How to Check Existing Alt-text activity, learners should open an internet browser (they can choose their preferred browser) and find an online image.

To see alt-text in a browser, right-click the image and choose the correct "Inspect" option by browser. The HTML code for the site will appear. For an `` (image), the alt-text code is `alt="alt-text description"` (see below for browser-specific directions).

Google Chrome users: Right click and choose "inspect" (bottom option). The html element you selected will be highlighted.

Mozilla Firefox users: Right click and choose "Inspect Element" (bottom option). The html element you selected will be highlighted.

Microsoft Edge users: Right click and choose "Inspect" (bottom option). The html element you selected will be highlighted.

Apple Safari users: Enable "Show Develop menu in menu bar" option under Safari>Preferences>Advanced. Right click and choose "Inspect Element" (bottom option). The html element you selected will be highlighted.

BASIC TENETS OF EFFECTIVE ALT-TEXT (EXPLANATION)

Consistent with the 5E Model, this overview provides an Explanation of the material for the learner. This information is provided in lecture-format, led by the instructor, with a slide deck presentation of the content.

BEST PRACTICE

Describe the function of the image, not its appearance.

- What is the image intended to achieve?
- What information is it presenting?
- If you can't see the image, what are you missing?

COMMON PITFALLS

- Including unnecessary details. Keep it simple.
- Using words such as "picture of" or "image of" (Unless you need to indicate the media-such as an archival photo or painting).
- Introducing new information that isn't in the accompanying text or the picture.
- Keyword stuffing. Write for your user!

EXAMPLE

Images identifying a person can have their name as alt-text. Images intended to convey a message need to provide an effective description of that message.

For the example image (see Figure 1), the function of the image is to identify a person, so the alt-text should be: "Barack Obama."



Figure 1. President Barack Obama. From "[President Barack Obama](#)," by National Archives, n.d., in the public domain.

For the example [“Arthur fist meme” image](#) found at (Lee, 2016), the function of the image is to convey frustration, so the alt-text should be: “Arthur from the animated TV series balls his fist to convey frustration.”

CHECK-IN ACTIVITY (EXTENSION)

Consistent with the 5E Model, this activity provides an opportunity for the learner to apply their learning (Extension). Present these images to the learners and have them answer the provided questions. This can be done individually, in small groups, or as a whole group. A whole group discussion of function and suitable alt-text for each image at the end of the activity is recommended.

What is the function of the clock in the example image (see Figure 2)? What alt-text might be suitable?

Answer: There are multiple answers that are all correct because this image is provided without further context. Encourage learners to identify multiple functions and suitable alt-text based on those functions. Possible answers could be:

- The function of the clock is to tell time, so the alt-text should be: “Clock face with the time of 8 o’clock.”
- The function of the clock is an example of a clock face, so the alt-text should be: “Clock face.”
- The function of the clock is decorative, so the alt-text should be marked as decorative (see Decorative Images section).

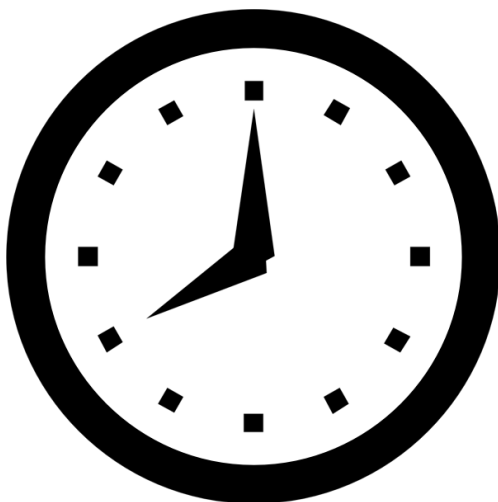


Figure 2. Clock Face. From [“Clock face vector illustration,”](#) by OpenClipart, 2014. In the public domain.

Now consider this same image in three different contexts (see Figure 3). What might suitable alt-text look like for each of these examples?

Answer:

- *First Image:* Clock is a decorative image. Alt-text should be marked as decorative (see Decorative Images section).
- *Second Image:* Clock is a stand-in for the time displayed. Alt-text should reflect the time displayed on each clock face.
- *Third Image:* Clock is an example of an analog clock. Alt-text for each clock should focus on the type of clock it is.

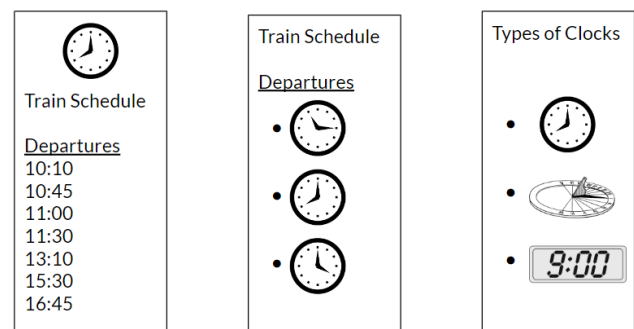


Figure 3. Three different clock images of a train schedule and types of clocks. Adapted from [“Clock face vector illustration,”](#) by OpenClipart, 2014b. In the public domain. Adapted from [“Sundial vector image,”](#) by OpenClipart, 2018. In the public domain. Adapted from [“Digital clock display vector graphics,”](#) by OpenClipart, 2014a. In the public domain.

CONTENT PRESENTATION (20 MINS; EXPLANATION)

Consistent with the 5E Model, splitting images into 5 typologies provides an Explanation of the material for the learner. This information is provided in lecture-format, led by the instructor, with a slide deck presentation of the content.

IMAGE TYPES

There are five types of images commonly found in online learning objects:

- Decorative images
- Images of text
- Images for enhanced comprehension

- Screenshots
- Infographics

Let's look at each in turn.

DECORATIVE IMAGES

When identifying decorative images, ask the following questions:

- What is the image intended to achieve?
- What information is it presenting?
- Are you missing any information if you can't see the image?

If answers are difficult to come up with, or the answer tends towards "not much," the image is likely decorative.

Alt-Text for Decorative Images. Decorative images should be marked with a null alt-text, which is indicated by "". Some platforms will mark the alt text null if the field is left blank. A null alt text tag is used so that users with screen readers don't see or aren't confused by content unnecessary for comprehension.

Example. The image of the book covers available at the [History Research Guide: Your Writing site](#) under heading "Guides on writing history essays" (Chee, 2023b) can be used as examples of decorative images. On Chee (2023b) History Research Guide: Your Writing site, the images of the books are unnecessary content because the title of the book is provided and linked to the library search engine to locate the book. If you inspect the images on your browser (see "How to Check Existing Alt-Text" section for directions), you will note the alt-text is "" which indicates null alt-text or a descriptive image.

IMAGES OF TEXT (MEANT TO BE READ AS TEXT)

When identifying images of text, ask the following questions:

- Will the conveyed information in this picture be lost if the text is typed out?
- Is this image of text part of a logo?

If the answer to either is "yes", then it is acceptable to use an image of text. Otherwise, information should be typed out.

Alt-Text for Images of Text. For the first question, make sure the conveyed information is repeated in the alt-text. For the second question, it is sufficient to identify the logo as "logo for [insert company/group]".

Tip. Rarely is an image of text so information-laden that it cannot be presented instead in text format.

Example. Figure 4 includes an image of the RefWorks logo and thus the alt-text for the logo within the context of the website is simply "logo for RefWorks"

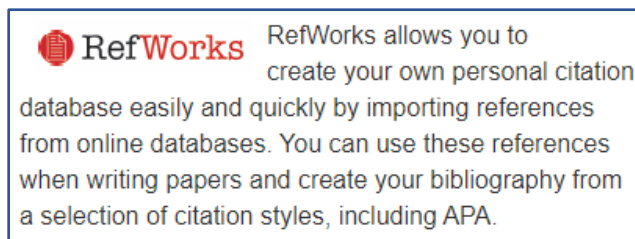


Figure 4. Image of RefWorks description. From "[Recreation and Leisure Studies: Citations](#)," by S. Mutch, 2023b, University of Waterloo. Copyright 2023 by the University of Waterloo. Reprinted with permission.

IMAGES AS EXAMPLES/FOR ENHANCED COMPREHENSION

When identifying images for enhanced comprehension, ask the following questions:

- What is the image intended to achieve?
- What information is it presenting?
- If you can't see the image, what are you missing?

If the answers tend towards "an example of x" or "conveys a sense of y", then the image is likely being used for enhanced comprehension.

Alt-Text for Images for Enhanced Comprehension. Generally, try to describe the function of the image, rather than its appearance. Avoid repeating information in the alt-text that is already present in the title or preamble to the image as users with a screen reader will hear the same content twice, which may be irritating or confusing.

Tip. Make the implied message of images explicit. This can be more difficult than it seems!

Example. The image of the American National Biography (collage of 4 faces) available at the [History Research Guide: Get Started site](#) under heading

“About this guide” (Chee, 2023a) can be used as an example of an image for enhanced comprehension.

In this example, the function of the image has been described after the image, “*American National Biography* has entries on Billie Holiday; Mark Twain; Jacqueline Onassis; Malcolm X, ... And SO many more.” (Chee, 2023a, About this guide), which means the image can be marked as decorative. However, this case could also be resolved by removing the sub-script and including the alt-text: “A collage of Billie Holiday, Mark Twain, Jacqueline Onassis, and Malcolm X, examples of the people featured in the *American National Biography*.”

SCREENSHOTS

Identifying a screenshot should be fairly evident. Screenshots are typically included to help users locate information on, or navigate through a busy page, directing them to the precise content they need for a particular task.

Alt-Text for Screenshots. Navigational help is just as important, if not more important, for users with cognitive or visual needs. Navigating with a screen reader is tedious. Use alt-text to describe the location of target components, using text or HTML landmarks when appropriate (e.g., below the heading xyz). You could also include the screenshot description in the regular text on the page and mark the screenshot as decorative.

Tip. To better understand the navigation needs of screen-reader users, imagine only being able to focus on a post-it sized section of the screen at once. What directions would be most helpful for way-finding? Demonstrating how a screen reader identifies poor alt-text can help to exemplify the issues inherent with navigating screenshot images.

Example. Figure 5 is a screenshot of selecting the “Speech/Lecture” Document Type in the Advanced Search tab of the ABI/Inform platform. The alt-text for this image is “In the Advanced Search tab of ABI/Inform, check the “Speech/Lecture” checkbox that follows the Document Type heading to limit your search to speeches and lectures.” Notice how the alt-text describes the directions for the location and selection of the “Speech/Lecture” option on the website.

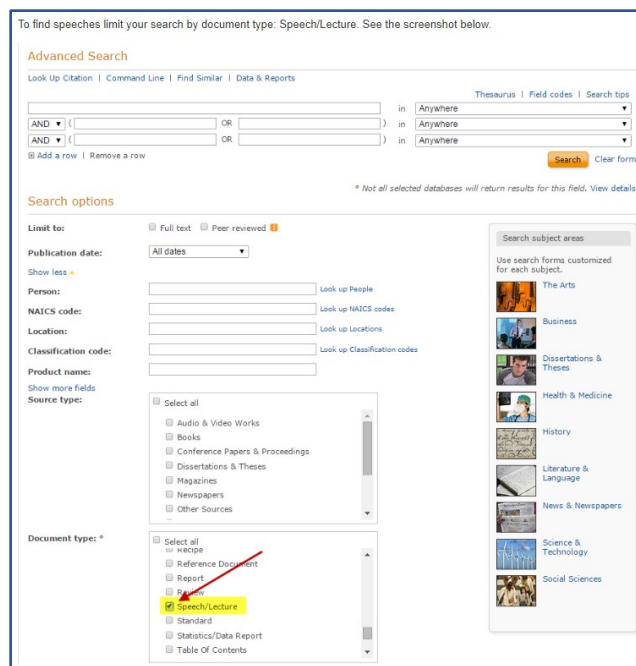


Figure 5. Screenshot of selecting the “Speech/Lecture” Document Type in the Advanced Search tab of the ABI/Inform platform. From “[Communication Arts: Speeches and monologues](#),” by S. Mutch, 2023a, University of Waterloo. Copyright 2023 by the University of Waterloo. Reprinted with permission.

INFOGRAPHIC

An infographic is any combination of text and graphical elements that has been created to distill complicated information/relationships into a compact and digestible format. This is an enhanced form of an “image of text”, and thus deserves its own category.

Alt-Text for Infographics. Some screen readers will stop reading alt-text after a certain number of characters (around 125), so it is important to have a separate place for a longer description. In HTML, the `longdesc` attribute may be used to hyperlink to a detailed description of the image. However, since this long description can be useful for all users for understanding an infographic, it is recommended that instead of using the `longdesc` attribute, the long description is included as text on the same page as the image (e.g., underneath the image). If using the `longdesc` attribute, the alt-text should briefly describe the image and indicate where the long description can be found.

Tip. Write the `longdesc` as though you were explaining the infographic verbally.

Example. The EBM Pyramid image available at the [EBM Resource Pyramid site](#) under heading “Evidence-Based Medicine Resources” (University of Pittsburgh, 2023) can be used as an example of an infographic image.

The description of the EBM Resource Pyramid is provided below the image, “The Evidence-Based Pyramid depicts a triangular representation of the levels of evidence with the strongest evidence at the top and progressing down through evidence with decreasing strength. At the apex of the pyramid are Systematic Reviews...” (University of Pittsburgh, 2023, para. 3). The alt-text for the image is, “EBM Resource Pyramid. For a text-based version, see text below image” (you can inspect the image on your browser to see this alt-text; see How to Check Existing Alt-Text (Exploration) section).

Within the context of online learning objects, infographics are sometimes complicated by serving as the standalone learning element, rather than serving as one aspect within a larger learning object. The alt-text approach of including a longer description below the infographic can be used if the platform allows. Alternatively, the infographic image can be converted into a different format type like a PDF, where each individual graphical element can be described, and additional tags can be added for enhanced explanation. For further support on converting images to PDF and adding additional tags and descriptions, see Chee et al. (2022) and Voichita et al. (2022).

PRACTICE AND ASSESSMENT (20-25 MINS; EXTENSION & EVALUATION)

Consistent with the 5E Model, this active learning portion provides learners an opportunity to apply their learning (Extension), and for the instructor to informally Evaluate student learning.

After the presentation of the initial material, the instructor should have learners practice looking at the other digital images, either supplied by the instructor, or found by the learners with an online search. The instructor should circulate around the room using a Socratic approach to probe depth and application of concepts introduced.

FINAL CHECK-IN

The instructor concludes by highlighting that effective alt-text relies entirely on context and the intended function of an image.

Practice examples should be provided by the instructor (or taken from learner examples from the previous exercise). Learners should practice sorting images into each of the five types of images. The sorting exercise will help learners reflect on the function of an image and the type of alt-text that should be included. Examples are best drawn from a suite of learning objects related to the ones that lesson attendees will be subsequently creating in their work as educators. The instructor can ask individuals to present their image, identify the type, and the suggested alt-text, or facilitate a whole-group discussion on a few of the practice examples.

Assessment chosen for this is intentionally formative in nature as learners are likely to have different backgrounds and levels of experience working with alt-text for images. This approach to assessment of learning was additionally chosen to align with the 5E Model and to emphasize the need for intentional and iterative practice of alt-text specifically and web accessibility work more generally in the educational context.

IN THE WILD

After the final check-in, attendees should use most of the remaining time to continue looking at the alt-text of images they brought with them, focusing on the type of image and if the alt-text is suitable. The instructor should circulate during this time to provide hands-on guidance and help learners work through the subjective aspects of this work. During this time the instructor can get a sense of the success of the lesson by answering the question: Are attendees thinking critically about the function of the images included in their learning objects?

WRAP-UP (5 MINS)

After allowing the learners time to identify and evaluate and/or create alt-text to the images they brought with them (In the Wild section), the instructor should call the learners back together.

The instructor should ask for one or more learners (based on time left in the lesson) to share their experience working through identifying the image types and generating robust alt-text. Reassure the learners that this is only the beginning of a longer learning process and that writing good alt-text takes time and practice. Outcomes may also be assessed by reviewing changes to alt-text in the images brought by learners.

CRITICAL REFLECTION

The goal of this lesson was to support educators in becoming more accessibility-literate. To this end, images from online instructional materials were categorized into five types and learners were supported in identifying and writing robust alt-text for each image type. In doing so, the intent was to have learners reflect on the purpose of included images and to encourage them to include robust alt-text at the moment of creation.

Attendees left the lesson with a better understanding of the subjective nature of alt-text, the need for the creator of a learning object to input alt-text based on intended image function, and equipped with questions to help think critically about the place and purpose of images.

The lesson could have gone better with examples tailored to each participant. Some participants did not bring many images and struggled to engage with the second half of the lesson. Equally, some participants concluded that removing images wherever possible was a simpler solution than developing robust alt-text. This is an opportunity to engage in a conversation about the intent behind images. Sometimes images are not the best solution if thrown in without intentionality. However, some direct presentation of effective use of visual content for student learning could help mitigate this instinct.

An alternative approach would be to provide additional images. Participants could then create alt-text and compare their versions to instructor-created alt-text. Though this option would be more time efficient, it may not engender authentic engagement promoted by tailored examples and especially integral for the context-dependent nature of writing good alt-text.

More time for one-on-one support would have helped tailor the approach for the needs of each participant. In some contexts, one-on-one support may not be feasible. In those instances, we think arranging learners in small groups and having them work through an example brought forward by one group member is an effective way to accomplish the same intent.

REFERENCES

- Balci, S., Cakiroglu, J., & Tekkaya, C. (2006). Engagement, exploration, explanation, extension, and evaluation (5E) learning cycle and conceptual change text as learning tools. *Biochemistry and Molecular Biology Education*, 34(3), 199-203. <https://doi.org/10.1002/bmb.2006.49403403199>
- Chee, M. (2023a, April 27). *History research guide: Get started*. University of Waterloo. Retrieved June 18, 2023, from <https://subjectguides.uwaterloo.ca/history>
- Chee, M. (2023b, April 27). *History research guide: Your writing*. University of Waterloo. Retrieved June 18, 2023, from <https://subjectguides.uwaterloo.ca/history/your-writing>
- Chee, M., Davidian, Z., & Weaver, K. D. (2022). More to do than can ever be done: Reconciling library online learning objects with WCAG 2.1 standards for accessibility. *Journal of Web Librarianship*, 16(2), 87–119. <https://doi.org/10.1080/19322909.2022.2062521>
- Duran, L. B., & Duran, E. (2004). The 5E instructional model: A learning cycle approach for inquiry-based science teaching. *Science Education Review*, 3(2), 49-58. <https://eric.ed.gov/?id=EJ1058007>
- Lee, D. (2016, August 1). The Arthur fist meme is the best new meme in a long line of Arthur memes [Digital image]. *The Verge*. <https://www.theverge.com/2016/8/1/12342168/arthur-fist-meme-twitter-tumblr-internet-culture>
- Mutch, S. (2023a, June 12). *Communication arts: Speeches and monologues*. University of

Waterloo. Retrieved June 18, 2023, from <https://subjectguides.uwaterloo.ca/commarts/fiindspeeches>

Mutch, S. (2023b, June 12). *Recreation and leisure studies: Citations*. University of Waterloo. Retrieved June 18, 2023, from <https://subjectguides.uwaterloo.ca/rls/cite>

National Archives. (n.d.). *President Barack Obama*. Barack Obama Presidential Library. Retrieved June 18, 2023, from <https://www.obamalibrary.gov/obamas/president-barack-obama>

OpenClipart. (2014a, May 18). Digital clock display vector graphics. *Free SVG*. <https://freessvg.org/digital-clock-display-vector-graphics10435>

OpenClipart. (2014b, July 7). Clock face vector illustration. *Free SVG*. <https://freessvg.org/clock-face-vector-illustration>

OpenClipart. (2018, June 21). Sundial vector image. *Free SVG*. <https://freessvg.org/sundial-vector-image>

University of Pittsburgh. (2023, April 7). *EBM resource pyramid*. Health Sciences Library System Guides. Retrieved June 18, 2023, from <https://hsls.libguides.com/pyramid>

W3C. (2018, June 5). *Web Content Accessibility Guidelines (WCAG) 2.1*. <https://www.w3.org/TR/WCAG21/>

SUPPORT MATERIALS

Drawing in part from content in this lesson, an online asynchronous learning module was developed that may be of interest for readers to peruse (Chee et al., 2021). Other resources are provided to expand instructors' and learners' knowledge.

Chee, M., Gross, L., Voichita, S., & Wong, E. (2021). *Microsoft Word accessibility training* [Online module]. https://lib.uwaterloo.ca/online_learning/sites/default/files/learnings/Accessible%20Word%20Documents/#/lessons/KLZGjgLCKYDc-QZ_sOlofHQJP4_OtJl-

Chee, M. & Weaver, K. D. (2021). Meeting a higher standard: A case study of accessibility compliance in LibGuides upon the adoption of WCAG 2.0 guidelines. *Journal of Web Librarianship*, 15(2), 69–89. <https://doi.org/10.1080/19322909.2021.1907267>

King, H. R. (2021). *Thinking about digital accessibility: Stumbling blocks and steppingstones in design and development*. Lulu.com

Tobin, T. J., & Behling, K. T. (2018). *Reach everyone, teach everyone: Universal design for learning in higher education*. West Virginia University Press.

Voichita, S., Kholodova, J., Chee, M., & Weaver, K. D. (2022). PDF accessibility: Considerations and best practices for learning objects and other Library materials. *UWSpace*. <http://hdl.handle.net/10012/18126>

Web Accessibility in Mind. (2021, October 19). *Alternative text*. <https://webaim.org/techniques/alttext/>

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