The Learning Pathway: Planning for Learning and Assessment in *Number Sense* and *Algebraic Reasoning* (N/K-6)

Outcomes listed are based on END of grade achievement expectations. Teachers should refer to the Manitoba Curriculum Framework of Outcomes to assess and plan for breadth and depth of instruction.

Pre-counter

Modeling and Communicating Mathematical Thinking

At play centres (play house, blocks, sand and water tables) children can articulate using mathematical language what they are thinking while "playing" with materials that represent a real world context.

During snack time students can model mathematical situations.

Application of Knowledge

I can make sets by matching
- to 5
- to 10

Knowledge

Rote Counting:
I can rote count:
- to 5 to 10

Place Value:
I can subitize:
- familiar dot patterns to 3

Uses 1:1 Correspondence

Modeling and Communicating Mathematical Thinking
(Using tools such as; beaded number lines (5 and 10 structure), rekenrek, five frames, manipulatives, musical instruments, etc.)

K.N.3 / K.N.4 / K.PR.1*
I can use manipulaitves to represent and describe a numeral in two parts [to 5] and to 10

I can construct a set of objects corresponding to a given numeral

I can create a repeating pattern

Application of Knowledge

Flexible Thinking K.N.5 / K.N.6	**Pre-Proportional Reasoning** K.N.6
I can count objects 1:1 to: • find 'how many?' in a set up [to 5] up to 10 • compare two sets up [to 5] up to 10	**I can** use manipulatives to compare quantities that are: • Same as • More than • Fewer

Knowledge

Rote Counting
K.N.1
I can rote count:
- forward to 20 . . . *to 30**
- backward from 10
- say number before/after any given number to 10

Place Value
K.N.2
I can subitize familiar patterns to 5 . . . *to 6**:
- on dice, on five frames, using finger patterns

Basic Arithmetical Learning
K.N.2
I can:
- name one more/one less to 5

Algebraic Reasoning
K.PR.1*
I can:
- create a repeating pattern with manipulatives, sounds or actions

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Uses Manipulatives

Modeling and Communicating Mathematical Thinking
(Using tools such as; beaded number lines to 20, ten frames, rekenrek, manipulatives, musical instruments, etc)

1.N.4* / 1.N.9* / 1.PR.1 / 1.PR.3*
I can represent the results of counting and operations to 20 by:
- drawing a picture/diagram
- matching numerals to quantity

I can represent and describe numbers to 20:
- using a variety of manipulatives, including ten frames and based-10 materials
- modeling a number using two different objects

I can create or act out a story problem orally or through a shared reading

I can create and add to a repeating pattern

I can construct two equal set

Application of Knowledge

Flexible Thinking 1.N.3* / 1.N.5* / 1.N.7* 1.N.9* / 1.N.10* / 1.PR.3*	**Pre-Proportional Reasoning** 1.N.3* / 1.N.7*
I can use strategies to determine addition and subtraction problems to 20, by: • counting on/back • making 10 as a strategy • using 1 more/1 less	**I can:** take any even numbered quantity (2s, 4s, 6s) an share into two equal groups
I can count all concrete or pictorial objects to: • solve addition [to 10] and to 20 • solve subtraction [to 10] to 20 • compare two sets [to 10] to 20 *Confirm benchmark to 10 before going to 20*	**I can** count all objects (up to 20) to solve simple problems involving: • GROUPING a set of counters into equal groups and say the quantity in each share
I can count all objects (up to 20) to solve simple problems involving: • FINDING the number of objects in the whole set using groups of 2s, 5s, or 10s	

Knowledge

Rote Counting
K.N.1* / 1.N.1* / 1.N.8
I can:
- rote count forward to 30 . . . *to 100**
- rote count backward from 20 . . . *from 100**
- say number before/after any given number to 20
- rote count by 2s to 10 . . . *to 30** and by 5s to 20 . . . *to 100**

Place Value
1.N.2*
I can subitize familiar patterns/arrangements:
- to 6 on dice
- to 10 on ten frames, using finger patterns, on beaded number line/rekenrek

Basic Arithmetical Learning
1.N.8* / 1.N.10*
I can:
- name two more/two less to 10 . . . *to 20**
I know:
- doubles to 3+3

Algebraic Reasoning
K.PR.1* / 1.PR.1 / 1.PR.3*
I can:
- add to a repeating pattern using manipulatives, sounds, or actions
- describe equality as a balance to 20 concretely & pictorially

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Uses Visualization

Modeling and Communicating Mathematical Thinking
(Using tools such as: beaded number lines, ten frames, double ten frames, ENL, rekenrek, manipulatives, etc)

1.N.4* / 1.N.9* / 1.PR.3* / 1.PR.4
I can represent and describe the results of counting and operations to 20 by:
- drawing and labeling diagrams
- writing ± number sentences

I can represent and describe numbers to 20 by:
- using a variety of manipulatives, including ten frames and based-10 materials
- modeling a number using two different objects

I can solve addition and subtraction problems to 20 from screened/partially screened collections

I can describe equality and inequality as a balance

Application of Knowledge

Flexible Thinking 1.N.3* / 1.N.5* / 1.N.7* 1.N.9* / 1.N.10* / 1.PR.3*	**Pre-Proportional Reasoning** 2.N.1* / 2.N.5*
I can use strategies to determine addition and subtraction problems to 20, by: • starting from known doubles • using addition to subtract (think addition)	**I can** visualize and count all objects (up to 20) to solve simple problems using: • a variety of groups with and without singles
I can visualize and count all objects when: • using pairs to 5 and 5 + strategies • solving addition [to 10] and to 20 • solving subtraction [to 10] and to 20 • comparing two sets [to 10] and to 20 *Confirm benchmark to 10 before going to 20*	**I can** use doubles to solve simple problems involving: • naming half of an even-numbered set to 10
I can visualize and count all objects (up to 20) to solve simple problems involving: • count the total number of objects in a set by counting-on by using groups of 2s, 5s, and 10s	

Knowledge

Rote Counting
1.N.1*
I can rote count:
- from any starting point fwd to 100 and bkwd. from 100
- starting from zero by 2s to 30 and by 5s to 100 and by 10s to 100

Place Value
1.N.2* / 1.N.4*
I can identify familiar patterns/arrangements:
- to 20, and describe the number's relationship to 5 and to 10
I can determine:
- compatible number pairs for 5, 10 and 20

Basic Arithmetical Learning
1.N.10*
I know:
- doubles to 5+5
- doubles ± 1 to 5+5

Algebraic Reasoning
1.PR.2 / 1.PR 3* / 1.PR.4 / 2.PR.1
I can:
- predict the next element in a pattern and translate a repeating pattern from one representation to another
- identify the core of a repeating pattern
- record equalities using the = symbol

WNCP Outcomes marked with an asterisk (*) appear in more than one Signpost.

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Capable Counter

Modeling and Communicating Mathematical Thinking
(Using tools such as; ENL, Rekenrek, manipulatives, double ten frames, dotty arrays, coins, tallies, technology, etc.)

2.N.4 / 2.N.7 / 2.N.9* / 2.PR.2 / 2.PR.3*

I can represent a number using a variety of manipulatives

I can represent the results of problem solving by:
- drawing and labeling a picture/diagram
- using and describing my personal strategy
- writing ± number sentences/equations
- modeling relationships between addition and subtraction
- representing a number in a variety of ways
- modeling addition and subtraction using concrete materials or visual representations (technology), and record the process symbolically

I can create and extend increasing patterns

I can construct two unequal sets

Application of Knowledge

Flexible Thinking
1.N.3* / 1.N.7* / 1.N.9* / 1.N.10* / 2.N.9*

I can use skip-counting, often in conjunction with 1:1 counting to solve problems involving:
- finding the number in the whole set
- finding the number in each equal share
- finding the total number of equal shares

I can count on or count back to solve addition and subtraction problems:
- by 1s with answers to 100 (single digit quantity)
- by 10s and 1s with answers to 100 (two digit numbers)

I can solve addition and subtraction problems using:
- commutative property for addition
- relating to addition facts to solve subtraction (think addition)

Pre-Proportional Reasoning
2.N.1* / 2.N.5*

I can:
- use doubles to solve simple problems involving naming half of an even-numbered set to 20
- give examples of fractions in a real world context

Knowledge

Rote Counting
2.N.1* / 2.N.5*
I can:
- rote count to 100 forward and backward from any respective multiple; by 2s and by 5s and by 10s
- rote count to 100 forward by 2s from 1 and by 10s from 1 to 9
- order numbers in the range 0-100

Place Value
2.N.4 / 2.N.7
I can identify:
- the number of groups of 10s in decade numbers
- the number of 10s and ones in 2-digit numbers (standard and non-standard)

I can determine:
- compatible number pairs to 50 involving benchmarks, involving any number

Basic Arithmetical Learning
1.N.10* / 2.N.8 / 2.N.9* / 2.N.10*
I know:
- doubles to 10+10
- 10+ any single digit
- addition and subtraction facts with answers *to 10 . . . to 18*

I can demonstrate:
- an understanding of addition with answers to 100 and corresponding subtraction facts

I can determine:
- addition and subtract facts with zero

Algebraic Reasoning
2.PR.2 / 2.PR.3 / 2.PR.4
I can:
- create, extend increasing patterns with numbers up to 100
- Record equalities/inequalities using the equal symbol or non-equal symbol

Uses Additive Reasoning: Beginning

Modeling and Communicating Mathematical Thinking
(Using tools such as; ENL, arrays, manipulatives, and uses technology, etc.)

2.N.9* / 2.N.10* / 3.N.2* / 3.N.4 / 3.N.5 / 3.N.6 / 3.N.7 / 3.N.11 / 3.N.12 / 3.N.13 / 3.PR.2

I can use diagrams, words and equations to represent and describe my personal mental strategies, and my results, for problems involving:
- addition and subtraction (to 100)
- multiplication facts with answers to 5x5
- division facts with answers to 25÷5

I can demonstrate an understanding of fractions by:
- representing a portion of a whole divided into equal parts

I can represent a number in different ways to 1000 (concrete, pictorial, symbolic):
- using proportional and non-proportional, and explain how they are equivalent
- estimate a quantity and justify their reasoning (supply students with a referent)

I can represent and describe numbers concretely, pictorially and symbolically (as an expression)

I can create and extend decreasing patterns

Application of Knowledge

Flexible Thinking
2.N.9* / 2.N.10* / 3.N.6 / 3.N.7
3.N.9 / 3.N.10 / 3.N.11 / 3.N.12

I can mentally solve (+ and -) problems using a limited range of part-whole strategies involving:
- two digit numbers (place value partitioning; bridge over a decade; think addition to subtract) to 1000
- hidden doubles

I can derive answers using known multiplication facts in combination with repeated addition for problems involving:
- multiplication with answers to 5 x 5
- division with answers to 25 ÷ 5
- commutative property
- relating to subtraction
- skip counting
- partitioning

Pre-Proportional Reasoning
3.N.12 / 3.N.13

I can use:
- repeated halving in context with even numbers less than 20

I can determine:
- a half of a REGION
- one fourth or one quarter of a REGION

Knowledge

Rote Counting
3.N.1 / 3.N.2*
I can rote count, forward and backward to 1000 from any starting point:
- by 1s, by 10s, by 100s
- from respective multiples by 5s, by 25s
- to 25 from zero by 3s, by 4s

Place Value
3.N.2* / 3.N.5
I can identify:
- the number of 10s in 3-digit numbers (standard and non-standard)
I can determine:
- compatible number pairs for 100 involving benchmarks, involving any number

Basic Arithmetical Learning
3.N.10 / 3.N.11
I can determine:
- addition facts with answers to 18
- subtraction facts with answers to 18
- doubles ± 1 to 20
- multiplication facts [for 2, 5, and 10] with answers to *5x5*

Algebraic Reasoning
3.PR.2 / 3.PR.3
I can create and extend decreasing patterns:
- with manipulatives, diagrams and numbers
I can solve:
- one step addition or subtraction equations involving unknown numbers

Uses Additive Reasoning: Capable

Modeling and Communicating Mathematical Thinking
(Using tools such as; ENL, arrays, equations, expressions, pictures, manipulatives and uses technology, etc.)

4.N.1 / 4.N.2 / 4.N.5 / 4.N.6 / 4.N.7 / 4.N.8 / 4.N.9 / 4.N.10 / 4.PR. 1 / 4.PR.2* / 4.PR.3 / 4.PR.4 / 4.PR.5

I can use diagrams, words and equations to represent my personal mental strategies, and my results, for whole number problems involving:
- addition, subtraction (to 10 000)
- multiplication, division (2 or 3-digit by 1-digit)
- mental math strategies (to 9x9)
- modeling multiplication using the distributive property and arrays

I can use numbers to 10 000 in a variety of ways to:
- represent and describe math relationships using charts and diagrams to solve problems
- identify, describe, reproduce, represent and explain patterns and relationships in a variety of ways

I can represent (concretely, symbolically, pictorially):
- decimals (10ths, 100ths) and fractions in a variety of ways
- relate decimals to fractions

Application of Knowledge

Flexible Thinking
4.N.1 / 4.N.3 / 4.N.5 / 4.N.6 / 4.N.7 / 4.PR.4

I can use underlined mathematical relationships to solve addition and subtraction problems:
- with place value understanding
- using personal strategies
- using compensation

I can develop recall of multiplication facts to 81 using strategies such as:
- doubling
- halving
- repeated doubling
- doubling and adding one more group
- skip counting from a known fact
- using part-whole place value reasoning
- using ten facts and five facts

I can solve multiplication and division problems by:
- using arrays to represent multiplication
- relating to division
- using the commutative property
- renaming
- partitioning

Pre-Proportional Reasoning
4.N5 / 4.N8

I can use repeated halving in context involving:
- identifying halves, fourths or quarters, of a set

I can use halving:
- to determine fractions of a set to 20

Knowledge

Rote Counting
4.N.8/4.N.9
I can rote count forward
- $\frac{1}{2}$s, $\frac{1}{4}$s, 10ths (0-10)
I can read and order:
- decimal numbers involving tenths
- fractions with like denominators using fourths

Place Value
3.N.2* / 4.N.8
I can identify:
- the number of 10s and 100s in 4 digit numbers (standard and non-standard)
- compatible fractions with $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{3}$ (concrete and pictoral)

Basic Arithmetical Learning
4.N.5
I can:
- recall multiplication facts for 2, 5, and 10 to 80
- develop multiplication facts to 81
- use strategies such as: skip counting, doubling, halving, doubling and adding 1 more group, repeated doubling, using ten facts and 5 facts

Algebraic Reasoning
4.PR.1 / 4.PR.3 / 4.PR.5
I can:
- determine patterns in tables and charts
- extend patterns in tables and charts
- create an equation based on a context with a symbol to represent an unknown (addition/subtraction.)

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Uses Multiplicative Reasoning: Beginning

Modeling and Communicating Mathematical Thinking
(illustrate, represent, explain, model, describe, record, discuss in context, and uses technology, etc.)

4.PR.2* / 4.PR.6 / 5.N.1* / 5.N.2 / 5.N.3 / 5.N.4 / 5.N.5* / 5.N.6* / 5.N.9 / 5.N.11*

I can use diagrams, equations and words to represent my personal mental strategies/results, for problems involving:
- whole number addition/subtraction to 4 digits
- whole number multiplication (up to 2-digits by 2-digits) / division (up to 3-digits by 1-digit)
- decimal number addition/subtraction to hundredths (with $)

I can identify and explain math relations using charts and diagrams to solve problems

I can relate decimals to fractions concretely, pictorially and symbolically

I can represent and describe whole numbers to 1 000 000

I can:
- create a concrete representation of a pattern from a table or chart
- solve one-step equations using manipulatives

Application of Knowledge

Flexible Thinking
4.PR.6 / 5.N.2 / 5.N.3* / 5.N.4

I can use mathematical relationships:
- when using constant difference

I can apply estimation strategies, such as:
- front-end rounding
- compatibles
- compensation

I can determine multiplication facts to 81 by**:**
- halving and doubling
- relating facts
- doubling and adding one more group
- annex zero

I can solve:
- problems using arrays and part-whole thinking (distributive property)

Pre-Proportional Reasoning
4.N.8* / 5.N.2 / 5.N.7*

I can use proportional reasoning with the AREA model for fractions to:
- reason from part to whole
- reason from whole to part

I can use:
- repeated addition to determine fractions of a set to 20

Knowledge

Rote Counting
5.N.7* / 5.N.8* / 5.N.10

I can:
- read, order and compare fractions with unlike denominators using benchmarks $0, \frac{1}{2}, 1$
- order decimals to thousandths
- say $\frac{1}{10}$ more than or less than any decimal number

Place Value
5.N.1 / (4.N.9 -5.N.8)

I can identify:
- the number of 10s and 100s in 5 digit numbers (standard and non-standard)
- the number of tenths and hundredths in decimals to two places
- compatible fractions for $\frac{3}{4}, \frac{2}{3}$, and $\frac{2}{10}$

Basic Arithmetical Learning
5.N.3* / 5.N.4*

I can recall:
- multiples of 0, 1, 2, 3, and 5 to 81
- multiplication facts that are squares with answers to 9x9 [10x10]

I can derive:
- division facts using their related multiplication facts with answers to 81÷9:
- multiplication facts with 10s

Algebraic Reasoning
4.PR.2 / 4.PR.6

I can:
- reproduce a pattern with concrete materials from information in tables and charts
- solve one step equations with unknowns (multiplication)

Uses Multiplicative Reasoning: Capable

Modeling and Communicating Mathematical Thinking
(illustrate, represent, explain, model, describe, record, discuss in context and uses technology, etc.)

5.N.1* / 5.N.5* / 5.N.6* / 5.N.8 / 5.N.11* / 5.PR.1 / 5.PR.2

I can use diagrams, equations and words to represent my personal mental strategies, and my results, for problems involving:
- operations with whole numbers and decimal numbers (to thousandths)

I can describe and represent decimals (tenths, hundredths, thousandths) concretely, pictorially and symbolically by:
- expressing a given numeral in expanded notation (standard and non-standard)

I can:
- describe, orally or in writing, a pattern using mathematical language
- create a problem in context for an equation

Application of Knowledge

Flexible Thinking
5.N.3* / 5.N.4* / 5.N.5* / 5.N.8* / 5.N.11 / 5.PR.2

I can use part-whole mental math strategies in whole number and decimal contexts to:
- bridge to one with decimals
- partition using place value
- using front-end estimation
- predicting sums and differences using other estimation strategies

I can determine multiplication facts and related division facts to 81 by:
- halving and doubling with decimals

I can use strategies to solve multiplication (2 by 2 digit) and division (3 by 1 digit) problems in context using:
- the distributive property
- open arrays (partitioning)
- renaming

Pre-Proportional Reasoning
5.N.5* / 5.N.7*

I can use proportional reasoning with the SET model for fractions involving:
- reasoning from part to whole
- reasoning from whole to part
- fractions as division
- halving in a fraction context. Tenths can be made by halving fifths
- linking proportional reasoning to multiplication.

I can use:
- the 2s, 5s, 10s facts to determine $\frac{1}{2}, \frac{1}{4}, \frac{1}{10}$ of a set

Knowledge

Rote Counting
5.N.7* / 5.N.8* / 5.N.9 / 5.N.10*

I can:
- express a decimal tenth as an equivalent 100th or 1000th
- order common fractions using benchmarks
- read and relate fractions to decimals
- order decimals on a number line (btwn. 0-2)
- name equivalent fraction/decimal/percent for $\frac{1}{2}, \frac{1}{4}, \frac{1}{10}$

Place Value
5.N.1* / 5.N.7* / 5.N.8*

I can identify:
- the number of 10s,100s, 1000s and so on with any whole number up to 7 places (standard and non-standard)
- compatible decimals (tenths) to make one

Basic Arithmetical Learning
5.N.3* / 6.N.3*

I can recall:
- related division facts for multiples for 2s, 5s, and 10s

I can determine:
- related division facts
- factors of numbers [to 50] 100

Algebraic Reasoning
5.PR.1 / 5.PR.2

I can:
- write an expression based on patterns in a table/chart
- solve single variable equations with one unknown

Uses Proportional Reasoning: Beginning

Modeling and Communicating Mathematical Thinking
(ratio table, double number line, bar models, ENL, illustrate, represent, explain, model, describe, record, discuss in context and uses technology, etc.)

5.N.11* / 6.N.1 / 6.N.3 / 6.N.4 / 6.N 5 / 6.N.6 / 6.N.8 / 6.PR.1 / 6.PR.2

I can:
- represent, describe and write numerals for numbers of any magnitude (greater that one million - less than one-thousandth)
- explain how that pattern of the place value system works
- provide and explain a concrete or pictorial representation for a ratio
- describe, using everyday language, orally or in writing, the relationship shown on a graph
- state, using math language, the relationship in a table of values
- translate and graph a pattern to a table of values
- identify the factors for a number and demonstrate/explain the strategy used (concretely, pictorially, symbolically)
- represent ratio and proportion concretely, pictorially, symbolically

I can use diagrams, equations and words to represent my personal mental strategies, and my results, for problems involving:
- improper fractions can represent a number greater than 1
- operations with whole and decimal numbers (to thousandths)

Application of Knowledge

Flexible Thinking
5.N.5* / 6.N.3* / 6.N.8

I can:
- use previously learned strategies to develop more sophisticated strategies (i.e. combining strategies)
- extend strategy use to higher numeral ranges
- apply strategies with problems involving decimal numbers

Developing Proportional Reasoning
6.N.4 / 6.N.5 / (7.N.5)* / 6.PR1 / 6.PR.3

I can use proportional reasoning with the AREA and SET model for fractions involving:
- halving in a fraction context. Sixths by halving thirds, eights by halving fourths
- renaming improper fractions to a mixed number
- explaining the part-whole and part-part ratio of a set
- using a ratio table for solving problems

* *Outcomes involving rational number in grade 6 are sparse. In order for students to be successful in grade 7 they need more experience in becoming flexible with fractions. This outcome is not being assessed but to honour developmental instruction students need exposure.*

Knowledge

Rote Counting
6.N.4

I can:
- read, order and relate fractions including mixed and improper

Place Value
6.N.1 / 6.N6. / 5.N.7*

I can identify:
- the number of 10ths (standard and non-standard) and 100ths, 1000ths with decimal numbers to 1000ths (standard)
- solve a problem using percents (compatibles)

Basic Arithmetical Learning
6.N.3* / 6.N.8

I can determine:
- factors of numbers to 100

I can determine products or quotients:
- involving decimals (x or ÷ by 10)

Algebraic Reasoning
6.PR.1 / 6.PR.2 / 6.PR.3/ 6.PR.4

I can:
- demonstrate an understanding of the relationships within table of values
- represent and describe patterns and relationships using tables
- represent generalizations arising from number relationships using equations
- demonstrate and explain the meaning of preservation of equality

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