



Course Outline: Grade 7 Mathematics

Course Name: Grade 7 Mathematics

Course Code: MAT7

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: Intermediate

Development Date: 2019

Course Description

This course builds on the Grade 6 curriculum by further developing students' understanding of fundamental mathematical concepts. Students explore topics related to number sense and numeration, measurement, geometry and spatial sense, patterning and algebra, and data management and probability. Students represent and order decimals, fractions, and integers, represent squares and square roots, divide whole numbers by simple fractions and decimals, and add and subtract simple fractions and integers. Students multiply and divide decimal numbers to thousandths by one-digit whole numbers, apply order of operations in expressions with brackets, relate fractions, decimals, and percentages, and solve problems involving whole-number percentages and unit rates. Students convert between metric units, including converting between square centimetres and square metres, develop the area relationship for a trapezoid, and determine and apply the formula for the volume of a prism. Students learn and apply surface area relationships for prisms and relate millilitres and cubic centimetres. Students construct parallel, perpendicular, and intersecting lines, sort and classify triangles and quadrilaterals by geometric properties, and construct angle bisectors and perpendicular bisectors. Students investigate relationships among congruent shapes, and relate enlarging and reducing to similar shapes. Students compare similar and congruent shapes, perform and describe dilatations, tile a plane, and plot points in all four quadrants. Students represent linear growing patterns, and represent patterns algebraically. Students model real-life relationships involving constant rates graphically and algebraically when given a term number, and solve linear equations using concrete materials or inspection and guess and check. Students collect and organize categorical, discrete, and continuous data, display data in relative frequency tables and circle graphs, and identify bias in data. Students relate changes in data to changes in central tendency, make inferences based on data, investigate real-world applications of probability, and determine the theoretical probability of two independent events. 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 8 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 smart phone camera or similar device to take pictures of other student work
- A device to record audio digitally
- A printer
- A physical binder, folder, or notebook for offline activities
- Calculator
- Protractor
- Compass
- Ruler with centimetres
- Various household items to complete offline activities

Overall Curriculum Expectations

Strand	Overall Expectations
Number Sense and Numeration	<ul style="list-style-type: none"> • Represent, compare, and order numbers, including integers. • Demonstrate an understanding of addition and subtraction of fractions and integers, and apply a variety of computational strategies to solve problems involving whole numbers and decimal numbers. • Demonstrate an understanding of proportional relationships using percent, ratio, and rate.
Measurement	<ul style="list-style-type: none"> • Report on research into real-life applications of area measurements. • Determine the relationships among units and measurable attributes, including the area of a trapezoid and the volume of a right prism.
Geometry and Spatial Sense	<ul style="list-style-type: none"> • Construct related lines and classify triangles, quadrilaterals, and prisms. • Develop an understanding of similarity and distinguish between similarity and congruence.

	<ul style="list-style-type: none"> Describe location in the four quadrants of a coordinate system, dilate two-dimensional shapes, and apply transformations to create and analyse designs.
Patterning and Algebra	<ul style="list-style-type: none"> Represent linear growing patterns (where the terms are whole numbers) using concrete materials, graphs, and algebraic expressions. Model real-life linear relationships graphically and algebraically and solve simple algebraic equations using a variety of strategies, including inspection and guess and check.
Data Management and Probability	<ul style="list-style-type: none"> Collect and organize categorical, discrete, or continuous primary data and secondary data and display the data using charts and graphs, including relative frequency tables and circle graphs. Make and evaluate convincing arguments, based on the analysis of data. Compare experimental probabilities with the theoretical probability of an outcome involving two independent events.

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 (Courses with Qualified Teacher)

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 percentage. Additionally, the

course median is reported as a percentage. 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 percentage 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
Read, Represent and Compare Numbers	In the Read, Represent, and Compare Numbers unit, students represent, compare, and order decimal numbers and fractions, generate multiples and factors, and represent a quantity for a given context. Students also represent perfect squares and square roots, and identify, compare, represent, order, and add integers.
Geometry	In the Geometry unit, students construct lines, explore bisectors, and sort and classify triangles and quadrilaterals. Students investigate right prisms and angles, plot points on the Cartesian Coordinate Plane, and examine similar shapes. Students explore dilatations, create and analyse designs, and tile a plane. Students describe triangles, investigate congruent shapes, and compare similar and congruent shapes.
Operations	In the Operations unit, students divide whole numbers by fractions and decimal numbers, solve addition and subtraction problems with decimal numbers, and multiply decimal numbers by whole numbers using concrete materials and algorithms. Students solve multi-step multiplication and division word problems, divide decimal numbers by whole numbers using concrete materials and algorithms, and evaluate expressions using the order of operations.
Fractions	In the Fractions unit, students add fractions with like and unlike denominators using concrete materials, subtract fractions with like and unlike denominators using concrete materials, and simplify fractions. Furthermore, students add and subtract proper fractions using algorithms, add and subtract mixed numbers using algorithms, and relate repeated addition and multiplication of fractions by whole numbers.
Proportional Relationships	In the Proportional Relationships unit, students solve percentage problems; understand rates; investigate fractions, decimal numbers, percentages, and ratios; and solve unit rate problems.
Data Management and Probability	In the Data Management and Probability unit, students collect data, explore population, sample and census, investigate bias in data collection, and collect, organize, and display data. Students represent data with graphs, read, interpret, and draw conclusions from data, and examine graphs and misleading data. Students explore effects on central tendency, investigate trends and distribution of data, make inferences and arguments, and explore real-world

	applications of probability. Students also make predictions, investigate theoretical probability, and perform probability experiments.
Patterning and Algebra	In the Patterning unit, students represent linear growing patterns, make predictions and investigate the general term, compare pattern rules, and model constant rates using tables, graphs, and algebraic expressions. Students show algebraic expressions, explore algebraic expressions and patterns, and evaluate algebraic expressions. Students also solve linear equations with concrete materials, guess and check, and use a calculator.
Measurement	In the Measurement unit, students explore equal volume prisms, solve measuring problems, and investigate exponents in area and volume. Students solve area problems and develop an understanding of trapezoids, composite shapes, right prism properties, right prism surface area, and capacity and volume conversions.

The Final Grade (Courses with Qualified Teacher)

Student evaluation in this course is based on the student's achievement of curriculum expectations. The final percentage 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 reflects the student's most consistent level of achievement across all units in the course, although special consideration is given to more recent evidence of achievement. There is no final assessment, such as an exam, in this course.