

COOL4Ed ACCESSIBILITY CHECKPOINTS

METHODS FOR EPUB3 FORMATS
(ASSISTIVE TECHNOLOGIES)



Evaluation time

Estimate evaluation time per book:

- Novice rater: 2~3 hours
- Experienced rater: 1.5~2 hours

Depending on book content and amount of material,

- STEM books
- Books with more pages
- Books with lots of images

Takes longer to evaluate

Accessibility Checkpoints

1. Accessibility Documentation
2. Text Access
3. Text Adjustment
4. Reading Layout
5. Reading Order
6. Structural Markup/Navigation
7. Tables
8. Hyperlinks
9. Color and Contrast
10. Language
11. Images
12. Multimedia
13. Flickering
14. STEM
15. Interactive Elements

How to access texts

STEPS:

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3. Search for preferred formats
4. Download text

How to access texts

STEPS:

2. Select desired titles

Introduction to Statistics

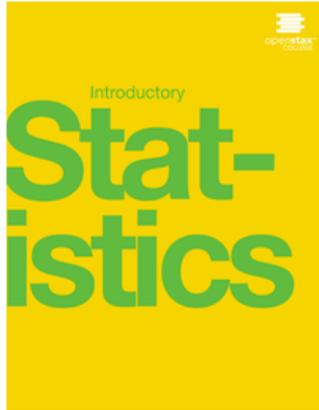


MATH 110

eTextbook	eTextbook Reviews
<i>Introductory Statistics From BC Campus</i>	Tami Matsumoto, CCC Faculty Andrew Noymer, UC Faculty Hasan Rahim, CCC Faculty
<i>Introductory Statistics From Open Stax College</i>	Tami Matsumoto, CCC Faculty Andrew Noymer, UC Faculty Hasan Rahim, CCC Faculty
<i>Online Statistics Education: An Interactive Multimedia Course of</i>	Tami Matsumoto, CCC

How to access texts

3. Search for preferred format and download text



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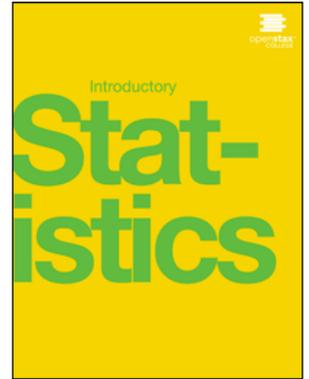
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Formats

Online texts are available in various formats and should be evaluated based on the following rankings:

1. EPUB3
2. HTML
3. Microsoft Word
4. PDF

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Formats

In other words, EPUB3 is ideal, but if it is not available, we move down the list and search for the next available format

4. Download textbook or open link (if applicable)

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Bookshare

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Formats

Note: This is an OpenStax text. Although EPUB3 isn't listed, it is available!

To determine if there is an EPUB3 format for OpenStax texts, additional navigation is required.

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Web View	Read live on the web.
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Introductory Statistics

Book by: OpenStax College

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[☰ Contents +](#) [i Metadata +](#) [⚙ Tools +](#)

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Preface

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Introductory Statistics

Book by: OpenStax College

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Preface

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Note: At the time of this writing, only OpenStax texts have been found to need additional navigation. All other texts have been found to clearly list out all available formats.

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Checklist

All information obtained from textbook evaluation will be entered into checklists:

HTML Accessibility Checklist					
Content	Name of book	Format	OS Used	Total Number of Pages	Number of Chapters
HTML					

Check point	Criteria	Amount of Material	Pass/Fail
1 Acc. Documentation	A. URL to Formal Accessibility Policy		
1 Acc. Documentation	B. URL to Accessibility Statement		
1 Acc. Documentation	C. URL to Accessibility Evaluation Report		
2 Text Access	Text to Speech	0	
3 Text Adjustment	A. Compatible	0	
3 Text Adjustment	B. Adjust font and colors	0	
4 Reading Layout	A. Reflow the text	30 web pages	
4 Reading Layout	B. Page # match printed material & reflow of text	30 web pages	
5 Reading Order	Digital resource layout		
6 Structural Markup	A. Navigation text		
6 Structural Markup	B. Lists		
6 Structural Markup	C. eReader application		
7 Table Markup	Table Markup		
8 Hyperlinks	Hyperlinks (within book)		
8 Hyperlinks	Hyperlink (live on internet)	20 links	
9 Color and Contrast	A. Color redundancy		
9 Color and Contrast	B. Contrast		
10 Language	A. Markup		
10 Language	B. Passage Markup		
11 Images	A. Non-decorative		
11 Images	B. Decorative		
11 Images	C. Complex		
12 Multimedia	A. Text Track		
12 Multimedia	B. Transcript		
12 Multimedia	C. Assistive Player		
13 Flickering	Flickering	10 links	
14 STEM	A. Markup (figures)	10 figures	
14 STEM	A. Markup (graphs)	10 graphs	
14 STEM	A. Markup (equation)	10 equations	
14 STEM	B. Notation Markup (figures)	10 figures	
14 STEM	B. Notation Markup (graphs)	10 graphs	
14 STEM	B. Notation (equation)	10 equations	
15 Interactive Elements	A. Keyboard		
15 Interactive Elements	B. Markup		
15 Interactive Elements	C. Text Prompts		

EPUB Accessibility Checklist					
Content	Name of book	Format	OS Used	Total Number of Pages	Number of Chapters
EPUB					
#	Check point	Criteria	Amount of Material	Pass/Fail	Additional Info
1	Acc. Documentation	A. URL to Formal Accessibility Policy			
1	Acc. Documentation	B. URL to Accessibility Statement			
1	Acc. Documentation	C. URL to Accessibility Evaluation Report			
2	Text Access	Text to Speech	0 pages		
3	Text Adjustment	A. Compatible	0 pages		
3	Text Adjustment	B. Adjust font and colors	0 pages		
4	Reading Layout	A. Reflow the text	0 pages		
4	Reading Layout	B. Page #s match printed material & reflow of text	0 pages		
5	Reading Order	Digital resource layout			
6	Structural Markup	A. Navigation text			
6	Structural Markup	B. Lists			
6	Structural Markup	C. eReader application			
7	Table Markup	Table Markup			
8	Hyperlinks	Hyperlinks (in-book)	30 links		
8	Hyperlinks	Hyperlink (live)	20 links		
9	Color and Contrast	A. Color redundancy			
9	Color and Contrast	B. Contrast			
10	Language	A. Markup			
10	Language	B. Passage Markup			
11	Images	A. Non-decorative			
11	Images	B. Decorative			
11	Images	C. Complex			
12	Multimedia	A. Text Track			
12	Multimedia	B. Transcript			
12	Multimedia	C. Assistive Player			
13	Flickering	Flickering	10 links		
14	STEM	A. Markup (figures)	10 figures		
14	STEM	A. Markup (graphs)	10 graphs		
14	STEM	A. Markup (equation)	10 equations		
14	STEM	B. Notation Markup (figures)	10 figures		
14	STEM	B. Notation Markup (graphs)	10 graphs		
14	STEM	B. Notation (equation)	10 equations		
15	Interactive Elements	A. Keyboard			
15	Interactive Elements	B. Markup			
15	Interactive Elements	C. Text Prompts			

Checklist

For every book, enter the following:

- Content area
- Name of book
- Format (i.e., EPUB, HTML, Word, or PDF)
- OS used (e.g., Microsoft; Windows)
- For EPUB, Word, and PDF formats: Total number of pages (obtained from Word or PDF format preferably, if available)
- For HTML only: Total number of chapters

Note: Only Windows will be used for analysis until Apple equivalents are decided upon.

Checklist

Example for the EPUB format of Introductory Statistics (PDF version has 863 pages)

Select content type from dropdown list

Select format and OS – note: each format has a different checklist

Only for HTML

EPUB Accessibility Checklist					
Content	Name of book	Format	OS Used	Total Number of Pages	Number of Chapters
Introduction to Statistics	Introductory Statistics	EPUB	Windows	863	

Enter name of book in its entirety

Checklist

Note: When certain information is entered such as the number of pages or number of chapters, certain information in the checklist is updated:

EPUB Accessibility Checklist					
Content	Name of book	Format	OS Used	Total Number of Pages	Number of Chapters
Introduction to Statistics	Introductory Statistics	EPUB	Windows	863	
#	Check point	Criteria	Amount of Material	Pass/Fail	Additional Info
1	Acc. Documentation	A. URL to Formal Accessibility Policy			
1	Acc. Documentation	B. URL to Accessibility Statement			
1	Acc. Documentation	C. URL to Accessibility Evaluation Report			
2	Text Access	Text to Speech	172.6 pages		
3	Text Adjustment	A. Compatible	86.3 pages		
3	Text Adjustment	B. Adjust font and colors	86.3 pages		
4	Reading Layout	A. Reflow the text	172.6 pages		
4	Reading Layout	B. Page #s match printed material & reflow of text	172.6 pages		

Checklist

This information is based upon predetermined values for the amount of information that needs to be evaluated. You only need to round up to the next page count (or link count).

EPUB Accessibility Checklist					
Content	Name of book	Format	OS Used	Total Number of Pages	Number of Chapters
Introduction to Statistics	Introductory Statistics	EPUB	Windows	863	
#	Check point	Criteria	Amount of Material	Pass/Fail	Additional Info
1	Acc. Documentation	A. URL to Formal Accessibility Policy			
1	Acc. Documentation	B. URL to Accessibility Statement			
1	Acc. Documentation	C. URL to Accessibility Evaluation Report			
2	Text Access	Text to Speech	172.6 pages		
3	Text Adjustment	A. Compatible	86.3 pages		
3	Text Adjustment	B. Adjust font and colors	86.3 pages		
4	Reading Layout	A. Reflow the text	172.6 pages		
4	Reading Layout	B. Page #s match printed material & reflow of text	172.6 pages		

173 pages
87 pages
87 pages
173 pages
173 pages

Checklist

The percentages used are included in this presentation, but that is only for your reference – the checklist will fill out this information for you!

EPUB Accessibility Checklist					
Content	Name of book	Format	OS Used	Total Number of Pages	Number of Chapters
Introduction to Statistics	Introductory Statistics	EPUB	Windows	863	
#	Check point	Criteria	Amount of Material	Pass/Fail	Additional Info
1	Acc. Documentation	A. URL to Formal Accessibility Policy			
1	Acc. Documentation	B. URL to Accessibility Statement			
1	Acc. Documentation	C. URL to Accessibility Evaluation Report			
2	Text Access	Text to Speech	172.6 pages		
3	Text Adjustment	A. Compatible	86.3 pages		
3	Text Adjustment	B. Adjust font and colors	86.3 pages		
4	Reading Layout	A. Reflow the text	172.6 pages		
4	Reading Layout	B. Page #s match printed material & reflow of text	172.6 pages		

➔

173 pages
87 pages
87 pages
173 pages
173 pages

Skills Commons Accessibility Checkpoints

All information obtained from textbook evaluation will be entered into the checkpoints document:

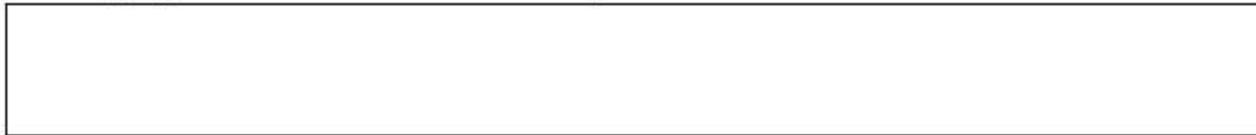
3. *Text Adjustment*

PASS/FAIL: _____ Ranking: _____

- A. Text is compatible with assistive technology.
- 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).

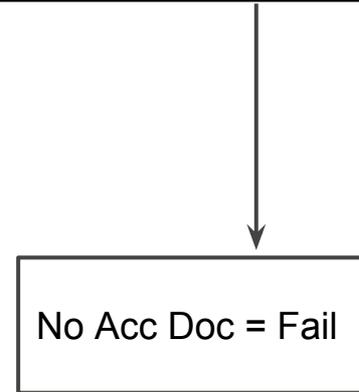
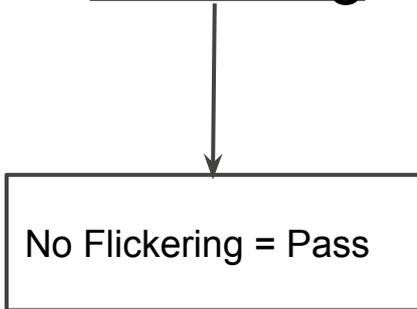
Additional Information: Please describe the technologies (hardware and software versions) and methodologies you used to evaluate the accessibility of the resource for this feature.

Enter info such as the pages you evaluated here as well.



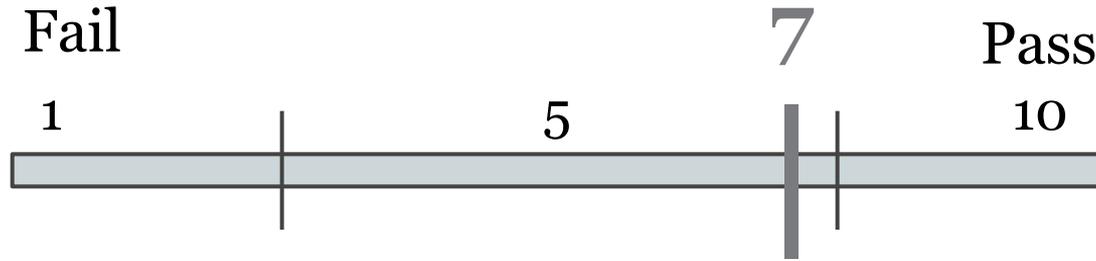
Pass, Fail, or N/A?

- Evaluate material based on the amount of material included in the checklist.
- If there is no related materials, mark N/A for that checkpoint. The only exception are Acc Documentation and Flickering.



Ratings

- Ratings are on a scale of 1-10



- Failure to meet a checkpoint (Fail) should not be rated above a 7
- Meeting a checkpoint (Pass) should not be rated below a 7

Assistive Technology

Kurzweil 3000

Kurzweil 3000

- Assistive technology
- Log in:
 - ID: cudalab
 - Password: cuda@1949
- All of us are sharing the same ID and password.

Accessibility Checkpoints

1. Accessibility Documentation
2. Text Access 😊
3. Text Adjustment 😊
4. Reading Layout 😊
5. Reading Order 😊
6. Structural Markup/Navigation
7. Tables
8. Hyperlinks 😊
9. Color and Contrast
10. Language
11. Images 😊
12. Multimedia 😊
13. Flickering 😊
14. STEM 😊
15. Interactive Elements 😊

EPUB3

EPUB3 Evaluation Requirements

OS

- Windows OS (XP or above)

Require Downloading

- Kurzweil 3000
- Color Contrast Analyzer- CCA ([Download](#))
- Adobe Digital Editions ([Download](#))

1. Accessibility Documentation

For the textbooks' organizations, find the following:

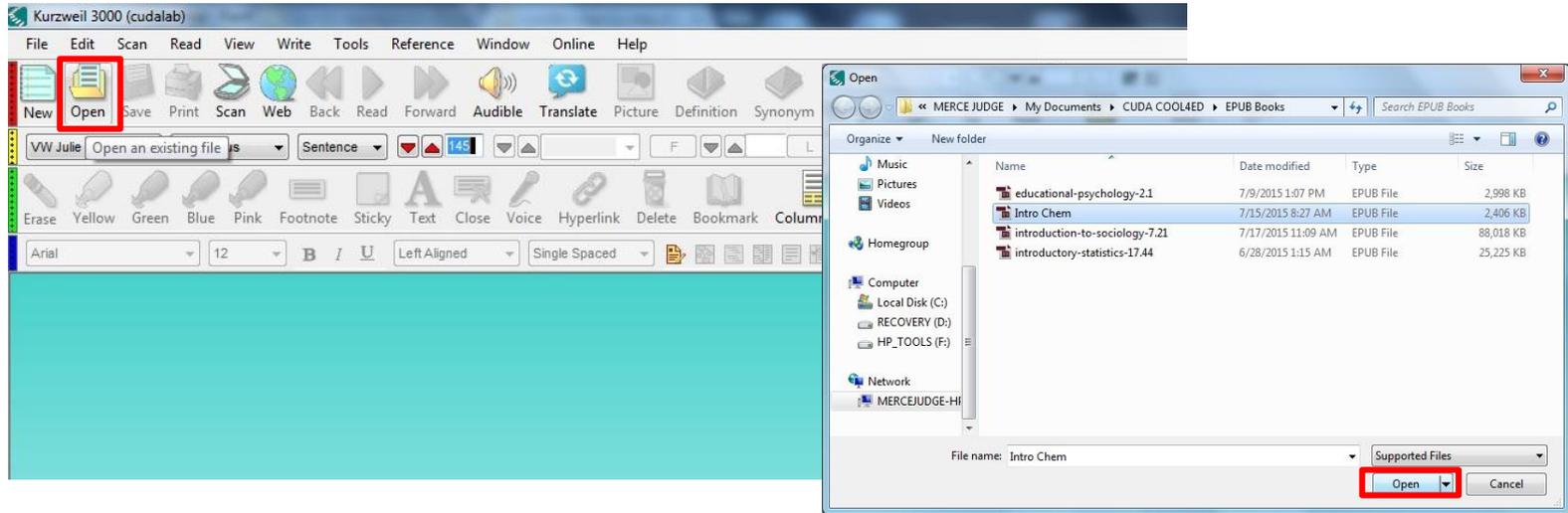
- URL to formal Accessibility Policy
- URL to accessibility statements
- URL to Accessibility Evaluation Report

2. Text Access

- ☑ The text of the digital resource is available to assistive technology that allows the user to enable text-to-speech (TTS) functionality

OPEN EPUB

- Start up Kurzweil 3000
- Enter the log in ID and password provided
- Open > Select book > Open



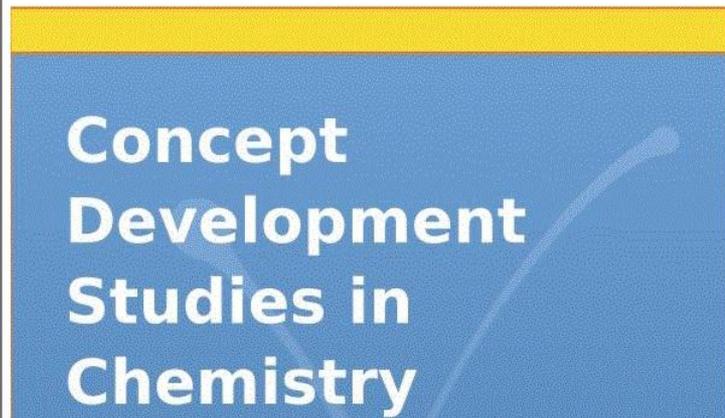
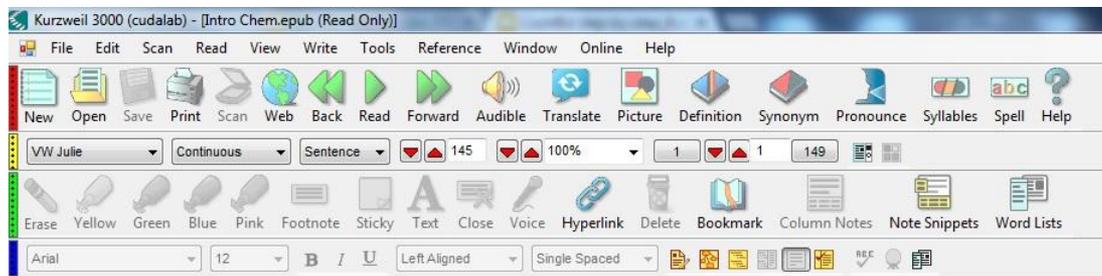
Text Access

STEPS:

1. Open up EPUB book with Kurzweil 3000
2. Go to evaluation pages
3. Click on READ

Text Access

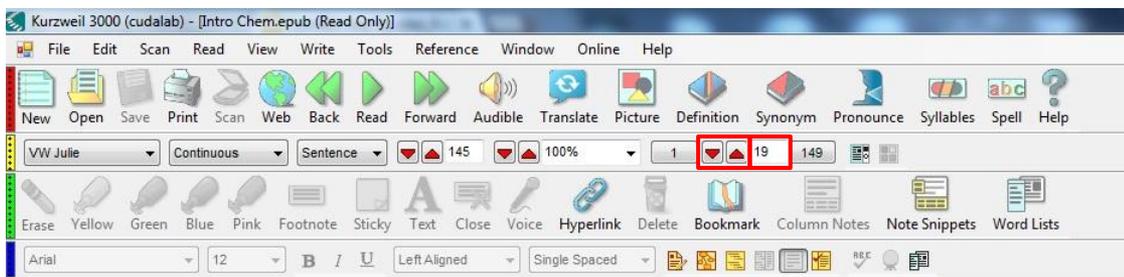
1. Open up EPUB book with Kurzweil 3000



Text Access

2. Go to evaluation pages

- Use previous/next page buttons OR type in page number



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2006/09/18 21:34:57 -0500

4.1. Foundation

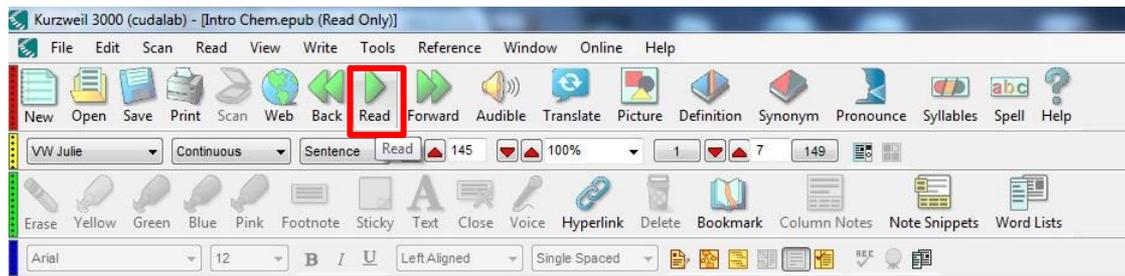
We begin as a starting point with the atomic molecular theory. We thus assume that most of the common elements have been identified, and that each element of the elements are all known, and that, as a consequence, it is possible via mass composition measurements to determine the molecular formula for any compound. Finally, we assume an understanding of common chemical and physical properties, and that these chemical and physical properties are periodic functions of the atomic number.

4.2. Goals

The atomic molecular theory is extremely useful in explaining what it means to form a compound from its component elements. That is, a compound consists of a fixed ratio of atoms. However, our knowledge of these atoms is very limited. The only property we know at this point is the relative mass of each atom. Consequently, we cannot predict the chemical and physical properties as expressed in the Periodic Table. Why are elements which are very dissimilar in atomic mass nevertheless very similar in

Text Access

3. Click on READ



slowly and meticulously. Each sentence contains substance to be studied and understood. You should, at each step in the analysis, challenge yourself as to outline the concept development study, making sure you understand how each piece of the argument contributes to the development of a concept or model

It is very important to understand that scientific models and theories are almost never "proven," unlike mathematical theorems. Rather, they are logically developed many times in these concept development studies when a conclusion is not logically required by an observation and a line of reasoning. Instead, we may all Scientists most commonly abide by the principle of *Occam's razor*, one statement of which might be that the explanation which requires the least assumption

One very important way to challenge your understanding is to study in a group in which you take turns explaining the development of the model. The ability using the concept. Use the questions at the end of the concept development studies to practice your skill at explaining technical arguments clearly and concisely

1.3. Updates in the 2012 Edition

The 2012 editions of these Concept Development Studies were completely rewritten with two goals in mind. The first was to make these more readable, let to be more manageable in individual units. Both of these goals were based on the invaluable input of my students and of the high school teachers I have worked with in the 2012 edition. Further new modules will be added in the next edition

Text Access

- Amount of Material to Be Evaluated

*** Sample 10% of the pages ***

Ex. If the book has 150 pages in total
 $150 \text{ pages} \times .10 = 15 \text{ pages}$

You will check 15 pages for text adjustment

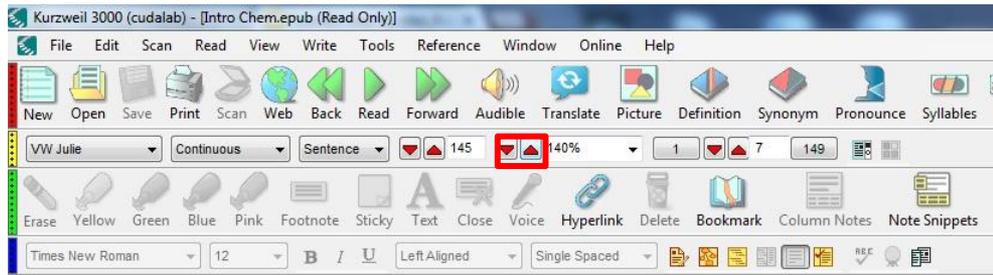
Note: The checklist will decide most of these values for you.

3. Text Adjustment (Size)

- ✓ The text allows the user to adjust the font size

STEPS:

1. Open the EPUB file with Kurzweil 3000
2. Use the Zoom buttons to increase/decrease font size



slowly and meticulously. Each sentence contains substance to be studied and understood. You should reproduce the reasoning leading to the next conclusion. One good way to do this is to outline the argument contributes to the development of a concept or model.

Text Adjustment (Size)

- Amount of Material to Be Evaluated

*** Sample 5% of the pages ***

Ex. If the book has 150 pages in total

$150 \text{ pages} \times .05 = 7.5 \text{ pages}$

Round up to the next whole number (Always round up)

You will check 8 pages for text adjustment

Note: The checklist will decide most of these values for you.

3. Text Adjustment (Color)

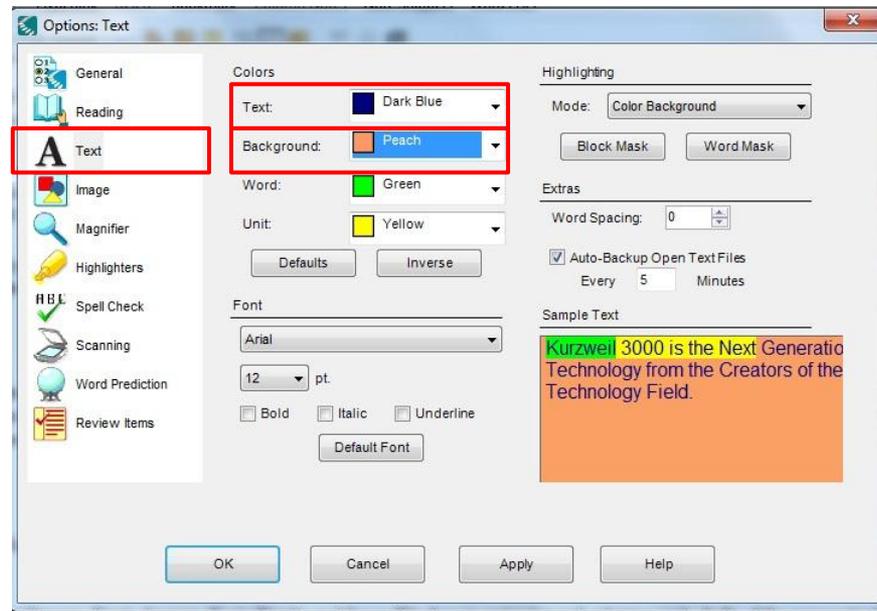
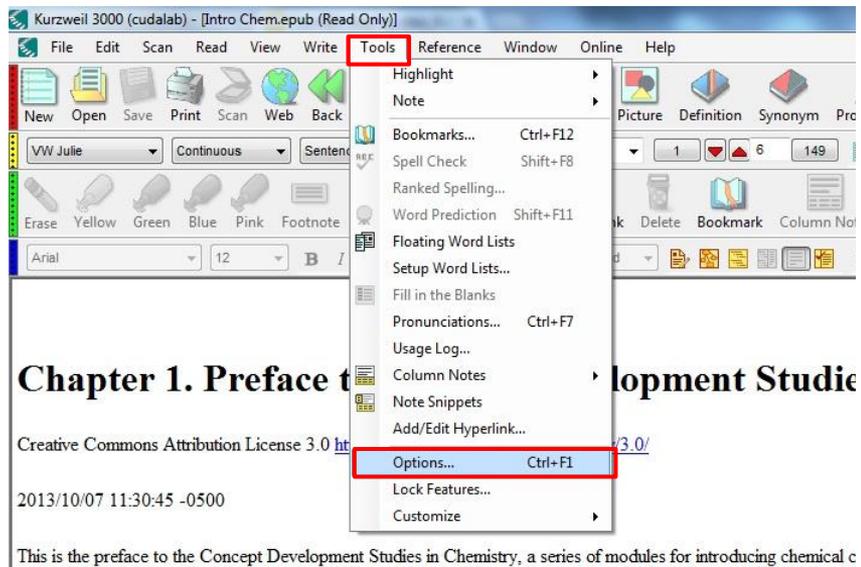
- ✓ The resource allows the user to adjust the font/background color

STEPS:

1. Open up EPUB book with Kurzweil 3000
2. Click on Tools> Options> Text
3. Change font and background color from dropdown
4. Click on Apply> OK
5. Go to the next page to see the change

3. Text Adjustment (Color)

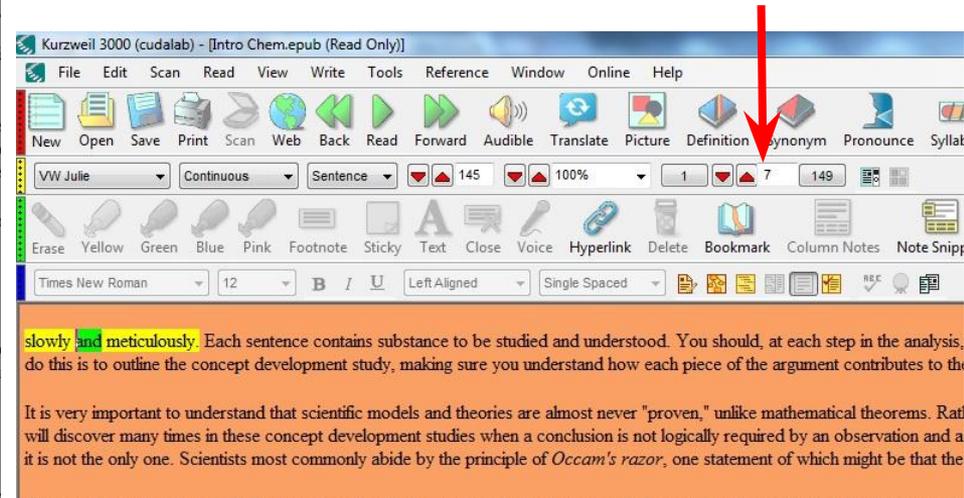
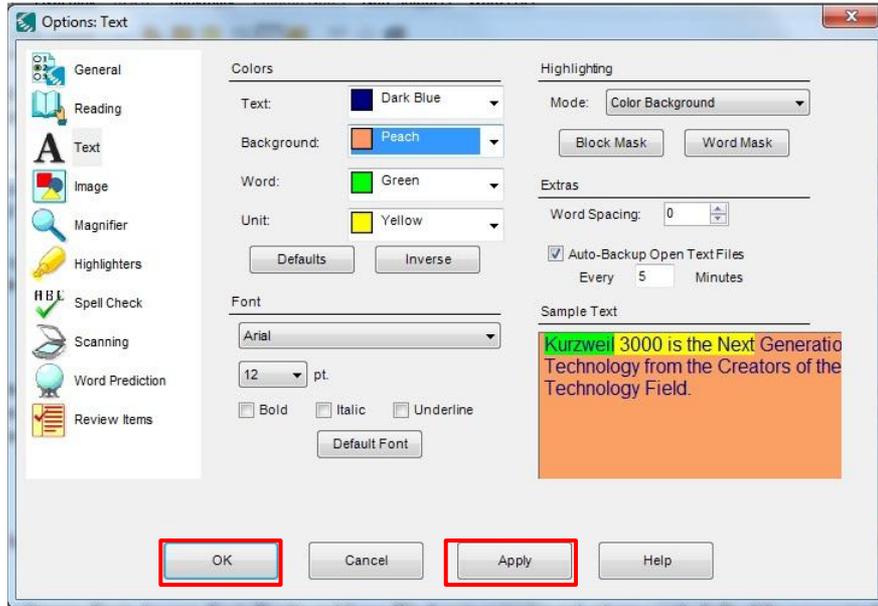
1. Open up EPUB book with Kurzweil 3000
2. Click on Tools> Options> Text
3. Change text and background color from dropdown



3. Text Adjustment (Color)

4. Click on Apply > OK

5. Go to the next page to check for the change



Text Adjustment (Color)

- Amount of Material to Be Evaluated

*** Sample 5% of the pages ***

Ex. If the book has 150 pages in total

150 pages x .05 = 7.5 pages

Round up to the next whole number (Always round up)

You will check 8 pages for text adjustment

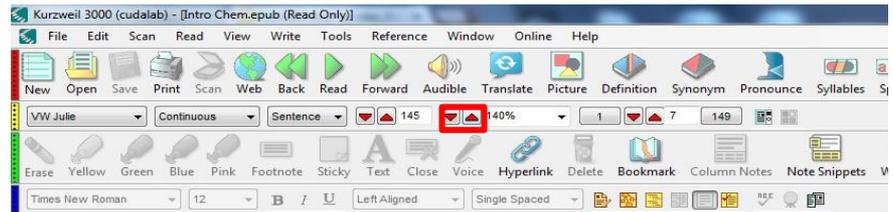
Note: The checklist will decide most of these values for you.

4. Reading Layout (Reflow)

- ✓ 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

STEPS:

1. Open the EPUB file with Kurzweil 3000
2. Use the Zoom buttons to increase/decrease font size
3. Check if the text reflows



slowly and meticulously. Each sentence contains substance to be studied and understood. You should reproduce the reasoning leading to the next conclusion. One good way to do this is to outline the argument contributes to the development of a concept or model.

4. Reading Layout (Page # match)

- If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material

***Compare pages with printed material

***If printed material not available, mark N/A

Reading Layout

- Amount of Material to Be Evaluated

*** Sample 5% of the pages ***

5. Reading Order

- ☑ Reading order for digital resource content logically corresponds to the visual layout of the page when rendered by assistive technology

STEPS:

1. Open the EPUB file with Kurzweil 3000
2. Locate 5 pages (include page # in the reports) that contains a more complicated layout
3. Use the READ function to check if the reading order is logical (please refer to checkpoint #2 for instructions on READ)

5. Reading Order

- Amount of Material to Be Evaluated

*** Sample 5 pages ***

6. Structural Markup / Navigation

- ☑ 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

Kurzweil cannot check for this, mark N/A on the reports

Structural Markup / Navigation

- ☑ The text of the digital resource includes markup for bullets and numbered lists that is compatible with assistive technology

Kurzweil cannot check for this, mark N/A on the reports

Structural Markup / Navigation

- ☑ 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

****Kurzweil cannot check for this, mark N/A on the reports****

7. Tables

- ☑ Data tables include markup (e.g. tags or styles) that identifies row and column headers in a manner that is compatible with assistive technology

Kurzweil cannot check for this, mark N/A on the reports

8. Hyperlinks

- ✓ Functionality: Links (e.g. website or email addresses) within the text of the digital resource are rendered as active hyperlinks in a manner that allows them to be detected and activated with assistive technology.
- ✓ Descriptive: The link is descriptive enough for the users to know where the link will take them. If the link appears as an URL = fail this sub-category.
 - E.g. CSULB homepage ○
www.csulb.edu X
- ✓ Checking for both in-book links and live hyperlinks

Hyperlinks

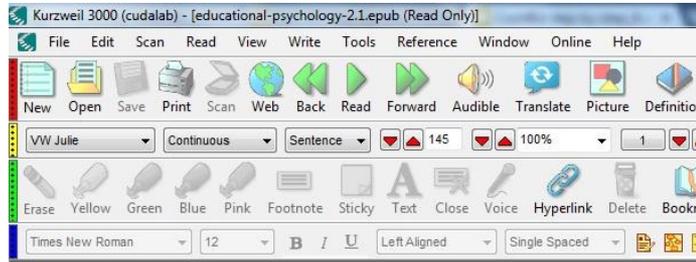
1. Open the EPUB file with Kurzweil 3000
2. Double Click on hyperlinks & see if it takes you to the correct location (section of book/ website)

**If nothing happens then the link doesn't work



this happen are described in this book in the chapters ahead.

1.3. Teaching is different from in the past



Attributions

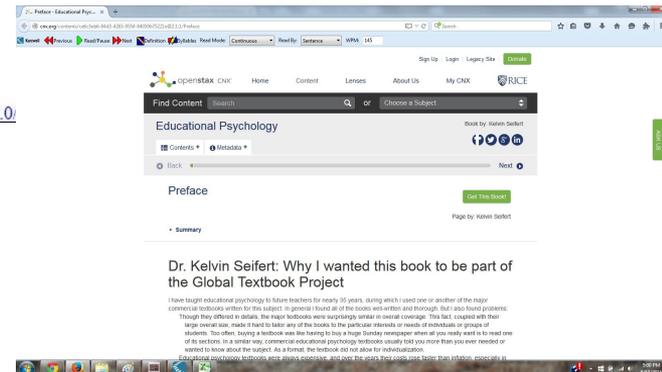
Collection: Educational Psychology

Edited by: Kelvin Seifert

URL: <http://cnx.org/content/col11302/1.2/>

Copyright: Kelvin Seifert

License: <http://creativecommons.org/licenses/by/3.0/>



Hyperlinks

Check for functionality & descriptive link

- Amount of Material to Be Evaluated

*** Sample 30 in-book links ***

10 from the beginning of the book

10 from the middle of the book

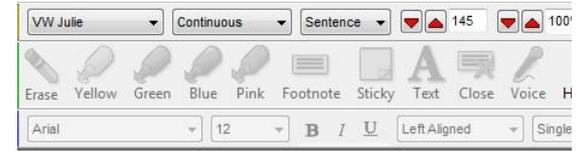
10 from the end of the book

Ex. Links that takes you to a certain chapter

*** Sample 20 website hyperlinks ***

Hyperlink that takes you somewhere outside of the book

Ex. Links to a live website



this happen are described in this book in the chapters ahead.

1.3. Teaching is different from in the past*

In the past decade or two teaching has changed significantly, so much in fact knowledge, and skills needed to prepare for a teaching career. The changes

To see what we mean, look briefly at four new trends in education, at how th

- increased diversity: there are more differences among students than
- increased instructional technology, classroom, schools, and stu

A screenshot of a PDF reader toolbar and the 'Attributions' section of a document. The toolbar is similar to the one above but includes a 'Hyperlink' icon. Below the toolbar, the 'Attributions' section is visible, containing the following text:

Attributions
Collection: Educational Psychology
Edited by: Kelvin Seifert
URL: <http://cnx.org/content/col11302/1.2/>
Copyright: Kelvin Seifert
License: <http://creativecommons.org/licenses/by/3.0/>

The URL is highlighted with a red box.

9. Color & Contrast (Color Redundancy)

- ☑ Color redundancy (information is not conveyed by color alone) needs to be checked manually

Changes in classrooms has several other effects. One, for example, is that it can tempt teachers to think that what is taught is equivalent to what is learned—even if they are different. If I assign a reading to my students about the Russian Revolution, it would be nice to assume not only that they have read the same words, but also learned and read and learned all of what I assigned; others may have read everything but misunderstood the material or remembered only some of it; and still others, unfortunately, may not even read this picture, if asked confidentially. There are ways, of course, to deal helpfully with such diversity of outcomes; for suggestions, see especially [Section 10.1](#) of the instructional strategies I adopt, they cannot include assuming that what I teach is the same as what students understand or retain of what I teach.

as dependent on sequencing and readiness

Even teaching and learning creates a secondary issue for teachers, that of educational **readiness**. Traditionally the concept referred to students' preparedness to **start school**, for example, if he or she was in good health, showed moderately good social skills, could take care of personal physical needs (like eating lunch or going to the bathroom). [Table 2.6](#) shows a similar set of criteria for determining whether a child is "ready" to learn to read (Copple & Bredekamp, 2006). At older ages (such as in high school), to take a course in physics, for example, a student must first have certain prerequisite experiences, such as studying advanced algebra or calculus. To begin work in a new field, it is also important to mention also studying educational psychology!).

E.g.
Links are presented with color (blue) and underline.

*** Sample 5% of the pages ***

9. Color & Contrast (Contrast Ratio)

- ✓ The visual presentation of text and images of text in the digital resource has a contrast ratio of at least 4.5:1 (AA)
- ✓ Large text (18 point +) has a contrast ratio of at least 3:1 (AA)

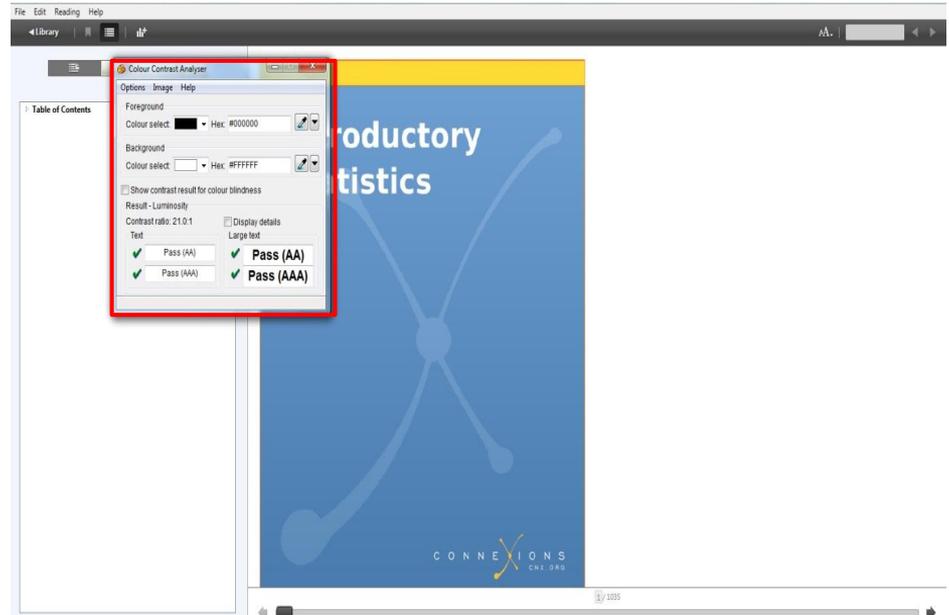
Normal text

Large text

Color & Contrast (Contrast Ratio)

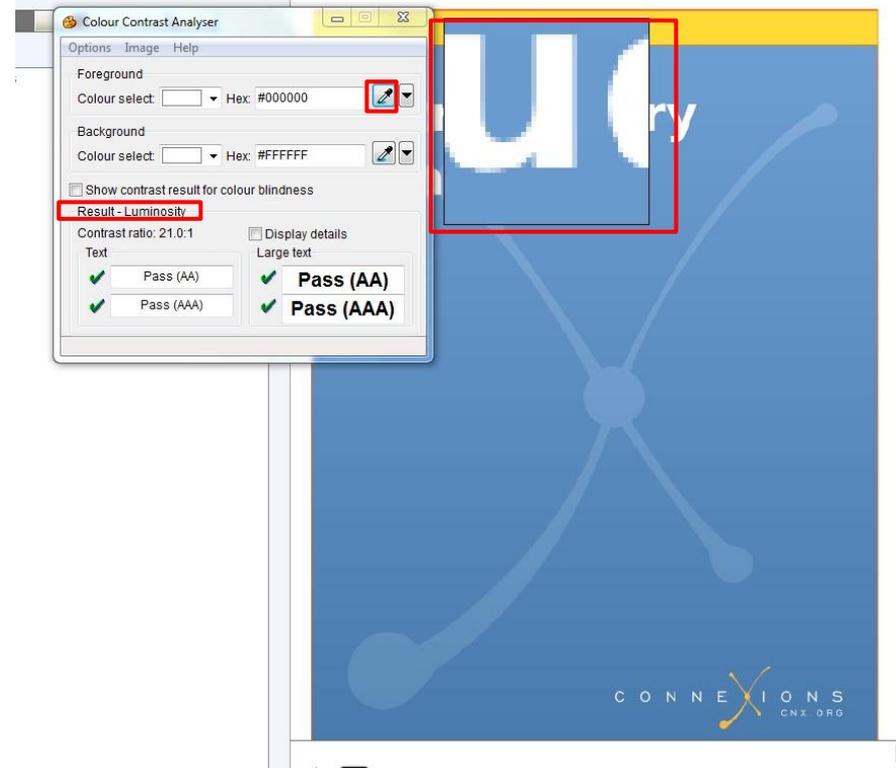
Colour Contrast Analyzer (CCA)

1. Download Colour Contrast Analyzer Tool
2. Open the document you want to evaluate
3. Open the application



Color & Contrast (Contrast Ratio)

4. Make sure you are in the **Result -- Luminosity** mode.
5. Click the **Foreground eye dropper** tool, hover over and click the foreground color to select it.



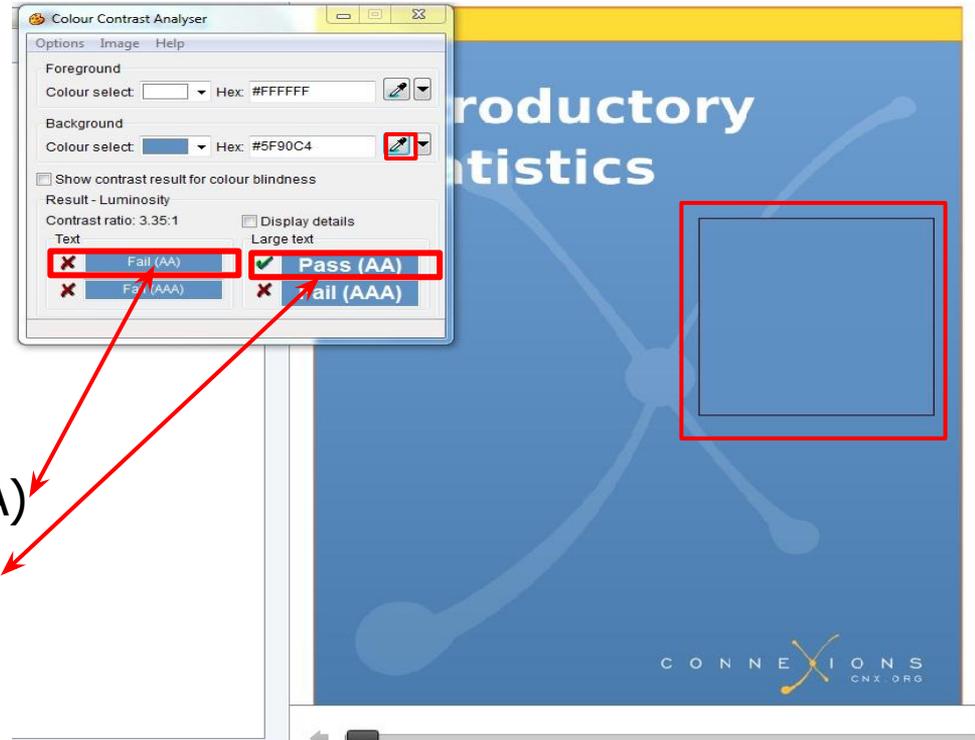
Color & Contrast (Contrast Ratio)

6. Click the **Background eye dropper** tool, hover over and click the background color.

7. Determine if the text is greater than 18 points (e.g. Header).

Small text: Check under "Text" (AA)

Large text (18+): Check under "Large text" (AA)



Color & Contrast (Contrast Ratio)

- ◉ Amount of Material to Be Evaluated

Contrast Ratio

*** Sample 10% of the pages ***

10. Language

- ☑ The text of the digital resource includes markup that declares the language of the content in a manner that is compatible with assistive technology
- ☑ 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

Kurzweil cannot check for this, mark N/A on the reports

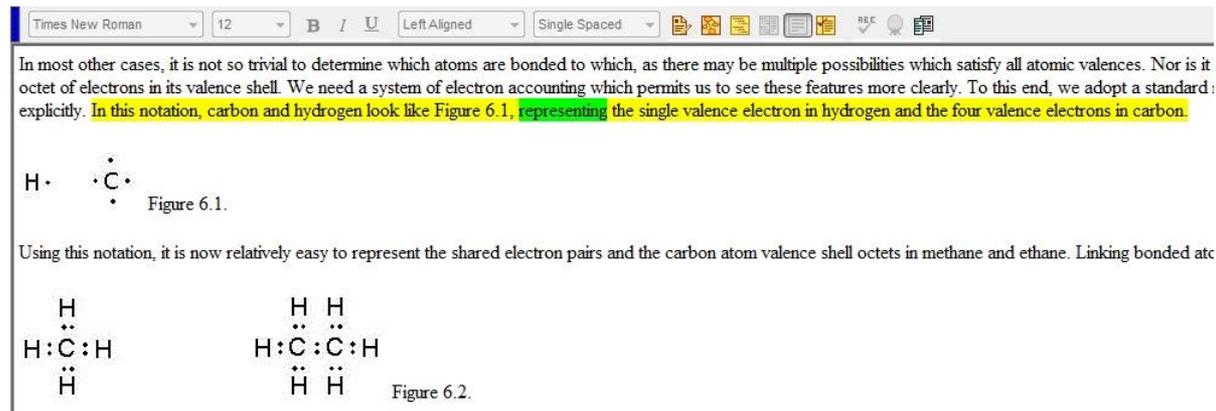
11. Images

- ✓ 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)
- ✓ Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology
- ✓ Complex images, charts, and graphs have longer text descriptions that are compatible with assistive technology

Images

STEPS:

1. Open up EPUB book with Kurzweil 3000
2. Locate an image
3. Select the sentence right before the image
4. Click READ
5. Check if the reader reads the image or skip through it



The screenshot shows a text editor window with a toolbar at the top. The text in the editor reads: "In most other cases, it is not so trivial to determine which atoms are bonded to which, as there may be multiple possibilities which satisfy all atomic valences. Nor is it octet of electrons in its valence shell. We need a system of electron accounting which permits us to see these features more clearly. To this end, we adopt a standard: explicitly. In this notation, carbon and hydrogen look like Figure 6.1, representing the single valence electron in hydrogen and the four valence electrons in carbon." Below the text is Figure 6.1, which shows a hydrogen atom (H·) and a carbon atom (·C·) with four valence electrons represented by dots. Below Figure 6.1 is the text: "Using this notation, it is now relatively easy to represent the shared electron pairs and the carbon atom valence shell octets in methane and ethane. Linking bonded at". Below this text are two chemical structures: methane (H·C·H) and ethane (H·C·C·H), where the shared electron pairs are represented by pairs of dots between the atoms. Figure 6.2 is captioned below these structures.

Times New Roman 12 B I U Left Aligned Single Spaced

In most other cases, it is not so trivial to determine which atoms are bonded to which, as there may be multiple possibilities which satisfy all atomic valences. Nor is it octet of electrons in its valence shell. We need a system of electron accounting which permits us to see these features more clearly. To this end, we adopt a standard: explicitly. In this notation, carbon and hydrogen look like Figure 6.1, representing the single valence electron in hydrogen and the four valence electrons in carbon.

H· ·C·
·

Figure 6.1.

Using this notation, it is now relatively easy to represent the shared electron pairs and the carbon atom valence shell octets in methane and ethane. Linking bonded at

H H
H:C:H H:C:H
H H

Figure 6.2.

Images (Additional Manual Check)

- ◉ Check manually: Make sure the descriptions for the images are descriptive enough for both non-decorative images and complex images.
- ◉ Amount of Material to Be Evaluated for non-decorative and complex images:
*** Sample 10% of the pages***
- ◉ Rule of thumb: if the image cannot be described in one sentence, it's complex!

12. Multimedia

- ✓ A synchronized text track (e.g. open or closed captions) is provided with all video content
- ✓ A transcript is provided with all audio content
- ✓ Audio/video content is delivered via a media player that is compatible with assistive technology

Note: No examples have been found for this format

13. Flickering

- ☑ Resources should not contain anything that flashes more than three times in any one-second period

Note: No examples have been found for this format

If there is no flickering = Pass this checkpoint

14. STEM

STEM: Science, Technology, Engineering, and Math

- ✓ STEM content is marked up in a manner that is compatible with assistive technology
- ✓ The resource conveys both the notation (presentation) and meaning (semantics) of the STEM content
- ✓ Including but not limited to:
 - ✓ Figures
 - ✓ Graphs
 - ✓ Tables
 - ✓ Equations

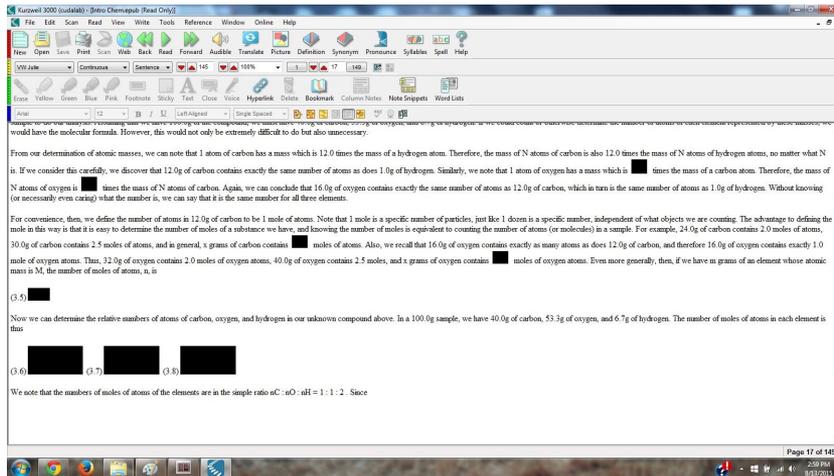
13. STEM

STEPS:

1. Open up EPUB book with Kurzweil 3000
2. Locate a STEM content
3. Select the sentence right before the content
4. Click READ
5. Check if the reader reads the image or skip through it
6. If it reads it, check if it reads the content correctly

13. STEM

Sometimes in Kurzweil you will see these black boxes in the content, those are usually STEM content that we can't access. In this case, pay attention to how much of the STEM content shows correctly, take this into account when giving it the score.



These very mass ratio numbers do imply suggestions as to how they may be used.

[redacted]

The masses of oxygen appearing in these compounds are in simple whole number ratio fixed unit of mass of oxygen. The simplest explanation for this fixed unit of mass is that different compounds have differing numbers of atoms. The mass ratios make it clear that ratios must be the result of the simple ratios in which atoms combine into molecules. If molecular formula NO, then oxide A has formula N O₂, and oxide C has formula N

Table 2.2. Possible Molecular Formulae for Nitrogen Oxides

Assuming that:	Oxide C is NO	Oxide B is NO	Oxide A is NO
Oxide A is	N O ₄	N O ₂	NO
Oxide B is	N O ₂	NO	N ₂ O
Oxide C is	NO	N ₂ O	N ₄ O

We don't have a way (from these data) to know which of these sets of molecular formulae

13. STEM

To check the content in these black boxes, you may open the same book with Adobe Digital Editions > check and compare the content.

2.4. Observation 2: Multiple Mass Ratios

Significant insight into the above problem is found by studying different compounds formed from the same elements. For example, there are actually three oxides of nitrogen, that is, compounds composed only of nitrogen and oxygen. For now, we will call them oxide A, oxide B, and oxide C. Oxide A has oxygen to nitrogen mass ratio 2.28 : 1, oxide B has oxygen to nitrogen mass ratio 1.14 : 1, and oxide C has oxygen to nitrogen mass ratio 0.57 : 1.

The fact that there are three mass ratios might seem to contradict the Law of Definite Proportions, which on the surface seems to say that there should be just one ratio. However, each mass combination gives rise to a completely unique chemical compound with very different chemical properties. For example, oxide A is very toxic, whereas oxide C is used as an anesthetic. It is also true that the mass ratio is not arbitrary or continuously variable: we cannot pick just any combination of masses in combining oxygen and nitrogen, rather we must obey one of only three. So there is no contradiction: we simply need to be careful with the Law of Definite Proportions to say that **each unique compound** has a definite mass ratio of combining elements.

These new mass ratio numbers are highly suggestive in the following way. Notice that, in each case, we took the ratio of oxygen mass to a nitrogen mass of 1, and that the resultant ratios have a very simple relationship:

$$\begin{aligned} 2.28 : 1.14 : 0.57 &= 2 : 1 : 0.5 \\ &= 4 : 2 : 1 \end{aligned}$$

The masses of oxygen appearing in these compounds are in simple whole number ratios when we take a

Table 2.2. Possible Molecular Formulae for Nitrogen Oxides

Assuming that:	Oxide C is NO	Oxide B is NO	Oxide A is NO
Oxide A is	NO_4	NO_2	NO
Oxide B is	NO_2	NO	N_2O
Oxide C is	NO	N_2O	N_4O

We don't have a way (from these data) to know which of these sets of molecular formulae we can assert that either one of them or one analogous to them is right.

Similar data are found for any set of compounds formed from common elements. For two oxides of carbon, one with oxygen to carbon mass ratio 1.33:1 and the other with the second oxide must have twice as many oxygen atoms, per carbon atom, as does the first. This statement of this observation is the **Law of Multiple Proportions**. <extrule>

When two elements combine to form more than one compound, the mass of element A which combines in the second compound with the same given mass of element B has a simple whole number ratio to the mass of element A which combines in the first compound with a given amount of element B.

<extrule> This sounds confusing, but an example clarifies this statement. Consider carbon and oxygen. Let carbon be element B and oxygen be element A. Take a fixed given mass of carbon, say 1 gram. The mass of oxygen which combines with 1 gram of carbon to form the first compound is 1.33 grams. The mass of oxygen which combines with 1 gram of carbon to form the second compound is 2.66 grams. These masses are in ratio $2.66 : 1.33 = 2 : 1$, a simple whole number ratio.



The masses of oxygen appearing in these compounds are in simple whole number ratios when we take a fixed unit of mass of oxygen. The simplest explanation for this fixed unit of mass is that the different compounds have differing numbers of atoms. The mass ratios make it clear that the ratios must be the result of the simple ratios in which atoms combine into molecules. If we take the molecular formula NO, then oxide A has formula NO_4 , and oxide C has formula N_4O .

Table 2.2. Possible Molecular Formulae for Nitrogen Oxides

Assuming that:	Oxide C is NO	Oxide B is NO	Oxide A is NO
Oxide A is	NO_4	NO_2	NO
Oxide B is	NO_2	NO	N_2O
Oxide C is	NO	N_2O	N_4O

We don't have a way (from these data) to know which of these sets of molecular formulae

STEM

If the image itself does not contain an Alt tag but the content/text around it does have a notation (presentation) and meaning (semantics) of the STEM content with good description then we may PASS it with a note included.



Figure 1.15 Biologists may choose to study *Escherichia coli* (*E. coli*), a bacterium that is a normal resident of our digestive tracts but which is also sometimes responsible for disease outbreaks. In this micrograph, the bacterium is visualized using a scanning electron microscope and digital colorization. (credit: Eric Erbe; digital colorization by Christopher Pooley, USDA-ARS)

STEM

Successive Ionization Energies (kJ/mol)

	Na	Mg	Al	Si	P	S	Cl	Ar
IE ₁	496	738	578	787	1012	1000	1251	1520
IE ₂	4562	1451	1817	1577	1903	2251	2297	2665
IE ₃	6912	7733	2745	3231	2912	3361	3822	3931
IE ₄	9543	10540	11575	4356	4956	4564	5158	5770
IE ₅	13353	13630	14830	16091	6273	7013	6542	7238
IE ₆	16610	17995	18376	19784	22233	8495	9458	8781
IE ₇	20114	21703	23293	23783	25397	27106	11020	11995

Table 4.1



Figure 6.2

Labels, descriptions, or tags should be descriptive

STEM

- Amount of Material to Be Evaluated

For BOTH Markup and Notation, find:

10 figures

10 graphs

10 equations

10 tables

***As Applicable:

If there is no STEM content then mark N/A on the report***

15. Interactive Elements

- ☑ Keyboard
Interactive elements allow for keyboard-only operation
WITH and WITHOUT assistive tech

STEPS:

1. Use the TAB key to navigate the menu
2. Items that are selected will have a box around the link
3. Use the ENTER key to select a link or other item

***As Applicable:

If there is no Interactive Elements, mark N/A on the report***

Interactive Elements

- ☑ Markup
 - Each interactive element conveys information to assistive technology regarding the element's
 - ☑ name
 - ☑ type
 - ☑ status

***As Applicable:

If there is no Interactive Elements, mark N/A on the report***

Interactive Elements

- ☑ Text prompts

The following are conveyed with assistive technology:

- ☑ Instructions
- ☑ Prompts
- ☑ Error messages

***As Applicable:

If there is no Interactive Elements, mark N/A on the report***