



Course Outline: Grade 4 Mathematics

Course Name: Grade 4 Mathematics

Course Code: MAT4

Credit Value: None. Credits are not issued at the elementary level.

Prerequisite: None

Curriculum Policy Document: [*The Ontario Curriculum Grades 1-8: Mathematics, 2005 \(revised\)*](#)

Course Developer: Virtual Elementary School

Department: Primary

Development Date: 2019

Course Description

This course builds on the grade 3 curriculum to further develop students' understanding of fundamental mathematical concepts by exploring topics related to number sense and numeration, measurement, geometry and spatial sense, patterning and algebra, and data management and probability. Students work with numbers up to 10 000, represent money amounts up to \$100, and develop the concept of place value up to tenths. Students represent and compare fractions, relate halves, fifths, and tenths to decimals, and build on addition, subtraction, multiplication, and division skills. They add and subtract three-digit numbers and multiply and divide two-digit whole numbers by one-digit whole numbers. Through investigations, students measure length, mass, volume, area, and perimeter, measure time intervals, determine elapsed time, compare mass and capacity, and relate years to decades and decades to centuries. Students identify the properties of parallelograms, classify two-dimensional shapes, identify angles, classify prisms and pyramids, construct three-dimensional figures, describe location using a grid system, and perform and describe reflections. Students relate the term and term number in a numeric sequence and generate patterns involving addition, subtraction, multiplication, and reflections. Students determine the missing numbers in equations and use the commutative and distributive properties. Students collect, organize, read, and display data in stem-and-leaf plots and double bar graphs. Students also understand median, compare two sets of data, predict the frequency of an outcome, and investigate how the number of repetitions of a probability experiment affects the conclusion. Throughout the course, students reinforce the mathematical processes of problem-solving, reasoning and proving, reflecting, selecting tools and computational strategies, connecting, representing, and communicating.

Through investigation of real-life problems, students develop a strong foundation of mathematical knowledge and skills. Students apply mathematical processes and build transferrable critical-thinking skills in varied teaching and consolidation activities that appeal to diverse learning styles. Students participate in engaging storylines along with characters that connect their learning to real-world contexts and build confidence through facilitating a positive attitude towards mathematics. Various opportunities are provided to consolidate student learning through technology and offline activities, including tactile manipulatives, to reinforce essential

mathematical strategies and tools. The course has a strong focus on reinforcing number sense and numeracy skills and provides various activities for practice throughout. This course prepares students for grade 5 mathematics.

Resources Required by the Student

This course is entirely online and does not require nor rely on any textbook. Students will require the following resources:

- A scanner, smart phone camera, or similar device to digitize handwritten or hand-drawn work
- A printer
- A physical binder, folder, or notebook for offline activities
- Various household items to complete offline activities

Overall Curriculum Expectations

Strand	Overall Expectations
Number Sense and Numeration	<ul style="list-style-type: none"> • Read, represent, compare, and order whole numbers to 10 000, decimal numbers to tenths, and simple fractions, and represent money amounts to \$100; • Demonstrate an understanding of magnitude by counting forward and backwards by 0.1 and by fractional amounts; • Solve problems involving the addition, subtraction, multiplication, and division of single- and multi-digit whole numbers, and involving the addition and subtraction of decimal numbers to tenths and money amounts, using a variety of strategies; • Demonstrate an understanding of proportional reasoning by investigating whole-number unit rates.
Measurement	<ul style="list-style-type: none"> • Estimate, measure, and record length, perimeter, area, mass, capacity, volume, and elapsed time, using a variety of strategies; • Determine the relationships among units and measurable attributes, including the area and perimeter of rectangles.
Geometry and Spatial Sense	<ul style="list-style-type: none"> • Identify quadrilaterals and three-dimensional figures and classify them by their geometric properties, and compare various angles to benchmarks; • Construct three-dimensional figures, using two-dimensional shapes; • Identify and describe the location of an object, using a grid map, and reflect two-dimensional shapes.
Patterning and Algebra	<ul style="list-style-type: none"> • Describe, extend, and create a variety of numeric and geometric patterns, make predictions related to the patterns, and investigate repeating patterns involving reflections; • Demonstrate an understanding of equality between pairs of expressions, using addition, subtraction, and multiplication.

Data Management and Probability	<ul style="list-style-type: none"> • Collect and organize discrete primary data and display the data using charts and graphs, including stem-and-leaf plots and double bar graphs; • Read, describe, and interpret primary data and secondary data presented in charts and graphs, including stem-and-leaf plots and double bar graphs; • Predict the results of a simple probability experiment, then conduct the experiment and compare the prediction to the results
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Teaching and Learning Strategies

Through a balance of problem-solving and direct instruction, students develop a strong foundation of mathematical processes, knowledge, and skills to apply in real-world contexts. The course utilizes a combination of technology and offline activities, providing opportunities to develop an understanding of skills and concepts in interactive and concrete ways and engage multiple learning styles. The lessons feature a variety of intriguing storylines, characters, videos, storybooks, and interactive games to reinforce students' learning. The activities also build a foundation of mathematical models and strategies that students will use throughout the elementary grades.

The course relies on the assistance of a learning coach to support young students through the content. The learning coach will be involved in facilitating technical aspects of the course (e.g. printing and scanning printable activities) and participating in discussion-based activities to assist students in developing communication skills.

Reporting (Facilitated Only)

Student achievement will be communicated formally to students via progress reports and official report cards. A progress report is provided after completion of the first unit in the course. The progress report is not an evaluation of the student's achievement. Rather, the purpose is to give students and parents early and specific feedback regarding the student's general progress during the first unit of study.

Report cards are issued at the midterm point in the course as well as upon completion of the course. Each report card will focus on two distinct but related aspects of student achievement. First, the achievement of curriculum expectations is reported as a letter grade. Additionally, the course median is reported as a letter grade. The teacher will also provide written comments concerning the student's strengths, areas for improvement, and next steps.

Second, the learning skills are reported as letter grades representing four levels of accomplishment. Upon completion of a course, VES will send a copy of the report card to the student's home school (if in Ontario) where the course will be added to the ongoing list of courses on the student's Ontario Student Record (OSR). The report card will also be sent to the student's home address.

Units

Unit	Description
Representing Numbers	In the Representing Numbers unit, students learn to read and write numbers up to 1000, show an understanding of place value up to 10 000, represent, compare, and order numbers up to 10 000, and round four-digit numbers in real-life situations.
Geometry	In the Geometry unit, students draw lines of symmetry on 2D shapes, identify, compare, and classify quadrilaterals, explore benchmark angles, and identify, describe, and classify prisms and pyramids. Students construct 3D figures and nets of 3D figures, construct and sketch skeletons of 3D figures, draw and describe nets of rectangular and triangular prisms, and construct 3D figures using congruent shapes. Students also identify and describe the location of an object on a grid, identify, perform, and describe reflections, create and extend patterns with reflections, and create and analyze symmetrical designs.
Addition and Subtraction	In the Addition and Subtraction unit, students add and subtract two-digit numbers using mental strategies, add and subtract four-digit numbers using partial sums, add and subtract four-digit numbers vertically, and read, represent, and add money amounts up to \$100.
Multiplication and Division	In the Multiplication and Division unit, students multiply and divide by 8, multiply and divide by 9, solve multiplication problems mentally, multiply and divide 10, 100, and 1000 using mental strategies, and multiply and divide using a variety of tools. Students solve vertical multiplication equations, divide two-digit by one-digit numbers, solve multiplication problems by estimating, describe relationships using multiplication, and explore multiplication and unit rates.
Patterning and Algebra	In the Patterning and Algebra unit, students create and extend patterns, analyze terms and term numbers, create number patterns, and predict terms in a pattern. Students also determine the relationship between multiplication and division, find the missing number in a multiplication problem, and identify the commutative and distributive properties.
Fractions and Decimal Numbers	In the Fractions and Decimal Numbers unit, students represent fractions, identify the fraction of a group, compare and order fractions, show equivalent fractions, and count by halves, thirds, fourths, and tenths. Students also read and write decimal numbers, show place values from 0.1 to 10 000, represent, compare, and order decimal numbers up to tenths, count forward, add and subtract decimal numbers, and explore the relationship between fractions and decimal numbers.
Data Management and Probability	In the Data Management and Probability unit, students collect data by conducting a survey, and collect and organize data in charts, tables, and graphs. Students read, interpret, and draw conclusions on data, demonstrate an understanding of the median, describe and compare sets of data, and explore probability and probability experiments.

Measurement	In the Measurement unit, students measure length, height, and distance, draw length, and estimate, measure, and record the perimeter of a polygon. Students determine the relationships among length, perimeter, and area, compare perimeters and areas, and estimate, measure, and record mass. Students investigate grams and kilograms, capacity, millilitres and litres, and volume. They also compare mass and capacity. Students determine elapsed time and solve problems involving years, decades, and centuries.
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The Final Grade (Facilitated Only)

The evaluation for this course is based on the student's achievement of curriculum expectations. The final letter grade represents the quality of the student's overall fulfillment of the expectations for the course and reflects the corresponding level of achievement as described in the achievement chart for the discipline. The final grade will be determined based on each of the 8 units (12.5% each) and will reflect the student's most consistent level of achievement throughout the course, although special consideration will be given to more recent evidence of achievement. There is no final assessment, such as an exam, in this course.