



California Open Online Library for Education & Accessibility

COOL4Ed (the California Open Online Library for Education) was created so that faculty can easily find, adopt, utilize, review and/or modify free and open etextbooks for little or no cost. The COOL4Ed accessibility open textbook evaluations can inform faculty, staff, and students how the free and open etextbooks meet 15 accessibility “checkpoints” that could impact the learning of learners with a range of disabilities.

SUMMARY OF ACCESSIBILITY EVALUATION:

Textbook: **Introductory Chemistry (BC Campus)**
Format of Textbook: **HTML**

Assistive Technology (AT) Evaluation Score: Overall	7.9 (Maximum score = 10)
<p>Assistive Technologies (AT) Evaluations applies specialized tools and software in the accessibility evaluation process. These specialized assistive technologies, see list below, are typically not used or available by the general public into the accessibility evaluation process.</p> <ul style="list-style-type: none"> • Accessibility features of desktop operating systems (e.g. high-contrast display themes, settings from the Keyboard and Mouse control panels) • Accessibility-related software included with desktop operating systems (e.g. VoiceOver, Microsoft Narrator) • Third-party accessibility software and hardware: • Screen readers (e.g. JAWS, Window Eyes) • Magnification software (e.g. ZoomText Magnifier/Reader, MAGIC Pro with Speech) • Reading software for users with learning disabilities (e.g. Read and Write Gold, Kurzweil 3000) • Refreshable Braille displays 	
Non- Assistive Technology (NAT) Evaluation Score: Overall	8.6 (Maximum score =10)
<p>Non-Assistive Technologies (NAT) Evaluations applies only native or basic tools and software such as the keyboard and Narrator in the accessibility evaluation process. These non-assistive technologies are readily available and used by the general public.</p>	



COOL4Ed Accessibility Evaluation Methods:

The California State University [Accessible Technology Initiative](#) and [MERLOT](#) (Multimedia Educational Resources for Learning and Online Teaching) developed the rubric or “checkpoints” for the accessibility evaluation. [CAST](#), a nationally recognized organization with expertise in accessibility and UDL, reviewed and affirmed the appropriateness and value of the accessibility evaluation rubric and contributed the references and support resources to help people learn how best to design, evaluate, and remediate the learning materials to maximize the accessibility of the learning resources for all. The “checkpoints” have been built upon the Section 508 technical standards and has been organized and tailored to the typical characteristics of digital resources used in higher education courses.

The accessibility evaluations were performed by the [Center for Usability in Design and Accessibility](#) at California State University, Long Beach; faculty and graduate students with expertise in human factors, usability, and accessibility performed the evaluations of over 150 free and open etextbooks. COOL4ed.org has published the accessibility evaluation rubric and provides a detailed description of the methodology used to evaluate the accessibility of the etextbooks in COOL4ed.

LOOKING FOR DETAILED ACCESSIBILITY REPORTS?

[See Detailed Accessibility Evaluation Report using Assistive Technologies](#)

[See Detailed Accessibility Evaluation Report using Non-Assistive Technologies](#)



DETAILED ACCESSIBILITY EVALUATION REPORT using Assistive Technologies

Assistive Technologies (AT) Evaluations applies specialized tools and software in the accessibility evaluation process. These specialized assistive technologies, such as Kurzweil and NVDA, are typically not used or available by the general public into the accessibility evaluation process.

1. Accessibility Documentation

A. The organization providing the online materials has a formal accessibility policy.	Fail
Additional Information:	Did not find any information about BC Campus's formal accessibility policy.
B. The organization providing the online materials has an accessibility statement.	Fail
Additional Information:	Did not find any information about BC Campus's accessibility statement.
C. An Accessibility Evaluation Report is available from an external organization.	Fail
Additional Information:	Did not find any information about BC Campus's accessibility evaluation report.

2. Text Access

A. The text of the digital resource is available to assistive technology that allows the user to enable text-to-speech (TTS) functionality.	Pass
Additional Information:	3/3 chapters had proper text to speech capabilities (Ch. 2, 10, 15). All of the text and written content were read aloud by the NVDA reader, but graphs, figures, and equations were not read properly. Equations had portions that were skipped when read aloud, and figures and graphs had no descriptions to describe what was in the figures and graphs.



3. Text Adjustment

A. Text is compatible with assistive technology.	Pass
Additional Information:	3/3 chapters were able to properly zoom in and out without horizontal scrolling and without any information being lost (Ch. 2, 10, 15).
B. The resource allows the user to adjust the font size and font/background color (or is rendered by an application such as a browser, media player, or reader) that offers this functionality).	Pass
Additional Information:	3/3 chapters had fonts and backgrounds that were able to change colors (Ch. 2, 10, 15). However, there were figures that did not change color by using the Care your eyes program (Ch. 2).

4. Reading Layout

A. Text of the digital resource is compatible with assistive technology that allows the user to reflow the text by specifying the margins and line spacing (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	Pass
Additional Information:	30/30 webpages had proper reflow of text when zoomed in and out (Ch. 2(7), 6(10), 7(8), 10(5)).
B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material.	Pass
Additional Information:	30/30 webpages match the printed material and reflow of text of the printed material (Ch. 2(7), 6(10), 7(8), 10(5)).

5. Reading Order

A. The reading order for digital resource content logically corresponds to the visual layout of	Pass
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the page when rendered by assistive technology.	
Additional Information:	5/5 pages had proper reading order (Ch. 2(2), 10(2), 15(1)). Although the images, figures, and equations were not read aloud properly by the NVDA reader, the written content was still read aloud in a logical order. None of the written content was skipped or read in a way that was difficult to follow.

6. Structural Markup/Navigation

A. The text of the digital resource includes markup (e.g. tags or styles) that allows for navigation by key structural elements (chapters, headings, pages) using assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	Pass
Additional Information:	3/3 chapters were properly navigable using the NVDA hotkeys (Ch. 2, 10, 15). The headers, lists, tables, and links were navigable.
B. The text of the digital resource includes markup for bullets and numbered lists that is compatible with assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	Pass
Additional Information:	10/10 lists were properly navigable to using the NVDA hotkeys (Ch. 2(5), 10(5)). The items in the lists were also navigable.
C. If the text of the digital resource is delivered within an ebook reader application, a method is provided that allows users to bypass the reader interface and move directly to the text content that is compatible with assistive technology.	N/A
Additional Information:	Not using eReader application.



7. Tables

<p>A. Data tables include markup (e.g. tags or styles) that identifies row and column headers in a manner that is compatible with assistive technology (or are rendered by an application such as a browser, media player, or reader that offers this functionality).</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>10/10 tables are properly navigable using the NVDA hotkeys (Ch. 2(7), 10, 15(2)). The tables were found using the hotkeys and were navigable cell by cell. However, you were only able to go through the cells from left to right by pressing the up and down directional keys rather than going in all directions.</p>

8. Hyperlinks

<p>A. In-book links take you to a location within the textbook. For example, the table of contents would be considered in-book links and embedded links take you to the correct location in the book.</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>All hyperlinks are live.</p>
<p>B. Live hyperlinks take you to any website or webpages external to the book.</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>50/50 hyperlinks were properly functioning (Ch. 2(12), 10(21), 15(17)). 48/50 hyperlinks had proper description (Ch. 2(11), 10(21), 15(16)). The remaining two hyperlinks were labeled as URLs (Ch. 2, 15).</p>
<p>C. Live links take you to the correct webpage that is functioning properly.</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>50/50 hyperlinks were properly functioning (Ch. 2(12), 10(21), 15(17)).</p>
<p>D. Live links are descriptive enough for the users to know where it should take them.</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>48/50 hyperlinks had proper description (Ch. 2(11), 10(21), 15(16)). The remaining two hyperlinks were labeled as URLs (Ch. 2, 15).</p>



9. Color and Contrast

<p>A. All information within the material that is conveyed using color is also available in a manner that is compatible with those that do not perceive color, and information conveyed by color is also conveyed in other ways.</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>3/3 chapters had consistent color redundancy (Ch. 2, 10, 15). The headers and subheaders were consistently black against a white background. Normal text was consistently black against a white background. Links were consistently maroon against a white background. However, there were keywords looked like links even though they were not links which may confuse readers.</p>
<p>B. Information is conveyed from the sub-categories for contrast.</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>3/3 chapters had proper color contrast (Ch. 2, 10, 15). Headers were black against a white background. Normal text was black against a white background and links were maroon against a white background. Simple images were black against a white background.</p>
<p>C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>Headers were black against a white background.</p>
<p>D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>Normal text was black against a white background and links were maroon against a white background.</p>
<p>E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>Simple images were black against a white background.</p>



10. Language

A. The text of the digital resource includes markup that declares the language of the content in a manner that is compatible with assistive technology.	Pass
Additional Information:	Language markup is English.
B. If the digital resource includes passages in a foreign language, these passages include markup that declares the language in a manner that is compatible with assistive technology.	N/A
Additional Information:	No passage markup.

11. Images

A. Non-decorative images have alternative text that is compatible with assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	Fail
Additional Information:	0/3 chapters had non-decorative images that were properly described in detail other than the captions (Ch. 2, 10, 15). None of the images had full descriptions that described what the images contained. While the NVDA reader was reading the content aloud, the images were either described as just a "graphic", had no description, or was only explained by the captions that were provided. Even with the captions provided there was still not enough information.
B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	N/A
Additional Information:	No decorative images found.
C. Complex images, charts, and graphs have longer text descriptions that are compatible with assistive technology (or are rendered by	Fail



<p>an application such as a browser, media player, or reader) that offers this functionality).</p>	
<p>Additional Information:</p>	<p>0/3 chapters had non-decorative images that were properly described in detail other than the captions (Ch. 2, 10, 15). None of the images had full descriptions that described what the images contained. While the NVDA reader was reading the content aloud, the images were either described as just a "graphic", had no description, or was only explained by the captions that were provided. Even with the captions provided there was still not enough information.</p>

12.Multimedia

<p>A. A synchronized text track (e.g. open or closed captions) is provided with all video content.</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>No multimedia content.</p>
<p>B. A transcript is provided with all audio content.</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>No multimedia content.</p>
<p>C. Audio/video content is delivered via a media player that is compatible with assistive technology. This includes support for all criteria listed in Section 15 below.</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>No multimedia content.</p>

13.Flickering

<p>A. The digital resource content does not contain anything that flashes more than three times in any one-second period.</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>No flickering content.</p>



14. Science, Technology, Engineering, and Math (STEM)

A. STEM figures have appropriate markup that indicates that the image is a figure.	Pass
Additional Information:	10/10 figures were properly marked up (Ch. 2(8), 10(2)).
B. STEM graphs have appropriate markup that indicates that the image is a graph.	Fail
Additional Information:	0/10 graphs were properly marked as graphs (Ch. 2, 6(4), 10(4), 15)). These graphs were not labeled.
C. STEM equations have appropriate markup that indicates that the image is an equation.	Pass
Additional Information:	10/10 equations were properly marked up (Ch. 2(7), 15(3)). All of the equations were visible with nothing blacked out or censored.
D. STEM tables have appropriate markup that indicates the image is a table.	Pass
Additional Information:	10/10 tables were properly marked up as tables (Ch. 2(7), 10, 15(2)).
E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	Fail
Additional Information:	5/10 figures had proper notation markup (Ch. 2(5)). The remaining five figures were only described as "graphics" when read aloud by the NVDA reader or were only given enough information as the caption provided. However, it was not an adequate amount of information.
F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	Fail
Additional Information:	0/10 graphs had proper notation markup (Ch. 2, 6(4), 10(4), 15)). None of the graphs had captions that described the graphs and while read aloud, the NVDA reader did not describe the graphs at all.



<p>G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.</p>	<p>Fail</p>
<p>Additional Information:</p>	<p>0/10 equations had proper notation markup when read aloud (Ch. 2(7), 15(3)). The equations were not read in a logical manner. The equations with exponents were pronounced wrongly and multiplication symbols were skipped. For example, 10^0 was pronounced as "one hundred."</p>
<p>H. Assistive technology used can access the content from the STEM tables.</p>	<p>Pass</p>
<p>Additional Information:</p>	<p>10/10 tables had proper notation markup (Ch. 2(5), 10, 15(2)). The tables were read aloud cell by cell from left to right. However, you were only able to go from left to right rather than in all directions using the directional keys.</p>

15. Interactive Elements

<p>A. Each interactive element (e.g. menu, hyperlink, button) and function (e.g. annotations) allows keyboard-only operation both with and without assistive technology.</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>No interactive elements.</p>
<p>B. Each interactive element conveys information to assistive technology regarding the element's name, type, and status (e.g. "Play, button, selected").</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>No interactive elements.</p>
<p>C. All instructions, prompts, and error messages necessary to complete forms are conveyed as text to assistive technology (or are rendered by an application such as a browser, media player, or reader that offers this functionality).</p>	<p>N/A</p>
<p>Additional Information:</p>	<p>No interactive elements.</p>



DETAILED ACCESSIBILITY EVALUATION REPORT using Non-Assistive Technologies

Non-Assistive Technologies (NAT) Evaluations applies only native or basic tools and software such as the keyboard and Narrator in the accessibility evaluation process. These non-assistive technologies are readily available and used by the general public.

1. Accessibility Documentation

A. The organization providing the online materials has a formal accessibility policy.	Fail
Additional Information:	Not found
B. The organization providing the online materials has an accessibility statement.	Fail
Additional Information:	Not found
C. An Accessibility Evaluation Report is available from an external organization.	Fail
Additional Information:	Not found

2. Text Access

A. The text of the digital resource is available to assistive technology that allows the user to enable text-to-speech (TTS) functionality.	Pass
Additional Information:	3/3 chapters work with text to speech function on Google Chrome. Chapter 2, 5 & 11 were checked.

3. Text Adjustment

A. Text is compatible with assistive technology.	Pass
Additional Information:	3/3 chapters work. Chapters 2, 5 & 11 were checked.
B. The resource allows the user to adjust the font size and font/background color (or is rendered by an application such as a browser, media player, or reader) that offers this functionality).	Pass



Additional Information:	3/3 chapters pass. 1, 7 & 13 were checked and all passed with care your eyes on Google Chrome.
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4. Reading Layout

A. Text of the digital resource is compatible with assistive technology that allows the user to reflow the text by specifying the margins and line spacing (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	Pass
Additional Information:	18/18 chapters/pages reflow when making the web browser smaller and when zooming up to 200%.
B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material.	Fail
Additional Information:	0/3 chapter match. Chapter 2, 10 and 13. None of these chapters exactly match. The discrepancies are apparent right way in the beginning of these chapters.

5. Reading Order

A. The reading order for digital resource content logically corresponds to the visual layout of the page when rendered by assistive technology.	N/A
Additional Information:	Non-assistive technology only.

6. Structural Markup/Navigation

A. The text of the digital resource includes markup (e.g. tags or styles) that allows for navigation by key structural elements (chapters, headings, pages) using assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	N/A
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Additional Information:	Non-assistive technology only.
B. The text of the digital resource includes markup for bullets and numbered lists that is compatible with assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	N/A
Additional Information:	Non-assistive technology only.
C. If the text of the digital resource is delivered within an ebook reader application, a method is provided that allows users to bypass the reader interface and move directly to the text content that is compatible with assistive technology.	N/A
Additional Information:	Non-assistive technology only.

7. Tables

A. Data tables include markup (e.g. tags or styles) that identifies row and column headers in a manner that is compatible with assistive technology (or are rendered by an application such as a browser, media player, or reader that offers this functionality).	N/A
Additional Information:	Non-assistive technology only.

8. Hyperlinks

A. In-book links take you to a location within the textbook. For example, the table of contents would be considered in-book links and embedded links take you to the correct location in the book.	N/A
Additional Information:	HTML documents only contain live links, inbook links are available.
B. Live hyperlinks take you to any website or webpages external to the book.	Pass



Additional Information:	Average Score
C. Live links take you to the correct webpage that is functioning properly.	Pass
Additional Information:	20/20 links work. These links are found in table of contents and within the text body.
D. Live links are descriptive enough for the users to know where it should take them.	Pass
Additional Information:	20/20 links work. These links are found in table of contents and within the text body.

9. Color and Contrast

A. All information within the material that is conveyed using color is also available in a manner that is compatible with those that do not perceive color, and information conveyed by color is also conveyed in other ways.	Fail
Additional Information:	1, 7 and 13 have links and words that are highlighted in red to show they are link or that the word is important and are not underlined.
B. Information is conveyed from the sub-categories for contrast.	Pass
Additional Information:	Average Score
C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	Pass
Additional Information:	3/3 chapters passed. Chapters 1, 7 & 12 were checked.
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	Pass
Additional Information:	3/3 chapters passed. Chapters 1, 7 & 12 were checked.
E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	Pass
Additional Information:	10/11 images pass. Chapters 1, 7 & 12 were checked.



10. Language

A. The text of the digital resource includes markup that declares the language of the content in a manner that is compatible with assistive technology.	Pass
Additional Information:	3/3 chapters pass. 1, 7 & 13 were checked and all passed.
B. If the digital resource includes passages in a foreign language, these passages include markup that declares the language in a manner that is compatible with assistive technology.	N/A
Additional Information:	No other language was found.

11. Images

A. Non-decorative images have alternative text that is compatible with assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	Pass
Additional Information:	Chapters 1, 7 & 13 were checked using w3c and pass.
B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	Pass
Additional Information:	Chapters 1, 7 & 13 were checked using w3c and pass.
C. Complex images, charts, and graphs have longer text descriptions that are compatible with assistive technology (or are rendered by an application such as a browser, media player, or reader) that offers this functionality).	Pass
Additional Information:	Chapters 1, 7 & 13 were checked and all complex images had an appropriate alt tag.



12. Multimedia

A. A synchronized text track (e.g. open or closed captions) is provided with all video content.	N/A
Additional Information:	No multimedia found.
B. A transcript is provided with all audio content.	N/A
Additional Information:	No multimedia found.
C. Audio/video content is delivered via a media player that is compatible with assistive technology. This includes support for all criteria listed in Section 15 below.	N/A
Additional Information:	No multimedia found.

13. Flickering

A. The digital resource content does not contain anything that flashes more than three times in any one-second period.	Pass
Additional Information:	No flickering. Chapter 1-10 were checked.

14. Science, Technology, Engineering, and Math (STEM)

A. STEM figures have appropriate markup that indicates that the image is a figure.	Pass
Additional Information:	10/10 figure found in chapter 1 have a proper mark up.
B. STEM graphs have appropriate markup that indicates that the image is a graph.	N/A
Additional Information:	No graphs were found in chapter 2, 5 and 7 which were the chapters checked.
C. STEM equations have appropriate markup that indicates that the image is an equation.	Fail
Additional Information:	0/10 equations found in chapter 6 have mark ups.
D. STEM tables have appropriate markup that indicates the image is a table.	Pass



Additional Information:	7 /10 tables found in chapter 2 have a proper mark up.
E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	Pass
Additional Information:	7/10 figures found in chapter 1 have proper description.
F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	N/A
Additional Information:	No graphs were found in chapter 2, 5 and 7 which were the chapters checked.
G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	Pass
Additional Information:	10/10 equations found in chapter 6 have proper descriptions.
H. Assistive technology used can access the content from the STEM tables.	Pass
Additional Information:	7/10 tables have a proper description.

15. Interactive Elements

A. Each interactive element (e.g. menu, hyperlink, button) and function (e.g. annotations) allows keyboard-only operation both with and without assistive technology.	N/A
Additional Information:	No interactive elements found.
B. Each interactive element conveys information to assistive technology regarding the element's name, type, and status (e.g. "Play, button, selected").	N/A



Additional Information:	No interactive elements found.
C. All instructions, prompts, and error messages necessary to complete forms are conveyed as text to assistive technology (or are rendered by an application such as a browser, media player, or reader that offers this functionality).	N/A
Additional Information:	No interactive elements found.

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