



## 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:** Analytical Chemistry (ChemWiki)  
**Format of Textbook:** HTML

<b>Assistive Technology (AT) Evaluation Score: Overall</b>	<b>6.7 (Maximum score = 10)</b>
<p><b>Assistive Technologies (AT) Evaluations</b> 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"> <li>• Accessibility features of desktop operating systems (e.g. high-contrast display themes, settings from the Keyboard and Mouse control panels)</li> <li>• Accessibility-related software included with desktop operating systems (e.g. VoiceOver, Microsoft Narrator)</li> <li>• Third-party accessibility software and hardware:</li> <li>• Screen readers (e.g. JAWS, Window Eyes)</li> <li>• Magnification software (e.g. ZoomText Magnifier/Reader, MAGIC Pro with Speech)</li> <li>• Reading software for users with learning disabilities (e.g. Read and Write Gold, Kurzweil 3000)</li> <li>• Refreshable Braille displays</li> </ul>	
<b>Non- Assistive Technology (NAT) Evaluation Score: Overall</b>	<b>7.9 (Maximum score =10)</b>
<p><b>Non-Assistive Technologies (NAT) Evaluations</b> 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.	<b>Fail</b>
Additional Information:	<b>No content found.</b>
B. The organization providing the online materials has an accessibility statement.	<b>Fail</b>
Additional Information:	<b>No content found.</b>
C. An Accessibility Evaluation Report is available from an external organization.	<b>Fail</b>
Additional Information:	<b>No content found.</b>

### 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.	<b>Pass</b>
Additional Information:	<b>1/1 chapters pass (Chapter 1 checked).</b>

### 3. Text Adjustment

A. Text is compatible with assistive technology.	<b>Pass</b>
Additional Information:	<b>1/1 chapters checked and passes. Chemical Reactions Chapter checked.</b>
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).	<b>Pass</b>



Additional Information:	<b>1/1 chapters checked and passes. Chemical Reactions Chapter checked.</b>
-------------------------	---

#### 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).	<b>Fail</b>
Additional Information:	<b>0/30 pages pass.</b>
B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material.	<b>N/A</b>
Additional Information:	<b>No page numbers online available.</b>

#### 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.	<b>Pass</b>
Additional Information:	<b>5/5 pages pass.</b>

#### 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).	<b>Fail</b>
Additional Information:	<b>0/1 chapters pass.</b>
B. The text of the digital resource includes markup for bullets and numbered lists that is	<b>Pass</b>



compatible with assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	
Additional Information:	<b>7/10 lists in Ch1 recognized.</b>
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.	<b>N/A</b>
Additional Information:	<b>Not using reader application.</b>

## 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).	<b>Pass</b>
Additional Information:	<b>11/11 pass.</b>

## 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.	<b>N/A</b>
Additional Information:	<b>Table of Contents links work well.</b>
B. Live hyperlinks take you to any website or webpages external to the book.	<b>Pass</b>
Additional Information:	<b>51/51 pass functionality and descriptions (although 7 links were not very meaningfully described).</b>



C. Live links take you to the correct webpage that is functioning properly.	<b>Pass</b>
Additional Information:	<b>51/51 links checked and pass (Analytical Chemistry 2.0 Chapter: Sections 1 and 2A&amp;B).</b>
D. Live links are descriptive enough for the users to know where it should take them.	<b>Pass</b>
Additional Information:	<b>51/51 links were not URLs (but some not very descriptive). (Analytical Chemistry 2.0 Chapter: Sections 1 and 2A&amp;B).</b>

### 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.	<b>Fail</b>
Additional Information:	<b>0/1 chapters pass. Links are not underlined (just blue font). Data Analysis chapter checked.</b>
B. Information is conveyed from the sub-categories for contrast.	<b>Pass</b>
Additional Information:	<b>2/2 chapters pass.</b>
C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	<b>Pass</b>
Additional Information:	<b>2/2 chapters pass.</b>
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	<b>Pass</b>
Additional Information:	<b>2/2 chapters pass.</b>
E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	<b>N/A</b>
Additional Information:	<b>No simple images found.</b>



### 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.	<b>Pass</b>
Additional Information:	<b>lang="en"</b>
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.	<b>N/A</b>
Additional Information:	<b>No passages in foreign language.</b>

### 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).	<b>Fail</b>
Additional Information:	<b>0/1 chapters pass.</b>
B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	<b>Fail</b>
Additional Information:	<b>1/2 images found and pass.</b>
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).	<b>Fail</b>
Additional Information:	<b>0/1 chapters pass.</b>



### 12. Multimedia

A. A synchronized text track (e.g. open or closed captions) is provided with all video content.	<b>Fail</b>
Additional Information:	<b>0/3 pass.</b>
B. A transcript is provided with all audio content.	<b>Fail</b>
Additional Information:	<b>0/3 pass.</b>
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.	<b>N/A</b>
Additional Information:	<b>Not using additional assistive technologies.</b>

### 13. Flickering

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

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

A. STEM figures have appropriate markup that indicates that the image is a figure.	<b>Pass</b>
Additional Information:	<b>10/10 pass.</b>
B. STEM graphs have appropriate markup that indicates that the image is a graph.	<b>Fail</b>
Additional Information:	<b>0/10 marked as graphs.</b>
C. STEM equations have appropriate markup that indicates that the image is an equation.	<b>Fail</b>
Additional Information:	<b>0/10 marked as equations.</b>
D. STEM tables have appropriate markup that indicates the image is a table.	<b>Pass</b>
Additional Information:	<b>11/11 marked as tables.</b>





E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	<b>Pass</b>
Additional Information:	<b>10/10 pass.</b>
F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	<b>N/A</b>
Additional Information:	<b>Marked as figures.</b>
G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	<b>Pass</b>
Additional Information:	<b>10/10 pass.</b>
H. Assistive technology used can access the content from the STEM tables.	<b>Pass</b>
Additional Information:	<b>11/11 appropriate notation.</b>

### ***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.	<b>N/A</b>
Additional Information:	<b>No interactive elements found.</b>
B. Each interactive element conveys information to assistive technology regarding the element's name, type, and status (e.g. "Play, button, selected").	<b>N/A</b>
Additional Information:	<b>No interactive elements found.</b>
C. All instructions, prompts, and error messages necessary to complete forms are conveyed as text to assistive technology (or are rendered	<b>N/A</b>



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

## 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.	<b>Fail</b>
Additional Information:	<b>No content found.</b>
B. The organization providing the online materials has an accessibility statement.	<b>Fail</b>
Additional Information:	<b>No content found.</b>
C. An Accessibility Evaluation Report is available from an external organization.	<b>Fail</b>
Additional Information:	<b>No content found.</b>

### *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.	<b>Pass</b>
Additional Information:	<b>Chemical Reactions Chapter checked. Headers are not read unless highlighted. Chemical formulas are not read accurately. Google Select and Speak free version used.</b>



### 3. Text Adjustment

A. Text is compatible with assistive technology.	<b>Fail</b>
Additional Information:	<b>Chemical Reactions Chapter checked. Requires horizontal scroll after 150%.</b>
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).	<b>Pass</b>
Additional Information:	<b>Chemical Reactions Chapter checked and pass. Google "care your eyes" used.</b>

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

### 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.	<b>N/A</b>
Additional Information:	<b>Needs assistive technologies.</b>



## 6. Structural Markup/Navigation

<p>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).</p>	<p><b>N/A</b></p>
<p>Additional Information:</p>	<p><b>Needs assistive technologies.</b></p>
<p>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).</p>	<p><b>N/A</b></p>
<p>Additional Information:</p>	<p><b>Needs assistive technologies.</b></p>
<p>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.</p>	<p><b>N/A</b></p>
<p>Additional Information:</p>	<p><b>Needs assistive technologies.</b></p>

## 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><b>N/A</b></p>
<p>Additional Information:</p>	<p><b>Needs assistive technologies.</b></p>



## 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.	
Additional Information:	<b>Table of Contents links work well.</b>
B. Live hyperlinks take you to any website or webpages external to the book.	<b>Pass</b>
Additional Information:	<b>Chapters Checked: Analytical Chemistry 2 Sections 2D, 2F, 3A, 4A, 9A, Electrochemistry Basics section 1.</b>
C. Live links take you to the correct webpage that is functioning properly.	<b>Pass</b>
Additional Information:	<b>15/20. Analytical Chemistry 2 Sections 2D (7/7), 2F(2/2), 3A(1/1), 4A(1/1), 9A(1/1), Electrochemistry Basics section 1 (3/8).</b>
D. Live links are descriptive enough for the users to know where it should take them.	<b>Pass</b>
Additional Information:	<b>16/20. Analytical Chemistry 2 Sections 2D(7/7), 2F(0/2), 3A(0/1), 4A(0/1), 9A(1/1), Electrochemistry Basics section 1(8/8).</b>

## 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.	<b>Pass</b>
Additional Information:	<b>Chapter Quantifying Nature Checked. Headers are a bigger font size and bold. Some words in the text are italicized. Links are blue and underlined. Examples are contained within boxes.</b>
B. Information is conveyed from the sub-categories for contrast.	<b>Pass</b>
Additional Information:	<b>Chapter Quantifying Nature Checked.</b>



C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	<b>Pass</b>
Additional Information:	<b>Chapter Quantifying Nature Checked. Black headers on white background pass. White "example" headers on green background pass.</b>
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	<b>Pass</b>
Additional Information:	<b>Chapter Quantifying Nature Checked. Black and blue text pass. Green and red text do not pass. Black text in blue example boxes pass.</b>
E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	<b>Fail</b>
Additional Information:	<b>Chapter Quantifying Nature Checked. 0/3 pass.</b>

### **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.	<b>Pass</b>
Additional Information:	<b>Coding includes lang="en."</b>
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.	<b>N/A</b>
Additional Information:	<b>No passages found in foreign language.</b>

### **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).	<b>Pass</b>
---	-------------



Additional Information:	<b>19/19. Not all are described in a sentence but each title is descriptive enough. Chapter Qualitative Analysis Checked. Coding img alt="" are descriptive enough.</b>
B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	<b>Pass</b>
Additional Information:	<b>Chapter Qualitative Analysis Checked. 1/1 side advertisement on each page.</b>
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).	<b>Pass</b>
Additional Information:	<b>5/5 images are described well. Chapter Qualitative Analysis Checked.</b>

## 12. Multimedia

A. A synchronized text track (e.g. open or closed captions) is provided with all video content.	<b>Fail</b>
Additional Information:	<b>0/3 Quantitative Analysis: Titration: Titration of a Weak Acid with a Strong Base (2 YouTube links on bottom of page: Advanced Chemistry Titrations *captions not an option*and Chemistry: Weak Acid-Strong Base Titration*not available in US*); Electrochemistry: Electrodes: Standard Electrodes (YouTube video: Standard Reduction Potentials*captions not accurate*).</b>
B. A transcript is provided with all audio content.	<b>Fail</b>
Additional Information:	<b>1/3 available (not even accurate)Quantitative Analysis: Titration: Titration of a Weak Acid with a Strong Base (2 YouTube links on bottom of page: Advanced Chemistry Titrations *not available* and Chemistry: Weak Acid-Strong Base Titration*not available in US*); Electrochemistry: Electrodes:</b>



	<b>Standard Electrodes (YouTube video: Standard Reduction Potentials*not accurate*).</b>
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.	<b>Fail</b>
Additional Information:	<b>2/3 played. Quantitative Analysis: Titration: Titration of a Weak Acid with a Strong Base (2 YouTube links on bottom of page: Advanced Chemistry Titrations and Chemistry: Weak Acid-Strong Base Titration*not available in US*); Electrochemistry: Electrodes: Standard Electrodes (YouTube video: Standard Reduction Potentials).</b>

### ***13.Flickering***

A. The digital resource content does not contain anything that flashes more than three times in any one-second period.	<b>Pass</b>
Additional Information:	<b>Chapters 1-3 checked.</b>

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

A. STEM figures have appropriate markup that indicates that the image is a figure.	<b>Pass</b>
Additional Information:	<b>10/10 Quantitative Analysis: Titration chapter checked.</b>
B. STEM graphs have appropriate markup that indicates that the image is a graph.	<b>Fail</b>
Additional Information:	<b>0/10. they are marked as figures.Quantitative Analysis: Titration chapter checked.</b>
C. STEM equations have appropriate markup that indicates that the image is an equation.	<b>Fail</b>
Additional Information:	<b>0/10. Quantitative Analysis: Titration chapter checked; not marked as equations.</b>





D. STEM tables have appropriate markup that indicates the image is a table.	<b>Pass</b>
Additional Information:	<b>10/10 marked as tables Quantitative Analysis: Titration chapter checked.</b>
E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	<b>Pass</b>
Additional Information:	<b>Meaningful descriptions. Quantitative Analysis: Titration chapter checked.</b>
F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	<b>Pass</b>
Additional Information:	<b>Meaningful descriptions. Quantitative Analysis: Titration chapter checked.</b>
G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	<b>Pass</b>
Additional Information:	<b>Meaningful descriptions(mostly in text). Quantitative Analysis: Titration chapter checked.</b>
H. Assistive technology used can access the content from the STEM tables.	<b>Pass</b>
Additional Information:	<b>Meaningful descriptions(mostly in text). Quantitative Analysis: Titration chapter checked.</b>

### ***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.	<b>Pass</b>
Additional Information:	<b>Tabs through nagivation bar then to links in the text. Enter key works when pressed.</b>



B. Each interactive element conveys information to assistive technology regarding the element's name, type, and status (e.g. "Play, button, selected").	<b>N/A</b>
Additional Information:	<b>No interactive elements found.</b>
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).	<b>N/A</b>
Additional Information:	<b>No interactive elements found.</b>

© 2016 California State University (Version 1.0)



This work licensed under a Creative Commons Attribution 4.0 International License:  
<https://creativecommons.org/licenses/by/4.0/>. Please attribute the California State University when using this work.