

BIG IDEAS

Numbers represent quantities that can be decomposed into smaller parts.

One-to-one correspondence and a sense of 5 and 10 are essential for **fluency** with numbers.

Repeating elements in **patterns** can be identified.

Objects have **attributes** that can be described, measured, and compared.

Familiar events can be described as likely or unlikely and compared.

Learning Standards

Curricular Competencies	Content
<p><i>Students are expected to do the following:</i></p> <p>Reasoning and analyzing</p> <ul style="list-style-type: none"> • Use reasoning to explore and make connections • Estimate reasonably • Develop mental math strategies and abilities to make sense of quantities • Use technology to explore mathematics • Model mathematics in contextualized experiences <p>Understanding and solving</p> <ul style="list-style-type: none"> • Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving • Visualize to explore mathematical concepts • Develop and use multiple strategies to engage in problem solving • 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 <p>Communicating and representing</p> <ul style="list-style-type: none"> • Communicate mathematical thinking in many ways • Use mathematical vocabulary and language to contribute to mathematical discussions • Explain and justify mathematical ideas and decisions • Represent mathematical ideas in concrete, pictorial, and symbolic forms 	<p><i>Students are expected to know the following:</i></p> <ul style="list-style-type: none"> • number concepts to 10 • ways to make 5 • decomposition of numbers to 10 • repeating patterns with two or three elements • change in quantity to 10, using concrete materials • equality as a balance and inequality as an imbalance • direct comparative measurement (e.g., linear, mass, capacity) • single attributes of 2D shapes and 3D objects • concrete or pictorial graphs as a visual tool • likelihood of familiar life events • financial literacy — attributes of coins, and financial role-play

Learning Standards (continued)

Curricular Competencies	Content
<p>Connecting and reflecting</p> <ul style="list-style-type: none"> • Reflect on mathematical thinking • Connect mathematical concepts to each other and to other areas and personal interests • Incorporate First Peoples worldviews and perspectives to make connections to mathematical concepts 	

Big Ideas – Elaborations	MATHEMATICS Kindergarten
<p>Numbers:</p> <ul style="list-style-type: none"> • Number: Number represents and describes quantity. <p><i>Sample questions to support inquiry with students:</i></p> <ul style="list-style-type: none"> • How do these materials help us think about numbers and parts of numbers? • Which numbers of counters/dots are easy to recognize and why? • In how many ways can you decompose ____? • What stories live in numbers? • How do numbers help us communicate and think about place? • How do numbers help us communicate and think about ourselves? <p>fluency:</p> <ul style="list-style-type: none"> • Computational Fluency: Computational fluency develops from a strong sense of number. <p><i>Sample questions to support inquiry with students:</i></p> <ul style="list-style-type: none"> • If you know that 4 and 6 make 10, how does that help you understand other ways to make 10? • How does understanding 5 help us decompose and compose numbers to 10? • What parts make up the whole? <p>patterns:</p> <ul style="list-style-type: none"> • Patterning: We use patterns to represent identified regularities and to make generalizations. 	

Big Ideas – Elaborations

Sample questions to support inquiry with students:

- What makes a pattern a pattern?
- How are these patterns alike and different?
- Do all patterns repeat?

attributes:

- Geometry and Measurement: We can describe, measure, and compare spatial relationships.

Sample questions to support inquiry with students:

- What do you notice about these shapes?
- How are these shapes alike and different?

Familiar events:

- Data and Probability: Analyzing data and chance enables us to compare and interpret.

Sample questions to support inquiry with students:

- When might we use words like unlikely and likely?
- How does data/information help us predict the likeliness of an event (e.g., weather)?
- What stories can data tell us?

Curricular Competencies – Elaborations

Estimate reasonably:

- estimating by comparing to something familiar (e.g., more than 5, taller than me)
- First Peoples used specific estimating and measuring techniques in daily life (e.g., seaweed drying and baling).

mental math strategies:

- working toward developing fluent and flexible thinking about number

technology:

- calculators, virtual manipulatives, concept-based apps

Model:

- acting it out, using concrete materials, drawing pictures

multiple strategies:

- visual, oral, play, experimental, written, symbolic

connected:

- in daily activities, local and traditional practices, the environment, popular media and news events, cross-curricular integration
- Patterns are important in First Peoples technology, architecture, and artwork.
- Have students pose and solve problems or ask questions connected to place, stories, and cultural practices.

Communicate:

- concretely, pictorially, symbolically, and by using spoken or written language to express, describe, explain, justify, and apply mathematical ideas
- using technology such as screencasting apps, digital photos

Explain and justify:

- using mathematical arguments
- “Prove it!”

concrete, pictorial and symbolic forms:

- Use local materials gathered outside for concrete and pictorial representations.

Reflect:

- sharing the mathematical thinking of self and others, including evaluating strategies and solutions, extending, and posing new problems and questions

other areas and personal interests:

- to develop a sense of how mathematics helps us understand ourselves and the world around us (e.g., daily activities, local and traditional practices, the environment, popular media and news events, social justice, and cross-curricular integration)

Incorporate:

- Invite local First Peoples Elders and knowledge keepers to share their knowledge

make connections:

- Bishop’s cultural practices: counting, measuring, locating, designing, playing, explaining (http://www.csus.edu/indiv/o/oreyd/ACP.htm_files/abishop.htm)
- www.aboriginaleducation.ca
- *Teaching Mathematics in a First Nations Context*, FNESC <http://www.fnesc.ca/k-7/>

Content – Elaborations**MATHEMATICS
Kindergarten****number concepts:**

- counting:
 - one-to-one correspondence
 - conservation
 - cardinality
 - stable order counting
 - sequencing 1–10

Content – Elaborations

- linking sets to numerals
- subitizing
- using counting collections made of local materials
- counting to 10 in more than one language, including local First Peoples language or languages

ways to make 5:

- perceptual subitizing (e.g., I see 5)
- conceptual subitizing (e.g., I see 4 and 1)
- comparing quantities, 1–10
- using concrete materials to show ways to make 5
- Traditional First Peoples counting methods involved using fingers to count to 5 and for groups of 5.
 - <http://aboriginalperspectives.uregina.ca/rosella/lessons/math/numberconcepts.shtml>
 - <http://www.ankn.uaf.edu/curriculum/Tlingit/Salmon/graphics/mathbook.pdf>
 - https://www.youtube.com/watch?v=6-k_5hezWPE

decomposition:

- decomposing and recomposing quantities to 10
- Numbers can be arranged and recognized.
- benchmarks of 5 and 10
- making 10
- part-part-whole thinking
- using concrete materials to show ways to make 10
- whole-class number talks

repeating patterns:

- sorting and classifying using a single attribute
- identifying patterns in the world
- repeating patterns with two to three elements
- identifying the core
- representing repeating patterns in various ways
- noticing and identifying repeating patterns in First Peoples and local art and textiles, including beadwork and beading, and frieze work in borders

change in quantity to 10:

- generalizing change by adding 1 or 2
- modelling and describing number relationships through change (e.g., build and change tasks — begin with 4 cubes; what do you need to do to change it to 6? to change it to 3?)

Content – Elaborations

equality as a balance:

- modelling equality as balanced and inequality as imbalanced using concrete and visual models (e.g., using a pan balance with cubes on each side to show equal and not equal)
- fish drying and sharing

direct comparative measurement:

- understanding the importance of using a baseline for direct comparison in linear measurement
- linear height, width, length (e.g., longer than, shorter than, taller than, wider than)
- mass (e.g., heavier than, lighter than, same as)
- capacity (e.g., holds more, holds less)

single attributes:

- At this level, using specific math terminology to name and identify 2D shapes and 3D objects is not expected.
- sorting 2D shapes and 3D objects, using a single attribute
- building and describing 3D objects (e.g., shaped like a can)
- exploring, creating, and describing 2D shapes
- using positional language, such as beside, on top of, under, and in front of

familiar life events:

- using the language of probability, such as unlikely or likely (e.g., could it snow tomorrow?)

graphs:

- creating concrete and pictorial graphs to model the purpose of graphs and provide opportunities for mathematical discussions (e.g., survey the students about how they got to school, then represent the data in a graph and discuss together as a class)

financial literacy:

- noticing attributes of Canadian coins (colour, size, pictures)
- identifying the names of coins
- role-playing financial transactions, such as in a restaurant, bakery, or store, using whole numbers to combine purchases (e.g., a muffin is \$2.00 and a juice is \$1.00), and integrating the concept of wants and needs
- token value (e.g., wampum bead/trade beads for furs)

BIG IDEAS

Numbers to 20 represent quantities that can be decomposed into 10s and 1s.

Addition and subtraction with numbers to 10 can be modelled concretely, pictorially, and symbolically to develop computational **fluency**.

Repeating elements in **patterns** can be identified.

Objects and shapes have **attributes** that can be described, measured, and compared.

Concrete graphs help us to compare and interpret **data** and show one-to-one correspondence.

Learning Standards

Curricular Competencies	Content
<p><i>Students are expected to do the following:</i></p> <p>Reasoning and analyzing</p> <ul style="list-style-type: none"> • Use reasoning to explore and make connections • Estimate reasonably • Develop mental math strategies and abilities to make sense of quantities • Use technology to explore mathematics • Model mathematics in contextualized experiences <p>Understanding and solving</p> <ul style="list-style-type: none"> • Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving • Visualize to explore mathematical concepts • Develop and use multiple strategies to engage in problem solving • 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 <p>Communicating and representing</p> <ul style="list-style-type: none"> • Communicate mathematical thinking in many ways • Use mathematical vocabulary and language to contribute to mathematical discussions • Explain and justify mathematical ideas and decisions • Represent mathematical ideas in concrete, pictorial, and symbolic forms 	<p><i>Students are expected to know the following:</i></p> <ul style="list-style-type: none"> • number concepts to 20 • ways to make 10 • addition and subtraction to 20 (understanding of operation and process) • repeating patterns with multiple elements and attributes • change in quantity to 20, concretely and verbally • meaning of equality and inequality • direct measurement with non-standard units (non-uniform and uniform) • comparison of 2D shapes and 3D objects • concrete graphs, using one-to-one correspondence • likelihood of familiar life events, using comparative language • financial literacy — values of coins, and monetary exchanges

Learning Standards (continued)

Curricular Competencies	Content
<p>Connecting and reflecting</p> <ul style="list-style-type: none"> • Reflect on mathematical thinking • Connect mathematical concepts to each other and to other areas and personal interests • Incorporate First Peoples worldviews and perspectives to make connections to mathematical concepts 	

Big Ideas – Elaborations	MATHEMATICS Grade 1
<p>Numbers:</p> <ul style="list-style-type: none"> • Number: Number represents and describes quantity. <p><i>Sample questions to support inquiry with students:</i></p> <ul style="list-style-type: none"> • How does understanding 5 or 10 help us think about other numbers? • What is the relationship between 10s and 1s? • Why is it useful to use 10 frames to represent quantities? • What stories live in numbers? • How do numbers help us communicate and think about place? • How do numbers help us communicate and think about ourselves? <p>fluency:</p> <ul style="list-style-type: none"> • Computational Fluency: Computational fluency develops from a strong sense of number. <p><i>Sample questions to support inquiry with students:</i></p> <ul style="list-style-type: none"> • What is the relationship between addition and subtraction? • How does knowing that 4 and 6 make 10 help you understand other ways to make 10? • How many different ways can you solve...? (e.g., $8 + 5$) <p>patterns:</p> <ul style="list-style-type: none"> • Patterning: We use patterns to represent identified regularities and to make generalizations. 	

Big Ideas – Elaborations

Sample questions to support inquiry with students:

- How can patterns be used to make predictions?
- What is the relationship between increasing patterns and addition?
- What do you notice about this pattern? What is the part that repeats?
- What number patterns live in a hundred chart?

attributes:

- Geometry and Measurement: We can describe, measure, and compare spatial relationships.

Sample questions to support inquiry with students:

- How are these shapes alike and different?
- What stories live in these shapes?
- What 3D shapes can you find in nature?

data:

- Data and Probability: Analyzing data and chance enables us to compare and interpret.

Sample questions to support inquiry with students:

- What stories can data tell us?
- When might we use words like never, sometimes, always, more likely, and less likely?
- How does organizing concrete data help us understand the data?

Curricular Competencies – Elaborations

Estimate reasonably:

- estimating by comparing to something familiar (e.g., more than 5, taller than me)
- First Peoples people used specific estimating and measuring techniques in daily life (e.g., estimating time using environmental references and natural daily/seasonal cycles, estimating temperatures based on weather systems).

mental math strategies:

- working toward developing fluent and flexible thinking about number

technology:

- calculators, virtual manipulatives, concept-based apps

Curricular Competencies – Elaborations

Model:

- acting it out, using concrete materials, drawing pictures

multiple strategies:

- visual, oral, play, experimental, written, symbolic

connected:

- in daily activities, local and traditional practices, the environment, popular media and news events, cross-curricular integration
- Patterns are important in First Peoples technology, architecture, and artwork.
- Have students pose and solve problems or ask questions connected to place, stories, and cultural practices.

Communicate:

- concretely, pictorially, symbolically, and by using spoken or written language to express, describe, explain, justify, and apply mathematical ideas
- using technology such as screencasting apps, digital photos

Explain and justify:

- using mathematical arguments
- “Prove it!”

concrete, pictorial and symbolic forms:

- Use local materials gathered outside for concrete and pictorial representations.

Reflect:

- sharing the mathematical thinking of self and others, including evaluating strategies and solutions, extending, and posing new problems and questions

other areas and personal interests:

- to develop a sense of how mathematics helps us understand ourselves and the world around us (e.g., daily activities, local and traditional practices, the environment, popular media and news events, social justice, and cross-curricular integration)

Incorporate:

- how ovoid has different look to represent different animal parts
- Invite local First Peoples Elders and knowledge keepers to share their knowledge.

make connections:

- Bishop’s cultural practices: counting, measuring, locating, designing, playing, explaining (http://www.csus.edu/indiv/o/oreyd/ACP.htm_files/abishop.htm)
- www.aboriginaleducation.ca
- *Teaching Mathematics in a First Nations Context*, FNEESC <http://www.fnesc.ca/k-7/>

Content – Elaborations

number concepts to 20:

- counting:
 - counting on and counting back
 - skip-counting by 2 and 5
 - sequencing numbers to 20
 - comparing and ordering numbers to 20
 - Numbers to 20 can be arranged and recognized.
 - subitizing
 - base 10
 - 10 and some more
- books published by Native Northwest: *Learn to Count*, by various artists; *Counting Wild Bears*, by Gryn White; *We All Count*, by Jason Adair; *We All Count*, by Julie Flett (<http://nativenorthwest.com>) using counting collections made of local materials; counting in different languages; different First Peoples counting systems (e.g., Tsimshian)
- *Tlingit Math Book* ([http://yukon-ed-show-me-your-math.wikispaces.com/file/detail/Tlingit Math Book.pdf](http://yukon-ed-show-me-your-math.wikispaces.com/file/detail/Tlingit+Math+Book.pdf))

make 10:

- decomposing 10 into parts
- Numbers to 10 can be arranged and recognized.
- benchmarks of 10 and 20
- Traditional First Peoples counting methods involved using fingers to count to 5 and for groups of 5.
- traditional songs/singing and stories

addition and subtraction to 20:

- decomposing 20 into parts
- mental math strategies:
 - counting on
 - making 10
 - doubles
- Addition and subtraction are related.
- whole-class number talks
- nature scavenger hunt in *Kaska Counting Book* ([http://yukon-ed-show-me-your-math.wikispaces.com/file/detail/Kaska Counting Book.pdf](http://yukon-ed-show-me-your-math.wikispaces.com/file/detail/Kaska+Counting+Book.pdf))

repeating patterns:

- identifying sorting rules
- repeating patterns with multiple elements/attributes
- translating patterns from one representation to another (e.g., an orange-blue pattern could be translated to a circle-square pattern)

Content – Elaborations

- letter coding of pattern
- predicting an element in repeating patterns using a variety of strategies
- patterns using visuals (ten-frames, hundred charts)
- investigating numerical patterns (e.g., skip-counting by 2s or 5s on a hundred chart)
- beading using 3–5 colours

change in quantity to 20:

- verbally describing a change in quantity (e.g., I can build 7 and make it 10 by adding 3)

equality and inequality:

- demonstrating and explaining the meaning of equality and inequality
- recording equations symbolically, using = and \neq

direct measurement:

- Non-uniform units are not consistent in size (e.g., children’s hands, pencils); uniform units are consistent in size (e.g., interlocking cubes, standard paper clips).
- understanding the importance of using a baseline for direct comparison in linear measurement
- using multiple copies of a unit
- iterating a single unit for measuring (e.g., to measure the length of a string with only one cube, a student iterates the cube over and over, keeping track of how many cubes long the string is)
- tiling an area
- rope knots at intervals
- using body parts to measure
- book: *An Anishnaabe Look at Measurement*, by Rhonda Hopkins and Robin King-Stonefish (http://www.strongnations.com/store/item_display.php?i=3494&f=)
- hand/foot tracing for mitten/moccasin making

2D shapes and 3D objects:

- sorting 3D objects and 2D shapes using one attribute, and explaining the sorting rule
- comparing 2D shapes and 3D objects in the environment
- describing relative positions, using positional language (e.g., up and down, in and out)
- replicating composite 2D shapes and 3D objects (e.g., putting two triangles together to make a square)

concrete graphs:

- creating, describing, and comparing concrete graphs

familiar life event:

- using the language of probability (e.g., never, sometimes, always, more likely, less likely)

Content – Elaborations

- cycles (Elder or knowledge keeper to speak about ceremonies and life events)

financial literacy:

- identifying values of coins (nickels, dimes, quarters, loonies, and toonies)
- counting multiples of the same denomination (nickels, dimes, loonies, and toonies)
- Money is a medium of exchange.
- role-playing financial transactions (e.g., using coins and whole numbers), integrating the concept of wants and needs
- trade games, with understanding that objects have variable value or worth (shells, beads, furs, tools)

BIG IDEAS

Numbers to 100 represent quantities that can be decomposed into 10s and 1s.

Development of computational **fluency** in addition and subtraction with numbers to 100 requires an understanding of place value.

The regular change in increasing **patterns** can be identified and used to make generalizations.

Objects and shapes have **attributes** that can be described, measured, and compared.

Concrete items can be represented, compared, and interpreted pictorially in **graphs**.

Learning Standards

Curricular Competencies	Content
<p><i>Students are expected to do the following:</i></p> <p>Reasoning and analyzing</p> <ul style="list-style-type: none"> • Use reasoning to explore and make connections • Estimate reasonably • Develop mental math strategies and abilities to make sense of quantities • Use technology to explore mathematics • Model mathematics in contextualized experiences <p>Understanding and solving</p> <ul style="list-style-type: none"> • Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving • Visualize to explore mathematical concepts • Develop and use multiple strategies to engage in problem solving • 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 <p>Communicating and representing</p> <ul style="list-style-type: none"> • Communicate mathematical thinking in many ways • Use mathematical vocabulary and language to contribute to mathematical discussions • Explain and justify mathematical ideas and decisions • Represent mathematical ideas in concrete, pictorial, and symbolic forms 	<p><i>Students are expected to know the following:</i></p> <ul style="list-style-type: none"> • number concepts to 100 • benchmarks of 25, 50, and 100 and personal referents • addition and subtraction facts to 20 (introduction of computational strategies) • addition and subtraction to 100 • repeating and increasing patterns • change in quantity, using pictorial and symbolic representation • symbolic representation of equality and inequality • direct linear measurement, introducing standard metric units • multiple attributes of 2D shapes and 3D objects • pictorial representation of concrete graphs, using one-to-one correspondence • likelihood of familiar life events, using comparative language • financial literacy — coin combinations to 100 cents, and spending and saving

Learning Standards (continued)

Curricular Competencies	Content
<p>Connecting and reflecting</p> <ul style="list-style-type: none"> • Reflect on mathematical thinking • Connect mathematical concepts to each other and to other areas and personal interests • Incorporate First Peoples worldviews and perspectives to make connections to mathematical concepts 	

Big Ideas – Elaborations	MATHEMATICS Grade 2
<p>Numbers:</p> <ul style="list-style-type: none"> • Number: Number represents and describes quantity. <p><i>Sample questions to support inquiry with students:</i></p> <ul style="list-style-type: none"> • How does understanding 5 or 10 help us think about other numbers? • What is the relationship between 10s and 1s? • What patterns do you notice in numbers? • What stories live in numbers? • How do numbers help us communicate and think about place? • How do numbers help us communicate and think about ourselves? <p>fluency:</p> <ul style="list-style-type: none"> • Computational Fluency: Computational fluency develops from a strong sense of number. <p><i>Sample questions to support inquiry with students:</i></p> <ul style="list-style-type: none"> • What is the relationship between addition and subtraction? • How can you use addition to help you subtract? • How does understanding 10 help us to add and subtract two-digit numbers? <p>patterns:</p> <ul style="list-style-type: none"> • Patterning: We use patterns to represent identified regularities and to make generalizations. 	

Big Ideas – Elaborations

Sample questions to support inquiry with students:

- How can we represent patterns in different ways/modes?
- How can you create repeating patterns with objects that are all one colour?
- What stories live in patterns?

attributes:

- Geometry and Measurement: We can describe, measure, and compare spatial relationships.

Sample questions to support inquiry with students:

- What 2D shapes live in objects in our world?
- How can you combine shapes to make new shapes?

graphs:

- Data and Probability: Analyzing data and chance enables us to compare and interpret.

Sample questions to support inquiry with students:

- When you look at this graph, what do you notice? What do you wonder?
- How do graphs help us understand data?
- What are some different ways to represent data pictorially?

Curricular Competencies – Elaborations

Estimate reasonably:

- estimating by comparing to something familiar (e.g., more than 5, taller than me)

mental math strategies:

- working toward developing fluent and flexible thinking about number

technology:

- calculators, virtual manipulatives, concept-based apps

Model:

- acting it out, using concrete materials, drawing pictures

multiple strategies:

- visual, oral, play, experimental, written, symbolic

Curricular Competencies – Elaborations

connected:

- in daily activities, local and traditional practices, the environment, popular media and news events, cross-curricular integration
- Have students pose and solve problems or ask questions connected to place, stories, and cultural practices.
- Elder communication to explain harvest traditions and sharing practices

Communicate:

- concretely, pictorially, symbolically, and by using spoken or written language to express, describe, explain, justify, and apply mathematical ideas
- using technology such as screencasting apps, digital photos

Explain and justify:

- using mathematical arguments
- “Prove it!”

concrete, pictorial and symbolic forms:

- Use local materials gathered outside for concrete and pictorial representations.

Reflect:

- sharing the mathematical thinking of self and others, including evaluating strategies and solutions, extending, and posing new problems and questions

other areas and personal interests:

- to develop a sense of how mathematics helps us understand ourselves and the world around us (e.g., daily activities, local and traditional practices, the environment, popular media and news events, social justice, and cross-curricular integration)

Incorporate:

- Invite local First Peoples Elders and knowledge keepers to share their knowledge.

make connections:

- Bishop’s cultural practices: counting, measuring, locating, designing, playing, explaining (http://www.csus.edu/indiv/o/oreyd/ACP.htm_files/abishop.htm)
- www.aboriginalaeducation.ca
- *Teaching Mathematics in a First Nations Context*, FNEESC <http://www.fnesc.ca/k-7/>

Content – Elaborations

number concepts:

- counting:
 - skip-counting by 2, 5, and 10:

Content – Elaborations

- using different starting points
- increasing and decreasing (forward and backward)
- Quantities to 100 can be arranged and recognized:
 - comparing and ordering numbers to 100
 - benchmarks of 25, 50, and 100
 - place value:
 - understanding of 10s and 1s
 - understanding the relationship between digit places and their value, to 99 (e.g., the digit 4 in 49 has the value of 40)
 - decomposing two-digit numbers into 10s and 1s
- even and odd numbers

benchmarks:

- seating arrangements at ceremonies/feasts

facts to 20:

- adding and subtracting numbers to 20
- fluency with math strategies for addition and subtraction (e.g., making or bridging 10, decomposing, identifying related doubles, adding on to find the difference)

addition and subtraction to 100:

- decomposing numbers to 100
- estimating sums and differences to 100
- using strategies such as looking for multiples of 10, friendly numbers (e.g., $48 + 37$, $37 = 35 + 2$, $48 + 2$, $50 + 35 = 85$), decomposing into 10s and 1s and recomposing (e.g., $48 + 37$, $40 + 30 = 70$, $8 + 7 = 15$, $70 + 15 = 85$), and compensating (e.g., $48 + 37$, $48 + 2 = 50$, $37 - 2 = 35$, $50 + 35 = 80$)
- adding up to find the difference
- using an open number line, hundred chart, ten-frames
- using addition and subtraction in real-life contexts and problem-based situations
- whole-class number talks

patterns:

- exploring more complex repeating patterns (e.g., positional patterns, circular patterns)
- identifying the core of repeating patterns (e.g., the pattern of the pattern that repeats over and over)
- increasing patterns using manipulatives, sounds, actions, and numbers (0 to 100)
- Métis finger weaving
- First Peoples head/armband patterning
- online video and text: *Small Number Counts to 100* (<http://mathcatcher.irmacs.sfu.ca/story/small-number-counts-100>)

Content – Elaborations

change in quantity:

- numerically describing a change in quantity (e.g., for $6 + n = 10$, visualize the change in quantity by using ten-frames, hundred charts, etc.)

direct linear measurement:

- centimetres and metres
- estimating length
- measuring and recording length, height, and width, using standard units

2D shapes and 3D objects:

- sorting 2D shapes and 3D objects, using two attributes, and explaining the sorting rule
- describing, comparing, and constructing 2D shapes, including triangles, squares, rectangles, circles
- identifying 2D shapes as part of 3D objects
- using traditional northwest coast First Peoples shapes (ovoids, U, split U, and local art shapes) reflected in the natural environment

pictorial representation:

- collecting data, creating a concrete graph, and representing the graph, using a pictorial representation through grids, stamps, drawings
- one-to-one correspondence

likelihood of events:

- using comparative language (e.g., certain, uncertain; more, less, or equally likely)

financial literacy:

- counting simple mixed combinations of coins to 100 cents
- introduction to the concepts of spending and saving, integrating the concepts of wants and needs
- role-playing financial transactions (e.g., using bills and coins)

BIG IDEAS

Fractions are a type of **number** that can represent quantities.

Development of computational fluency in addition, subtraction, multiplication, and division of whole numbers requires flexible decomposing and composing.

Regular increases and decreases in **patterns** can be identified and used to make generalizations.

Standard units are used to describe, measure, and compare **attributes** of objects' shapes.

The likelihood of possible **outcomes** can be examined, compared, and interpreted.

Learning Standards

Curricular Competencies	Content
<p><i>Students are expected to do the following:</i></p> <p>Reasoning and analyzing</p> <ul style="list-style-type: none"> Use reasoning to explore and make connections Estimate reasonably Develop mental math strategies and abilities to make sense of quantities Use technology to explore mathematics Model mathematics in contextualized experiences <p>Understanding and solving</p> <ul style="list-style-type: none"> Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving Visualize to explore mathematical concepts Develop and use multiple strategies to engage in problem solving 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 <p>Communicating and representing</p> <ul style="list-style-type: none"> Communicate mathematical thinking in many ways Use mathematical vocabulary and language to contribute to mathematical discussions Explain and justify mathematical ideas and decisions Represent mathematical ideas in concrete, pictorial, and symbolic forms 	<p><i>Students are expected to know the following:</i></p> <ul style="list-style-type: none"> number concepts to 1000 fraction concepts addition and subtraction to 1000 addition and subtraction facts to 20 (emerging computational fluency) multiplication and division concepts increasing and decreasing patterns pattern rules using words and numbers, based on concrete experiences one-step addition and subtraction equations with an unknown number measurement, using standard units (linear, mass, and capacity) time concepts construction of 3D shapes one-to-one correspondence with bar graphs, pictographs, charts, and tables likelihood of simulated events, using comparative language financial literacy — fluency with coins and bills to 100 dollars, and earning and payment

Learning Standards (continued)

Curricular Competencies	Content
<p>Connecting and reflecting</p> <ul style="list-style-type: none"> • Reflect on mathematical thinking • Connect mathematical concepts to each other and to other areas and personal interests • Incorporate First Peoples worldviews and perspectives to make connections to mathematical concepts 	

Big Ideas – Elaborations	MATHEMATICS Grade 3
<p>number:</p> <ul style="list-style-type: none"> • Number: Number represents and describes quantity. <p><i>Sample questions to support inquiry with students:</i></p> <ul style="list-style-type: none"> • In how many ways can you represent the fraction ____? • What is the relationship between parts and wholes when we think about fractions? • How do these materials help you think about fractions? • What stories live in numbers? • How do numbers help us communicate and think about place? • How do numbers help us communicate and think about ourselves? <p>fluency:</p> <ul style="list-style-type: none"> • Computational Fluency: Computational fluency develops from a strong sense of number. <p><i>Sample questions to support inquiry with students:</i></p> <ul style="list-style-type: none"> • What is the relationship between addition and multiplication? • How can we decompose and compose numbers to help us add, subtract, multiply, and divide? • How might we use mental math strategies to solve equations? <p>patterns:</p> <ul style="list-style-type: none"> • Patterning: We use patterns to represent identified regularities and to make generalizations. 	

Big Ideas – Elaborations

Sample questions to support inquiry with students:

- How are these patterns alike and different (e.g., increasing and decreasing)?
- How are place value patterns repeated in large numbers?
- How do numbers help us describe patterns?

attributes:

- Geometry and Measurement: We can describe, measure, and compare spatial relationships.

Sample questions to support inquiry with students:

- Where do 2D shapes live in 3D shapes?
- How do standard units help us to compare and communicate measurements?
- How do the properties of shapes contribute to buildings and designs?

outcomes:

- Data and Probability: Analyzing data and chance enables us to compare and interpret.

Sample questions to support inquiry with students:

- How is the probability of an event determined and described?
- What events in our lives are left to chance?
- What are the possible outcomes of these events?

Curricular Competencies – Elaborations

Estimate reasonably:

- estimating by comparing to something familiar (e.g., more than 5, taller than me)

mental math strategies:

- working toward developing fluent and flexible thinking about number

technology:

- calculators, virtual manipulatives, concept-based apps

Model:

- acting it out, using concrete materials, drawing pictures

multiple strategies:

- visual, oral, play, experimental, written, symbolic

Curricular Competencies – Elaborations

connected:

- in daily activities, local and traditional practices, the environment, popular media and news events, cross-curricular integration
- Have students pose and solve problems or ask questions connected to place, stories, and cultural practices.

Communicate:

- concretely, pictorially, symbolically, and by using spoken or written language to express, describe, explain, justify, and apply mathematical ideas
- using technology such as screencasting apps, digital photos

Explain and justify:

- using mathematical arguments
- “Prove it!”

concrete, pictorial and symbolic forms:

- Use local materials gathered outside for concrete and pictorial representations.

Reflect:

- sharing the mathematical thinking of self and others, including evaluating strategies and solutions, extending, and posing new problems and questions

other areas and personal interests:

- to develop a sense of how mathematics helps us understand ourselves and the world around us (e.g., daily activities, local and traditional practices, the environment, popular media and news events, social justice, and cross-curricular integration)

Incorporate:

- Invite local First Peoples Elders and knowledge keepers to share their knowledge.

make connections:

- Bishop’s cultural practices: counting, measuring, locating, designing, playing, explaining (http://www.csus.edu/indiv/o/oreyd/ACP.htm_files/abishop.htm)
- www.aboriginaleducation.ca
- *Teaching Mathematics in a First Nations Context*, FNESC <http://www.fnesc.ca/k-7/>

Content – Elaborations

number concepts:

- counting:
 - skip-counting by any number from any starting point, increasing and decreasing (i.e., forward and backward)
 - Skip-counting is related to multiplication.
 - investigating place-value based counting patterns (e.g., counting by 10s, 100s; bridging over a century; noticing the role of zero as a placeholder 698, 699, 700, 701; noticing the predictability of our number system)

Content – Elaborations

- Numbers to 1000 can be arranged and recognized:
 - comparing and ordering numbers
 - estimating large quantities
- place value:
 - 100s, 10s, and 1s
 - understanding the relationship between digit places and their values, to 1000 (e.g., the digit 4 in 342 has the value of 40 or 4 tens)
 - understanding the importance of 0 as a place holder (e.g., in the number 408, the zero indicates that there are 0 tens)
- instructional resource: *Math in a Cultural Context*, by Jerry Lipka

fraction concepts:

- Fractions are numbers that represent an amount or quantity.
- Fractions can represent parts of a region, set, or linear model.
- Fraction parts are equal shares or equal-sized portions of a whole or unit.
- Provide opportunities to explore and create fractions with concrete materials.
- recording pictorial representations of fraction models and connecting to symbolic notation
- equal partitioning
- equal sharing, pole ratios as visual parts, medicine wheel, seasons

addition and subtraction:

- using flexible computation strategies, involving taking apart (e.g., decomposing using friendly numbers and compensating) and combining numbers in a variety of ways, regrouping
- estimating sums and differences of all operations to 1000
- using addition and subtraction in real-life contexts and problem-based situations
- whole-class number talks

computational fluency:

- adding and subtracting of numbers to 20
- demonstrating fluency with math strategies for addition and subtraction (e.g., decomposing, making and bridging 10, related doubles, and commutative property)
- Addition and subtraction are related.
- At the end of Grade 3, most students should be able to recall addition facts to 20.

multiplication and division:

- understanding concepts of multiplication (e.g., groups of, arrays, repeated addition)
- understanding concepts of division (e.g., sharing, grouping, repeated subtraction)
- Multiplication and division are related.

Content – Elaborations

- Provide opportunities for concrete and pictorial representations of multiplication.
- Use games to develop opportunities for authentic practice of multiplication computations.
- looking for patterns in numbers, such as in a hundred chart, to further develop understanding of multiplication computation
- Connect multiplication to skip-counting.
- Connect multiplication to division and repeated addition.
- Memorization of facts is not intended for this level.
- fish drying on rack; sharing of food resources in First Peoples communities

patterns:

- creating patterns using concrete, pictorial, and numerical representations
- representing increasing and decreasing patterns in multiple ways
- generalizing what makes the pattern increase or decrease (e.g., doubling, adding 2)

pattern rules:

- from a concrete pattern, describing the pattern rule using words and numbers
- predictability in song rhythm and patterns
- Share examples of local First Peoples art with the class, and ask students to notice patterns in the artwork.

equations:

- start unknown (e.g., $n + 15 = 20$ or $\square + 15 = 20$)
- change unknown (e.g., $12 + n = 20$ or $12 + \square = 20$)
- result unknown (e.g., $6 + 13 = n$ or $6 + 13 = \square$)
- investigating even and odd numbers

standard units:

- linear measurements, using standard units (e.g., centimetre, metre, kilometre)
- capacity measurements, using standard units (e.g., millilitre, litre)
- Introduce concepts of perimeter, area, and circumference (the distance around); use of formula and pi to calculate not intended — the focus is on the concepts.
- area measurement, using square units (standard and non-standard)
- mass measurements, using standard units (e.g., gram, kilogram)
- estimation of measurements, using standard referents (e.g., If this cup holds 100 millilitres, about how much does this jug hold?)

time:

- understanding concepts of time (e.g., second, minute, hour, day, week, month, year)

Content – Elaborations

- understanding the relationships between units of time
- Telling time is not expected at this level.
- estimating time, using environmental references and natural daily/seasonal cycles, temperatures based on weather systems, traditional calendar

3D shapes:

- identifying 3D shapes according to the 2D shapes of the faces and the number of edges and vertices (e.g., construction of nets, skeletons)
- describing the attributes of 3D shapes (e.g., faces, edges, vertices)
- identifying 3D shapes by their mathematical terms (e.g., sphere, cube, prism, cone, cylinder)
- comparing 3D shapes (e.g., How are rectangular prisms and cubes the same or different?)
- understanding the preservation of shape (e.g., the orientation of a shape will not change its properties)
- jingle dress bells, bentwood box, birch bark baskets, pithouses

one-to-one correspondence:

- collecting data, creating a graph, and describing, comparing, and discussing the results
- choosing a suitable representation

simulated events:

- using comparative language (e.g., certain, uncertain; more, less, or equally likely)
- developing an understanding of chance (e.g., tossing a coin creates a 50-50 chance of landing a head or tail; drawing from a bag, using spinners, and rolling dice all simulate probability events)
- story: *The Snowsnake Game* (<http://yukon-ed-show-me-your-math.wikispaces.com/file/view/The%20Snowsnake%20Game.pdf/203828506/The%20Snowsnake%20Game.pdf>)

financial literacy:

- counting mixed combinations of coins and bills up to \$100:
 - totalling up a set of coins and bills
 - using different combinations of coins and bills to make the same amount
- understanding that payments can be made in flexible ways (e.g., cash, cheques, credit, electronic transactions, goods and services)
- understanding that there are different ways of earning money to reach a financial goal (e.g., recycling, holding bake sales, selling items, walking a neighbour's dog)
- Using pictures of First Peoples trade items (e.g., dentalium shells, dried fish, or tools when available) with the values indicated on the back, have students play a trading game.

BIG IDEAS

Fractions and decimals are types of **numbers** that can represent quantities.

Development of computational **fluency** and multiplicative thinking requires analysis of patterns and relations in multiplication and division.

Regular changes in **patterns** can be identified and represented using tools and tables.

Polygons are closed shapes with similar **attributes** that can be described, measured, and compared.

Analyzing and interpreting experiments in **data** probability develops an understanding of chance.

Learning Standards

Curricular Competencies	Content
<p><i>Students are expected to do the following:</i></p> <p>Reasoning and analyzing</p> <ul style="list-style-type: none"> Use reasoning to explore and make connections Estimate reasonably Develop mental math strategies and abilities to make sense of quantities Use technology to explore mathematics Model mathematics in contextualized experiences <p>Understanding and solving</p> <ul style="list-style-type: none"> Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving Visualize to explore mathematical concepts Develop and use multiple strategies to engage in problem solving 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 <p>Communicating and representing</p> <ul style="list-style-type: none"> Communicate mathematical thinking in many ways Use mathematical vocabulary and language to contribute to mathematical discussions Explain and justify mathematical ideas and decisions Represent mathematical ideas in concrete, pictorial, and symbolic forms 	<p><i>Students are expected to know the following:</i></p> <ul style="list-style-type: none"> number concepts to 10 000 decimals to hundredths ordering and comparing fractions addition and subtraction to 10 000 multiplication and division of two- or three-digit numbers by one-digit numbers addition and subtraction of decimals to hundredths addition and subtraction facts to 20 (developing computational fluency) multiplication and division facts to 100 (introductory computational strategies) increasing and decreasing patterns, using tables and charts algebraic relationships among quantities one-step equations with an unknown number, using all operations how to tell time with analog and digital clocks, using 12- and 24-hour clocks regular and irregular polygons perimeter of regular and irregular shapes

Learning Standards (continued)

Curricular Competencies	Content
<p>Connecting and reflecting</p> <ul style="list-style-type: none"> • Reflect on mathematical thinking • Connect mathematical concepts to each other and to other areas and personal interests • Incorporate First Peoples worldviews and perspectives to make connections to mathematical concepts 	<ul style="list-style-type: none"> • line symmetry • one-to-one correspondence and many-to-one correspondence, using bar graphs and pictographs • probability experiments • financial literacy — monetary calculations, including making change with amounts to 100 dollars and making simple financial decisions

Big Ideas – Elaborations	MATHEMATICS Grade 4
<p>numbers:</p> <ul style="list-style-type: none"> • Number: Number represents and describes quantity. <p><i>Sample questions to support inquiry with students:</i></p> <ul style="list-style-type: none"> • What is the relationship between fractions and decimals? • How are these fractions (e.g., $\frac{1}{2}$ and $\frac{7}{8}$) alike and different? • How do we use fractions and decimals in our daily life? • What stories live in numbers? • How do numbers help us communicate and think about place? • How do numbers help us communicate and think about ourselves? <p>fluency:</p> <ul style="list-style-type: none"> • Computational Fluency: Computational fluency develops from a strong sense of number. <p><i>Sample questions to support inquiry with students:</i></p> <ul style="list-style-type: none"> • What is the relationship between multiplication and division? • What patterns in our number system connect to our understanding of multiplication? • How does fluency with basic multiplication facts (e.g., $2x$, $3x$, $5x$) help us compute more complex multiplication facts? <p>patterns:</p> <ul style="list-style-type: none"> • Patterning: We use patterns to represent identified regularities and to make generalizations. 	

Big Ideas – Elaborations

Sample questions to support inquiry with students:

- What regularities can you identify in these patterns?
- Where do we see patterns in the world around us?
- How can we represent increasing and decreasing regularities that we see in number patterns?
- How do tables and charts help us understand number patterns?

attributes:

- Geometry and Measurement: We can describe, measure, and compare spatial relationships.

Sample questions to support inquiry with students:

- How are these polygons alike and different?
- How can we measure polygons?
- How do the properties of shapes contribute to buildings and design?

data:

- Data and Probability: Analyzing data and chance enables us to compare and interpret.

Sample questions to support inquiry with students:

- How is the probability of an event determined and described?
- What events in our lives are left to chance?
- How do probability experiments help us understand chance?

Curricular Competencies – Elaborations

Estimate reasonably:

- estimating by comparing to something familiar (e.g., more than 5, taller than me)

mental math strategies:

- working toward developing fluent and flexible thinking about number

technology:

- calculators, virtual manipulatives, concept-based apps

Model:

- acting it out, using concrete materials, drawing pictures

Curricular Competencies – Elaborations

multiple strategies:

- visual, oral, play, experimental, written, symbolic

connected:

- in daily activities, local and traditional practices, the environment, popular media and news events, cross-curricular integration
- Have students pose and solve problems or ask questions connected to place, stories, and cultural practices.

Communicate:

- concretely, pictorially, symbolically, and by using spoken or written language to express, describe, explain, justify, and apply mathematical ideas
- using technology such as screencasting apps, digital photos

Explain and justify:

- using mathematical arguments
- “Prove it!”

concrete, pictorial and symbolic forms:

- Use local materials gathered outside for concrete and pictorial representations.

Reflect:

- sharing the mathematical thinking of self and others, including evaluating strategies and solutions, extending, and posing new problems and questions

other areas and personal interests:

- to develop a sense of how mathematics helps us understand ourselves and the world around us (e.g., daily activities, local and traditional practices, the environment, popular media and news events, social justice, and cross-curricular integration)

Incorporate:

- Invite local First Peoples Elders and knowledge keepers to share their knowledge.

make connections:

- Bishop’s cultural practices: counting, measuring, locating, designing, playing, explaining (http://www.csus.edu/indiv/o/oreyd/ACP.htm_files/abishop.htm)
- www.aboriginaleducation.ca
- *Teaching Mathematics in a First Nations Context*, FNESC <http://www.fnesc.ca/k-7/>

Content – Elaborations

number concepts:

- counting:
 - multiples

Content – Elaborations

- flexible counting strategies
- whole number benchmarks
- Numbers to 10 000 can be arranged and recognized:
 - comparing and ordering numbers
 - estimating large quantities
- place value:
 - 1000s, 100s, 10s, and 1s
 - understanding the relationship between digit places and their value, to 10 000

decimals to hundredths:

- Fractions and decimals are numbers that represent an amount or quantity.
- Fractions and decimals can represent parts of a region, set, or linear model.
- Fractional parts and decimals are equal shares or equal-sized portions of a whole or unit.
- understanding the relationship between fractions and decimals

fractions:

- comparing and ordering of fractions with common denominators
- estimating fractions with benchmarks (e.g., zero, half, whole)
- using concrete and visual models
- equal partitioning

addition and subtraction:

- using flexible computation strategies, involving taking apart (e.g., decomposing using friendly numbers and compensating) and combining numbers in a variety of ways, regrouping
- estimating sums and differences to 10 000
- using addition and subtraction in real-life contexts and problem-based situations
- whole-class number talks

multiplication and division:

- understanding the relationships between multiplication and division, multiplication and addition, division and subtraction
- using flexible computation strategies (e.g., decomposing, distributive principle, commutative principle, repeated addition and repeated subtraction)
- using multiplication and division in real-life contexts and problem-based situations
- whole-class number talks

decimals:

- estimating decimal sums and differences
- using visual models, such as base 10 blocks, place-value mats, grid paper, and number lines

Content – Elaborations

- using addition and subtraction in real-life contexts and problem-based situations
- whole-class number talks

computational fluency:

- Provide opportunities for authentic practice, building on previous grade-level addition and subtraction facts.
- flexible use of mental math strategies

facts:

- Provide opportunities for concrete and pictorial representations of multiplication.
- building computational fluency
- Use games to provide opportunities for authentic practice of multiplication computations.
- looking for patterns in numbers, such as in a hundred chart, to further develop understanding of multiplication computation
- Connect multiplication to skip-counting.
- Connecting multiplication to division and repeated addition.
- Memorization of facts is not intended for this level.
- Students will become more fluent with these facts.
- using mental math strategies, such as doubling or halving
- Students should be able to recall the following multiplication facts by the end of Grade 4 (2s, 5s, 10s).

patterns:

- Change in patterns can be represented in charts, graphs, and tables.
- using words and numbers to describe increasing and decreasing patterns
- fish stocks in lakes, life expectancies

algebraic relationships:

- representing and explaining one-step equations with an unknown number
- describing pattern rules, using words and numbers from concrete and pictorial representations
- planning a camping or hiking trip; planning for quantities and materials needed per individual and group over time

one-step equations:

- one-step equations for all operations involving an unknown number (e.g., $___ + 4 = 15$, $15 - \square = 11$)
- start unknown (e.g., $n + 15 = 20$; $20 - 15 = \square$)
- change unknown (e.g., $12 + n = 20$)
- result unknown (e.g., $6 + 13 = ___$)

Content – Elaborations

tell time:

- understanding how to tell time with analog and digital clocks, using 12- and 24-hour clocks
- understanding the concept of a.m. and p.m.
- understanding the number of minutes in an hour
- understanding the concepts of using a circle and of using fractions in telling time (e.g., half past, quarter to)
- telling time in five-minute intervals
- telling time to the nearest minute
- First Peoples use of numbers in time and seasons, represented by seasonal cycles and moon cycles (e.g., how position of sun, moon, and stars is used to determine times for traditional activities, navigation)

polygons:

- describing and sorting regular and irregular polygons based on multiple attributes
- investigating polygons (polygons are closed shapes with similar attributes)
- Yup'ik border patterns

perimeter:

- using geoboards and grids to create, represent, measure, and calculate perimeter

line symmetry:

- using concrete materials such as pattern blocks to create designs that have a mirror image within them
- First Peoples art, borders, birchbark biting, canoe building
- Visit a structure designed by First Peoples in the local community and have the students examine the symmetry, balance, and patterns within the structure, then replicate simple models of the architecture focusing on the patterns they noted in the original.

one-to-one correspondence:

- many-to-one correspondence: one symbol represents a group or value (e.g., on a bar graph, one square may represent five cookies)

probability experiments:

- predicting single outcomes (e.g., when you spin using one spinner and it lands on a single colour)
- using spinners, rolling dice, pulling objects out of a bag
- recording results using tallies
- Dene/Kaska hand games, Lahal stick games

financial literacy:

- making monetary calculations, including decimal notation in real-life contexts and problem-based situations
- applying a variety of strategies, such as counting up, counting back, and decomposing, to calculate totals and make change
- making simple financial decisions involving earning, spending, saving, and giving
- equitable trade rules

BIG IDEAS

Numbers describe quantities that can be represented by equivalent fractions.

Computational **fluency** and flexibility with numbers extend to operations with larger (multi-digit) numbers.

Identified regularities in number **patterns** can be expressed in tables.

Closed shapes have **area and perimeter** that can be described, measured, and compared.

Data represented in graphs can be used to show many-to-one correspondence.

Learning Standards

Curricular Competencies	Content
<p><i>Students are expected to do the following:</i></p> <p>Reasoning and analyzing</p> <ul style="list-style-type: none"> • Use reasoning to explore and make connections • Estimate reasonably • Develop mental math strategies and abilities to make sense of quantities • Use technology to explore mathematics • Model mathematics in contextualized experiences <p>Understanding and solving</p> <ul style="list-style-type: none"> • Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving • Visualize to explore mathematical concepts • Develop and use multiple strategies to engage in problem solving • 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 <p>Communicating and representing</p> <ul style="list-style-type: none"> • Communicate mathematical thinking in many ways • Use mathematical vocabulary and language to contribute to mathematical discussions • Explain and justify mathematical ideas and decisions • Represent mathematical ideas in concrete, pictorial, and symbolic forms 	<p><i>Students are expected to know the following:</i></p> <ul style="list-style-type: none"> • number concepts to 1 000 000 • decimals to thousandths • equivalent fractions • whole-number, fraction, and decimal benchmarks • addition and subtraction of whole numbers to 1 000 000 • multiplication and division to three digits, including division with remainders • addition and subtraction of decimals to thousandths • addition and subtraction facts to 20 (extending computational fluency) • multiplication and division facts to 100 (emerging computational fluency) • rules for increasing and decreasing patterns with words, numbers, symbols, and variables • one-step equations with variables • area measurement of squares and rectangles • relationships between area and perimeter • duration, using measurement of time • classification of prisms and pyramids • single transformations

Learning Standards (continued)

Curricular Competencies	Content
<p>Connecting and reflecting</p> <ul style="list-style-type: none"> • Reflect on mathematical thinking • Connect mathematical concepts to each other and to other areas and personal interests • Incorporate First Peoples worldviews and perspectives to make connections to mathematical concepts 	<ul style="list-style-type: none"> • one-to-one correspondence and many-to-one correspondence, using double bar graphs • probability experiments, single events or outcomes • financial literacy — monetary calculations, including making change with amounts to 1000 dollars and developing simple financial plans

Big Ideas – Elaborations	MATHEMATICS Grade 5
<p>Numbers:</p> <ul style="list-style-type: none"> • Number: Number represents and describes quantity. <p><i>Sample questions to support inquiry with students:</i></p> <ul style="list-style-type: none"> • How can you prove that two fractions are equivalent? • In how many ways can you represent the fraction ___? • How do we use fractions and decimals in our daily life? • What stories live in numbers? • How do numbers help us communicate and think about place? • How do numbers help us communicate and think about ourselves? <p>fluency:</p> <ul style="list-style-type: none"> • Computational Fluency: Computational fluency develops from a strong sense of number. <p><i>Sample questions to support inquiry with students:</i></p> <ul style="list-style-type: none"> • How many different ways can you solve...? (e.g., 16×7) • What flexible strategies can we apply to use operations with multi-digit numbers? • How does fluency with basic multiplication facts (e.g., $2x$, $3x$, $5x$) help us compute more complex multiplication facts? <p>patterns:</p> <ul style="list-style-type: none"> • Patterning: We use patterns to represent identified regularities and to make generalizations. 	

Big Ideas – Elaborations

Sample questions to support inquiry with students:

- How do tables and charts help us understand number patterns?
- How do tables help us see the relationship between a variable within number patterns?
- How do rules for increasing and decreasing patterns help us solve equations?

area and perimeter:

- Geometry and Measurement: We can describe, measure, and compare spatial relationships.

Sample questions to support inquiry with students:

- What is the relationship between area and perimeter?
- What standard units do we use to measure area and perimeter?
- When might an understanding of area and perimeter be useful?

Data:

- Data and Probability: Analyzing data and chance enables us to compare and interpret.

Sample questions to support inquiry with students:

- How do graphs help us understand data?
- In what different ways can we represent many-to-one correspondence in a graph?
- Why would you choose many-to-one correspondence rather than one-to-one correspondence in a graph?

Curricular Competencies – Elaborations

Estimate reasonably:

- estimating by comparing to something familiar (e.g., more than 5, taller than me)

mental math strategies:

- working toward developing fluent and flexible thinking of number

technology:

- calculators, virtual manipulatives, concept-based apps

Model:

- acting it out, using concrete materials, drawing pictures

multiple strategies:

- visual, oral, play, experimental, written, symbolic

Curricular Competencies – Elaborations

connected:

- in daily activities, local and traditional practices, the environment, popular media and news events, cross-curricular integration
- First Peoples people value, recognize and utilize balance and symmetry within art and structural design; have students pose and solve problems or ask questions connected to place, stories, and cultural practices.

Communicate:

- concretely, pictorially, symbolically, and by using spoken or written language to express, describe, explain, justify, and apply mathematical ideas; may use technology such as screencasting apps, digital photos

Explain and justify:

- using mathematical arguments
- “Prove it!”

concrete, pictorial and symbolic forms:

- Use local materials gathered outside for concrete and pictorial representations.

Reflect:

- sharing the mathematical thinking of self and others, including evaluating strategies and solutions, extending, and posing new problems and questions

other areas and personal interests:

- to develop a sense of how mathematics helps us understand ourselves and the world around us (e.g., daily activities, local and traditional practices, the environment, popular media and news events, social justice, and cross-curricular integration)

Incorporate:

- Invite local First Peoples Elders and knowledge keepers to share their knowledge.

make connections:

- Bishop’s cultural practices: counting, measuring, locating, designing, playing, explaining (http://www.csus.edu/indiv/o/oreyd/ACP.htm_files/abishop.htm)
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Content – Elaborations

number concepts:

- counting:
 - multiples
 - flexible counting strategies
 - whole number benchmarks

Content – Elaborations

- Numbers to 1 000 000 can be arranged and recognized:
 - comparing and ordering numbers
 - estimating large quantities
- place value:
 - 100 000s, 10 000s, 1000s, 100s, 10s, and 1s
 - understanding the relationship between digit places and their value, to 1 000 000
- First Peoples use unique counting systems (e.g., Tsimshian use of three counting systems, for animals, people and things; Tlingit counting for the naming of numbers e.g., 10 = two hands, 20 = one person)

benchmarks:

- Two equivalent fractions are two ways to represent the same amount (having the same whole).
- comparing and ordering of fractions and decimals
- addition and subtraction of decimals to thousandths
- estimating decimal sums and differences
- estimating fractions with benchmarks (e.g., zero, half, whole)
- equal partitioning

whole numbers:

- using flexible computation strategies involving taking apart (e.g., decomposing using friendly numbers and compensating) and combining numbers in a variety of ways, regrouping
- estimating sums and differences to 10 000
- using addition and subtraction in real-life contexts and problem-based situations
- whole-class number talks

multiplication and division:

- understanding the relationships between multiplication and division, multiplication and addition, and division and subtraction
- using flexible computation strategies (e.g., decomposing, distributive principle, commutative principle, repeated addition, repeated subtraction)
- using multiplication and division in real-life contexts and problem-based situations
- whole-class number talks

decimals:

- understanding the relationships between multiplication and division, multiplication and addition, division and subtraction
- using flexible computation strategies (e.g., decomposing, distributive principle, commutative principle, repeated addition and repeated subtraction)
- using multiplication and division in real-life contexts and problem-based situations
- whole-class number talks

Content – Elaborations

decimals:

- estimating decimal sums and differences
- using visual models such as base 10 blocks, place-value mats, grid paper, and number lines
- using addition and subtraction in real-life contexts and problem-based situations
- whole-class number talks

addition and subtraction facts to 20:

- Provide opportunities for authentic practice, building on previous grade-level addition and subtraction facts.
- applying strategies and knowledge of addition and subtract facts in real-life contexts and problem-based situations, as well as when making math-to-math connections (e.g., for $800 + 700$, you can annex the zeros and use the knowledge of $8 + 7$ to find the total)

facts to 100:

- Provide opportunities for concrete and pictorial representations of multiplication.
- Use games to provide opportunities for authentic practice of multiplication computations.
- looking for patterns in numbers, such as in a hundred chart, to further develop understanding of multiplication computation
- Connect multiplication to skip-counting.
- Connect multiplication to division and repeated addition.
- Memorization of facts is not intended this level.
- Students will become more fluent with these facts.
- using mental math strategies such as doubling and halving, annexing, and distributive property
- Students should be able to recall many multiplication facts by the end of Grade 5 (e.g., 2s, 3s, 4s, 5s, 10s).
- developing computational fluency with facts to 100

one-step equations:

- solving one-step equations with a variable
- expressing a given problem as an equation, using symbols (e.g., $4 + X = 15$)

area and perimeter:

- measuring area of squares and rectangles, using tiles, geoboards, grid paper
- investigating perimeter and area and how they are related to but not dependent on each other
- use traditional dwellings
- Invite a local Elder or knowledge keeper to talk about traditional measuring and estimating techniques for hunting, fishing, and building.

time:

- understanding elapsed time and duration

Content – Elaborations

- applying concepts of time in real-life contexts and problem-based situations
- daily and seasonal cycles, moon cycles, tides, journeys, events

classification:

- investigating 3D objects and 2D shapes, based on multiple attributes
- describing and sorting quadrilaterals
- describing and constructing rectangular and triangular prisms
- identifying prisms in the environment

transformations:

- single transformations (slide/translation, flip/reflection, turn/rotation)
- using concrete materials with a focus on the motion of transformations
- weaving, cedar baskets, designs

many-to-one correspondence:

- many-to-one correspondence: one symbol represents a group or value (e.g., on a bar graph, one square may represent five cookies)

probability experiments:

- predicting outcomes of independent events (e.g., when you spin using a spinner and it lands on a single colour)
- predicting single outcomes (e.g., when you spin using a spinner and it lands on a single colour)
- using spinners, rolling dice, pulling objects out of a bag
- representing single outcome probabilities using fractions

financial literacy:

- making monetary calculations, including making change and decimal notation to \$1000 in real-life contexts and problem-based situations
- applying a variety of strategies, such as counting up, counting back, and decomposing, to calculate totals and make change
- making simple financial plans to meet a financial goal
- developing a budget that takes into account income and expenses

BIG IDEAS

Mixed **numbers** and decimal numbers represent quantities that can be decomposed into parts and wholes.

Computational **fluency** and flexibility with numbers extend to operations with whole numbers and decimals.

Linear relations can be identified and represented using expressions with variables and line graphs and can be used to form generalizations.

Properties of objects and shapes can be described, measured, and compared using volume, area, perimeter, and angles.

Data from the results of an experiment can be used to predict the theoretical probability of an event and to compare and interpret.

Learning Standards

Curricular Competencies	Content
<p><i>Students are expected to do the following:</i></p> <p>Reasoning and analyzing</p> <ul style="list-style-type: none"> Use logic and patterns to solve puzzles and play games Use reasoning and logic to explore, analyze, and apply mathematical ideas Estimate reasonably Demonstrate and apply mental math strategies Use tools or technology to explore and create patterns and relationships, and test conjectures Model mathematics in contextualized experiences <p>Understanding and solving</p> <ul style="list-style-type: none"> Apply multiple strategies to solve problems in both abstract and contextualized situations Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving 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 <p>Communicating and representing</p> <ul style="list-style-type: none"> Use mathematical vocabulary and language to contribute to mathematical discussions 	<p><i>Students are expected to know the following:</i></p> <ul style="list-style-type: none"> small to large numbers (thousandths to billions) multiplication and division facts to 100 (developing computational fluency) order of operations with whole numbers factors and multiples — greatest common factor and least common multiple improper fractions and mixed numbers introduction to ratios whole-number percents and percentage discounts multiplication and division of decimals increasing and decreasing patterns, using expressions, tables, and graphs as functional relationships one-step equations with whole-number coefficients and solutions perimeter of complex shapes area of triangles, parallelograms, and trapezoids angle measurement and classification volume and capacity triangles

Learning Standards (continued)

Curricular Competencies	Content
<ul style="list-style-type: none"> • Explain and justify mathematical ideas and decisions • Communicate mathematical thinking in many ways • Represent mathematical ideas in concrete, pictorial, and symbolic forms <p>Connecting and reflecting</p> <ul style="list-style-type: none"> • Reflect on mathematical thinking • Connect mathematical concepts to each other and to other areas and personal interests • Use mathematical arguments to support personal choices • Incorporate First Peoples worldviews and perspectives to make connections to mathematical concepts 	<ul style="list-style-type: none"> • combinations of transformations • line graphs • single-outcome probability, both theoretical and experimental • financial literacy — simple budgeting and consumer math

Big Ideas – Elaborations	MATHEMATICS Grade 6
<p>numbers:</p> <ul style="list-style-type: none"> • Number: Number represents and describes quantity. <p><i>Sample questions to support inquiry with students:</i></p> <ul style="list-style-type: none"> • In how many ways can you represent the number ___? • What are the connections between fractions, mixed numbers, and decimal numbers? • How are mixed numbers and decimal numbers alike? Different? <p>fluency:</p> <ul style="list-style-type: none"> • Computational Fluency: Computational fluency develops from a strong sense of number. <p><i>Sample questions to support inquiry with students:</i></p> <ul style="list-style-type: none"> • When we are working with decimal numbers, what is the relationship between addition and subtraction? • When we are working with decimal numbers, what is the relationship between multiplication and division? • When we are working with decimal numbers, what is the relationship between addition and multiplication? • When we are working with decimal numbers, what is the relationship between subtraction and division? 	

Big Ideas – Elaborations

Linear relations:

- Patterning: We use patterns to represent identified regularities and to make generalizations.

Sample questions to support inquiry with students:

- What is a linear relationship?
- How do linear expressions and line graphs represent linear relations?
- What factors can change or alter a linear relationship?

Properties:

- Geometry and Measurement: We can describe, measure, and compare spatial relationships.

Sample questions to support inquiry with students:

- How are the areas of triangles, parallelogram, and trapezoids interrelated?
- What factors are considered when selecting a viable referent in measurement?

Data:

- Data and Probability: Analyzing data and chance enables us to compare and interpret.

Sample questions to support inquiry with students:

- What is the relationship between theoretical and experimental probability?
- What informs our predictions?
- What factors would influence the theoretical probability of an experiment?

Curricular Competencies – Elaborations

logic and patterns:

- including coding

reasoning and logic:

- making connections, using inductive and deductive reasoning, predicting, generalizing, drawing conclusions through experiences

Estimate reasonably:

- estimating using referents, approximation, and rounding strategies (e.g., the distance to the stop sign is approximately 1 km, the width of my finger is about 1 cm)

apply:

- extending whole-number strategies to decimals
- working toward developing fluent and flexible thinking about number

Curricular Competencies – Elaborations

Model:

- acting it out, using concrete materials (e.g., manipulatives), drawing pictures or diagrams, building, programming

multiple strategies:

- includes familiar, personal, and from other cultures

connected:

- in daily activities, local and traditional practices, the environment, popular media and news events, cross-curricular integration
- Patterns are important in First Peoples technology, architecture, and art.
- Have students pose and solve problems or ask questions connected to place, stories, and cultural practices.

Explain and justify:

- using mathematical arguments

Communicate:

- concretely, pictorially, symbolically, and by using spoken or written language to express, describe, explain, justify, and apply mathematical ideas; may use technology such as screencasting apps, digital photos

Reflect:

- sharing the mathematical thinking of self and others, including evaluating strategies and solutions, extending, and posing new problems and questions

other areas and personal interests:

- to develop a sense of how mathematics helps us understand ourselves and the world around us (e.g., cross-discipline, daily activities, local and traditional practices, the environment, popular media and news events, and social justice)

personal choices:

- including anticipating consequences

Incorporate First Peoples:

- Invite local First Peoples Elders and knowledge keepers to share their knowledge

make connections:

- Bishop's cultural practices: counting, measuring, locating, designing, playing, explaining (http://www.csus.edu/indiv/o/oreyd/ACP.htm_files/abishop.htm)
- www.aboriginaleducation.ca
- *Teaching Mathematics in a First Nations Context*, FNEESC <http://www.fnesc.ca/k-7/>

Content – Elaborations

small to large numbers:

- place value from thousandths to billions, operations with thousandths to billions
- numbers used in science, medicine, technology, and media
- compare, order, estimate

facts to 100:

- mental math strategies (e.g., the double-double strategy to multiply 23×4)

order of operations:

- includes the use of brackets, but excludes exponents
- quotients can be rational numbers

factors and multiples:

- prime and composite numbers, divisibility rules, factor trees, prime factor phrase (e.g., $300 = 2^2 \times 3 \times 5^2$)
- using graphic organizers (e.g., Venn diagrams) to compare numbers for common factors and common multiples

improper fractions:

- using benchmarks, number line, and common denominators to compare and order, including whole numbers
- using pattern blocks, Cuisenaire Rods, fraction strips, fraction circles, grids
- birchbark biting

ratios:

- comparing numbers, comparing quantities, equivalent ratios
- part-to-part ratios and part-to-whole ratios

percents:

- using base 10 blocks, geoboard, 10x10 grid to represent whole number percents
- finding missing part (whole or percentage)
- $50\% = \frac{1}{2} = 0.5 = 50:100$

decimals:

- 0.125×3 or $7.2 \div 9$
- using base 10 block array
- birchbark biting

patterns:

- limited to discrete points in the first quadrant
- visual patterning (e.g., colour tiles)

Content – Elaborations

- Take 3 add 2 each time, $2n + 1$, and 1 more than twice a number *all* describe the pattern 3, 5, 7, ...
- graphing data on First Peoples language loss, effects of language intervention

one-step equations:

- preservation of equality (e.g., using a balance, algebra tiles)
- $3x = 12$, $x + 5 = 11$

perimeter:

- A complex shape is a group of shapes with no holes (e.g., use colour tiles, pattern blocks, tangrams).

area:

- grid paper explorations
- deriving formulas
- making connections between area of parallelogram and area of rectangle
- birchbark biting

angle:

- straight, acute, right, obtuse, reflex
- constructing and identifying; include examples from local environment
- estimating using 45° , 90° , and 180° as reference angles
- angles of polygons
- Small Number stories: *Small Number and the Skateboard Park* (<http://mathcatcher.irmacs.sfu.ca/stories>)

volume and capacity:

- using cubes to build 3D objects and determine their volume
- referents and relationships between units (e.g., cm^3 , m^3 , mL, L)
- the number of coffee mugs that hold a litre
- berry baskets, seaweed drying

triangles:

- scalene, isosceles, equilateral
- right, acute, obtuse
- classified regardless of orientation

transformations:

- plotting points on Cartesian plane using whole-number ordered pairs
- translation(s), rotation(s), and/or reflection(s) on a single 2D shape

Content – Elaborations

- limited to first quadrant
- transforming, drawing, and describing image
- Use shapes in First Peoples art to integrate printmaking (e.g., Inuit, Northwest coastal First Nations, frieze work) (<http://mathcentral.uregina.ca/RR/database/RR.09.01/mcdonald1/>)

line graphs:

- table of values, data set; creating and interpreting a line graph from a given set of data

single-outcome probability:

- single-outcome probability events (e.g., spin a spinner, roll a die, toss a coin)
- listing all possible outcomes to determine theoretical probability
- comparing experimental results with theoretical expectation
- Lahal stick games

financial literacy:

- informed decision making on saving and purchasing
- How many weeks of allowance will it take to buy a bicycle?

BIG IDEAS

Decimals, fractions, and percents are used to represent and describe parts and wholes of **numbers**.

Computational **fluency** and flexibility with numbers extend to operations with integers and decimals.

Linear relations can be represented in many connected ways to identify regularities and make generalizations.

The constant ratio between the circumference and diameter of circles can be used to describe, measure, and compare **spatial relationships**.

Data from circle graphs can be used to illustrate proportion and to compare and interpret.

Learning Standards

Curricular Competencies	Content
<p><i>Students are expected to do the following:</i></p> <p>Reasoning and analyzing</p> <ul style="list-style-type: none"> Use logic and patterns to solve puzzles and play games Use reasoning and logic to explore, analyze, and apply mathematical ideas Estimate reasonably Demonstrate and apply mental math strategies Use tools or technology to explore and create patterns and relationships, and test conjectures Model mathematics in contextualized experiences <p>Understanding and solving</p> <ul style="list-style-type: none"> Apply multiple strategies to solve problems in both abstract and contextualized situations Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving 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 <p>Communicating and representing</p> <ul style="list-style-type: none"> Use mathematical vocabulary and language to contribute to mathematical discussions Explain and justify mathematical ideas and decisions 	<p><i>Students are expected to know the following:</i></p> <ul style="list-style-type: none"> multiplication and division facts to 100 (extending computational fluency) operations with integers (addition, subtraction, multiplication, division, and order of operations) operations with decimals (addition, subtraction, multiplication, division, and order of operations) relationships between decimals, fractions, ratios, and percents discrete linear relations, using expressions, tables, and graphs two-step equations with whole-number coefficients, constants, and solutions circumference and area of circles volume of rectangular prisms and cylinders Cartesian coordinates and graphing combinations of transformations circle graphs experimental probability with two independent events financial literacy — financial percentage

Learning Standards (continued)

Curricular Competencies	Content
<ul style="list-style-type: none"> • Communicate mathematical thinking in many ways • Represent mathematical ideas in concrete, pictorial, and symbolic forms <p>Connecting and reflecting</p> <ul style="list-style-type: none"> • Reflect on mathematical thinking • Connect mathematical concepts to each other and to other areas and personal interests • Use mathematical arguments to support personal choices • Incorporate First Peoples worldviews and perspectives to make connections to mathematical concepts 	<ul style="list-style-type: none"> • combinations of transformations • line graphs • single-outcome probability, both theoretical and experimental • financial literacy — simple budgeting and consumer math

Big Ideas – Elaborations	MATHEMATICS Grade 7
<p>numbers:</p> <ul style="list-style-type: none"> • Number: Number represents and describes quantity. <p><i>Sample questions to support inquiry with students:</i></p> <ul style="list-style-type: none"> • In how many ways can you represent the number ___? • What is the relationship between decimals, fractions, and percents? • How can you prove equivalence? • How are parts and wholes best represented in particular contexts? <p>fluency:</p> <ul style="list-style-type: none"> • Computational Fluency: Computational fluency develops from a strong sense of number. <p><i>Sample questions to support inquiry with students:</i></p> <ul style="list-style-type: none"> • When we are working with integers, what is the relationship between addition and subtraction? • When we are working with integers, what is the relationship between multiplication and division? • When we are working with integers, what is the relationship between addition and multiplication? • When we are working with integers, what is the relationship between subtraction and division? 	

Big Ideas – Elaborations

Linear relations:

- Patterning: We use patterns to represent identified regularities and to make generalizations.

Sample questions to support inquiry with students:

- What is a linear relationship?
- In how many ways can linear relationships be represented?
- How do linear relationships differ?
- What factors can change a linear relationship?

spatial relationships:

- Geometry and Measurement: We can describe, measure, and compare spatial relationships.

Sample questions to support inquiry with students:

- What is unique about the properties of circles?
- What is the relationship between diameter and circumference?
- What are the similarities and differences between the area and circumference of circles?

Data:

- Data and Probability: Analyzing data and chance enables us to compare and interpret.

Sample questions to support inquiry with students:

- How is a circle graph similar to and different from other types of visual representations of data?
- When would you choose to use a circle graph to represent data?
- How are circle graphs related to ratios, percents, decimals, and whole numbers?
- How would circle graphs be informative or misleading?

Curricular Competencies – Elaborations

logic and patterns:

- including coding

reasoning and logic:

- making connections, using inductive and deductive reasoning, predicting, generalizing, drawing conclusions through experiences

Estimate reasonably:

- estimating using referents, approximation, and rounding strategies (e.g., the distance to the stop sign is approximately 1 km, the width of my finger is about 1 cm)

Curricular Competencies – Elaborations

apply:

- extending whole-number strategies to decimals
- working toward developing fluent and flexible thinking about number

Model:

- acting it out, using concrete materials (e.g., manipulatives), drawing pictures or diagrams, building, programming

multiple strategies:

- includes familiar, personal, and from other cultures

connected:

- in daily activities, local and traditional practices, the environment, popular media and news events, cross-curricular integration
- Patterns are important in First Peoples technology, architecture, and art.
- Have students pose and solve problems or ask questions connected to place, stories, and cultural practices.

Explain and justify:

- using mathematical arguments

Communicate:

- concretely, pictorially, symbolically, and by using spoken or written language to express, describe, explain, justify, and apply mathematical ideas; may use technology such as screencasting apps, digital photos

Reflect:

- sharing the mathematical thinking of self and others, including evaluating strategies and solutions, extending, and posing new problems and questions

other areas and personal interests:

- to develop a sense of how mathematics helps us understand ourselves and the world around us (e.g., cross-discipline, daily activities, local and traditional practices, the environment, popular media and news events, and social justice)

personal choices:

- including anticipating consequences

Incorporate First Peoples:

- Invite local First Peoples Elders and knowledge keepers to share their knowledge

make connections:

- Bishop's cultural practices: counting, measuring, locating, designing, playing, explaining (http://www.csus.edu/indiv/o/oreyd/ACP.htm_files/abishop.htm)
- www.aboriginaleducation.ca
- *Teaching Mathematics in a First Nations Context*, FNEESC <http://www.fnesc.ca/k-7/>

Content – Elaborations

facts to 100:

- When multiplying 214 by 5, we can multiply by 10, then divide by 2 to get 1070.

operations with integers:

- addition, subtraction, multiplication, division, and order of operations
- concretely, pictorially, symbolically
- order of operations includes the use of brackets, excludes exponents
- using two-sided counters
- $9 - (-4) = 13$ because -4 is 13 away from $+9$
- extending whole-number strategies to decimals

operations with decimals:

- includes the use of brackets, but excludes exponents

relationships:

- conversions, equivalency, and terminating versus repeating decimals, place value, and benchmarks
- comparing and ordering decimals and fractions using the number line
- $\frac{1}{2} = 0.5 = 50\% = 50:100$
- shoreline cleanup

discrete linear relations:

- four quadrants, limited to integral coordinates
- $3n + 2$; values increase by 3 starting from y-intercept of 2
- deriving relation from the graph or table of values
- Small Number stories: *Small Number and the Old Canoe*, *Small Number Counts to 100* (<http://mathcatcher.irmacs.sfu.ca/stories>)

two-step equations:

- solving and verifying $3x + 4 = 16$
- modelling the preservation of equality (e.g., using balance, pictorial representation, algebra tiles)
- spirit canoe trip pre-planning and calculations
- Small Number stories: *Small Number and the Big Tree* (<http://mathcatcher.irmacs.sfu.ca/stories>)

circumference:

- constructing circles given radius, diameter, area, or circumference
- finding relationships between radius, diameter, circumference, and area to develop $C = \pi \times d$ formula
- applying $A = \pi \times r \times r$ formula to find the area given radius or diameter
- drummaking, dreamcatcher making, stories of SpiderWoman (Dene, Cree, Hopi, Tsimshian), basket making, quill box making (**Note:** Local protocols should be considered when choosing an activity.)

Content – Elaborations

volume:

- volume = area of base x height
- bentwood boxes, wiigwaasabak and mide-wiigwaas (birch bark scrolls)
- *Exploring Math through Haida Legends: Culturally Responsive Mathematics*
(http://www.haidanation.ca/Pages/language/haida_legends/media/Lessons/RavenLes4-9.pdf)

Cartesian coordinates:

- origin, four quadrants, integral coordinates, connections to linear relations, transformations
- overlaying coordinate plane on medicine wheel, beading on dreamcatcher, overlaying coordinate plane on traditional maps

transformations:

- four quadrants, integral coordinates
- translation(s), rotation(s), and/or reflection(s) on a single 2D shape; combination of successive transformations of 2D shapes; tessellations
- First Peoples art, jewelry making, birchbark biting

circle graphs:

- constructing, labelling, and interpreting circle graphs
- translating percentages displayed in a circle graph into quantities and vice versa
- visual representations of tidepools or traditional meals on plates

experimental probability:

- experimental probability, multiple trials (e.g., toss two coins, roll two dice, spin a spinner twice, or a combination thereof)
- dice games (<http://web.uvic.ca/~tpelton/fn-math/fn-dicegames.html>)

financial literacy:

- financial percentage calculations
- sales tax, tips, discount, sale price

BIG IDEAS

Number represents, describes, and compares the quantities of ratios, rates, and percents.

Computational **fluency** and flexibility extend to operations with fractions.

Discrete linear relationships can be represented in many connected ways and used to identify and make generalizations.

The relationship between surface area and volume of **3D objects** can be used to describe, measure, and compare spatial relationships.

Analyzing **data** by determining averages is one way to make sense of large data sets and enables us to compare and interpret.

Learning Standards

Curricular Competencies	Content
<p><i>Students are expected to do the following:</i></p> <p>Reasoning and analyzing</p> <ul style="list-style-type: none"> • Use logic and patterns to solve puzzles and play games • Use reasoning and logic to explore, analyze, and apply mathematical ideas • Estimate reasonably • Demonstrate and apply mental math strategies • Use tools or technology to explore and create patterns and relationships, and test conjectures • Model mathematics in contextualized experiences <p>Understanding and solving</p> <ul style="list-style-type: none"> • Apply multiple strategies to solve problems in both abstract and contextualized situations • Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving • 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 <p>Communicating and representing</p> <ul style="list-style-type: none"> • Use mathematical vocabulary and language to contribute to mathematical discussions • Explain and justify mathematical ideas and decisions 	<p><i>Students are expected to know the following:</i></p> <ul style="list-style-type: none"> • perfect squares and cubes • square and cube roots • percents less than 1 and greater than 100 (decimal and fractional percents) • numerical proportional reasoning (rates, ratio, proportions, and percent) • operations with fractions (addition, subtraction, multiplication, division, and order of operations) • discrete linear relations (extended to larger numbers, limited to integers) • expressions- writing and evaluating using substitution • two-step equations with integer coefficients, constants, and solutions • surface area and volume of regular solids, including triangular and other right prisms and cylinders • Pythagorean theorem • construction, views, and nets of 3D objects • central tendency • theoretical probability with two independent events • financial literacy — best buys

Learning Standards (continued)

Curricular Competencies	Content
<ul style="list-style-type: none"> • Communicate mathematical thinking in many ways • Represent mathematical ideas in concrete, pictorial, and symbolic forms <p>Connecting and reflecting</p> <ul style="list-style-type: none"> • Reflect on mathematical thinking • Connect mathematical concepts to each other and to other areas and personal interests • Use mathematical arguments to support personal choices • Incorporate First Peoples worldviews and perspectives to make connections to mathematical concepts 	

Big Ideas – Elaborations	MATHEMATICS Grade 8
<p>numbers:</p> <ul style="list-style-type: none"> • Number: Number represents and describes quantity. <p><i>Sample questions to support inquiry with students:</i></p> <ul style="list-style-type: none"> • How can two quantities be compared, represented, and communicated? • How are decimals, fractions, ratios, and percents interrelated? • How does ratio use in mechanics differ from ratio use in architecture? <p>fluency:</p> <ul style="list-style-type: none"> • Computational Fluency: Computational fluency develops from a strong sense of number. <p><i>Sample questions to support inquiry with students:</i></p> <ul style="list-style-type: none"> • When we are working with fractions, what is the relationship between addition and subtraction? • When we are working with fractions, what is the relationship between multiplication and division? • When we are working with fractions, what is the relationship between addition and multiplication? • When we are working with fractions, what is the relationship between subtraction and division? 	

Big Ideas – Elaborations

Discrete linear relationships:

- Patterning: We use patterns to represent identified regularities and to make generalizations.

Sample questions to support inquiry with students:

- What is a discrete linear relationship?
- How can discrete linear relationships be represented?
- What factors can change a discrete linear relationship?

3D objects:

- Geometry and Measurement: We can describe, measure, and compare spatial relationships.

Sample questions to support inquiry with students:

- What is the relationship between the surface area and volume of regular solids?
- How can surface area and volume of regular solids be determined?
- How are the surface area and volume of regular solids related?
- How does surface area compare with volume in patterning and cubes?

data:

- Data and Probability: Analyzing data and chance enables us to compare and interpret.

Sample questions to support inquiry with students:

- How does determining averages help us understand large data sets?
- What do central tendencies represent?
- How are central tendencies best used to describe a quality of a large data set?

Curricular Competencies – Elaborations

logic and patterns:

- including coding

reasoning and logic:

- making connections, using inductive and deductive reasoning, predicting, generalizing, drawing conclusions through experiences

Estimate reasonably:

- estimating using referents, approximation, and rounding strategies (e.g., the distance to the stop sign is approximately 1 km, the width of my finger is about 1 cm)

Curricular Competencies – Elaborations

apply:

- extending whole-number strategies to decimals
- working toward developing fluent and flexible thinking about number

Model:

- acting it out, using concrete materials (e.g., manipulatives), drawing pictures or diagrams, building, programming

multiple strategies:

- includes familiar, personal, and from other cultures

connected:

- in daily activities, local and traditional practices, the environment, popular media and news events, cross-curricular integration
- Patterns are important in First Peoples technology, architecture, and art.
- Have students pose and solve problems or ask questions connected to place, stories, and cultural practices.

Explain and justify:

- using mathematical arguments

Communicate:

- concretely, pictorially, symbolically, and by using spoken or written language to express, describe, explain, justify, and apply mathematical ideas; may use technology such as screencasting apps, digital photos

Reflect:

- sharing the mathematical thinking of self and others, including evaluating strategies and solutions, extending, and posing new problems and questions

other areas and personal interests:

- to develop a sense of how mathematics helps us understand ourselves and the world around us (e.g., cross-discipline, daily activities, local and traditional practices, the environment, popular media and news events, and social justice)

personal choices:

- including anticipating consequences

Incorporate First Peoples:

- Invite local First Peoples Elders and knowledge keepers to share their knowledge

make connections:

- Bishop's cultural practices: counting, measuring, locating, designing, playing, explaining (http://www.csus.edu/indiv/o/oreyd/ACP.htm_files/abishop.htm)
- www.aboriginaleducation.ca
- *Teaching Mathematics in a First Nations Context*, FNEESC <http://www.fnesc.ca/k-7/>

Content – Elaborations

perfect squares and cubes:

- using colour tiles, pictures, or multi-link cubes
- building the number or using prime factorization

square and cube roots:

- finding the cube root of 125
- finding the square root of 16/169
- estimating the square root of 30

percents:

- A worker's salary increased 122% in three years. If her salary is now \$93,940, what was it originally?
- What is $\frac{1}{2}\%$ of 1 billion?
- The population of Vancouver increased by 3.25%. What is the population if it was approximately 603,500 people last year?
- beading

proportional reasoning:

- two-term and three-term ratios, real-life examples and problems
- A string is cut into three pieces whose lengths form a ratio of 3:5:7. If the string was 105 cm long, how long are the pieces?
- creating a cedar drum box of proportions that use ratios to create differences in pitch and tone
- paddle making

fractions:

- includes the use of brackets, but excludes exponents
- using pattern blocks or Cuisenaire Rods
- simplifying $\frac{1}{2} \div \frac{9}{6} \times (7 - \frac{4}{5})$
- drumming and song: $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, whole notes, dot bars, rests = one beat
- changing tempos of traditional songs dependent on context of use
- proportional sharing of harvests based on family size

discrete linear relations:

- two-variable discrete linear relations
- expressions, table of values, and graphs
- scale values (e.g., tick marks on axis represent 5 units instead of 1)
- four quadrants, integral coordinates

expressions:

- using an expression to describe a relationship
- evaluating $0.5n - 3n + 25$, if $n = 14$

Content – Elaborations

two-step equations:

- solving and verifying $3x - 4 = -12$
- modelling the preservation of equality (e.g., using a balance, manipulatives, algebra tiles, diagrams)
- spirit canoe journey calculations

surface area and volume:

- exploring strategies to determine the surface area and volume of a regular solid using objects, a net, 3D design software
- volume = area of the base x height
- surface area = sum of the areas of each side

Pythagorean theorem:

- modelling the Pythagorean theorem
- finding a missing side of a right triangle
- deriving the Pythagorean theorem
- constructing canoe paths and landings given current on a river
- First Peoples constellations

3D objects:

- top, front, and side views of 3D objects
- matching a given net to the 3D object it represents
- drawing and interpreting top, front, and side views of 3D objects
- constructing 3D objects with nets
- using design software to create 3D objects from nets
- bentwood boxes, lidded baskets, packs

central tendency:

- mean, median, and mode

theoretical probability:

- with two independent events: sample space (e.g., using tree diagram, table, graphic organizer)
- rolling a 5 on a fair die and flipping a head on a fair coin is $1/6 \times 1/2 = 1/12$
- deciding whether a spinner in a game is fair

financial literacy:

- coupons, proportions, unit price, products and services
- proportional reasoning strategies (e.g., unit rate, equivalent fractions given prices and quantities)

BIG IDEAS

The principles and processes underlying operations with **numbers** apply equally to algebraic situations and can be described and analyzed.

Computational fluency and flexibility with numbers extend to operations with rational numbers.

Continuous linear relationships can be identified and represented in many connected ways to identify regularities and make generalizations.

Similar shapes have **proportional relationships** that can be described, measured, and compared.

Analyzing the validity, reliability, and representation of **data** enables us to compare and interpret.

Learning Standards

Curricular Competencies	Content
<p><i>Students are expected to do the following:</i></p> <p>Reasoning and analyzing</p> <ul style="list-style-type: none"> • Use logic and patterns to solve puzzles and play games • Use reasoning and logic to explore, analyze, and apply mathematical ideas • Estimate reasonably • Demonstrate and apply mental math strategies • Use tools or technology to explore and create patterns and relationships, and test conjectures • Model mathematics in contextualized experiences <p>Understanding and solving</p> <ul style="list-style-type: none"> • Apply multiple strategies to solve problems in both abstract and contextualized situations • Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving • 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 <p>Communicating and representing</p> <ul style="list-style-type: none"> • Use mathematical vocabulary and language to contribute to mathematical discussions • Explain and justify mathematical ideas and decisions 	<p><i>Students are expected to know the following:</i></p> <ul style="list-style-type: none"> • operations with rational numbers (addition, subtraction, multiplication, division, and order of operations) • exponents and exponent laws with whole-number exponents • operations with polynomials, of degree less than or equal to 2 • two-variable linear relations, using graphing, interpolation, and extrapolation • multi-step one-variable linear equations • spatial proportional reasoning • statistics in society • financial literacy — simple budgets and transactions

Learning Standards (continued)

Curricular Competencies	Content
<ul style="list-style-type: none"> • Communicate mathematical thinking in many ways • Represent mathematical ideas in concrete, pictorial, and symbolic forms <p>Connecting and reflecting</p> <ul style="list-style-type: none"> • Reflect on mathematical thinking • Connect mathematical concepts to each other and to other areas and personal interests • Use mathematical arguments to support personal choices • Incorporate First Peoples worldviews and perspectives to make connections to mathematical concepts 	

Big Ideas – Elaborations	MATHEMATICS Grade 9
<p>numbers:</p> <ul style="list-style-type: none"> • Number: Number represents and describes quantity. • Algebraic reasoning enables us to describe and analyze mathematical relationships. <p><i>Sample questions to support inquiry with students:</i></p> <ul style="list-style-type: none"> • How does understanding equivalence help us solve algebraic equations? • How are the operations with polynomials connected to the process of solving equations? • What patterns are formed when we implement the operations with polynomials? • How can we analyze bias and reliability of studies in the media? <p>fluency:</p> <ul style="list-style-type: none"> • Computational Fluency: Computational fluency develops from a strong sense of number. <p><i>Sample questions to support inquiry with students:</i></p> <ul style="list-style-type: none"> • When we are working with rational numbers, what is the relationship between addition and subtraction? • When we are working with rational numbers, what is the relationship between multiplication and division? • When we are working with rational numbers, what is the relationship between addition and multiplication? • When we are working with rational numbers, what is the relationship between subtraction and division? 	

Big Ideas – Elaborations

Continuous linear relationships:

- Patterning: We use patterns to represent identified regularities and to make generalizations.

Sample questions to support inquiry with students:

- What is a continuous linear relationship?
- How can continuous linear relationships be represented?
- How do linear relationships help us to make predictions?
- What factors can change a continuous linear relationship?
- How are different graphs and relationships used in a variety of careers?

proportional relationships:

- Geometry and Measurement: We can describe, measure, and compare spatial relationships.
- Proportional reasoning enables us to make sense of multiplicative relationships.

Sample questions to support inquiry with students:

- How are similar shapes related?
- What characteristics make shapes similar?
- What role do similar shapes play in construction and engineering of structures?

data:

- Data and Probability: Analyzing data and chance enables us to compare and interpret.

Sample questions to support inquiry with students:

- What makes data valid and reliable?
- What is the difference between valid data and reliable data?
- What factors influence the validity and reliability of data?

Curricular Competencies – Elaborations

logic and patterns:

- including coding

reasoning and logic:

- making connections, using inductive and deductive reasoning, predicting, generalizing, drawing conclusions through experiences

Estimate reasonably:

- estimating using referents, approximation, and rounding strategies (e.g., the distance to the stop sign is approximately 1 km, the width of my finger is about 1 cm)

Curricular Competencies – Elaborations

apply:

- extending whole-number strategies to rational numbers and algebraic expressions
- working toward developing fluent and flexible thinking about number

Model:

- acting it out, using concrete materials (e.g., manipulatives), drawing pictures or diagrams, building, programming

multiple strategies:

- includes familiar, personal, and from other cultures

connected:

- in daily activities, local and traditional practices, the environment, popular media and news events, cross-curricular integration
- Patterns are important in First Peoples technology, architecture, and art.
- Have students pose and solve problems or ask questions connected to place, stories, and cultural practices.

Explain and justify:

- using mathematical arguments

Communicate:

- concretely, pictorially, symbolically, and by using spoken or written language to express, describe, explain, justify, and apply mathematical ideas; may use technology such as screencasting apps, digital photos

Reflect:

- sharing the mathematical thinking of self and others, including evaluating strategies and solutions, extending, and posing new problems and questions

other areas and personal interests:

- to develop a sense of how mathematics helps us understand ourselves and the world around us (e.g., cross-discipline, daily activities, local and traditional practices, the environment, popular media and news events, and social justice)

personal choices:

- including anticipating consequences

Incorporate First Peoples:

- Invite local First Peoples Elders and knowledge keepers to share their knowledge

make connections:

- Bishop's cultural practices: counting, measuring, locating, designing, playing, explaining (http://www.csus.edu/indiv/o/oreyd/ACP.htm_files/abishop.htm)
- www.aboriginaleducation.ca
- *Teaching Mathematics in a First Nations Context*, FNEsc (<http://www.fnesc.ca/resources/math-first-peoples/>)

Content – Elaborations

operations:

- includes brackets and exponents
- simplifying $(-3/4) \div 1/5 + ((-1/3) \times (-5/2))$
- simplifying $1 - 2 \times (4/5)^2$
- paddle making

exponents:

- includes variable bases
- $2^7 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 128$; $n^4 = n \times n \times n \times n$
- exponent laws (e.g., $6^0 = 1$; $m^1 = m$; $n^5 \times n^3 = n^8$; $y^7/y^3 = y^4$; $(5n)^3 = 5^3 \times n^3 = 125n^3$; $(m/n)^5 = m^5/n^5$; and $(3^2)^4 = 3^8$)
- limited to whole-number exponents and whole-number exponent outcomes when simplified
- $(-3)^2$ does not equal -3^2
- $3x(x - 4) = 3x^2 - 12x$

polynomials:

- variables, degree, number of terms, and coefficients, including the constant term
- $(x^2 + 2x - 4) + (2x^2 - 3x - 4)$
- $(5x - 7) - (2x + 3)$
- $2n(n + 7)$
- $(15k^2 - 10k) \div (5k)$
- using algebra tiles

two-variable linear relations:

- two-variable continuous linear relations; includes rational coordinates
- horizontal and vertical lines
- graphing relation and analyzing
- interpolating and extrapolating approximate values
- spirit canoe journey predictions and daily checks

multi-step:

- includes distribution, variables on both sides of the equation, and collecting like terms
- includes rational coefficients, constants, and solutions
- solving and verifying $1 + 2x = 3 - 2/3(x + 6)$
- solving symbolically and pictorially

Content – Elaborations

proportional reasoning:

- scale diagrams, similar triangles and polygons, linear unit conversions
- limited to metric units
- drawing a diagram to scale that represents an enlargement or reduction of a given 2D shape
- solving a scale diagram problem by applying the properties of similar triangles, including measurements
- integration of scale for First Peoples mural work, use of traditional design in current First Peoples fashion design, use of similar triangles to create longhouses/models

statistics:

- population versus sample, bias, ethics, sampling techniques, misleading stats
- analyzing a given set of data (and/or its representation) and identifying potential problems related to bias, use of language, ethics, cost, time and timing, privacy, or cultural sensitivity
- using First Peoples data on water quality, Statistics Canada data on income, health, housing, population

financial literacy:

- banking, simple interest, savings, planned purchases
- creating a budget/plan to host a First Peoples event