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: **ChemWiki UC Davis**
Format of Textbook: **HTML**

Assistive Technology (AT) Evaluation Score: Overall	**7.6 (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	**6.6 (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 related information.**
B. The organization providing the online materials has an accessibility statement.	**Fail**
Additional Information:	**Did not find related information.**
C. An Accessibility Evaluation Report is available from an external organization.	**Fail**
Additional Information:	**Did not find related information.**

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:	**(General, Organic, Physical Chemistry, Periodic Table of the Elements, Reference Tables, Physical Constants, Units and Conversions, Lab Techniques) Able to read all tested pages.**

3. Text Adjustment

A. Text is compatible with assistive technology.	**Pass**
Additional Information:	**(General, Organic, Physical Chemistry) Able to zoom in and out.**
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,	**Pass**

media player, or reader) that offers this functionality).	
Additional Information:	**(General, Organic, Physical Chemistry) Able to change font and background colors.**

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).	**Fail**
Additional Information:	**(General, Organic, Physical Chemistry) Not able to reflow text, need to use horizontal scrolling.**
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 version 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.	**Pass**
Additional Information:	**(General, Organic, Physical Chemistry, Periodic Table of the Elements, Reference Tables, Physical Constants, Units and Conversions, Lab Techniques) Follow logical reading orders.**

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	**Pass**

such as a browser, media player, or reader that offers this functionality).	
Additional Information:	**(General, Organic, Physical Chemistry, Periodic Table of the Elements, Reference Tables, Physical Constants, Units and Conversions, Lab Techniques) Have level 1 and 3 but skipped level 2 headings. Also, some headings in the content were not recognized.**
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 out of 10 lists worked. (General, Organic, Physical Chemistry) Headings within the main text content are formatted in list format so it was a little bit confusing. (Homepage, Units and Conversions) Able to recognize and read all lists.**
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:	

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:	**10 out of 10 tables worked. "Periodic Table of the Elements" is just an image so cannot read it. (Reference Tables "Character Tables") Table within**

	table was also a little bit confusing, but was able to recognize all tables so that's good.

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.	**Pass**
Additional Information:	**(Homepage, General, Organic, Physical Chemistry) 50 out of 50 links worked.**
C. Live links take you to the correct webpage that is functioning properly.	**Pass**
Additional Information:	**(Homepage, General, Organic, Physical Chemistry) 50 out of 50 links worked.**
D. Live links are descriptive enough for the users to know where it should take them.	**Pass**
Additional Information:	**(Homepage, General, Organic, Physical Chemistry) 50 out of 50 links are descriptive. Later found out some links only have link addresses (9.5: Resonance).**

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:	**Most of links are in blue and underlined. However, when links present in a list, they are the same format/color as non-link text, so it was confusing and**

	you can only tell whether it's a link by hovering over and the color will turn blue.
B. Information is conveyed from the sub-categories for contrast.	**Pass**
Additional Information:	**See below detailed explanation.**
C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	**Pass**
Additional Information:	**White on blue failed, black on white passed, black on gray small text failed, dark red on white passed.**
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	**Pass**
Additional Information:	**Black on white passed, blue on white small text failed but large text passed, black on gray passed.**
E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	**Pass**
Additional Information:	**Most logo/icon passed bacause they're mostly in black on white background.**

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:	**lang="en-US"**
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:	

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:	**(Acid-Base Extraction) Only have descriptions for 2 out 3 images, the last one read link address. (9.1: Lewis Theory: An Overview) Images are treated as figures so not recognizable by NVDA. (Lab 1: Cyclic Voltammetry) Images are labeled as figure but recognizable by NVDA as images. Inconsistent with other pages.**
B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	**Fail**
Additional Information:	**Not able to recognize chapter icons (e.g. homework, quizzes, etc.) and organization logos as images.**
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:	**Did not have description/alt text even though they have brief text description at the bottom of the image.**

12.Multimedia

A. A synchronized text track (e.g. open or closed captions) is provided with all video content.	**Pass**
Additional Information:	**Only found 1 youtube video, text track present.**
B. A transcript is provided with all audio content.	**Fail**
Additional Information:	**Only found 1 youtube video, not transcript.**
C. Audio/video content is delivered via a media player that is compatible with assistive	**N/A**

technology. This includes support for all criteria listed in Section 15 below.	
Additional Information:	

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.**

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

A. STEM figures have appropriate markup that indicates that the image is a figure.	**Fail**
Additional Information:	**10 out of 10 do not have mark ups. (Acid-Base Extraction) Do not have markup for any of the figures instead just read the link addresses.**
B. STEM graphs have appropriate markup that indicates that the image is a graph.	**Fail**
Additional Information:	**10 out of 10 no alt text. (8.5: Electron Affinity, Lab 1: Cyclic Voltammetry, 9.3: Polar Covalent Bonds and Electrostatic Maps) No alt text for graphs, the NVDA just skipped them.**
C. STEM equations have appropriate markup that indicates that the image is an equation.	**Fail**
Additional Information:	**10 out of 10 do not have alt text. (8.5: Electron Affinity, 9.2: Covalent Bonding: An Introduction) No alt text for equation, not recognizable by NVDA, just skipped equation to read next paragraph.**
D. STEM tables have appropriate markup that indicates the image is a table.	**Pass**
Additional Information:	**9 out of 10 worked. (9.1: Lewis Theory: An Overview, 9.2: Covalent Bonding: An Introduction, 1.7: Significant Figures) Able to identify all tables, but one table is in image format (9.1: Lewis Theory: An**

	Overview fig 8.7) so not able to access individual cells.
E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Pass**
Additional Information:	**10 out of 10 do not have notations. (Acid-Base Extraction) All figures do not have a title nor specific descriptions, the descriptions are blended in the text paragraphs.**
F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Pass**
Additional Information:	**10 out of 10 have title and notation. (8.5: Electron Affinity, Lab 1: Cyclic Voltammetry, 9.3: Polar Covalent Bonds and Electrostatic Maps) Have title for graphs, but all graphs are labeled as figures.**
G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Fail**
Additional Information:	**10 out of 10 equations have assigned numbers but none of them have detailed descriptions. (8.5: Electron Affinity, 9.2: Covalent Bonding: An Introduction) All equations have an assigned number, but not all of them have descriptions specific to them.**
H. Assistive technology used can access the content from the STEM tables.	**Pass**
Additional Information:	**5 out of 10 worked. (9.1: Lewis Theory: An Overview, 9.2: Covalent Bonding: An Introduction, 1.7: Significant Figures) Most tables have a title and 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:	
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:	
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:	

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 included**
B. The organization providing the online materials has an accessibility statement.	**Fail**
Additional Information:	**Not included**

C. An Accessibility Evaluation Report is available from an external organization.	**Fail**
Additional Information:	**Not included**

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:	**Text was converted to speech without a problem pages: 1-10.**

3. Text Adjustment

A. Text is compatible with assistive technology.	**Pass**
Additional Information:	
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:	

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).	**Fail**
Additional Information:	**Page does not reflow, chapter checked: CHE2A CHE2B CHE2C CHE2AH CHE2BH.**
B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material.	**Fail**

Additional Information:	**Pages are clutered with links and several nav bars.**

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:	

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:	
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:	
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:	

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:	

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.	**Pass**
Additional Information:	
C. Live links take you to the correct webpage that is functioning properly.	**Pass**
Additional Information:	
D. Live links are descriptive enough for the users to know where it should take them.	**Pass**
Additional Information:	**Links provide description in the content around them, "Terms of Use" Chapter links.**

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:	**Links are only denoted by color, Headers are larger.**

B. Information is conveyed from the sub-categories for contrast.	**Pass**
Additional Information:	**Everything passes, however there is a gray nav bar toward the top that does not pass the assessment.**
C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	**Fail**
Additional Information:	**On all pages. The top headings/links/contents sections that start with chemWik, Periodic Table of the Elements and Wikitext fail.**
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	**Pass**
Additional Information:	**Text passes standards, 21.0:1.**
E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	**Pass**
Additional Information:	

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:	
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:	

11.Images

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

browser, media player, or reader that offers this functionality).	
Additional Information:	**No errors found using W3.**
B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	**Pass**
Additional Information:	
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:	**Most images need more description to explain what is going on.**

12.Multimedia

A. A synchronized text track (e.g. open or closed captions) is provided with all video content.	**N/A**
Additional Information:	
B. A transcript is provided with all audio content.	**N/A**
Additional Information:	
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:	

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:	

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

A. STEM figures have appropriate markup that indicates that the image is a figure.	**Fail**
Additional Information:	**Figures are not read logically, CHE2A 4.1, 4.2, 4.3, 4.4.**
B. STEM graphs have appropriate markup that indicates that the image is a graph.	**Fail**
Additional Information:	**Graphs are not read logically, CHE2B 3.1, 3.2, 3.3, 3.4.**
C. STEM equations have appropriate markup that indicates that the image is an equation.	**Fail**
Additional Information:	**Equations are not read logically, CHE2A 4.1, 4.2, 4.3, 4.4.**
D. STEM tables have appropriate markup that indicates the image is a table.	**N/A**
Additional Information:	
E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Pass**
Additional Information:	
F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Pass**
Additional Information:	
G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Pass**
Additional Information:	
H. Assistive technology used can access the content from the STEM tables.	**N/A**

Additional Information:	

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:	
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:	
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:	