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Accessible and Universal Design for Learning in OER

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Slides, speaking notes, and links
to resources: bit.ly/oerudl2021

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Open educational resources are...

“Freely accessible
online.”



Agenda

- **Technical Accessibility**
 - Web Content Accessibility Guidelines' 4 principles
 - Accessibility in educational resources
- **Universal Design for Learning**
- **Inclusive Design**
- **Questions**



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Technical Accessibility

Web Content Accessibility Guidelines (WCAG)

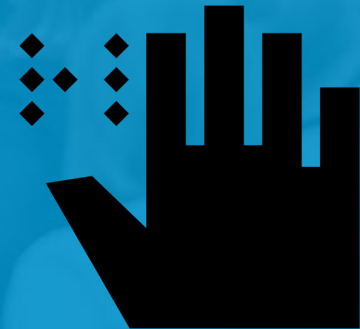
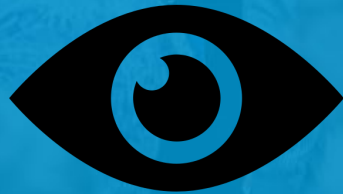
1. Perceivable
2. Operable
3. Understandable
4. Robust



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Principle 1: Perceivable

Information and user interface components must be presented to users in ways they can perceive.

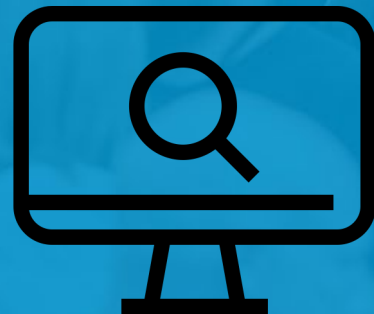




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Principle 2: Operable

User interface components and navigation must be operable.

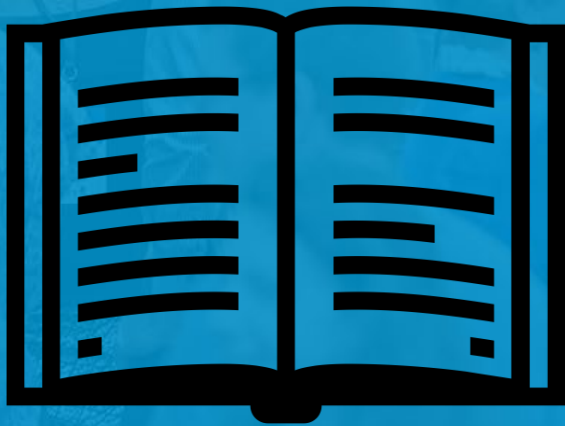




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Principle 3: Understandable

Information and the operation of user interface must be understandable.



Organizing Content

- Content is organized under headings and subheadings
- Headings and subheadings are used sequentially

<h1>Chapter 1: Introduction to Sociology</h1>

<h2>Introduction</h2>

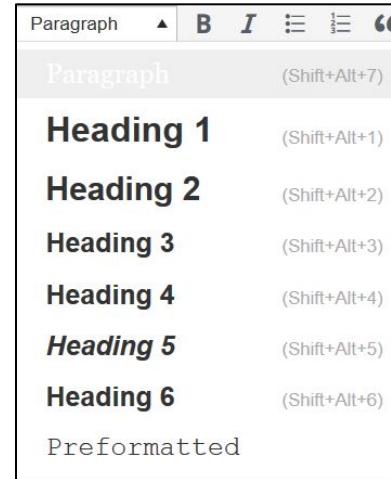
Concerts, sporting matches and games, and political rallies can have...

<h2>1.1 What is Sociology</h2>

A dictionary defines sociology as the systematic study of...

<h3>What are Society and Culture?</h3>

Sociologists study all aspects and levels of society...





Links

- The link text makes sense out of context
- Links do not open in new windows or tabs (unless a text reference is provided)
- The web address is available for those using a print copy

Not accessible

For more information on web accessibility, [click here](#).

Not accessible

For more information on web accessibility, go to <https://opentextbc.ca/accessibilitytoolkit/>.

Accessible

For more information on web accessibility, refer to the [*Accessibility Toolkit*](#).

Accessible

For more information on web accessibility, refer to the [*Accessibility Toolkit \[New Tab\]*](#).

Accessible

The [BC Open Textbook Review Template \[Word File\]](#) provides guidelines for completing an open textbook review.

Data Tables

- ❑ Tables include a caption.
- ❑ Tables include row and/or column headers.
- ❑ Row and column headers have the correct scope assigned.
- ❑ Tables do not have merged or split cells.
- ❑ Tables have adequate cell padding.

Table 15.1 One way scholars have categorized religions is by classifying what or who they hold to be divine

Religious Classification	What/Who Is Devine	Example
Polytheism	Multiple gods	Hinduism, Ancient Greeks and Romans
Monotheism	Single god	Judaism, Islam, Christianity
Atheism	No deities	Atheism, Buddhism, Taoism
Animism	Nonhuman beings (animals, plants, natural world)	Indigenous nature worship, Shinto



Audio

Examples: Podcasts, interviews, recorded lectures

A transcript provides a text equivalent of audio content. It includes

- Speaker name(s)
- Headings and subheadings
- All relevant audio content, including
 - All speech content
 - Relevant descriptions of speech
 - Descriptions of relevant non-speech audio

Include a transcript



Video

- ❑ All relevant visual information is conveyed via an audio description or transcript
- ❑ All relevant audio information is conveyed via captions or a transcript

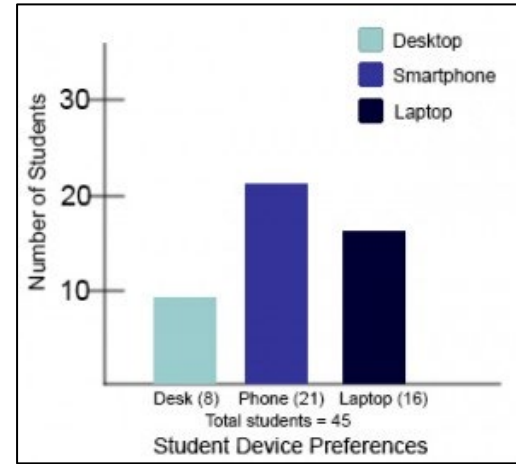
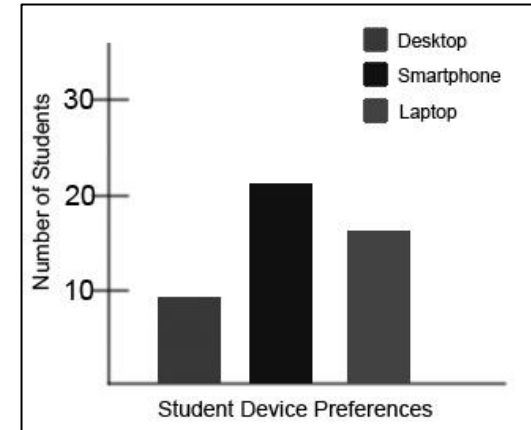
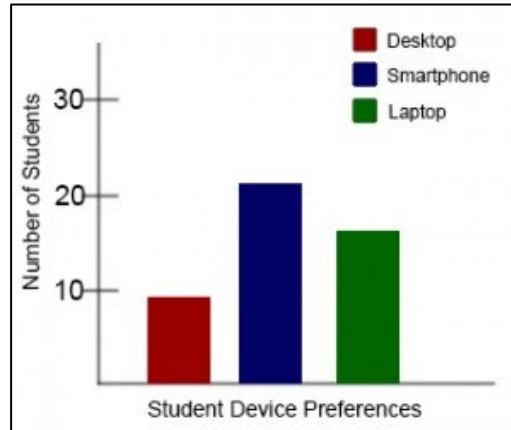
Captions: Text that is synchronized with audio in a video.

Audio descriptions: Audio descriptions of visual content shown in the video that isn't conveyed through audio

Transcript: Includes the same information as with audio transcripts, but may also include relevant description of visual content

Colour and Colour Contrast

- ❑ Information is not conveyed by colour alone
- ❑ There is sufficient colour contrast between foreground and background



"Student Device Preferences Graphs" by BCcampus. © CC BY



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Contrast Checker

<https://contrastchecker.com/>

Images

- ❑ Images that convey information include alternative text (alt text) descriptions of the image's content or function.
- ❑ Images that are purely decorative do not have alt text
- ❑ Graphs, charts, and maps include contextual or supporting details in the text surrounding the image.
- ❑ Images do not rely on colour to convey information.

A decorative image does not need a text description.

- Is primarily for design
- Does not convey content (or are already described in surrounding text)

A functional image contains content that requires a text description.

- Alt text
- Surrounding text or caption
- Long description



Text Descriptions

What to describe

- Content/purpose of the image
- Main focus of the image
- May depend on audience/context

How to describe

- Clear, concise, and accurate
- Go from general to specific
- Use words rather than symbols when writing math or scientific expressions
- Who? What? Where? When? Why?

Alt Text

A short text description of an image that appears in the alt attribute of the image tag.

- Will not appear visually
- Can be accessed by text-to-speech technology (including screen readers)
- Should be less than 125 characters
- Does not need to include “Image of..”
- If left blank, a screen reader will skip the image.



Surrounding Text or Caption



Figure 2.3 In 1871, the newcomer population in B.C. was still outnumbered by Aboriginal people who were, nevertheless, being hustled onto reserves and mostly without treaties. A Stó:lō woman, weaving baskets, n.d.

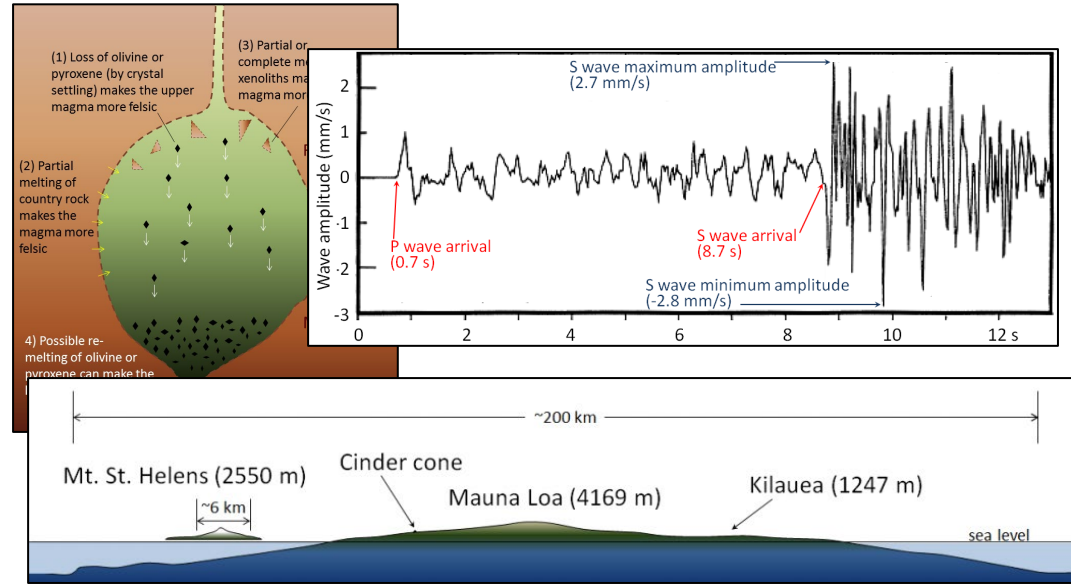
Stó:lō woman with a cedar basket by Royal British Columbia Museum (PN996). Public Domain. Image caption © John Belshaw. CC BY.



Examples

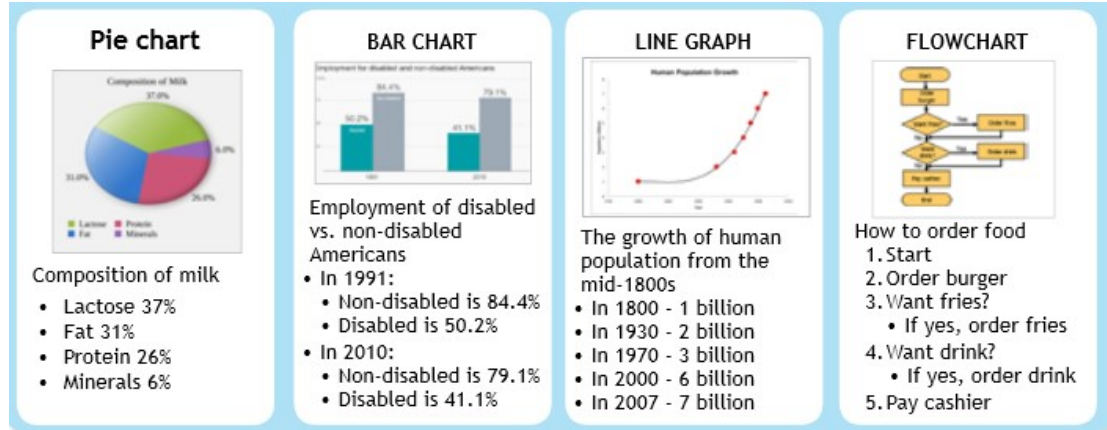
pie charts, bar charts, line graphs, flow charts, diagrams, illustrations, math graphs, and maps

Long Descriptions for Complex Images



Magma Chambers, P and S Waves, and Volcano Size © Steven Earle. CC BY

Lists



Bulleted and numbered lists can be used to present information found in

- Pie charts
- Bar charts
- Line graphs
- Flow charts

Adapted from © Supada Amornchat. [Complex Images for All Learners \[PDF\]](#). CC BY-NC-SA.

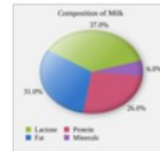
Data Tables

Data tables can be used to present information found in

- Complex tables
- Bar charts
- Line graphs
- Pie charts

PIE CHART

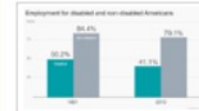
List the numbers from smallest to largest.



Composition	%
Minerals	6
Protein	26
Fat	31
Lactose	37

BAR CHART

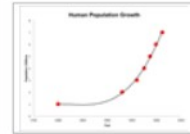
Briefly describe the chart & a summary, and provide title and axis labels.



Year	Non-disabled	Disabled
1991	84.4%	50.2%
2010	79.1%	41.1%

LINE GRAPH

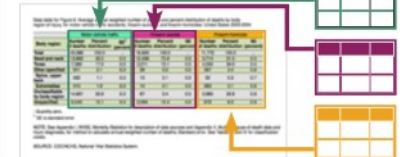
List the numbers from earliest to latest year.



Year	Population
1800	1 billion
1930	2 billion
1970	3 billion
2007	7 billion

COMPLEX TABLE

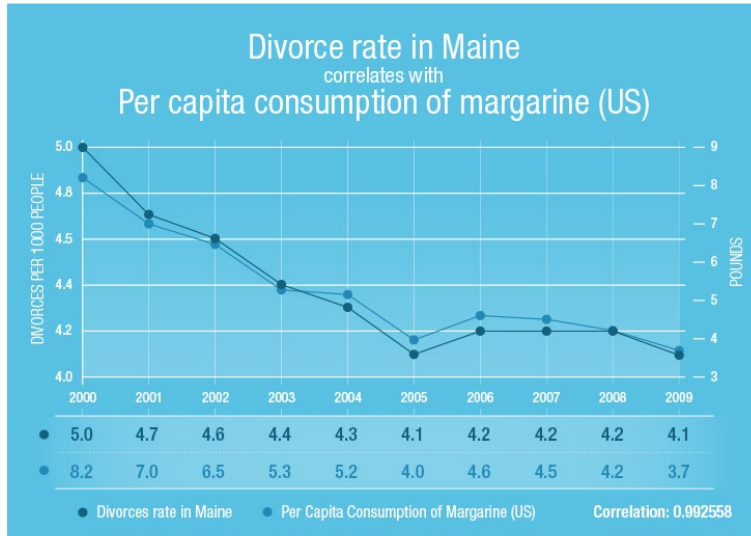
Data separated into 3 tables aids cognitive overload in navigation.



Adapted from © Supada Amornchat. [Complex Images for All Learners \[PDF\]](#). CC BY-NC-SA.

How would you describe these images?

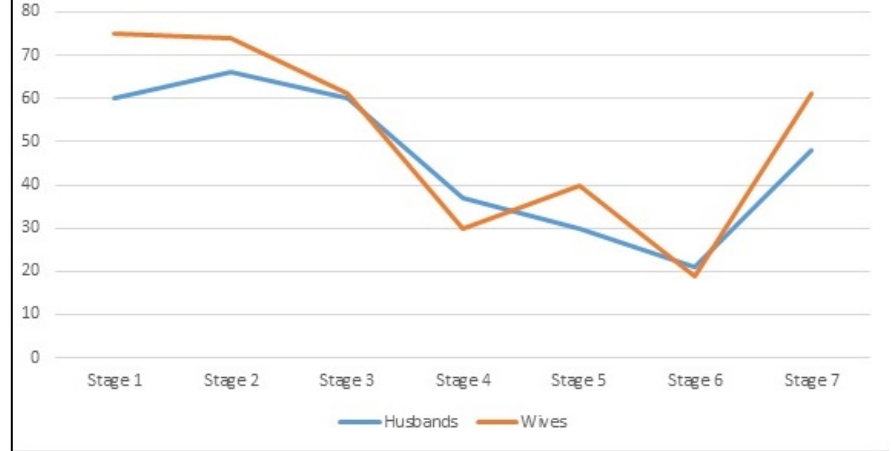
FIGURE 4 MISTAKING CORRELATION FOR CAUSATION



Source: Tyler Vigen

ALTIMETER

Figure 14.1. "Very satisfying" marriages



"Mistaking Correlation for Causation" by Altimeter. © CC BY-NC-SA

"Figure 14.1" © William Little. Based on data from Lupri and Frideres, 1981. CC BY.




Symbols

\times or \times or \cdot

$-$ or $-$ or $-$

\div or $/$

$\frac{1}{2}$ or $1/2$



Formulas: MathJax

- ❑ Formulas have been created using MathML or LaTeX
- ❑ Formulas are rendered with MathJax.

MathJax

This a display engine that translates mathematical markup (like MathML or LaTeX) into accessible, high-resolution equations.

This allows the equations to be rendered **aurally** or **visually**.



Formulas: Images with Alt Text

$$m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

- ❑ Formulas are images with alternative text descriptions if MathML is not an option.

Alternative Text:

m equals begin fraction m sub 0 over
begin square root 1 minus begin fraction
v sup 2 over c sup 2 end fraction end
square root end fraction



Accessibility Checkers

WAVE (wave.webaim.org)

- Can be used to evaluate web content
- Can paste a link to a website or install it as browser plugin

Office 365 Products

(Word, PowerPoint, Excel, Email)

- Built-in accessibility checkers



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Beyond Technical Accessibility

- Limitations of accessibility checklists
- Universal Design for Learning (UDL)
- Inclusive design
- Adopting accessible practices



Accessibility Checklists

Strengths

- Easy to understand and follow
- Highlight the most important technical considerations to make sure students with disabilities can access the material

Weaknesses

- Accessibility as something that we can go back and fix later
- Do not ensure good design
- Do not account for the multiple formats of OER
- Students face challenges not addressed in standard accessibility checklists
- Does not ensure equal access to learning outcomes



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What is an average student?

The classroom, “far from neutral, is constructed for a mythical, “able-bodied,” neurotypical norm that neither reflects nor accommodates the wide range of diverse learners within it, regardless of whether these learners have been diagnosed with a disability” (Wilson, 2017).



How do we understand disability?

Medical Model: Disability is an individual problem, affliction, or deficit that needs a cure or accommodation.

Social Model: Disability emerges when there is a mismatch between a person, their environment and tools they have available to them, and their goals.



What else affects accessibility?

- **Day-to-day life**
- **Digital literacy**
- **Access to technology**
- **Structure of information**
- **Presentation of information**



Universal Design for Learning (UDL)

Provide multiple means of

- Engagement (WHY)
- Representation (WHAT)
- Action and Expression (HOW)



Multiple Means of Representation: Multiple Modalities


Video, audio, text,
images,
interactive
activities

Click play on the following audio player to listen along as you read this section.

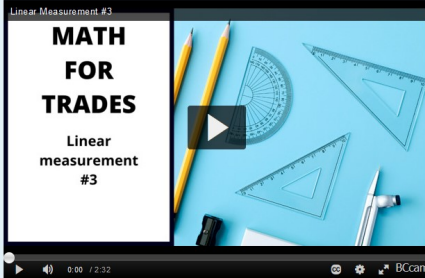


This section provides a brief description of two of the most fundamental electrical relationships: **Ohm's law**, which describes current flow in electrical circuits, and **Watt's law**, which describes how power is dissipated.

Question 1



Jakob is a carpenter who creates forms for concrete columns. The measurements for the column are in millimetres but Jakob would rather work in inches so he decides to translate the millimetres to inches. The columns are rectangular and are 400 mm by 250 mm. What are the measurements of the column in inches?



MATH FOR TRADES
Linear measurement #3

Multiple Means of Representation: Multiple Formats

Web, HTML,
PDF, EPUB

Math for Trades: Volume 2

Chad Flinn and Mark Overgaard

The *Math for Trades: Volume 2* textbook continues where the first volume left off. Volume 2 increases the challenge with topics such as converting units and working with equations, perimeter, area, and volume. Once again the material is presented from a trades perspective with easy-to-understand examples and videos explanations accompanying questions. The goal of this volume is to take the material you learned in *Math for Trades: Volume 1* and apply it to more advanced topics that you may encounter during your trades training.



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READ BOOK



Math for Trades Volume 2



open.bccampus.ca

BCcampus | OpenEd

Download this book

EPUB3

Digital PDF

Print_.pdf

XHTML

Pressbooks XML

Web Links

Additional Resources

- [UDL Guidelines](#)
- [UDL on Campus](#)
- Webinar: [Using Universal Design for Learning \(UDL\) to Remove Barriers for All Learning](#)



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Inclusive Design

“Design that considers the full range of human diversity with respect to ability, language, culture, gender, age, and other forms of human difference.”

— Inclusive Design Research Centre



“Inclusive Design Dimensions” by the Inclusive Design Research Centre. CC BY.



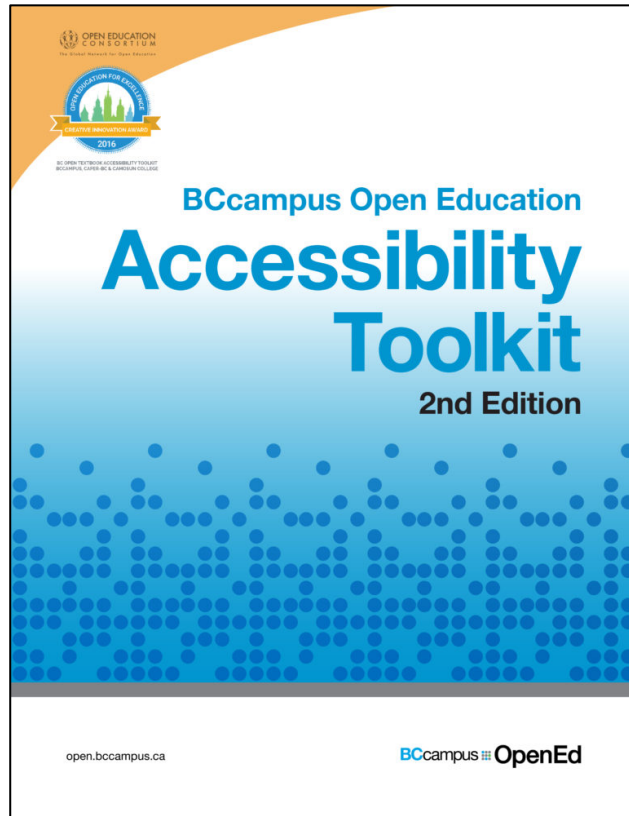
Adopting Accessible Practices

How can you build accessibility considerations into the creation process?

What are the different formats that you can make available?

How can you empower the students using the resource to take advantage of the features and options available?

How can you collect and encourage student feedback and leverage the diverse needs of students to design better?



Accessibility Toolkit

<https://opentextbc.ca/accessibilitytoolkit>

- Information about how to create accessible educational resources
- Accessibility checklists
- Activities
- Webinars on Inclusive Design



Questions?

Download the slides and list of resources
from the following link: bit.ly/oerudl2021

References

- Amornchat, S. (n.d.). Complex images for all learners: A guide to making visual content accessible [PDF]. Retrieved from <https://www.lsu.edu/accessibility/training/complex-images.pdf>
- CAST. (2018). Universal Design for Learning Guidelines version 2.2. Retrieved from <http://udlguidelines.cast.org>
- Coolidge, A., Doner, S., Robertson, T., Gray, J. (2018). Accessibility Toolkit – 2nd Edition. Victoria, B.C.: BCcampus. <https://opentextbc.ca/accessibilitytoolkit/>
- Inclusive Design Research Centre. (n.d.). What is inclusive design? Retrieved from <https://idrc.ocadu.ca/about-the-idrc>
- Kirkpatrick, A., O Connor, J., Campbell, A., & Cooper, M. (Eds.) (June 5, 2018). Web Content Accessibility Guidelines (WCAG) 2.1. WC3. <https://www.w3.org/TR/WCAG21/>
- Wilson, J. D. (2017). Reimagining disability and inclusive education through universal design for learning. *Disability Studies Quarterly*, 37(2). <http://dx.doi.org/10.18061/dsq.v37i2.5417>