

Universal Design for Learning and Open Educational Resources

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BCcampus

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Session Overview

- Social model of disability
- Open Educational Resources (OER)
- Universal Design for Learning (UDL)
- How UDL can be applied to OER creation and design
- Image descriptions

Social
Model



OER



UDL

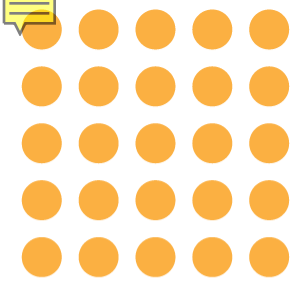


UDL and
OER



Image
Descriptions

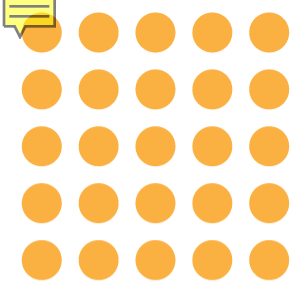




What impacts student success?

- Day-to-day life
- Digital literacy
- Access to technology
- Disability
- Finances
- Caregiving responsibilities
- Mental health
- Family support
- Interest in the subject
- Experiences of discrimination vs. privilege
- Living situation





Ways of thinking about disability

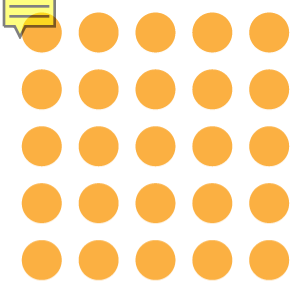
Medical model

Disability as an individual problem, affliction, or deficit that needs a cure or accommodation.

Social model

Disability as a spectrum that can affect different people in different ways depending on their context, environment, and the tools they have access to, and is a product of history and culture.





Results of these different models

Medical model

The onus is on the student to request accommodations.

The instructor is not required to make permanent changes to their teaching practices; only the student who made the request receives the accommodation.

Social model

The onus is on the person designing the learning experience to reduce/eliminate barriers from the beginning.

It is assumed that students are diverse and have a variety of access needs and preferences.



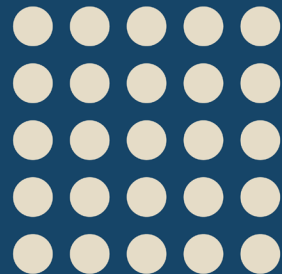


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Open Educational Resources (OER)

Educational resources shared under an open licence, which indicates the copyright holder gives permission for people to use, edit, and share the resource for free.





Characteristics of OER

- Open licences
- Digital-first design
- Often supported by open source technologies
- Multiple formats
- Multimedia
- Free for students
- Agency for instructors

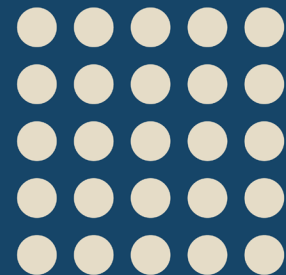




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Universal Design for Learning





Three UDL Principles

Provide multiple means of

- Engagement (why)
- Representation (what)
- Action and expression (how)





Access

Support

Executive Function

Design Multiple Means of **Representation** →



Design Options for **Perception** (1) →

- Support opportunities to customize the display of information (1.1) >
- Support multiple ways to perceive information (1.2) >
- Represent a diversity of perspectives and identities in authentic ways (1.3) >

Design Options for **Language & Symbols** (2) →

- Clarify vocabulary, symbols, and language structures (2.1) >
- Support decoding of text, mathematical notation, and symbols (2.2) >
- Cultivate understanding and respect across languages and dialects (2.3) >
- Address biases in the use of language and symbols (2.4) >
- Illustrate through multiple media (2.5) >

Design Options for **Building Knowledge** (3) →

- Connect prior knowledge to new learning (3.1) >
- Highlight and explore patterns, critical features, big ideas, and relationships (3.2) >
- Cultivate multiple ways of knowing and making meaning (3.3) >
- Maximize transfer and generalization (3.4) >

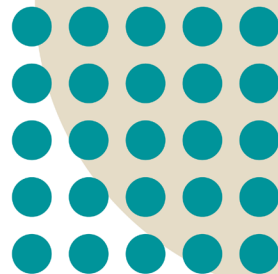
Guidelines for Multiple Means of Representation

1. Perception (Access)
2. Language and symbols (Support)
3. Building knowledge (Executive Function)

Guideline 1: Perception

Ensure that key information is equally perceptible to all learners:

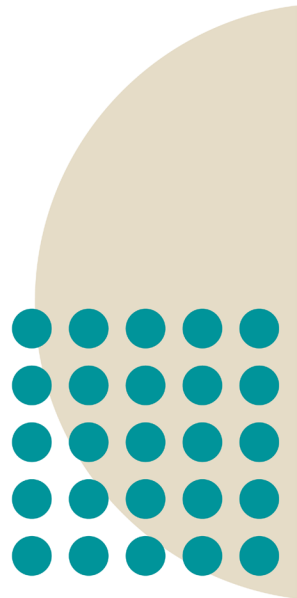
1. Support opportunities to customize the display of information
2. Support multiple ways to perceive information
3. Represent a diversity of perspectives and identities in authentic ways



Guideline 2: Language and Symbols

Ensure that multiple representations are available for clarity, comprehensibility, and creating a shared understanding for all learners.

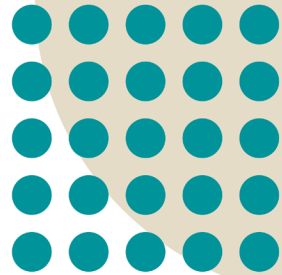
1. Clarify vocabulary, symbols, and language structures.
2. Support decoding of text, mathematical notation, and symbols
3. Cultivate understanding and respect across languages and dialects
4. Address biases in the use of language and symbols
5. Illustrate through multiple media



Guideline 3: Building Knowledge

Transform accessible information into knowledge that can be used for future decision making.

1. Connect prior knowledge to new learning.
2. Highlight and explore patterns, critical features, big ideas, and relationships
3. Cultivate multiple ways of knowing and making meaning
4. Maximize transfer and generalization



Educational Resources

OER

Digital-first design
Student-centred

UDL
(representation)

- Open licences
- Multiple formats
- Supported by open technologies (Pressbooks, H5P)
- Free to students
- Greater instructor agency

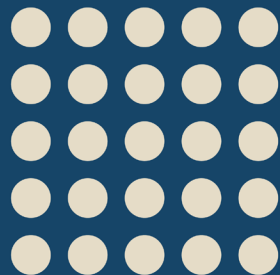
- Giving students choice and flexibility
- Supporting learning through design
- Disability lens (accessible design, assuming diversity)



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Examples of UDL's Principle of Representation being applied to OER





Multimodality

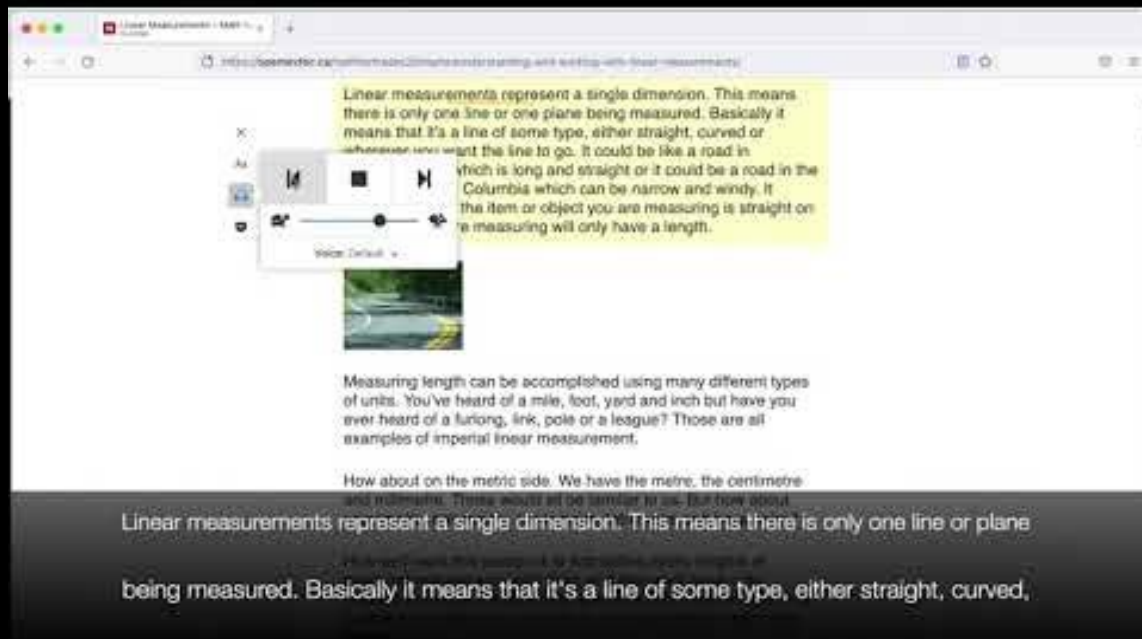
Combining text, images, video, audio, and interactivity to give students multiple ways to engage with content.

Examples:

- Text-to-speech
- Audiobooks
- Videos
- H5P



Text-to-speech



Linear measurements represent a single dimension. This means there is only one line or one plane being measured. Basically it means that it's a line of some type, either straight, curved or

which is long and straight or it could be a road in the Columbia which can be narrow and windy. If the item or object you are measuring is straight on

re measuring will only have a length.

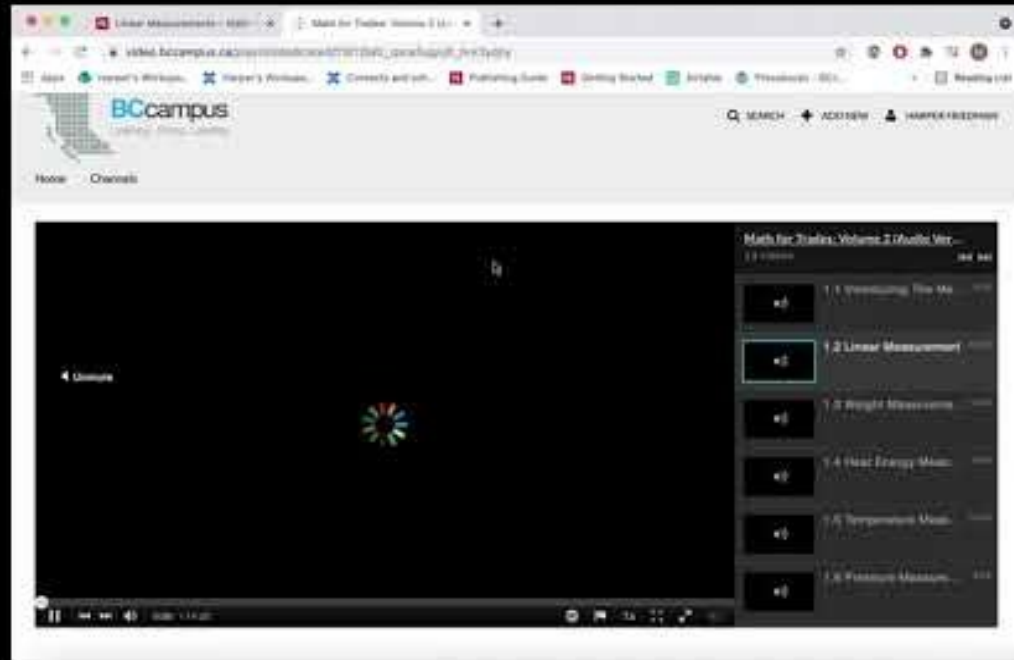
Measuring length can be accomplished using many different types of units. You've heard of a mile, foot, yard and inch but have you ever heard of a furlong, link, pole or a league? Those are all examples of imperial linear measurement.

How about on the metric side. We have the metre, the centimetre and millimetre. These would all be familiar to us. But how about

Linear measurements represent a single dimension. This means there is only one line or plane

being measured. Basically it means that it's a line of some type, either straight, curved,

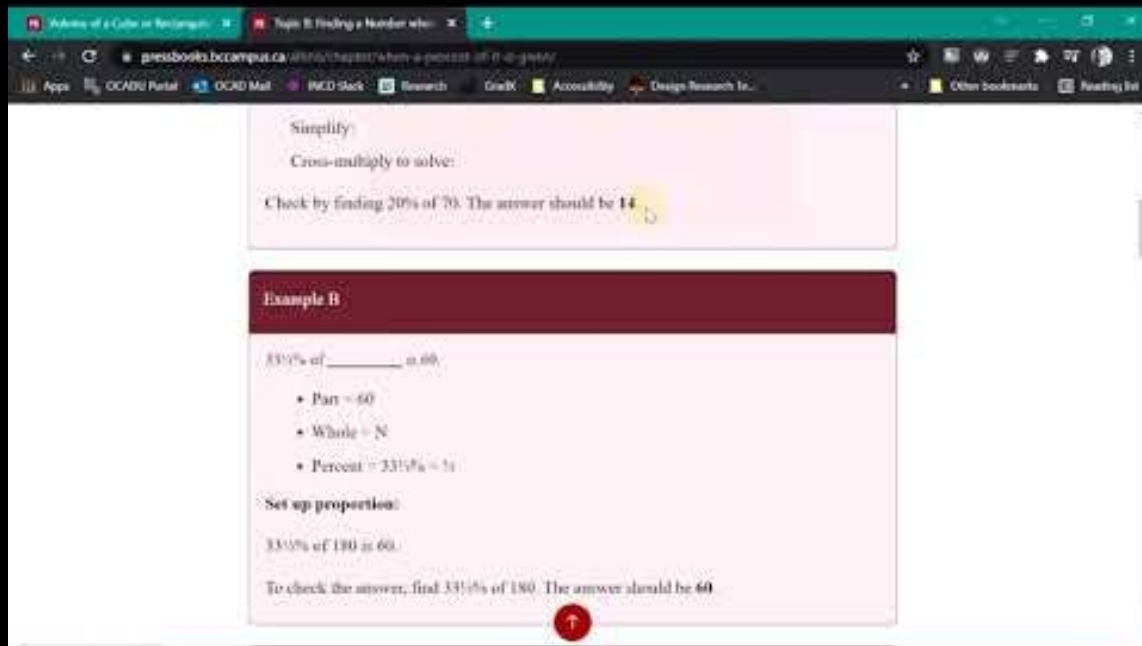
Audio books



The screenshot shows a web browser displaying a page from BCcampus. The page features a video player interface for an audio book. The main player area is dark with a central logo and a play button. To the right, there is a table of contents for the audio book.

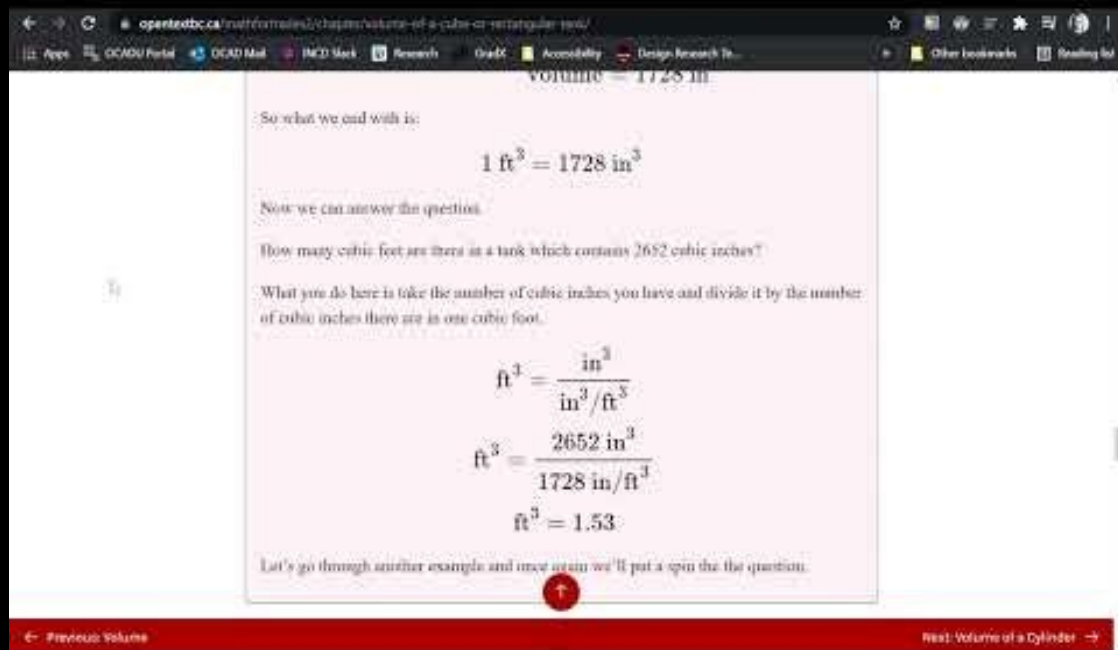
Math for Grades 7/8: Volume 2 (Audio Ver...
1.1 Introduction: The Me...
1.2 Linear Measurement
1.3 Weight Measureme...
1.4 Heat Energy Meas...
1.5 Temperature Meas...
1.6 Pressure Measure...

MathJax - Zoom



The screenshot shows a web browser window with two tabs. The active tab is titled "Topic B: Finding a Number when...". The address bar shows the URL "pressbooks.bccampus.ca/pressbooks-chapter/when-a-percent-of-it-is-given/". The browser's address bar and navigation icons are visible at the top. The main content area displays a page with a pink background. A section titled "Simplify" is visible, with the instruction "Cross-multiply to solve:" and a check instruction "Check by finding 20% of 70. The answer should be 14." The number "14" is highlighted in yellow. Below this, a section titled "Example B" is shown in a dark red header. The text in this section reads: "33 1/3% of _____ is 60." followed by a list of values: "• Part = 60", "• Whole = N", and "• Percent = 33 1/3% = 1/3". Below the list, it says "Set up proportion:" and "33 1/3% of 180 is 60." and "To check the answer, find 33 1/3% of 180. The answer should be 60." A red circular icon with a white upward-pointing arrow is located at the bottom center of the page.

Screen reader reading math



The screenshot shows a web browser window with the URL `opentextbc.ca/math/formulas/chapters/volume-of-a-cube-or-rectangular-box/`. The page content is as follows:

VOLUME = $l \times w \times h$

So what we end with is:

$$1 \text{ ft}^3 = 1728 \text{ in}^3$$

Now we can answer the question:

How many cubic feet are there in a tank which contains 2652 cubic inches?

What you do here is take the number of cubic inches you have and divide it by the number of cubic inches there are in one cubic foot.

$$\text{ft}^3 = \frac{\text{in}^3}{\text{in}^3/\text{ft}^3}$$
$$\text{ft}^3 = \frac{2652 \text{ in}^3}{1728 \text{ in}^3/\text{ft}^3}$$
$$\text{ft}^3 = 1.53$$

Let's go through another example and once again we'll put a spin on the question.

Navigation: Previous Volume (left arrow), Next: Volume of a Cylinder (right arrow)

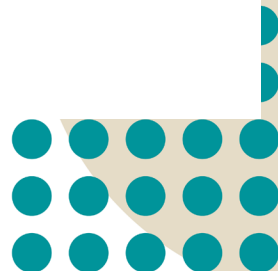


Ohm's Law

Combining the elements of **voltage**, **current**, and **resistance**, George Ohm developed the following formula:

The difference in electric potential between two points, which is defined as the work needed per unit of charge to move a test charge between the two points. It is measured in volts (V).

- E = Voltage in volts
- I = Current in amps
- R = Resistance in ohms





Video demonstrations

Video: Global Virgin Application – Oxidative Colour

Note: Video has no sound.





Structure of Information

- Scaffolding new knowledge
- Resource navigation options
- Chapter and heading titles
- Numbering systems (i.e., headings, figures, tables)
- Consistent chapter elements and structure





Textboxes

Can be used to:

- Highlight the most important ideas of a section.
- Walkthrough key processes or procedures.
- Provide concrete examples or case studies to support main ideas.

Example A

Express 4:5 in higher terms.

$$4 : 5 = \frac{4}{5} \rightarrow \frac{4}{5} \left(\frac{\times 2}{\times 2} \right) \rightarrow \frac{8}{10}$$

4:5 is equivalent to 8:10



H5P

- Interactive web-based activities and formative assessments
- Available in Pressbooks – activities can be embedded in the webbook
- Can build your own activities or reuse and remix activities created by others

Resources: h5p.org and kitchen.opened.ca



H5P: Multiple Choice

Mark all of the fragments in the list of sentences below.

To find the perfect apartment.

Working without taking a break.

I needed to bring work home.

Unless the ground thaws before spring break.

You'll find what you need if you look.

We try to get as much work done as we can in an hour.

We won't be planting any tulips this year.

Deidre scoured the classifieds each day.

In order to meet the deadline.

On the shelf next to the potted plant.

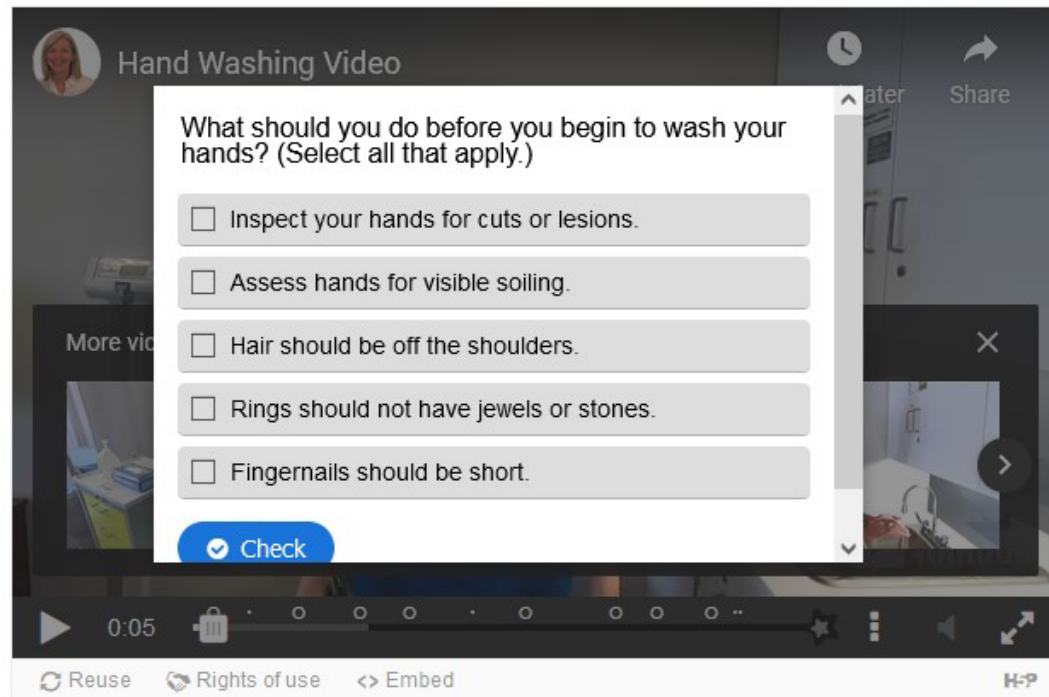
Check

[Reuse](#) [Rights of use](#) [Embed](#)

H5P

"Fragments" activity by Brenna Clarke Gray was adapted from content from *Writing for Success - 1st Canadian Edition*, which is licensed under a CC BY-NC-SA 4.0 licence.

H5P: Interactive Video



The screenshot shows a video player interface for a video titled "Hand Washing Video". A white quiz overlay is centered on the screen, asking the question: "What should you do before you begin to wash your hands? (Select all that apply.)". The quiz contains five multiple-choice options, each with an unchecked checkbox:

- Inspect your hands for cuts or lesions.
- Assess hands for visible soiling.
- Hair should be off the shoulders.
- Rings should not have jewels or stones.
- Fingernails should be short.

At the bottom of the quiz overlay is a blue button with a checkmark icon and the text "Check". The video player background shows a video of a person at a sink. The player controls at the bottom include a play button, a progress bar at 0:05, and icons for full screen, share, and other options. Below the player are links for "Reuse", "Rights of use", and "Embed".

"Hand washing interactive video" by Michelle Hughes is licensed under a CC BY-NC 4.0 licence.

H5P: Image Hotspots

+ Clear, Informative Title

Clear, informative headline +

+ Topic sentence that's related to the organizational pattern you're using. Supporting information that supports the topic sentence, provides examples, identifies causes, defines effects or otherwise supports the claim made.

+ transitional paragraph that summarizes the previous point, introduces the next point and shows how the two are related.

Clear, informative headline parallel to first

Another topic sentence that states the paragraph's main point. Supporting information as necessary. Transitional sentence that sets up the paragraph list:

- + Topic sentence: Supporting details.
 - Topic sentence parallel with first: supporting details.
 - Topic sentence parallel with second: supporting details.

Reuse <> Embed

H5P

"Organizing Information" activity by Arley Cruthers is licensed under a CC BY-NC 4.0 licence.



More information on UDL

Universal Design for Learning Guidelines

- Explore all of the principles in more detail
- Read about the guidelines and checkpoints, which provide more detail about what each principle includes.
- Lots of concrete examples.

URL: [UDLguidelines.cast.org/](https://udlguidelines.cast.org/)





What lessons can OER and UDL learn from each other?





Lessons OER can learn from UDL

1. “Access” (aka free) is not enough – resources must be designed to be accessible to students with disabilities
2. Producing OER in multiple formats is important
3. There is value in putting time to making resources more multimodal and interactive

Ultimately, how we design OER matters.





Lessons UDL can learn from OER

1. There are open tools available that support UDL practices
2. Open licenses make it easier for instructors to share work and find educational resources
3. Cost is a real and big barrier for students

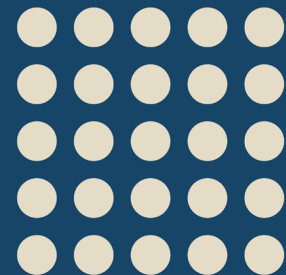




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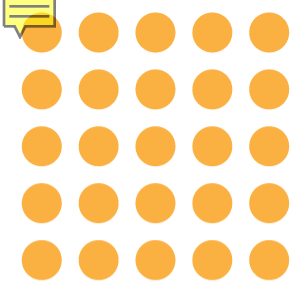
Designing for Print





Annotate: Why might someone want a print copy?





Print Design Considerations

- Text size
- Links to additional resources
- Access to multimedia content

Move through the slides at your own pace. You can use the quiz questions to test your knowledge. After you're done, you'll be invited to reflect on what you learned.



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://kpu.pressbooks.pub/businesswriting/?p=1322#h5p-38>





Questions?





Digging deeper into image descriptions





An image description

is a verbal or written description of an image for someone who can't see it.





Who are image descriptions for?

Someone who has

- A disability affecting vision (i.e., blindness)
- A brain injury that causes sensitivity to screens
- A cognitive disability where a written explanation may be helpful
- Poor internet connection that causes images not to load





Why are image descriptions important?

Images have huge explanatory power. They allow us to give context, represent spatial concepts, show relationships, and provide examples in minimal space.

In education, images are often crucial parts of course materials. Image descriptions ensure that important information is provided for all students from the very beginning.





Figure 1 The Numbered Treaties

Map of Numbered Treaties of Canada by Themightyquill is licensed under a CC BY-SA 2.5 licence.

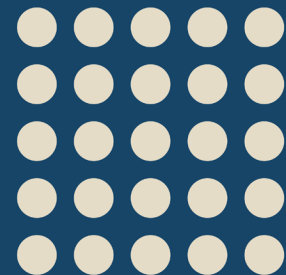




BCcampus

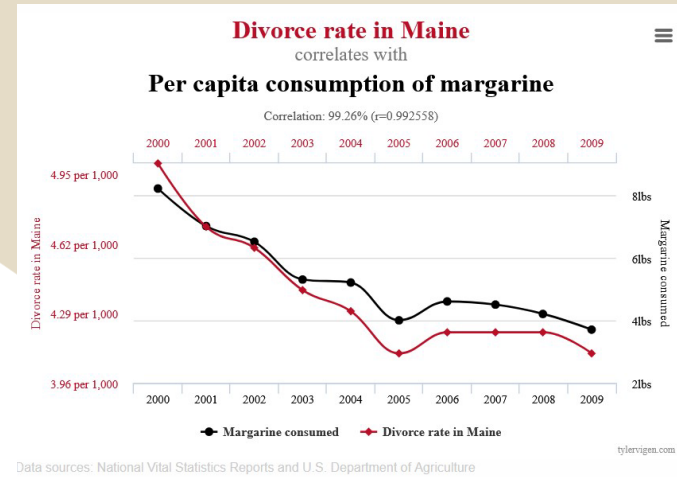
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How to write image descriptions



Object – Action - Context

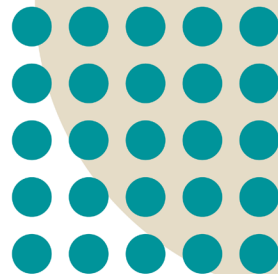
- **Object:** A line graph
- **Action:** shows a close correlation between the divorce rate in Maine and the per capita consumption of margarine between 2000 and 2009.
- **Context:** The lines fall at the same rate from 2000 to 2005, then there is a slight rise before it levels off again.



Chen, A. (2020).

Things to keep in mind

1. **Context:** Why is the image there?
2. **Audience:** Who is accessing the image?
3. **Concise:** Keep it short
4. **Objectivity:** Avoid judgements
5. **General to specific**
6. **Tone and language**





Example

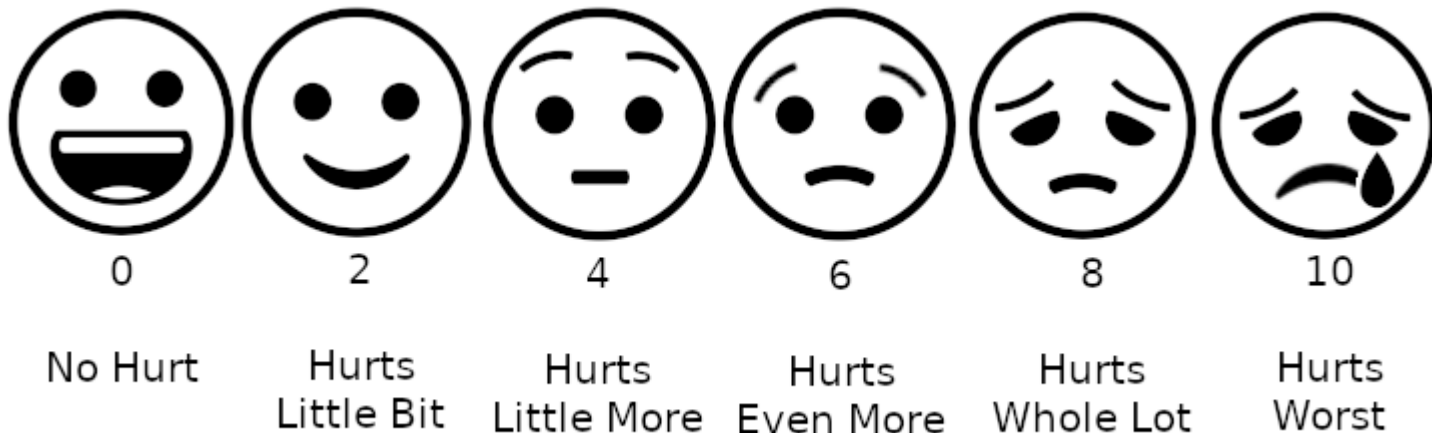
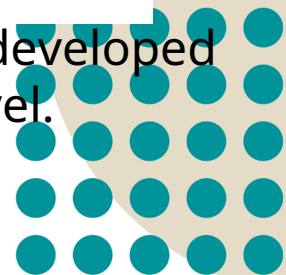


Figure 1: The Wong-Baker Faces Pain Rating Scale was developed to help children identify and communicate their pain level.



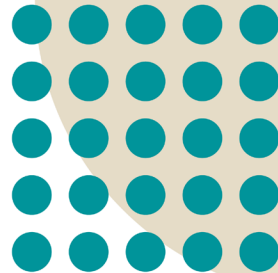


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Josie's Description

A scale that uses cartoon faces to illustrate levels of pain. Each face has a description of the pain and a number from 0 to 10. Zero is no hurt and smiling, 2 is hurts a little and a small smile, 4 is hurts a little more and a straight face, 6 is hurts even more and a slightly sad face, 8 is hurts a whole lot and a big sad face, and 10 is hurts worst and a bigger sad face that is crying.





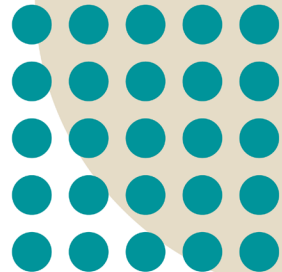
Alt Text as Poetry

By Bojana Coklyat and Shannon Finnegan

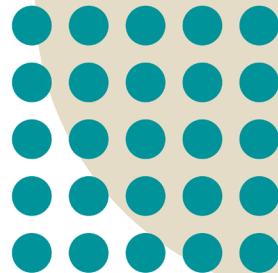


Alt Text As Poetry

1. Attention to language
2. Word economy
3. Experimental spirit



1. Information is lost and gained
2. There is no single correct answer
3. It always involves creative decisions





Activity 1: What do you see?



Write down 5-10 things you see in the image.

What details do you think are the most important?





Activity 1: Short description

Try writing a short description for this image.



1. Context
2. Audience
3. Concise
4. Objectivity
5. General to specific
6. Tone and language



Activity 1: A possible description



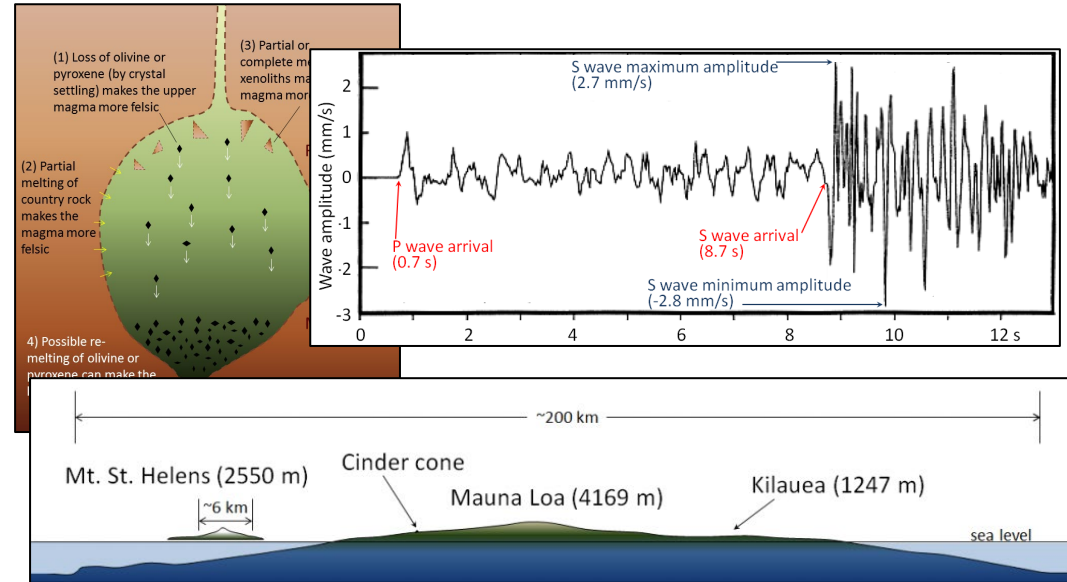
Students sit in 4 rows of tiered desks. An instructor stands in front of a projector.



Long Descriptions for Complex Images

Examples

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



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



Lists

Pie chart	BAR CHART	LINE GRAPH	FLOWCHART
<p>Composition of Milk</p> <ul style="list-style-type: none">Lactose 37%Fat 31%Protein 26%Minerals 6%	<p>Employment of disabled vs. non-disabled Americans</p> <ul style="list-style-type: none">In 1991:<ul style="list-style-type: none">Non-disabled is 84.4%Disabled is 50.2%In 2010:<ul style="list-style-type: none">Non-disabled is 79.1%Disabled is 41.1%	<p>The growth of human population from the mid-1800s</p> <ul style="list-style-type: none">In 1800 - 1 billionIn 1930 - 2 billionIn 1970 - 3 billionIn 2000 - 6 billionIn 2007 - 7 billion	<p>How to order food</p> <ol style="list-style-type: none">StartOrder burgerWant fries?<ul style="list-style-type: none">If yes, order friesWant drink?<ul style="list-style-type: none">If yes, order drinkPay cashier

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.

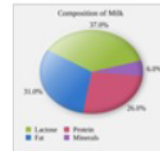
Data Tables

Data tables can be used to present information found in

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

PIE CHART

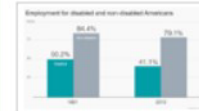
List the numbers from smallest to largest.



Composition	%
Minerals	6
Protein	26
Fat	31
Lactose	37

BAR CHART

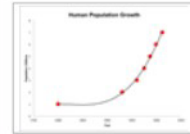
Briefly describe the chart & a summary, and provide title and axis labels.



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

LINE GRAPH

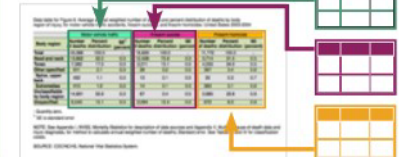
List the numbers from earliest to latest year.



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 this image?

⋮

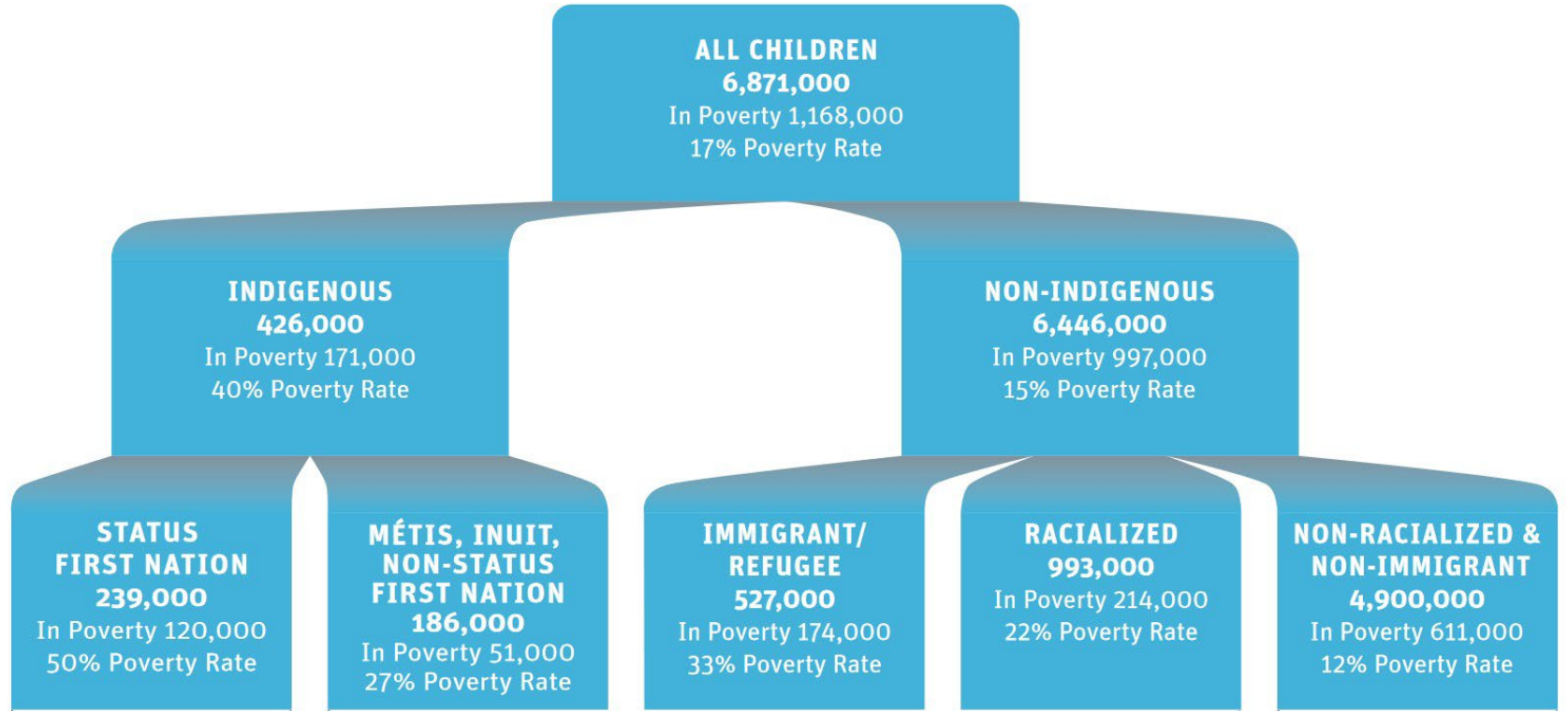


Image source: Macdonald, D., & Wilson, D. (2013). [Poverty or Prosperity: Indigenous Children in Canada \[PDF\]](#). *Canadian Centre for Policy Alternatives*. Not openly licensed.





Option 1: Bulleted List

A flow chart describing the poverty rates of different groups of children in Canada based on 2006 census data.

- **6,871,000 total children:** 1,168,000 in poverty, 17% poverty rate.
- **426,000 Indigenous children:** 171,000 in poverty, 40% poverty rate.
 - 239,000 Status First Nation children: 120,000 in poverty, 50% poverty rate.
 - 186,000 Métis, Inuit, Non-Status First Nation children: 51,000 in poverty, 27% poverty rate.
- **6,446,000 Non-Indigenous children:** 997,000 in poverty, 15% poverty rate.
 - 527,000 Immigrant/refugee children: 174,000 in poverty, 33% poverty rate.
 - 993,000 Racialized children: 214,000 in poverty, 22% poverty rate.
 - 4,900,000 Non-racialized and non-immigrant children: 611,000 in poverty, 12% poverty rate.



Option 2: Table

A flow chart describing the poverty rates of different groups of children in Canada based on 2006 census data. The data is provided in the below table.

Group	Total Children	Total In Poverty	Poverty Rate
All children	6,871,000	1,168,000	17%
All Indigenous children	426,000	171,000	40%
Status First Nation children	239,000	120,000	50%
Métis, Inuit, and Non-Status First Nation children	186,000	51,000	27%
All Non-Indigenous children	6,446,00	997,000	15%
Immigrant/Refugee children	527,000	174,000	33%
Racialized children	993,000	214,000	22%
Non-racialized & Non-Immigrant children	4,900,000	611,000	12%





POET Training Tool

poet.diagramcenter.org/

- When to describe images
- How to describe images
- Practice describing images

Lots of examples.



Session Recap

- Social model of disability
- Open Educational Resources (OER)
- Universal Design for Learning (UDL)
- How UDL can be applied to OER creation and design
- Image descriptions





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Questions?



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Find, Use, and Share Open Educational Resources

August 1, 2024

Technical Accessibility

August 8, 2024

Introduction to Pressbooks

August 15, 2024

Advanced Pressbooks

August 22, 2024

UDL and Open Educational Resources

August 29, 2024

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