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: Grade 6 Mathematics
Course Developer: Virtual Elementary School
Department: Junior
Development Date: 2020

Overview

This course builds on the Grade 5 curriculum to further develop students' understanding of fundamental mathematical concepts by exploring topics related to number, coding, algebra, data, spatial sense, social- emotional learning skills in mathematics, and financial literacy.

Throughout the course, students build their social emotional learning skills by focusing specifically on breaking down problems in order to understand questions in simple terms. Such methods can be applied to mathematical reasoning. Students are encouraged to explore how to arrive at solutions in a variety of ways in order to apply their mathematical thinking creatively and in a way that serves their unique perspectives and understandings.

Regarding numbers, students will be introduced to scientific notation in order to be able to read, represent, compare, order, and round both small and large numbers. They will do the same using whole numbers, mixed numbers, fractions, percentages, and decimal numbers. They will learn about prime and composite numbers as well as integers, ratios, and unit rates. While furthering their operational knowledge, they will practice multiplying and dividing four and two-digit numbers and decimal numbers. They will also practice adding, subtracting, multiplying, and dividing decimal numbers, whole numbers, fractions, percentages, and mixed numbers.

In algebra, students will practice solving equations with one, two, and three variables and add monomials. They will also solve, verify, and graph inequalities. While expanding their coding knowledge, they will use code structures and practice debugging code.

In data, student will explore the differences between discrete and continuous data. They will continue to collect, organize, and display data in a variety of appropriate graphs, charts, tallies, and other visual formats. They will create infographics in order to display data in a way that tells a story about their findings. They will also continue to expand their knowledge and understanding of probability by conducting a variety of different probability experiments.

In spatial sense, students will explore the geometric properties of different quadrilaterals. They will sort polygons according to regular and irregular properties and use knowledge of angles to measure,

construct, and find angle measurements. Students will also build 3D models using drawings. Spatial understanding will be further developed by plotting points on a Cartesian plane and by exploring measurement. Students will continue to estimate, measure, and record measures of length, area, mass, and capacity and will practice converting measurements to different units.

In financial literacy, students will compare different types of payment methods in order to develop a better understanding of their uses. Students will learn about different types of financial goals, see how such goals may be reached, and gain an understanding of interest and other financial fees.

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 who connect their learning to real-world contexts and build confidence by instilling a positive attitude towards mathematics. Various opportunities consolidate students' 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. It also provides various activities for practice throughout. This course prepares students for grade 7 mathematics.

Resources Required

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
- A ruler, protractor, scissors, calculator, cards
- Various household items to complete offline activities

Overall Curriculum Expectations

A. Social Emotional Learning Skills in Mathematics	• A1. Social-Emotional Learning (SEL) Skills and the Mathematical Processes: apply, to the best of their ability, a variety of social-emotional learning skills to support their use of the mathematical processes and their learning in connection with the expectations in the other five strands of the mathematics curriculum
B. Number	• B1. Number Sense: demonstrate an understanding of numbers and make connections to the way numbers are used in everyday life • B2. Operations use knowledge of numbers and operations to solve mathematical problems encountered in everyday life
C. Algebra	• C1. Patterns and Relationships: identify, describe, extend, create, and make predictions about a variety of patterns, including those found in real-life contexts • C2. Equations and Inequalities: demonstrate an understanding of variables, expressions, equalities, and inequalities, and apply this understanding in various contexts

	• C3. Coding: solve problems and create computational representations of mathematical situations using coding concepts and skills • C4. Mathematical Modelling: apply the process of mathematical modelling to represent, analyse, make predictions, and provide insight into real-life situations
D. Data	• D1. Data Literacy: manage, analyse, and use data to make convincing arguments and informed decisions, in various contexts drawn from real life • D2. Probability: describe the likelihood that events will happen, and use that information to make predictions
E. Spatial Sense	• E1. Geometric and Spatial Reasoning: describe and represent shape, location, and movement by applying geometric properties and spatial relationships in order to navigate the world around them • E2. Measurement: compare, estimate, and determine measurements in various contexts
F. Financial Literacy	• F1. Money and Finances: demonstrate the knowledge and skills needed to make informed financial decisions

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 engages multiple learning styles by utilizing a combination of technology and offline activities to provide opportunities to develop an understanding of skills and concepts in interactive and concrete ways. The lessons feature a variety of intriguing storylines, videos, graphics, 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 who supports students moving 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.

Units

Numbers	In the Numbers unit, students read and write numbers up to 1 000 000, 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 Geometry unit, students sort and classify quadrilaterals, sort and construct polygons, and classify, measure, and construct angles. They learn how to find unknown angles. Students build 3D models using drawings and sketch isometric perspectives and different views. Furthermore, students plot and read points on a Cartesian plane.
Operations	In the Operations unit, 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.

Fractions, Percentages, Rations, 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 add and subtract fractions and multiply and divide whole numbers by proper fractions. They solve problems involving rations and learn how to calculate the percentage of a whole numbers. Students learn about the relationships among percentages, decimals, and fractions and explore the concept of unit rates.
Data Management and Probability	In the Data Management and Probability unit, students learn about discrete and continuous data, collect and organize data, select appropriate graphs, use technology, and determine how well a set of data represents a population. They learn how to create an infographic to represent data. Furthermore, students express theoretical probability as a fraction/decimal/percentage, represent probability on a range of 0 to 1, and predict the outcome of a probability experiment.
Algebra	In algebra, students learn to add monomials. They solve equations and problems involving one, two, and three variables. Students solve, verify, and graph inequalities.
Patterning	In the Patterning unit, students identify various repeating, growing, and shrinking patterns. They extend, create, translate, and represent patterns. Students use algebraic representations of pattern rules to solve problems. They use patterns to illustrate the relationship between whole and decimal numbers.
Coding	Students use various control structures to write efficient code. They solve problems using efficient code and debug and correct errors in coding to make it more efficient.
Measurement	In the Measurement unit, students estimate, measure, and record length, area, mass, and capacity. Students convert metric units and find the areas of quadrilaterals and polygons. Students estimate and calculate the surface area of a rectangular prism and a triangular prism.
Financial Literacy	In this unit, students compare different methods of payments and learn the different types of financial goals. Students identify factors that affect how reaching these financial goals may occur. Students describe how financial resources can be distributed and learn the concept of interest.

Reporting and The Final Grade (Facilitated)

Reporting

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 of the report 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 and the course median are reported as letter grades. 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.

The Final Grade

Student evaluation in 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 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. Students are not required to write a final exam in this course.

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