

Mathematical PROCESSES

The seven interrelated **mathematical processes** are intended to permeate teaching and describe the critical aspects of learning, doing, and understanding mathematics. These processes allow students to engage in thinking about mathematics, and support the acquisition and the use of mathematical knowledge and foundational skills that develop conceptual understanding.

These processes are outlined in detail in [Kindergarten to Grade 8 Mathematics: Manitoba Curriculum Framework of Outcomes \(2013\)](#).

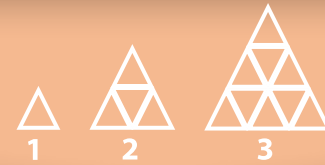
[C] COMMUNICATION
[CN] CONNECTIONS
[ME] MENTAL MATHEMATICS AND ESTIMATION

[PS] PROBLEM SOLVING
[R] REASONING
[T] TECHNOLOGY
[V] VISUALIZATION

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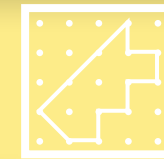
NUMBER Strand

- **Counting**
Number sequence and estimation of quantities to 1000 **N.1 N.4**
- **Representation of Whole Numbers**
Whole numbers to 1000 **N.2 N.3 N.5**
- **Representation of Rational Numbers**
Fractions as part of a whole **N.13**
- **Operations with Whole Numbers**
Mental math and estimation strategies of addition and subtraction (two 2-digit numerals) **N.6 N.7 N.8**
Addition and subtraction of numbers with answers to 1000 **N.9**
Recall of addition and related subtraction facts to 18 **N.10**
Multiplication and related division facts to 5 x 5 **N.11 N.12**



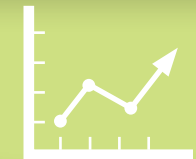
PATTERNS AND RELATIONS Strand

- ▶ **Patterns**
- **Patterning and Algebraic Thinking**
Increasing and decreasing patterns **PR.1 PR.2**
- ▶ **Variables and Equations**
- **Algebraic Representations with Equations**
One-step addition and subtraction equations **PR.3**



SHAPE AND SPACE Strand

- ▶ **Measurement**
- **Length**
Measure of length using standard units (cm and m) **SS.3**
Perimeter **SS.5**
- **Mass (Weight)**
Measure of mass using standard units (g and kg) **SS.4**
- **Time**
Passage of time using non-standard and standard units **SS.1**
Relationships between units of measure **SS.2**
- ▶ **3-D Objects and 2-D Shapes**
- **Identifying, Sorting, Comparing, and Constructing**
3-D objects **SS.6**
Regular and irregular polygons **SS.7**



STATISTICS AND PROBABILITY Strand

- ▶ **Data Analysis**
- **Collection, Organization, and Analysis of Data**
First-hand data **SP.1**
Problems involving bar graphs **SP.2**

- ▶ **Substrands**
- **Learning Targets**

Grade 3 Mathematics at a Glance can be used in designing, planning, and assessing student learning for the year. It can be used as a planning tool to preview the content of the [Grade 3 Mathematics curriculum](#).

It is organized by **strands** and sorts learning outcomes into categories or **learning targets**. The learning targets can be used to connect learning by integrating strands, learning outcomes, and other subject areas.

This document can be used with the *Glance Across the Grades* document to plan clear and concise expectations for student learning by using big ideas (the why behind what we are learning).

NUMBER Strand

- Counting**
 Say the number sequence forward and backward by 10s and 100s between any two given numbers and by multiples of 5 and 25 to 1000. Say the forward number sequence by multiples of 3 and 4 to 100. Estimate quantities to 1000 using referents. ◀ N.1 N.4
- Representation of Whole Numbers**
 Represent, describe, compare, and order whole numbers to 1000. Illustrate the meaning of place value for numbers to 1000. ↔ N.2 N.3 N.5
- Representation of Rational Numbers**
 Demonstrate an understanding that fractions represent a part of a whole divided into equal parts. Describe everyday situations where fractions are used. Compare fractions of the same whole with like denominators. ▶ N.13
- Operations with Whole Numbers**
 Describe and apply mental mathematics and estimation strategies for adding and subtracting two 2-digit numerals. Demonstrate an understanding of addition and subtraction with answers to 1000 (limited to 1-, 2-, and 3-digit numerals). ↔ N.6 N.7 N.8 N.9

 Recall addition and related subtraction facts to 18 (9 + 9). ◀ N.10

 Demonstrate an understanding of multiplication (up to 5 x 5) and of division (limited to division related to multiplication facts up to 5 x 5) by representing and explaining multiplication (equal groups and arrays) and division (equal sharing and equal grouping), by creating and solving problems, modelling, and relating multiplication to repeated addition and to division and relating division to repeated subtraction. ▶ N.11 N.12

PATTERNS AND RELATIONS Strand

- Patterns**
 - Patterning and Algebraic Thinking**
 Demonstrate an understanding of increasing and decreasing patterns by describing, extending, comparing, and creating patterns. ↔ PR.1 PR.2
 - Variables and Equations**
 - Algebraic Representations with Equations**
 Solve one-step addition and subtraction equations involving symbols representing an unknown number. ▶ PR.3

SHAPE AND SPACE Strand

- Measurement**
 - Length and Mass (Weight)**
 Demonstrate an understanding of measuring length (cm, m) and mass (g, kg) by selecting and justifying referents, modelling and describing the relationship between units of measure, estimating, and recording the measures. ↔ SS.3 SS.4

 Demonstrate an understanding of perimeter (cm, m) of regular and irregular shapes by estimating using referents, measuring and recording, and constructing different shapes for a given perimeter to demonstrate that many shapes are possible for a perimeter. ▶ SS.5
 - Time**
 Relate the passage of time to common activities using standard and non-standard units. Use relationships between the standard unit of measures of time in a problem-solving context. ↔ SS.1 SS.2
- 3-D Objects and 2-D Shapes**
 - Identifying, Sorting, Comparing, and Constructing**
 Describe 3-D objects according to the shape of the faces, and the number of edges and vertices. Sort regular and irregular polygons according to the number of sides. ↔ SS.6 SS.7

STATISTICS AND PROBABILITY Strand

- Data Analysis**
 - Collection, Organization, and Analysis of Data**
 Collect and organize first-hand data using tally marks, line plots, charts, and lists. Construct, label, and interpret bar graphs to solve problems. ↔ SP.1 SP.2

- Concept/learning outcomes are taught in this grade only and will be applied in future grades.
- ◀ Concept/learning outcomes introduced in previous grade(s) are further taught in this grade and will be applied in future grades.
- ▶ Concept/learning outcomes are taught for the first time in this grade and will be taught in future grade(s).
- ↔ Concept/learning outcomes introduced in previous grades are taught in this grade and will continue to be taught in future grades.

REPORT CARD CATEGORIES

KNOWLEDGE AND UNDERSTANDING OF MATHEMATICAL CONCEPTS

The student demonstrates knowledge and understanding of grade-specific mathematical concepts and skills in each strand (number, patterns and relations, shape and space, statistics and probability).

MENTAL MATH AND ESTIMATION








The student uses math knowledge and number facts to calculate mentally or estimate within each strand (number, patterns and relations, shape and space, statistics and probability). Students apply mental math strategies with efficiency, accuracy, and flexibility. They are able to make reasonable estimates of values or quantities using benchmarks and referents.

PROBLEM SOLVING

The student applies knowledge, skill, or understanding to solve problems in each strand (number, patterns and relations, shape and space, statistics and probability). By learning to solve problems and by learning through problem solving, students connect mathematical ideas in new contexts. Students think logically, visualize, model, reason, and communicate and justify their solutions.

The seven interrelated **mathematical processes** are intended to permeate teaching and describe the critical aspects of learning, doing, and understanding mathematics. These processes allow students to engage in thinking about mathematics, and support the acquisition and the use of mathematical knowledge and foundational skills that develop conceptual understanding.

These processes are outlined in detail in [Kindergarten to Grade 8 Mathematics: Manitoba Curriculum Framework of Outcomes \(2013\)](#).

 COMMUNICATION (C)	 CONNECTIONS (CN)	 MENTAL MATH AND ESTIMATION (ME)	 PROBLEM SOLVING (PS)	 REASONING (R)	 TECHNOLOGY (T)	 VISUALIZATION (V)
<p>Reading about, representing, viewing, writing about, listening to, and discussing mathematical ideas allows students to create links among their own language and ideas, the language and ideas of others, and the formal language and symbols of mathematics. Communication enables students to reflect upon, to validate, and to clarify their thinking. Expression of mathematical meaning and ideas can be accomplished orally or in written representations such as journals and learning logs.</p>	<p>Mathematics becomes more meaningful when it is contextualized and linked to students' experiences across disciplines. Furthermore, mathematics should be viewed as an integrated whole, rather than as the study of separate strands or units. Within a particular topic, students should see the connections between concrete, pictorial, and symbolic modes of representation. When mathematical ideas are connected to each other or to real-world phenomena, students begin to view mathematics as useful, relevant, and integrated.</p>	<p>Mental mathematics is a combination of strategies that enhances flexible thinking and number sense. Estimation is a strategy for determining approximate values or quantities, usually by referring to benchmarks or using referents, or for determining the reasonableness of calculated values. Estimation is often used to make mathematical judgments and to develop useful, efficient strategies for dealing with situations in daily life. Strategies in mental mathematics and estimation enable students to calculate mentally without the use of external aids. In the process, they improve their computational fluency—developing efficiency, accuracy, and flexibility.</p>	<p>Students develop understanding of mathematical concepts and procedures when they apply their mathematical knowledge to solve problems in new ways and meaningful contexts. When students encounter new situations and respond to questions of the type <i>How would you . . . ?</i> or <i>How could you . . . ?</i>, the problem-solving approach is being modelled. Problems are often open-ended, so students may arrive at multiple solutions in different and creative ways. Rich problems allow students in the class to demonstrate their knowledge, skill, or understanding at a level appropriate to them. Learning through problem solving should be the focus of mathematics at all grade levels and should be embedded throughout all topics.</p>	<p>Mathematical reasoning involves generalizing from patterns, conjecturing, validating, and proving. Students need to develop confidence in their abilities to reason and to justify their mathematical thinking. Good reasoning is as important as finding correct answers. The thinking skills developed by a focus on reasoning can be used in life in a wide variety of contexts and disciplines.</p>	<p>Technology contributes to and supports the learning of a wide range of mathematical concepts and can increase the focus on conceptual understanding by decreasing the time spent on repetitive procedures. It enables students to explore and create patterns, organize and display data, examine relationships, model situations, generate and test conjectures, solve problems, and reinforce the learning of basic facts. Technology can help to satisfy the curiosity of students and lead to rich mathematical discoveries at all grade levels. The use of technology can enhance, although it should not replace, conceptual understanding, procedural thinking, and problem solving.</p>	<p>Visual images and visual reasoning are important to a sense of number, space, and measurement. Visualization is fostered through the use of concrete materials, technology, and a variety of visual representations. Visualization can help students gain a concrete understanding of abstract concepts.</p>