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: **Organic Chemistry (ChemWiki)**
Format of Textbook: **HTML**

Assistive Technology (AT) Evaluation Score: Overall	**6.9 (Maximum score = 10)**
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. • 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	**5.9 (Maximum score =10)**
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.	

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 UCDavis Chemwiki's formal accessibility policy.**
B. The organization providing the online materials has an accessibility statement.	**Fail**
Additional Information:	**Did not find any information about UCDavis Chemwiki's accessibility statement.**
C. An Accessibility Evaluation Report is available from an external organization.	**Fail**
Additional Information:	**Did not find any information about UCDavis Chemwiki'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.	**Fail**
Additional Information:	**0/5 chapters had content that was read fully (Ch. 3, 10, 15, 22, 31). The normal text was read with no content skipped. However, there were figures that made up the majority of these chapters that were skipped. There were also 2 equations that were skipped as well in Chapters 10 and 15.**

3. Text Adjustment

A. Text is compatible with assistive technology.	**Pass**

Additional Information:	**5/5 chapters were able to properly zoom in and out (Ch. 3, 10, 15, 22, 31). The three chapters were able to properly zoom in and out without horizontal scrolling until 150% zoom. Beyond 150%, the reader had to horizontally scroll through the content of the page.**
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).	**Fail**
Additional Information:	**0/5 chapters had full proper adjustment of font and color (Ch. 3, 10, 15, 22, 31). The normal text was able to adjust font colors when converted, but the images in these chapters had missing information when the color was adjusted by using the Care your eyes program. The information that was left out when the color was adjusted was important information that was needed to complete the images and figures. Majority of the chapters were the figures as well.**

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 (Ch. 3(24), 22(6)). The webpages had proper reflow because the format did not adjust even when zooming in and out of the textbook.**
B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material.	**N/A**
Additional Information:	**No printed material available.**

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.	
Additional Information:	**0/5 webpages had content that was read fully (Ch. 3, 10, 15, 22, 31). The normal text was read with no content skipped. However, there were figures that made up the majority of these chapters that were skipped. There were also 2 equations that were skipped as well in Chapters 10 and 15. The pages were also read in a logical order that was easy to understand despite the images being skipped**

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:	**5/5 chapters had proper navigation of text while using the NVDA hotkeys (Ch. 3, 10, 15, 22, 31). Headers, lists, links, and tables were navigable with no problem.**
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:	**8/10 lists were properly navigable using the NVDA hotkeys (Ch. 3(4), 10(3), 28). The remaining 2 lists were not found (Ch. 3, 15).**
C. If the text of the digital resource is delivered within an ebook reader application, a method	**N/A**

is provided that allows users to bypass the reader interface and move directly to the text content that is compatible with assistive technology.	
Additional Information:	**Not using eReader application.**

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).	**Pass**
Additional Information:	**8/10 tables were properly navigable by using the NVDA hotkeys (Ch. 3(2), 10(3), 22(3)). The 8 tables were read aloud by the NVDA reader cell by cell, however you were only able to go left to right through the cells rather than in all directions while using the directional keys. The remaining 2 tables looked like tables but were not read aloud by the NVDA reader as tables.**

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:	**All hyperlinks were live.**
B. Live hyperlinks take you to any website or webpages external to the book.	**Pass**
Additional Information:	**46/50 hyperlinks properly functioned (Ch. 3(25), 10(18), 15(3)). The remaining 4 hyperlinks were links that were not found on the internet and one was a broken link. 50/50 hyperlinks had proper description**

	of where the links would go online (Ch. 3(27), 10(20), 15(3)).
C. Live links take you to the correct webpage that is functioning properly.	**Pass**
Additional Information:	**46/50 hyperlinks properly functioned (Ch. 3(25), 10(18), 15(3)). The remaining 4 hyperlinks were links that were not found on the internet and one was a broken link.**
D. Live links are descriptive enough for the users to know where it should take them.	**Pass**
Additional Information:	**50/50 hyperlinks had proper description of where the links would go online (Ch. 3(27), 10(20), 15(3)).**

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.	**Pass**
Additional Information:	**5/5 chapters had consistent color redundancy (Ch. 3, 10, 15, 22, 31). The headers were all black, normal text was black, and links were blue.**
B. Information is conveyed from the sub-categories for contrast.	**Pass**
Additional Information:	**Headers were black against a white background. Normal text was black against a white background and passed the contrast evaluation. However, links did not pass the evaluation; they were blue against a white background. A majority of the simple images were black against a white background and passed the contrast evaluation. However, some of the images had blue, green, and red elements that did not pass the contrast evaluation and can be seen throughout chapters 3, 7, and 15.**
C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	**Pass**

Additional Information:	**Headers were black against a white background.**
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	**Pass**
Additional Information:	**Normal text was black against a white background and passed the contrast evaluation. However, links did not pass the evaluation; they were blue against a white background.**
E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	**Pass**
Additional Information:	**A majority of the simple images were black against a white background and passed the contrast evaluation. However, some of the images had blue, green, and red elements that did not pass the contrast evaluation and can be seen throughout chapters 3, 7, and 15.**

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 available.**

11.Images

A. Non-decorative images have alternative text that is compatible with assistive technology (or is rendered by an application such as a	**Fail**

browser, media player, or reader that offers this functionality).	
Additional Information:	**0/5 chapters had non-decorative images that were described in detail while read aloud by the NVDA reader (Ch. 3, 10, 15, 22, 31). The images were skipped and would be read aloud as just "graphic."**
B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	**Pass**
Additional Information:	**5/5 chapters had decorative images that were properly skipped when read aloud by the NVDA reader (Ch. 3, 10, 15, 22, 31).**
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).	**Fail**
Additional Information:	**0/5 chapters had complex images that were described in detail while read aloud by the NVDA reader (Ch. 3, 10, 15, 22, 31). The images were skipped and would be read aloud as just "graphic."**

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 content found.**
B. A transcript is provided with all audio content.	**N/A**
Additional Information:	**No multimedia content 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 content 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 content.**

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

A. STEM figures have appropriate markup that indicates that the image is a figure.	**Fail**
Additional Information:	**1/10 figures were marked up properly as figures (Ch. 3(5), 10(5)). The remaining figures were not labeled.**
B. STEM graphs have appropriate markup that indicates that the image is a graph.	**Fail**
Additional Information:	**0/10 figures were properly marked up as graphs (Ch. 31(10)). All of the 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 marked up properly (Ch. 3(6), 10(2), 15(2)). All of the equations were visible, none were blacked out.**
D. STEM tables have appropriate markup that indicates the image is a table.	**Fail**
Additional Information:	**0/10 tables were properly marked up as tables (Ch. 3(3), 10(4), 22(3)).**
E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Fail**
Additional Information:	**0/10 figures had proper notation markup (Ch. 3(5), 10(5)). 5 figures were skipped (Ch. 3). Figures in chapter 10 were read aloud by the NVDA reader as a "graphic."**
F. STEM graphs have appropriate notation markup that conveys both the notation	**Fail**

(presentation) and meaning (semantics) of the STEM content.	
Additional Information:	**0/10 graphs had proper notation markup (Ch. 31(10)). All of the graphs were skipped and did not have any captions to explain what were in the graphs or how the graphs looked.**
G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Pass**
Additional Information:	**7/10 equations had proper notation markup (Ch. 3(6), 10). The remaining 3 equations were not read in a logical manner that was easy to understand and one equation was skipped when read aloud (Ch. 10, 15(2)).**
H. Assistive technology used can access the content from the STEM tables.	**Pass**
Additional Information:	**8/10 tables had proper notation markup (Ch. 3(2), 10(3), 22(3)). The remaining 2 tables looked like tables but were not read aloud by the NVDA reader as tables.**

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	**N/A**

by an application such as a browser, media player, or reader that offers this functionality).	
Additional Information:	**No interactive elements found.**

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:	**No content found.**
B. The organization providing the online materials has an accessibility statement.	**Fail**
Additional Information:	**No content found.**
C. An Accessibility Evaluation Report is available from an external organization.	**Fail**
Additional Information:	**No content 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:	**Headers and summaries are not read unless highlighted. Some ions and equations are not read correctly. Nothing found for "Nomenclature of Alkyl Halides" page. Chapters checked: Acid Halides,**

	Alcohols, Aldehydes and Ketones, Alkyl Halides, Amides.Google Select and Speak free version used.

3. Text Adjustment

A. Text is compatible with assistive technology.	**Fail**
Additional Information:	**Horizontal scroll needed for text to be readable at 175% zoom. Chapters checked: Acid Halides, Alcohols, Aldehydes and Ketones, Alkyl Halides, Amides.**
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:	**Text color is readable. Many images are inverted thus making them difficult to interpret. Google "care your eyes" used. Chapters checked: Acid Halides, Alcohols, Aldehydes and Ketones, Alkyl Halides, Amides.**

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).	**N/A**
Additional Information:	**No printed material or PDF available to compare.**
B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material.	**N/A**
Additional Information:	**No printed material or PDF available to compare.**

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:	**Needs assistive technologies.**

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**
Additional Information:	**Needs assistive technologies.**
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:	**Needs assistive technologies.**
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:	**Needs assistive technologies.**

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	**N/A**

technology (or are rendered by an application such as a browser, media player, or reader that offers this functionality).	
Additional Information:	**Needs assistive technologies.**

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:	
B. Live hyperlinks take you to any website or webpages external to the book.	**Fail**
Additional Information:	**Videos Chapter checked. URLs not used. "Medium bandwidtch" Links (1-20) do not work.**
C. Live links take you to the correct webpage that is functioning properly.	**Fail**
Additional Information:	**Videos Chapter checked. "Medium bandwidth" Links (1-20) do not work.**
D. Live links are descriptive enough for the users to know where it should take them.	**Pass**
Additional Information:	**URLs not used.**

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.	**Pass**
Additional Information:	**Headers are bold and bigger sized font. Links are underlined. Examples are boxed in. Important terms are in bold.**

B. Information is conveyed from the sub-categories for contrast.	**Pass**
Additional Information:	**Chapters checked: Acid Halides, Alcohols, Aldehydes and Ketones, Alkyl Halides, Amides.**
C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	**Pass**
Additional Information:	**Black headers pass.**
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	**Pass**
Additional Information:	**All text of different colors pass.**
E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	**N/A**
Additional Information:	**No simple images found.**

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:	**Coding contained lang="en."**
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 passages found in foreign language.**

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:	**Coded image alt attributes are either non existent or insufficient. Chapters checked: Amides, Amines, Anhydrides, Aryl Halides, Azides. W3C validator website used.**
B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	**Pass**
Additional Information:	**Logo at the top of the page has img alt "ChemWiki". Chapters checked: Amides, Amines, Anhydrides, Aryl Halides, Azides.**
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:	**Described in text. Missing alt attributes. Chapters checked: Amides, Amines, Anhydrides, Aryl Halides, Azides. W3C validator website used.**

12.Multimedia

A. A synchronized text track (e.g. open or closed captions) is provided with all video content.	**Fail**
Additional Information:	**Videos Chapter checked. Links do not work, videos not found.**
B. A transcript is provided with all audio content.	**Fail**
Additional Information:	**Videos Chapter checked. Links do not work, videos not 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.	**Fail**
Additional Information:	**Videos Chapter checked. Links do not work, videos not 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:	**Chapters checked: Acid Halides, Alcohols, Aldehydes and Ketones, Alkyl Halides, Amides.**

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

A. STEM figures have appropriate markup that indicates that the image is a figure.	**Fail**
Additional Information:	**3/10 are labeled as figures. Ch 5.**
B. STEM graphs have appropriate markup that indicates that the image is a graph.	**Fail**
Additional Information:	**0/1 Alchohols:Properties: Background.**
C. STEM equations have appropriate markup that indicates that the image is an equation.	**Fail**
Additional Information:	**0/9 are labeled as equations. Chapter 5.4.1-3 checked.**
D. STEM tables have appropriate markup that indicates the image is a table.	**Pass**
Additional Information:	**10/10 labeled as tables Chapters 5-10.**
E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Fail**
Additional Information:	**Descriptions are not sufficiently meaningful, possibly because the meanings are embedded in the text.**
F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Fail**
Additional Information:	**Descriptions are not sufficiently meaningful, possibly because the meanings are embedded in the text.**

G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Fail**
Additional Information:	**Descriptions are not sufficiently meaningful, possibly because the meanings are embedded in the text.**
H. Assistive technology used can access the content from the STEM tables.	**Fail**
Additional Information:	**Descriptions are not sufficiently meaningful, possibly because the meanings are embedded in the text.**

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.	**Pass**
Additional Information:	**Tabs through navigation bar then to links in the text. Enter key works when pressed.**
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.**