GRADE 4 MATHEMATICS at a glance

Grade 4 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 4 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
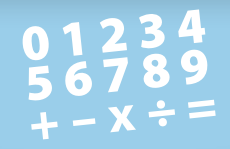
NUMBER Strand

- **Representation of Whole Numbers**
  Whole numbers to 10 000   N.1 N.2

- **Representation of Rational Numbers**
  Fractions as part of a whole or a set   N.8
  Decimals to hundredths   N.9
  Relationships between decimals and fractions   N.10

- **Operations with Whole Numbers**
  Addition and subtraction to 10 000   N.3
  Multiplication and related division facts to 9 x 9   N.4 N.5
  Multiplication 2- or 3-digit by 1-digit numerals   N.6
  Division 1-digit divisor and up to 2-digit dividends   N.7

- **Operations with Rational Numbers**
  Problems involving addition and subtraction of decimals to hundredths   N.11
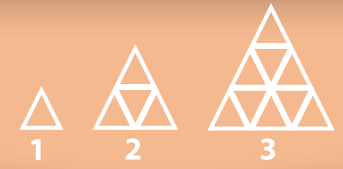
PATTERNS AND RELATIONS Strand

▶ **Patterns**
- **Patterning and Algebraic Thinking**
  Problems involving patterns and relationships using tables, charts, and diagrams
  PR.1 PR.2 PR.3 PR.4

▶ **Variables and Equations**
- **Algebraic Representations with Equations**
  One-step equations   PR.5 PR.6
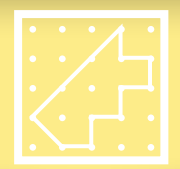
SHAPE AND SPACE Strand

▶ **Measurement**
- **Area**
  Area of 2-D shapes   SS.3

- **Time**
  Time and calendar dates   SS.1 SS.2

▶ **3-D Objects and 2-D Shapes**
- **Identifying, Sorting, Comparing, and Constructing**
  Problems involving 2-D shapes and 3-D objects   SS.4 SS.5

▶ **Transformations**
- **Position and Motion**
  Line symmetry   SS.6

STATISTICS AND PROBABILITY Strand

▶ **Data Analysis**
- **Collection, Organization, and Analysis of Data**
  Many-to-one correspondence   SP. 1
  Pictographs and bar graphs   SP. 2

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

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GRADE 4 MATHEMATICS
Curriculum Overview

NUMBER Strand

- **Representation of Whole Numbers**
  Represent, describe, order, and compare whole numbers to 10 000. ➡ N.1 N.2

- **Representation of Rational Numbers**
  Demonstrate an understanding of fractions less than or equal to one, using representations of part of a whole or a set. Name, record, compare, and order fractions. Model and explain that for different wholes, two identical fractions may not represent the same quantity. N.8

  Describe and represent decimals and relate decimals to fractions to hundredths. ➡ N.9 N.10

- **Operations with Whole Numbers**
  Demonstrate an understanding of addition and subtraction to 10 000 (limited to 3- and 4- digit numerals) using personal strategies, estimation, and standard algorithms. ➡ N.3

  Describe and apply mental math strategies to develop an understanding of multiplication facts and related division facts to 9 x 9. Recall multiplication and related division facts to 5 x 5. Demonstrate an understanding of multiplication (2- or 3-digit numerals by 1-digit numerals) and division (1-digit divisor and up to 2-digit dividends) to solve problems by using personal strategies, estimation, and arrays, by connecting concrete and symbolic representations, and by relating division to multiplication. Explain the properties of 0 and 1 for multiplication and the property of 1 for division. ➡
  N.4 N.5 N.6 N.7

- **Operations with Rational Numbers**
  Demonstrate an understanding of addition and subtraction of decimals (limited to hundredths) using compatible numbers, estimation, and mental math strategies to solve problems. ➡ N.11

PATTERNS AND RELATIONS Strand

▶ **Patterns**
- **Patterning and Algebraic Thinking**
  Identify, describe, reproduce, represent, and explain patterns and mathematical relationships found in tables, charts, and diagrams to solve problems. ➡
  PR.1 PR.2 PR.3 PR.4

▶ **Variables and Equations**
- **Algebraic Representations with Equations**
  Express a problem as an equation using a symbol. Solve one-step equations involving a symbol to represent an unknown. ➡
  PR.5 PR.6

SHAPE AND SPACE Strand

▶ **Measurement**
- **Area**
  Demonstrate an understanding of area (cm^2, m^2) of regular and irregular 2-D shapes by recognizing that area is measured in square units, selecting and justifying referents, estimating, determining and recording area, and constructing different rectangles for a given area in order to demonstrate that many different rectangles may have the same area. ➡ SS.3

- **Time**
  Read and record calendar dates in a variety of ways, and read and record time using digital and analog clocks, including 24-hour clocks. ⬅ SS.1 SS.2

▶ **3-D Objects and 2-D Shapes**
- **Identifying, Sorting, Comparing, and Constructing**
  Solve problems involving 2-D shapes and 3-D objects. Describe and construct rectangular and triangular prisms. ➡ SS.4 SS.5

▶ **Transformations**
- **Position and Motion**
  Demonstrate an understanding of line symmetry by identifying and creating symmetrical 2-D shapes and drawing lines of symmetry. ➡ SS.6

STATISTICS AND PROBABILITY Strand

▶ **Data Analysis**
- **Collection, Organization, and Analysis of Data**
  Demonstrate an understanding of many-to-one correspondence in order to construct and interpret pictographs and bar graphs to draw conclusions. ➡ 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.

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GRADE 4 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.

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