



# Teaching Literacy & Numeracy to Diverse Learners



## Your Thoughts?

- ◆ *What does literacy mean to you?*
- ◆ *What does numeracy mean to you?*



Think think think

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# High School

- ◆ Who is teaching your students to be literate and numerate in **YOUR** field?
  - ❖ What does it mean to be literate in automotive repair?
    - Literate with text structures used in your field
      - + E.g. able to read an instruction manual
    - Vocabulary development of discipline specific language orally, as sight words, and for writing
  - ❖ What about mathematics?
    - Literate with mathematics used in your field
    - Vocabulary development of discipline specific language related to numeracy orally, as sight words, and for writing

#### A. Measuring tools

1. **Pull-Push Rule** - flexible tape that slides into a material case and it is used to measure irregular and regular shapes.
2. **Ruler** - 12-inch or one foot rule and it is used to take/make simple measurements.
3. **Meter Stick** - used to measure a work piece.
4. **Try Square** - squaring, measuring and testing tool used to check adjacent surfaces for squareness.
5. **Caliper** - used to transfer measurements from the rule to the work.

#### B. MARKING LINING TOOLS

1. **Pencil** - used to layout or mark cutting lines.
2. **Marking Gauge** - wood or metal tool consisting of a beam, head and a point used to mark a line parallel to the grain of the wood.
3. **Chalk Line** - used to establish a straight line on a surface.
4. **Divider** - tool with two metal legs used to lay-out an arc circle or step off division on a line.
5. **Compass** - used to scribe arcs and circle in a metal wood.

#### C. TESTING TOOLS

1. **Try Square** - tool used in squaring, measuring and testing the squareness of a wood.
2. **Steel Square** - framing square used to mark out the work for squaring and checking of angles and is used in the construction of roof framing and large furniture.
3. **Spirit Level** - tool used for testing vertical and horizontal surfaces.
4. **Plumb bob** - tool used to test the vertical and horizontal surfaces.

#### D. EDGE CUTTING TOOLS

1. **Chisel** - tool used to trim and shape wood.
2. **Plane** - used to obtain a smooth and flat surface.
3. **Spoke shave** - small plane like tool from irregularly shaped objects.
4. **Cabinet scraper** - rectangular piece of steel with two cutting edges used for working flat and curved shapes.

#### E. TOOTH-CUTTING TOOLS

1. **Cross Cut Saw** - handsaw used to cut the wood across the grain.
2. **Rip-saw** - hand saw used to cut the wood along the grain.
3. **Back Saw** - handsaw with a metal back and plywood and joinery.
4. **Compass Saw** - used to cut irregular shape either in large or small board.
5. **Turning Saw** - used to rip, cross and cut curves in lumber.
6. **Coping Saw** - u-shaped saw used for cutting irregular shape in small board.
7. **Dovetail Saw** - small back saw with a straight chisel type handle used to cut very fine joints.

#### F. BORING TOOLS

1. **Auger bit** - tool used to make hole in woods.
2. **Expansive bit** - tool used to drill holes of various sizes in woods.
3. **Drill Bit** - tool used for boring holes either in metals, woods or plastics.

#### G. HOLDING TOOLS

1. **C-Clamp** - used for holding together pieces of lumber while working.
2. **Bench Vise** - used to hold any materials or tools in place.
3. **Bar Clamp** - used to hold large boards or frames together while assembling or gluing.

**ELECTRICAL SAFETY PRECAUTIONS**

**ELECTRICAL PRECAUTIONS**

**CAUTION**  
RISK OF ELECTRIC SHOCK  
DO NOT OPEN

**CAUTION**  
TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). THERE ARE NO USER SERVICEABLE PARTS INSIDE. REFER SERVICE TO YOUR AUTHORIZED AMERICAN AUDIO SERVICE TECHNICIAN.

The enclosure port within an equalized Herge is intended to assist the user in the presence of pressure. The enclosure port within an equalized Herge is intended to assist the user in the presence of pressure. The enclosure port within an equalized Herge is intended to assist the user in the presence of pressure.

**IMPORTANT SAFETY INSTRUCTIONS**

**READ INSTRUCTIONS** - All safety and operating instructions should be read before the product is opened.

**RETURN TO SERVICE** - If the safety and operating instructions are not read, or if the product is not used in accordance with the instructions, the manufacturer is not responsible for any damage to the product.

**WARNING** - Do not attempt to service the product unless you are qualified to do so. If you are not qualified, refer the product to a qualified service technician.

**CLEANING** - The product should be cleaned only with a soft, dry cloth. Do not use any liquid cleaners or solvents. Do not use any abrasive cleaners or scouring pads. Do not use any high pressure water spray.

**ATTACHMENTS** - Do not use attachments not recommended by the product manufacturer as they may cause damage.

**WATER AND MOISTURE** - Do not use the product near water - for example, near a bathtub, wash basin, kitchen sink, or laundry tub, in a room containing a bath or shower, near a body of water, or near a swimming pool, and the like.

**ACCESSORIES** - Do not place the product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious injury or damage to the product.

**REPAIRS** - The servicing of the product should be done by a qualified service technician. Refer to the manufacturer's service manual for instructions on how to obtain service.

**CARE** - A product and its packaging should be stored in a cool, dry place. Do not store the product in a hot, humid environment. Do not store the product in a place where it will be exposed to moisture, dust, or other contaminants.

**VENTILATION** - Do not block or cover the ventilation openings. The product should be used in a well-ventilated area. Do not use the product in a confined space.

**POWER SOURCES** - The product should be connected to a power source that is suitable for the type of power source indicated on the product label. Do not use a power source that is not suitable for the product.

**LOCATION** - The product should be located in a suitable location. Do not place the product in a place where it will be exposed to moisture, dust, or other contaminants.

**NOISE LEVELS** - The power cord of the appliance should be plugged into a wall outlet when not in use for a long period of time.

**DISCONNECTING OR RELOCATION** - If the product is to be disconnected or relocated, the power cord should be disconnected from the power source. Do not touch the metal parts of the product when disconnecting the power cord.

**POWER-CORD PROTECTION** - Power supply cords should be routed so that they are not likely to be walked on or run over by feet or objects. If they are to be crossed over an object, they should be properly secured to prevent being dislodged. Do not use any power supply cord that is frayed, damaged, or has any other defects.

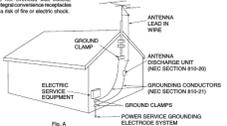
**OUTDOOR ANTENNA DISCONNECTING** - If an outdoor antenna is connected to the product, it should be disconnected before the product is used. Do not touch the antenna when it is connected to the product.

**REPLACEMENT PARTS** - When replacement parts are required, be sure that they are the correct type and quantity. Refer to the manufacturer's service manual for instructions on how to obtain replacement parts.

**SAFETY CHECKS** - After completion of any service or repair to the product, the service technician should perform safety checks to ensure that the product is in proper working order.

**WALL OR CEILING MOUNTING** - The product should be mounted on a wall or ceiling. Do not use the product on a surface that is not suitable for mounting.

**HEAT** - The product should be placed away from heat sources such as radiators, heat registers, stoves, or heat sinks (including appliances) that produce heat.



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**A.8 Some Least Squares Manipulations**

Let  $x_i = (x_{i1}, x_{i2}, \dots, x_{iK})'$  with  $x_{i1} = 1$  and  $\beta = (\beta_1, \beta_2, \dots, \beta_K)'$ . Then

$$x_i' \beta = \beta_1 + \beta_2 x_{i2} + \dots + \beta_K x_{iK}$$

The matrix

$$\sum_{i=1}^N x_i x_i' = \sum_{i=1}^N \begin{pmatrix} x_{i1} \\ x_{i2} \\ \vdots \\ x_{iK} \end{pmatrix} (x_{i1}, x_{i2}, \dots, x_{iK}) \quad 1.$$

$$= \begin{pmatrix} \sum_{i=1}^N x_{i1}^2 & \sum_{i=1}^N x_{i2} x_{i1} & \dots & \sum_{i=1}^N x_{iK} x_{i1} \\ \vdots & \sum_{i=1}^N x_{i2}^2 & \ddots & \vdots \\ \vdots & \vdots & \ddots & \vdots \\ \sum_{i=1}^N x_{iK} x_{i1} & \dots & \dots & \sum_{i=1}^N x_{iK}^2 \end{pmatrix} \quad 2.$$

is a  $K \times K$  symmetric matrix containing sums of squares and cross-products. The vector

$$\sum_{i=1}^N x_i y_i = \begin{pmatrix} \sum_{i=1}^N x_{i1} y_i \\ \sum_{i=1}^N x_{i2} y_i \\ \vdots \\ \sum_{i=1}^N x_{iK} y_i \end{pmatrix}$$

has length  $K$ , so that the system

$$\left( \sum_{i=1}^N x_i x_i' \right) b = \sum_{i=1}^N x_i y_i$$

is a system of  $K$  equations with  $K$  unknowns (in  $b$ ). If  $\sum_{i=1}^N x_i x_i'$  is invertible, a unique solution exists. Invertibility requires that  $\sum_{i=1}^N x_i x_i'$  is of full rank. If it is not full rank, a nonzero  $K$ -dimensional vector  $c$  exists such that  $x_i' c = 0$  for each  $i$  and a linear dependence exists between the columns/rows of the matrix  $\sum_{i=1}^N x_i x_i'$ .

With matrix notation, the  $N \times K$  matrix  $X$  is defined as

$$X = \begin{pmatrix} x_{11} & x_{12} & \dots & x_{1K} \\ \vdots & \vdots & \ddots & \vdots \\ x_{N1} & x_{N2} & \dots & x_{NK} \end{pmatrix} \quad 3.$$

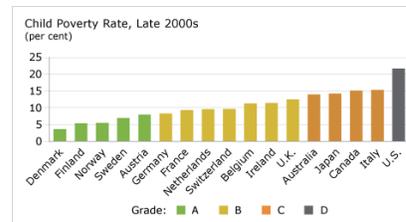
and  $y = (y_1, y_2, \dots, y_N)'$ . From this it is easily verified that

$$X'X = \sum_{i=1}^N x_i x_i' \quad 4.$$



## Your Turn

- ◆ Imagine you want to create an awareness campaign about child poverty in Canada.
- ◆ What formats would you use (images, written, statistics, graphs, etc.)?



## Effective Communication

...is rarely  
in the form  
of an  
essay!



## Text in the New Curriculum

*Text* and *texts* are generic terms referring to all forms of oral, written, visual, and digital communication:

- Oral texts include speeches, poems, plays, and oral stories.
- Written texts include novels, articles, and short stories.
- Visual texts include posters, photographs, and other images.
- Digital texts include electronic forms of all the above.
- Oral, written, and visual elements can be combined (e.g., in dramatic presentations, graphic novels, films, web pages, advertisements)

## Curricular Competencies

Comprehend and connect (reading, listening, viewing)

- ▶ Access information and ideas for **diverse purposes** and from a **variety of sources** and evaluate their **relevance, accuracy, and reliability**
- ▶ Apply appropriate strategies to comprehend written, oral, and visual **texts**, guide **inquiry**, and **extend thinking**
- ▶ Synthesize ideas from a variety of sources to build understanding
- ▶ Recognize and appreciate how **different features, forms, and genres of texts** reflect different purposes, audiences, and messages
- ▶ **Think critically, creatively, and reflectively** to explore ideas within, between, and beyond texts
- ▶ Recognize and identify the role of **personal, social, and cultural contexts, values, and perspectives** in **texts**
- ▶ Recognize **how language constructs personal, social, and cultural identity**
- ▶ Construct meaningful personal connections between self, **text**, and world
- ▶ Respond to **text** in **personal, creative, and critical ways**
- ▶ Understand **how literary elements, techniques, and devices enhance and shape meaning**
- ▶ Recognize an increasing range of **text** structures and how they contribute to meaning
- ▶ Recognize and appreciate the role of **story**, narrative, and oral tradition in expressing First Peoples perspectives, values, beliefs, and points of view
- ▶ Recognize the **validity of First Peoples oral tradition** for a range of purposes

# Curricular Competencies

Create and communicate (writing, speaking, representing)

- ▶ Exchange ideas and viewpoints to build shared understanding and extend thinking
- ▶ Use writing and design processes to plan, develop, and create engaging and meaningful **literary and informational texts** for a variety of purposes and **audiences**
- ▶ Assess and **refine texts** to improve their clarity, effectiveness, and impact according to purpose, **audience**, and message
- ▶ Use an increasing repertoire of conventions of Canadian spelling, grammar, and punctuation
- ▶ Use and experiment with **oral storytelling processes**
- ▶ Select and use appropriate features, forms, and genres according to audience, purpose, and message
- ▶ Transform ideas and information to create original texts



## Question



Think. think. think.

What is the difference between literacy, and decoding and encoding?

What is the difference between numeracy, and computation?



# Two Approaches

- ◆ **Conceptual approach**
  - ❖ What it means to be literate and numerate
  - ❖ Focuses on literary thinking and numerate thinking, and affective attitude
- ◆ **Strategic Approach**
  - ❖ Teach strategies for making sense of literature, numeracy
- ◆ **Both are important!**
  - ❖ It is not the particular text, or algorithm, that matters. It is the thinking and knowing how to make meaning from them!

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READING											
COMPREHENSION		FLUENCY / DECODING									
<p style="text-align: center; margin: 0;"><b>LITERAL / CONCRETE</b></p> <ul style="list-style-type: none"> <li>• Factual retelling</li> <li>• Who, what, where, when</li> <li>• Main idea</li> </ul>	<p style="text-align: center; margin: 0;"><b>INFERENTIAL</b></p> <ul style="list-style-type: none"> <li>• Why events / characters are as they are</li> <li>• Themes and feelings</li> <li>• Underlying morals or</li> </ul>	<p style="text-align: center; margin: 0;"><b>SIGHT WORDS</b></p> <ul style="list-style-type: none"> <li>• Words students recognize instantly</li> <li>• Should be 95% of text</li> </ul>	<p style="text-align: center; margin: 0;"><b>WORD ATTACK</b></p> <ul style="list-style-type: none"> <li>• Strategies for figuring out unknown words</li> </ul>								
<p style="text-align: center; margin: 0;"><b>STRATEGIES</b></p> <table style="width: 100%; border: none;"> <tr> <td style="padding: 2px;">Questioning</td> <td style="padding: 2px;">Inferring</td> </tr> <tr> <td style="padding: 2px;">Imaging</td> <td style="padding: 2px;">Connecting</td> </tr> <tr> <td style="padding: 2px;">Synthesizing</td> <td style="padding: 2px;">Big Ideas</td> </tr> <tr> <td style="padding: 2px;">What I know</td> <td style="padding: 2px;">Transforming</td> </tr> </table>		Questioning	Inferring	Imaging	Connecting	Synthesizing	Big Ideas	What I know	Transforming	<p style="text-align: center; margin: 0;"><b>STRATEGIES</b></p> <ul style="list-style-type: none"> <li>• Dolch Words</li> <li>• Theme based vocab</li> <li>• Instructional vocab</li> </ul>	
Questioning	Inferring										
Imaging	Connecting										
Synthesizing	Big Ideas										
What I know	Transforming										
<p style="text-align: center; margin: 0;"><b>INSTRUCTIONAL APPROACHES</b></p> <ul style="list-style-type: none"> <li>• SMART reading</li> <li>• Reading power</li> <li>• Reader's workshop</li> <li>• Literature Circles</li> </ul>		<p style="text-align: center; margin: 0;"><b>INSTRUCTIONAL APPROACHES</b></p> <ul style="list-style-type: none"> <li>• Repeated reading</li> <li>• Impress reading</li> <li>• Patterned literature</li> <li>• Rebus</li> <li>• VAKT</li> </ul>									
<p style="text-align: center; margin: 0;"><b>INSTRUCTIONAL APPROACHES</b></p> <ul style="list-style-type: none"> <li>• Guided reading</li> <li>• Direct instruction</li> <li>• Word sorts</li> <li>• Guess the Covered Word</li> </ul>		<p style="text-align: center; margin: 0;"><b>INSTRUCTIONAL APPROACHES</b></p> <ul style="list-style-type: none"> <li>• Sounding out</li> <li>• Context clues</li> <li>• Picture clues</li> <li>• Word structure</li> </ul>									

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## Pocket Chart

- ◆ Can be used at all ages
- ◆ Teaching pre-literacy skills, sight words / vocabulary, decoding, phonics, and conceptual information
- ◆ Use two charts, so appears like the two pages of a book
- ◆ Use pointer to teach return sweep, have kids take turns holding the pointer, or have SN kids do it
- ◆ Read aloud, model strategies, point out pictures, key vocabulary
- ◆ Echo read - Choral read - Volunteers read
- ◆ Repeated readings, can be timed
- ◆ Play games with text
  - ❖ Hand out pictures, have kids bring them up
  - ❖ Mix up sentences, read as nonsense poem, have kids reorganize



## Literature Circles

- ◆ Adapts the novel study for diversity, as it allows for multilevel texts, approaches to demonstrating understanding
- ◆ Originally, involved small groups of students (3-4 students per group) studying a variety of leveled texts, often centered around a theme or genre.
  - ❖ *E.g. mystery studies, several different mystery novels made available to students, sometimes with homogeneous groups reading texts at their level.*
- ◆ Students were assigned roles within the group, such as vocabulary enricher, illustrator, summarizer, etc.
- ◆ Students read each chapter, have a meeting, where each performs their role to support the groups' understanding
- ◆ Culminating activity can be MI based



## Faye Brownlie's Literature Circles

- ◆ As with original, multilevel texts are used, may be centered around a theme or genre
- ◆ No roles are assigned! Instead, students read silently for a period of time, then have a book club meeting.
- ◆ Meetings consist of students taking turns discussing their responses to the text
- ◆ Responses can be scaffolded (i.e. talk about the images you're making), or open ended
- ◆ Students then respond:
  - ◇ 2x journals – two column responses, one for "What Happened" in the story, which involves the concrete literal retelling or summary, and one for "What I think", which involves the personal response/connections/images, etc.
    - Can be multi-modal
- ◆ Students can progress through texts at their own rate, change groups as they go.



### Gentle Beginnings for Two Column Responses:

Faye Brownlie

#### Reading Response Journal Entries:

- 1.) Print one sentence you can read.
- 2.) Complete the stem:  
*I like the part...*
- 3.) add:  
*... because...*
- 4.) shift to two column response:
  - in column 1:  
Write about 1 important thing that happened.
  - in column 2:  
What are your feelings about it?
- 5.)
  - in column 1:  
Write briefly about 1 significant event.
  - in column 2:  
Write your thoughts and opinions about it.

Fehln

The Hat

The horse likes the hat.

Jonathan

The hat

The dog is a wot.  
That is. I like the dog.  
I like the rebn. on the hat.

Hilary Feb./oz.

What happened	My Thinking
<p>Mr. Little went to the roof top to see if Cosin Dinky is coming because the wind was blowing east. When cosin Dinky comes they eat a wonderful meal of peas and mashed potatoes. Tom asked Dinky if he would teach him how to fly.</p>	<p>I think that cosin Dinky will teach Tom how to fly. What do you think about this?</p>

Name: Cavan  
Grade: 3

★ (Do you hear me? I mean it!) going to move.

Using a chart, web, words or pictures, show me you understand the story...

What Happened	What I Think
<p>Alexander's family is going to move to a house a thousand miles away. He kept on saying that he's not going to move. His brothers Nick and Anthony call him Duke-face and immature, but Alexander still doesn't want to move. All the people said they would miss him. Finally, Alexander agreed. But after that he's not going to move.</p>	<p>I think that Alexander feels sad and angry because he had such a good time here - I wouldn't blame him. I would of felt the same way - missing your friends, teams, teachers, blah blah blah and so on. I think the author's message was: Look on the bright side of things. It's OK to miss things but be positive. You can still phone, write, email or even visit your friend. For example, when I came back from Hong Kong, I missed a lot of people there - I even cried a bit in the plane, just like Alexander. But now, we phone and e-mail, and I feel better.</p>



Sadako and the thousand paper cranes

Event	Response
Sadako is dizzy and she does not tell her family.	I think this is a mistake. If Sadako had told her family she might have been able to find the disease and she might have lived. I also know why she didn't tell. She loved running so much that she felt if she told some one she wouldn't be allowed to run.
Chizuko teaches Sadako how to fold paper cranes. Sadako finds hope.	This part really shows how devoted Chizuko is to Sadako and how good a friend she is. It reminds me of my dad's cousin Kelly. Kelly was a teacher, when she was 20 they found out she had leukemia. She continued to teach and she had her class. Sadako had her class and I came every day to see her.

#### Quotes

"Children who have limited experiences with books and other literacy related materials need an especially rich literacy environment in school. The classroom needs to be a safe place where students feel comfortable and encouraged as they experiment with varying uses of their developing literacies." (p. 159)

"Planning involves more than selecting enjoyable activities about a particular theme or topic." (p. 164)

"Students in the U.S. and English-speaking Canadian schools are assessed via the medium of the English language, the gatekeeper of mainstream education. As we consider the discussion on assessment in this chapter, let's keep in mind the rising number of children whose mother tongue and/or home language is other than that of the mainstream...." (p. 177)

"Informal assessment tools such as student portfolios, anecdotal records, project-based learning, observation of students' interactions within authentic learning situations, and simply asking students to 'think aloud' as they work through a text or activity are examples of ways teachers assess students' reading and writing abilities and content knowledge." (p. 187)

#### Notes

This made me think of the children, particularly those who don't speak English, who do not get the opportunity to have their parents read to them on a regular basis. It made me think about ways I could set up my classroom to promote literacy for all my students. Some things I want to do are to have a good classroom library, to provide sustained silent reading each day, to have a cross-age reading program where the students will be reading buddies, and to have guest readers from the community and the students' families come into the classroom to share favorite books.

This has been made clear to me through our various assignments and clinical experiences. For example, when I planned an interdisciplinary unit, I had to focus on the state learning goals and district curriculum guide to make sure my lessons were meaningful and appropriate.

I fully understand the issue with assessing students who are still learning English. It is a complicated issue. My boyfriend came to the U.S. from Poland when he was 15. He is very intelligent, but because he took the ACT [a college entrance exam] shortly after he arrived in the U.S., he scored extremely low, simply because of the language barrier. Low scores can cause teachers to make judgments about the intelligence of their students, when it is a language issue not an intelligence issue.

I have heard time and time again that student portfolios are the BEST way to assess students. However, I am not sure why schools have not started doing this yet. This is a question I'd like to ask my cooperating teacher and the principal so I can gain more insight.



#### Criteria for the "What Happened" Section

- ◆ Powerful entries:
  - ❖ Summarize the story: Tell the important events
  - ❖ Use powerful words
  - ❖ Use examples from the text
  - ❖ Describe the characters and setting
  - ❖ Make the story sound interesting

#### Criteria for the "What I Think" Section

- ◆ Powerful entries discuss:
  - ❖ What the passage made you think about and why
  - ❖ Your feelings as you read the passage and why you felt that way
  - ❖ Why the character behaved the way they did and what they were feeling
  - ❖ Text to self, text to text, and text to world connections
  - ❖ The images in your mind as you read
  - ❖ What you wonder
  - ❖ Any predictions of what will happen next
  - ❖ Tells about whether you liked the story or character or not and why
  - ❖ The author's message
  - ❖ New things you learned

© Dr. Jennifer Kat And...uses examples from the text, and powerful words!

#### What I Think

##### What You've Done Well:

- Synthesizes – summarizes and explains cause and effect
- Infers
  - Makes logical predictions
  - Discusses characters feelings, motivations, and points of view
  - Gives insight into underlying themes, author's message
- Makes connections
  - Text to self
  - Text to text
  - Text to world
- Details images – shows ability to place self within the context
  - Describes visual images, other sensory reactions (e.g. sounds, smells, tastes)
  - Discusses feelings, experiences
- Questions
  - Poses questions about events, characters actions / feelings, author's decisions
  - Discusses areas of confusion
- Reflects & Responds
  - Gives opinions, reactions with some support (tells why, refers to sections of text)
  - Talks about personal impact on feelings, values, beliefs, knowledge

##### What You Need to Work On:

- Synthesizes
- Infers
- Makes connections
- Details images
- Questions
- Reflects & Responds

Justin,  
 Your responses show your heart, and your connection to athletics.  
 I'd like to see you:  
 A.) Make some inferences  
 - What do you think the character is feeling? Thinking?  
 - Why do you think the author wrote the book? What were they trying to say?  
 B.) Questions  
 - What do you wonder about as you read?





## Your Turn

- ◆ How would this address curricular competencies in math?
- ◆ What about in other subjects?



## NIM

- ◆ Create 7 counters
- ◆ Decide who goes first. Take turns taking one or two counters.
- ◆ Whoever takes the last counter loses.
- ◆ Determine a winning strategy. Does it matter who goes first?



## Inclusive Math Education

- ◆ Problems can be presented orally, through story, visuals, etc.
- ◆ Allows all students to enter
- ◆ We tend to give our struggling learners the most rote, out of context work.
- ◆ Focus on critical and creative thinking through problem solving – selecting strategies, evaluating outcomes, selecting alternate strategies, etc.



## All Pedagogies

7 KEYS	7 PROCESSES
Conceptual Development	Reasoning and Proving
Logic / Problem solving	Problem Solving
Visual spatial skills and concepts	Representing
Computation	Selecting Tools / Computational Strategies
Affective connection	Connecting
Metacognition/reflection	Reflecting
Real World Application	Communicating

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## The Importance of Discourse

- ◆ We learn through dialogue – hearing multiple perspectives, evaluating evidence, clarifying, comparing ideas.
- ◆ It's not about the product, it's about the process
- ◆ True discourse is not Q&A, it is a conversation.



## Math 8 Lesson – Rectangular Prisms

### **Big Idea**

- ◆ The relationship between surface area and volume can be used to describe, measure, and compare spatial relationships.

### **Curricular competencies**

- ◆ Use reasoning and logic to explore, analyze, and apply mathematical ideas
- ◆ Model mathematics in contextualized experiences
- ◆ Apply multiple strategies to solve problems in both abstract and contextualized situations
- ◆ Visualize to explore mathematical concepts
- ◆ Engage in problem solving experiences that are connected to place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures
- ◆ Explain and justify mathematical ideas and decisions
- ◆ Communicate mathematical thinking in many ways
- ◆ Represent mathematical ideas in concrete, pictorial, and symbolic forms
- ◆ Incorporate First Peoples worldviews and perspectives to make connections to mathematical concepts (design and measurement)



## Function

- ◆ Ceremonial events of the Squamish people are customarily conducted in the Longhouse. During pre-contact, certain Longhouses were utilized as community dwellings, and others were set aside for the exclusive use of the winter spiritual dances. The Longhouse is a sacred place that plays a significant role in the culture of the Coast Salish people.
- ◆ “In modern times, the main events held in the long house are the winter spiritual dances... An important part of the ritual of the longhouse is the witnessing ceremony. Whenever one is doing ‘work’ of any consequence and a spokesperson or ‘floor manager’ has been selected, the first order of events is to call witnesses. These people are required to take note of the work that is taking place and to speak about the work when it has been completed...”



## Form



Longhouses were typically built in two parts:

- ❖ A rectangular base and a triangular roof
- ❖ A totem pole was added at the doorway to tell the story of the community or celebrations that had taken place.



## Student Project

- ◆ Design and build a model of a longhouse for a community of 100 people.
- ◆ Consider the amount of space needed for ceremony.
- ◆ Sketch your design on paper, to scale. For instance, if you think the building should be 50 meters long, you could build the model 50 centimeters long.
- ◆ Consider that totem poles ranged from 3 to 18 metres in height, and the building had to support at least the bottom third of the pole for stability.
- ◆ Draw a blueprint with the measurements of your building, and then construct it:
  - ❖ Build the rectangular base first. What is the length, height, and width of your longhouse, and why did you make it this size?
  - ❖ Add the triangular roof, what are the length, height, and width of the roof section?
  - ❖ Calculate the volume of your longhouse – how much space is there overall?
  - ❖ Design the totem pole – what is the story it tells?



## Rubric

	Access	Emerging	Developing	Proficient	Extending
The relationship between surface area and volume of 3-D objects can be used to describe, measure, and compare spatial relationships	Identifies 3D objects  Measures 2 D objects	Estimates and measures surface area of 2D and 3D shapes	Estimates and computes surface area and volume using provided algorithms	Compares spatial relationships between and among area and volume and 3D shapes using appropriate tools and technologies	Designs and formulates diagrams for context-based problems. Can combine formulas to hypothesize surface area/volume of irregularly shaped objects.