



Course Outline: Grade 6 Mathematics

Course Name: Grade 6 Mathematics

Course Code: MAT6

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: Junior

Development Date: 2019

Course Description

This course builds on the Grade 5 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 represent and order numbers to 1 000 000, develop the concept of place value to thousandths, compare and order fractional amounts with unlike denominators, and estimate 10%, 25%, 50%, and 75% of a quantity. Students add and subtract decimal amounts to thousandths, multiply and divide four-digit whole numbers by two-digit whole numbers, and multiply and divide decimals to tenths by whole numbers and two-digit by two-digit whole numbers. Furthermore, students divide three-digit whole numbers by one-digit whole numbers, apply order of operations in expressions without brackets, and relate simple fractions, decimals and percentages. Students measure quantities using metric units, convert from larger to smaller metric units, including square metres to square centimetres, and develop and apply area relationships for a parallelogram and a triangle. Students develop and apply the volume relationships for a triangular prism, determine and apply surface area relationships for rectangular and triangular prisms, and relate square metres and square centimetres. Students classify quadrilaterals by geometric properties, sort polygons by lines of symmetry and by rotational symmetry, measure angles to 180° with a protractor, and construct polygons. Students represent figures using views and isometric sketches, perform and describe rotations, and plot points in the first quadrant. Students represent patterns using ordered pairs and graphs, describe pattern rules in words, and calculate any term when given the term number. Students investigate variables as changing quantities and solve equations using concrete materials and the guess and check strategy. Furthermore, students collect and organize discrete and continuous data, display data using continuous line graphs, select appropriate geographical representations, use continuous line graphs and mean to compare sets of data, find theoretical probabilities, and predict the frequency of an outcome based on the theoretical probability. 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 7 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, smartphone camera, or similar device to digitize handwritten or hand-drawn work
- A smartphone camera or similar device to take pictures of student work
- A device to record audio
- A printer
- A physical binder, folder, or notebook for offline activities
- Various household items to complete offline activities
- Connecting cubes

Overall Curriculum Expectations

Strand	Overall Expectations
Number Sense and Numeration	<ul style="list-style-type: none"> • Read, represent, compare, and order whole numbers to 1 000 000, decimal numbers to thousandths, proper and improper fractions, and mixed numbers. • Solve problems involving the multiplication and division of whole numbers and the addition and subtraction of decimal numbers to thousandths using a variety of strategies. • Demonstrate an understanding of relationships involving percentage, ratio, and unit rate.
Measurement	<ul style="list-style-type: none"> • Estimate, measure, and record quantities using the metric measurement system. • Determine the relationships among units and measurable attributes, including the area of a parallelogram, the area of a triangle, and the volume of a triangular prism.
Geometry and Spatial Sense	<ul style="list-style-type: none"> • Classify and construct polygons and angles. • Sketch three-dimensional figures, and construct three-dimensional figures from drawings.

	<ul style="list-style-type: none"> Describe location in the first quadrant of a coordinate system, and rotate two-dimensional shapes.
Patterning and Algebra	<ul style="list-style-type: none"> Describe and represent relationships in growing and shrinking patterns (where the terms are whole numbers), and investigate repeating patterns involving rotations. Use variables in simple algebraic expressions and equations to describe relationships.
Data Management and Probability	<ul style="list-style-type: none"> Collect and organize discrete or continuous primary data and secondary data, and display the data using charts and graphs, including continuous line graphs. Read, describe, and interpret data, and explain relationships between sets of data. Determine the theoretical probability of an outcome in a probability experiment, and use it to predict the frequency of the outcome.

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 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
Numbers	In the Numbers unit, students read and write numbers up to 100 000, understand, represent, compare, and order numbers, and solve word problems up to 1 000 000. Students identify prime and composite numbers and find the prime factors for composite numbers. Students also understand place value and represent, compare, and order decimal numbers.
Geometry	In the Patterning unit, students sort and classify quadrilaterals, sort and construct polygons, and classify, measure, and construct angles. Students build 3D models using drawings and sketch isometric perspectives and different views. Furthermore, students plot points and represent location, identify, perform, and describe rotations, and create and analyze designs made by transformations.
Operations	In the Operations unit, students solve addition, subtraction, multiplication, and division problems. Students multiply and divide four-digit numbers by two-digit numbers, add and subtract decimal numbers to thousandths, and multiply and divide decimal numbers by whole numbers using concrete materials and algorithms. Students multiply whole numbers by 0.1, 0.01, and 0.001 and multiply and divide decimal numbers by 10, 100, 1000, and 10 000. Furthermore, students solve equations using the order of operations.
Fractions, Percentages, Ratios, and Unit Rates	In the Fractions, Percentages, Ratios, and Unit Rates unit, students represent fractions, compare fractions and mixed numbers using tools and fraction notation, and order fractions and mixed numbers. Students represent ratios using materials, drawings, and fractions. Students estimate using percentage benchmarks and explore fractions, decimal numbers, and unit rates.
Data Management and Probability	In the Data Management and Probability unit, students collect and organize data, select appropriate graphs, use technology, and determine how well a set of data represents a population. Students also read primary and secondary data, compare different graphical representations of the same data, and understand mean. Furthermore, students express theoretical probability as a ratio, represent probability on a range of 0 to 1, and predict the outcome of a probability experiment.
Algebra	In the Algebra unit, students understand variables, identify variables and constants in an equation, and solve equations with one, two, and three variables.
Patterning	In the Patterning unit, students identify geometric patterns and represent them numerically, plot ordered pairs, and determine the term number. Students also

	describe pattern rules, determine a term by extending a pattern, and extend and create rotation patterns.
Measurement	In the Measurement unit, students select the appropriate unit of measurement and estimate, measure, and record length, area, mass, and capacity. Students justify when an estimate or precise measurement is needed, convert metric units, and construct rectangles and squares given their area or perimeter. Students also find the area of a parallelogram and a triangle and solve related problems. Students construct parallelograms and triangles given the area, find the relationship between area units, and estimate and calculate the surface area of a rectangular prism and triangular prism. Furthermore, students calculate the volume of rectangular and triangular prisms and solve problems related to the volume of rectangular and triangular prisms.

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.