GRADE 6 MATHEMATICS at a glance

Grade 6 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 6 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).

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**

NUMBER Strand

- **Representation of Whole Numbers**
  Whole numbers greater than one million N.1
  Integers N.7
- **Representation of Rational Numbers**
  Numbers less than one thousandth N.1
  Relationships between improper fractions and mixed numbers N.4
  Ratio N.5
  Percent N.6
- **Operations with Whole Numbers**
  Problems involving large numbers using technology N.2
  Factors and multiples N.3
  Order of operations N.9
- **Operations with Rational Numbers**
  Multiplication and division of decimals N.8

PATTERNS AND RELATIONS Strand

Patterns
- **Patterning and Algebraic Thinking**
  Patterns and relationships using tables and graphs PR.1 PR.2

Variables and Equations
- **Algebraic Representations with Equations**
  Number relationships and preservation of equality PR.3 PR.4

SHAPE AND SPACE Strand

Measurement
- **Length, Area, and Volume (Capacity)**
  Formulas for perimeter, area, and volume SS.3
- **Angles**
  Measuring angles SS.1 SS.2

3-D Objects and 2-D Shapes
- **Identifying, Sorting, Comparing, and Constructing**
  Triangles SS.4
  Regular and irregular polygons SS.5

Transformations
- **Position and Motion**
  Single transformations, combinations of transformations, and the Cartesian plane SS.6 SS.7 SS.8 SS.9

STATISTICS AND PROBABILITY Strand

Data Analysis
- **Collection, Organization, and Analysis of Data**
  Line graphs SP. 1
  Methods of collecting data SP. 2
  Problems involving graphs and data SP.3

Chance and Uncertainty
- **Probability**
  Experimental and theoretical probability SP.4

Substrands
- **Learning Targets**

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GRADE 6 MATHEMATICS

Curriculum Overview

NUMBER Strand

- **Representation of Whole Numbers**
  Demonstrate an understanding of place value for numbers greater than one million. ⬌ N.1

  Demonstrate an understanding of integers. ➡ N.7

- **Representation of Rational Numbers**
  Demonstrate an understanding of place value for numbers less than one-thousandth. ⬌ N.1

  Relate improper fractions to mixed numbers. ➡ N.4

  Demonstrate an understanding of ratio and percent (limited to whole numbers). ➡ N.5 N.6

- **Operations with Whole Numbers**
  Solve problems involving large numbers, using technology. ■ N.2

  Demonstrate an understanding of factors and multiples by determining multiples and factors (of numbers less than 100), identifying prime and composite numbers, and solving problems. Explain and apply the order of operations, excluding exponents (limited to whole numbers). ➡ N.3 N.9

- **Operations with Rational Numbers**
  Demonstrate an understanding of multiplying and dividing decimals (1-digit whole-number multipliers, 1-digit natural number divisors, and multipliers and divisors that are multiples of 10), by using personal strategies, the standard algorithms, estimation, and solving problems. ➡ N.8

PATTERNS AND RELATIONS Strand

Patterns

- **Patterning and Algebraic Thinking**
  Demonstrate an understanding of the relationships within tables of values to solve problems. Represent and describe patterns and relationships using graphs and tables. ⬌ PR.1 PR.2

Variables and Equations

- **Algebraic Representations with Equations**
  Represent generalizations arising from number relationships using equations with letter variables. Demonstrate and explain the meaning of preservation of equality. ⬌ PR.3 PR.4

SHAPE AND SPACE Strand

Measurement

- **Length, Area, and Volume (Capacity)**
  Develop and apply a formula for determining the perimeter of polygons, the area of rectangles, and the volume of right rectangular prisms. ➡ SS.3

- **Angles**
  Demonstrate an understanding of angles by identifying, classifying, estimating, drawing, labelling, and determining the measure of angles in degrees. Demonstrate that the sum of interior angles for triangles is 180° and for quadrilaterals is 360°. ➡ SS.1 SS.2

3-D Objects and 2-D Shapes

- **Identifying, Sorting, Comparing, and Constructing**
  Construct and compare triangles in different orientations. Describe and compare the sides and angles of regular and irregular polygons. ➡ SS.4 SS.5

Transformations

- **Position and Motion**
  Perform and identify a combination of transformations on a single 2-D shape to create a design, and then draw and describe the image. ⬌ SS.6 SS.7

  Identify and plot points in the first quadrant of the Cartesian plane using whole-number ordered pairs. Perform and describe single transformations of a 2-D shape in the first quadrant of the Cartesian plane. ➡ SS.8 SS.9

STATISTICS AND PROBABILITY Strand

Data Analysis

- **Collection, Organization, and Analysis of Data**
  Construct and interpret line graphs to draw conclusions. ⬌ SP.1

  Select, justify, and use appropriate methods of collecting data. Graph collected data and analyze the graph to solve problems. ➡ SP.2 SP.3

Chance and Uncertainty

- **Probability**
  Demonstrate an understanding of probability by identifying all possible outcomes of a probability experiment. Differentiate between and determine experimental and theoretical probability. Compare experimental results with theoretical probability. ➡ SP.4

■	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.

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GRADE 6 MATHEMATICS

Mathematical Processes

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COMMUNICATION (C)

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.

CONNECTIONS (CN)

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.

MENTAL MATH AND ESTIMATION (ME)

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.

PROBLEM SOLVING (PS)

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 *How would you . . . ?* or *How could you . . . ?*, 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.

REASONING (R)

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.

TECHNOLOGY (T)

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.

VISUALIZATION (V)

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.