



# New math curriculum for Grades 1-8

Learn about Ontario's new elementary math curriculum for Grades 1 to 8. We will release the full curriculum in the summer and teachers will use it in classrooms starting in September 2020.

## Overview

We updated the [math curriculum \(https://www.dcp.edu.gov.on.ca/en/curriculum/elementary-mathematics\)](https://www.dcp.edu.gov.on.ca/en/curriculum/elementary-mathematics) for Grades 1 to 8. Teachers will use the new curriculum starting September 2020.

The new mathematics curriculum is part of a [four-year math strategy \(https://news.ontario.ca/edu/en/2019/08/first-year-investment-of-ontarios-four-year-math-strategy-announced.html\)](https://news.ontario.ca/edu/en/2019/08/first-year-investment-of-ontarios-four-year-math-strategy-announced.html), designed to:

- improve student performance in math
- help students solve everyday math problems
- increase students' employability to attain the jobs of the future

Ontario's elementary math curriculum was last updated in 2005.

## About the new math curriculum

### Content and structure

In the **2005 curriculum**, students found it difficult to connect learning from year to year. There are different expectations for English-language and French-language learners.

In the **2020 curriculum**, there will be clear connections to show how math skills build from year to year. There will be one curriculum in both English and French – the same learning experience for all Ontario students.

### Real-life connections

In the **2005 curriculum**, there are outdated examples for students.

In the **2020 curriculum**, there will be relevant, real-life examples that help connect math to everyday life, such as developing **infographics**, creating a **budget**, e-transfers and learning to **code**.

### Number facts

In the **2005 curriculum**, students are not required to memorize key number facts.

In the **2020 curriculum**, there will be more focus on **fundamental math concepts**, such as learning **multiplication** facts of  $0 \times 0$  to  $12 \times 12$ , to enhance **problem solving** and mental math.

### Spatial sense

In the **2005 curriculum**, younger grades have limited learning about **spatial reasoning**, for example making connections between **measurement** and **geometry**.

In the **2020 curriculum**, there will be use of spatial relationships and **shapes** to help young children prepare to learn later **math**. Across all grades, students will understand basic **number** concepts, **patterning** and **geometric** concepts.

### Fractions

In the **2005 curriculum**, fraction concepts are confusing in early grades.

In the **2020 curriculum**, there will be concepts about equal sharing to make **fractions** easier to understand, starting in Grade 1.

### Mathematics confidence

In the **2005 curriculum**, building mathematics confidence is implied.

In the **2020 curriculum**, there will be tools and strategies that are part of the curriculum to help students develop confidence, cope with challenges and think critically.

### Coding

In the **2005 curriculum**, there are no explicit references to coding.

In the **2020 curriculum**, starting in Grade 1, there will be **coding** skills to improve **problem solving** and develop fluency with technology.

### Financial literacy

In the **2005 curriculum**, **financial literacy** concepts are limited to basic understanding of **money** and coins.

the 2020 curriculum, there will be mandatory financial literacy learning in Grades 1 to 8, including understanding the value and use of money over time, how to manage financial well-being and the value of budgeting.

## Summary of major knowledge and skills

The curriculum will teach students fundamental math skills and connect them to real life to prepare students for success – now and in the future.

The new curriculum describes the knowledge and skills that students are expected to learn in each grade. It is organized in five areas with social-emotional learning skills and mathematical processes being taught and assessed through all areas.

### Number

Students learn about the world of numbers and develop fundamental skills, including understanding basic number facts, such as  $5 \times 5 = 25$  and how to solve mathematical problems in everyday life.

Students will:

- understand fundamental concepts and skills across all elementary grades so they are equipped to perform efficient and accurate mathematical calculations both mentally and on paper
- increase their confidence with different types of numbers – whole numbers, fractions, decimals and integers – and build the skills to use them for a variety of purposes and real-life applications
- start developmentally-appropriate fraction concepts earlier

### Algebra

Students learn about patterns and algebraic expressions. Students analyze real-life situations using coding and apply the process of mathematical modelling. For example, in Grade 1, students could plan and track class donations to a food bank and by Grade 8, students could develop a strategy to reduce waste at school.

Students will:

- be introduced to mathematical modelling and learn how math can be used to better understand and make predictions about real life
- develop algebraic reasoning skills throughout the grades, as students work with patterns, relationships and expressions

### Data

Students learn how to collect, organize, display and analyze data to make convincing arguments, informed decisions and predictions.

Students will:

- learn to be critical consumers of data and how to determine when data is being misrepresented
- develop skills to create infographics to tell a story using data
- make connections between the use of data and understanding the chance that something might happen, for example, weather forecasts

### Spatial sense

Students learn about measurement and geometry to help them describe and explore the world around them.

Students will:

- make connections between measurement and geometry in order to describe objects and their relationships to the space around them
- recognize how spatial sense informs graphic design, the planning of structures, and coding
- learn to estimate measures and use measurement tools accurately
- better understand different measurement units that are commonly referenced in the digital world today, including large measurement units, such as terabytes, and very small measurement units, such as nanoseconds

### Financial literacy

Students will build their skills and knowledge about the value and use of money, how decisions impact personal finances, as well as develop consumer and civic awareness.

Students will:

- learn how to manage finances responsibly, such as creating a budget to help save enough money to buy something they want such as a book, toy or a video game
- begin to develop a greater awareness as consumers and contributors in the local and broader economic system

### Social-emotional learning skills and mathematical processes

Social-emotional learning skills help students develop confidence, cope with challenges and think critically. This learning reflects current research and the government's commitment to student well-being and skill-building to help students see themselves as capable and confident math learners.

Students will develop social-emotional learning skills and use math processes (for example, problem solving and communicating) across the math curriculum. Students will learn to:

- make connections between math and everyday life, at home and in the community
- recognize mistakes and learn from them
- use strategies to be resourceful in working through challenging problems

## Support your child's learning

Math is everywhere. You can help your children make connections between what they learn in school and everyday experiences at home and in the community, such as:

- buying something at the store
- cooking at home

- managing money

You can make a difference and support your child's learning if you speak positively about math and model confidence. Learn more about how to [make math part of your day](https://www.ontario.ca/page/support-your-childs-math-learning) (<https://www.ontario.ca/page/support-your-childs-math-learning>).

## Find out what students learn grade by grade

Key concepts and skills like addition, subtraction, division and multiplication help set the stage for more advanced skills like working with decimals, data and integers.

New areas like coding, mathematical modelling and financial literacy will help provide the foundation students need to be competent and succeed in the world today. Prioritizing their well-being will help give students the tools and confidence to approach math positively, enjoy and appreciate mathematics as well as overcome any anxiety they may experience.

- [Grade 1](#)
- [Grade 2](#)
- [Grade 3](#)
- [Grade 4](#)
- [Grade 5](#)
- [Grade 6](#)
- [Grade 7](#)
- [Grade 8](#)

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### Grade 1

Here are some of the knowledge and skills that students are expected to learn.

#### Number

Students work with numbers up to 50 and begin to develop an understanding of the ways we use numbers. They are also introduced to the idea of fractions, through the context of sharing things equally.

#### Algebra

Students begin to look at how patterns can be used to make predictions. They also begin to work on the idea that in a number sentence (for example,  $2 + 2 = 4$ ) both sides must be equal to each other. These ideas are foundational to algebra work in later grades. Students will begin to write code to order a sequence of steps. They will also be introduced to mathematical modelling to analyze and create solutions for real-life situations, such as creating a seating arrangement for a class event.

#### Data

Students begin to develop their understanding about data by setting out to answer a question of interest (for example, "What type of animals do my classmates like?"). They organize this data into categories, and then display this information in order to draw conclusions.

#### Spatial sense

Students develop their spatial sense as they compare the length, mass and capacity of different objects as well as learn how calendars are organized to describe time. They also learn specific language to describe different shapes.

#### Financial literacy

Students learn to recognize Canadian coins and bills and compare their values.

#### Social emotional learning skills and math processes

Students learn about positive motivation, and how to use self talk strategies such as "I've done this before so I know I can do it again" as encouragement that they can do it or to encourage peers when counting.

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### Grade 2

Here are some of the knowledge and skills that students are expected to learn.

## Number

Students work with numbers up to 200. They develop and apply their growing understanding of numbers in various ways, such as solving problems involving addition and subtraction. They continue to work with fractions through the context of sharing things equally.

## Algebra

Students use shapes and numbers to continue to learn about patterns and how to extend them. They also learn about equality by adjusting pairs of addition and subtraction statements to make them equal. Students will develop code to move multiple objects from one location to another on a grid at the same time. They will also use mathematical modelling to analyze and create solutions for real-life situations, such as determining the cost of a lunch program.

## Data

Students continue to develop their understanding of data as they learn ways to collect, organize, display and interpret more complicated data. They will learn about the likelihood of events happening and how that can be used to make informed decisions, (for example, “If it is likely to rain tomorrow, then I should wear rain boots”).

## Spatial sense

Students continue to develop their spatial sense as they learn to visualize what different shapes look like when they are turned around or taken apart. They learn to recognize and describe more complex shapes and create simple maps of familiar places. Tools such as rulers will be used to accurately measure the lengths of objects, and timers and clocks are used to measure how much time has passed.

## Financial literacy

Students build on their understanding that money has value and identify different ways to represent the same amount of money. For example, how different combinations of coins can add up to \$1, and how different combinations of loonies, toonies and bills can add up to \$100.

## Social emotional learning skills and math processes

Students practise critical and creative thinking. For example, in financial literacy as students are learning to break down different denominations of money and select different tools and strategies such as making lists of different money combinations, drawing pictures of different groupings and using manipulatives to break down amounts in different ways.

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## Grade 3

Here are some of the knowledge and skills that students are expected to learn.

### Number

Students work with numbers up to 1,000 and learn how to break down numbers in different ways. For example, how the number 225 can be described as  $200 + 20 + 5$  or 2 hundreds, 2 tens, and 5 ones. Students learn that fractions can be represented in more than one way – for example, one-half can be thought of as two one-fourths. Multiplication is introduced using rows and columns, and students are expected to know  $\times 2$ ,  $\times 5$  and  $\times 10$ .

### Algebra

Students learn to identify and describe what repeats in a pattern, such as when a specific event happens every Monday, or when a number sequence goes up by 2 each time. Students begin to identify multiplication and division equations that are equal, such as  $3 \times 4$  and  $6 \div 2$ . Students will write code to perform a repeating operation, such as a repeating number pattern. They will also use mathematical modelling to analyze and create possible solutions for real-life situations, such as raising funds for a charity.

### Data

Students continue to develop their understanding of data. They learn more ways to collect, organize, display and interpret data involving larger numbers. They start to use scales on their graphs so they can represent larger data collections and use averages to make comparisons of data.

### Spatial sense

Students continue to develop their spatial sense as they recognize and describe three-dimensional objects and imagine what these objects would look like if they were taken apart or flipped around. Students continue to measure length and are introduced to measuring the weight of an object or how much it holds. They measure area and compare it to length, as well as learn how to tell time on both digital and analog clocks.

### Financial literacy

Students continue to develop their understanding of money by calculating the change required for simple transactions involving whole-dollar amounts.

### Social emotional learning skills and mathematical processes

Students identify and learn to manage emotions that they may feel such as pride, confusion, fear and excitement. For example, in algebra as they create and execute code that represents a mathematical situation.

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## Grade 4

Here are some of the knowledge and skills that students are expected to learn.

### Number

Students work with numbers up to 10,000 and are introduced to decimals. They learn how decimal numbers are used in real-life, such as taking a person's temperature on a thermometer and when making and recording precise measurements. Students will begin to divide two- and three-digit whole numbers by one-digit whole number and are expected to know multiplication facts from  $1 \times 1$  to  $10 \times 10$ . They also begin to solve problems that require more than one operation with whole numbers.

## Algebra

Students build their knowledge of patterning as they begin to classify patterns as repeating or increasing. They also begin to determine the values that make algebraic statements true – for example, if  $n + 3 = 10$ , then  $n$  must be 7. Students learn to write and read code to create geometric designs. They will also use the modelling process to analyze and create solutions for real-life situations, such as raising money through a walk-a-thon.

## Data

Developing an understanding of data continues as students collect, organize and display two or more data sets using frequency tables and multiple-bar graphs. Students begin to learn how to create an infographic, so that they can tell a story about data.

## Spatial sense

Students learn the characteristics and properties of a rectangle, one of the most common shapes in our everyday life. Students learn how to determine the area of a rectangle and the relationship between the various units in the metric system – a measurement system used throughout Canada and most of the world.

## Financial literacy

Students learn that there are different ways to pay for goods and services. Students also learn how consumers determine whether an item is good value for the price.

## Social emotional learning skills and mathematical processes

To learn about positive motivation, students will use a variety of tools and strategies in spatial sense as they try different non-standard units to measure the area of a table top, adjusting as they go in order to reach a solution.

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## Grade 5

Here are some of the knowledge and skills that students are expected to learn.

### Number

Students continue to work with numbers up to 100,000. Students are introduced to per cents and continue to build their understanding of decimals and fractions. Students are introduced to adding and subtracting fractions with the same denominator. Students are expected to know multiplication facts from  $0 \times 0$  to  $12 \times 12$ . They also solve problems involving more than one operation with whole and decimal numbers.

### Algebra

Students continue to classify patterns as repeating, growing and shrinking. Students begin to write and solve algebraic equations involving whole numbers, such as  $3 + x = 24 - 5$ . Students apply their understanding of multiplication and ratios to create and execute code for patterns that grow. They use the process of mathematical modelling to solve problems drawn from real-life, such as creating a design for a school playground and calculating how much the play structures they have chosen would cost.

### Data

Students learn about the importance of using various sampling techniques to get "good" data. They create infographics and learn how to identify when graphs are misleading. Students begin to use experiments to understand the concept of probability.

### Spatial sense

The development of spatial sense continues as students study the triangle. Students learn the characteristics and properties of different kinds of triangles, including their angles and measurements. Work continues in understanding and using the metric system to measure length, area, mass and capacity, and to convert from larger units to smaller ones.

### Financial literacy

Students learn about different ways to transfer money between people and organizations, such as e-transfers and cheques. They calculate the total cost and change required for cash transactions involving items priced in dollars and cents, using mental math and other strategies. Students learn how to determine the best value for an item – for example, five apples for \$1.00 versus three apples for 75 cents. Students prepare basic budgets and learn about the concepts of credit and debt.

### Social emotional learning skills and mathematical processes

Students continue to develop healthy relationship skills while working with numbers. Students play games with classmates that involve fractions, decimals and whole numbers. They also learn how to have positive interactions and be patient with others as students take different amounts of time to figure out the answer when it is their turn.

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## Grade 6

Here are some of the knowledge and skills that students are expected to learn.

### Number

In addition to working with numbers up to 1 million, students are introduced to integers, such as -2, -1, 0, 1, 2. They are learning the divisibility rules of 2, 3, 4, 5, 6, 8, 9, and 10. For example, a number is divisible by 5 if it ends in a 5 or 0. Expanding operational skills include dividing a whole number by a fraction or a mixed number, such as  $2\frac{1}{2}$ . Students also solve problems that involve more than one operation and the use of whole numbers, decimals and fractions.

## Algebra

Students continue to work with patterns and start to identify patterns that grow at a constant rate. For example, if someone drives 100 kilometers per hour, the distance travelled increases by 100 kilometers for each hour. They solve algebraic expressions involving whole numbers and decimal tenths, and algebraic equations involving multiple terms, such as  $2x + 3x = 5$ . Students use code to solve problems that involve optimization, such as finding the maximum area for a given perimeter. They also use the process of mathematical modelling to solve problems drawn from real-life, such as finding several different ways to maximize the play area in a playground design and calculating the costs of each.

## Data

Students learn to distinguish between discrete data, such as the number of students, and continuous data, such as the amount of precipitation in centimeters. They can choose how to display these different types of data, including the use of broken-line graphs to show the change over time. In addition, students learn different ways to describe probability. For example, there is a one in four chance of winning a prize at the school fun fair, or there is a 40 per cent chance of rain tomorrow.

## Spatial sense

Developing spatial sense continues with an emphasis on four-sided shapes. Students learn the characteristics and properties of different kinds of four-sided shapes and find their areas. They also build three-dimensional structures and learn to calculate surface area. Students learn to convert from one unit to another in the metric system. They also focus on extending their ability to measure angles.

## Financial literacy

The advantages and disadvantages of using different methods of payment for goods and services are explored. Students investigate different types of financial goals, identify and describe factors that could affect these goals, and outline steps to achieve them. Students explain the concept of interest rates and identify interest rates and fees offered by banks and other financial institutions. They also learn how trading, lending, borrowing and donating are different ways to distribute resources.

## Social emotional learning skills and mathematical processes

Students continue to deepen their sense of self. Students track different aspects that impact their physical and mental health, such as the number of steps they take each day, minutes of screen time or how they feel after physical activity. They use graphs and data visualization tools to provide information for reflection and learning.

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## Grade 7

Here are some of the knowledge and skills that students are expected to learn.

### Number

Working with numbers up to 1 billion, students are introduced to rational numbers, such as perfect squares and square roots. They are expected to know multiplication facts from  $0 \times 0$  to  $12 \times 12$ . Students begin to generate factors (for example, factors of 6 are 1 and 6, 2 and 3), multiples (such as multiples of 6 are 6, 12, 24, and so on) and add and subtract fractions by creating equivalent fractions. Students explore problems that require addition and subtraction of integers (for example, determine the overall score or change in temperature).

### Algebra

Students connect their understanding of whole-number patterns to patterns involving decimals. They continue to solve equations that involve multiple terms, whole numbers, and decimal numbers, such as  $2x + 5 = 3x - 1$ . Students write code to simulate a probability experiment and determine the different results in a game. They also use mathematical modelling to provide insight into real-life situations, such as determining the best options for raising funds for a local charity.

### Data

Students learn how to use circle graphs to represent data. They begin to develop a critical eye for analyzing data by examining graphs that may be misleading. Students also determine the differences between the probability of independent events versus dependent events. For example, how does the probability differ if two marbles are drawn from a bag with or without replacement.

### Spatial sense

Students continue to develop spatial sense as they study the circle. Students learn to measure various aspects of circles, such as circumference, diameter radius and area. They use these and other measurements to find the surface area and volume of cylinders and other three-dimensional objects. Students also learn how to dilate - enlarge and shrink - a shape.

### Financial literacy

Students begin to learn that international currencies have different values compared to Canadian dollars and understand how exchange rates work. They develop an awareness of how to plan for and reach financial goals. Students build their knowledge of how interest rates can affect savings and investments. They also learn about the cost of borrowing and compare interest rates and fees for different types of accounts and loans to become more informed consumers.

### Social-emotional learning skills and mathematical processes

Students learn how to cope with stress and manage complex challenges. Students learn to break down a task into smaller portions, make a plan and take it one step at a time.

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## Grade 8

Here are some of the knowledge and skills that students are expected to learn.

### Number

Students use scientific notation such as  $5.46 \times 10^6$  to understand, represent and compare very large and small numbers more easily, which is often required in Science. Students use fractions, decimals and per cents interchangeably, and should be able to recall square numbers to 144 and their square roots. Students solve problems that involve proportions

(for example, determining the percentage increase or decrease in the attendance of a show) and whole numbers, fractions, decimals, integers and exponents.

## Algebra

Students continue to develop their understanding of patterns, including those that involve integers. They use algebraic notation, such as  $s = d/t$ , to represent the relationship between speed, distance and time. They solve algebraic equations involving multiple terms, integers and decimal numbers. Students write code to create a line or curve that falls between the greatest number of data points. They also use modelling for real-life situations, such as making predictions about future fundraisers based on the funds raised from past fundraisers.

## Data

Students continue to build their data skills. They analyze data that is presented in more complex ways, such as in scatter plots, that show the relationship between two variables. In addition, students continue to increase their understanding of probability by comparing the outcomes of more complex experiments.

## Spatial sense

Students continue to develop spatial sense as they study right-angle triangles. They learn that if two side lengths are known, then the length of the third can be figured out without measuring it, using the Pythagorean Theory. Students learn how to calculate unknown angles by applying the angle properties of intersecting and parallel lines. Students also build their understanding of very large units such as a terabyte and very small units like a nanosecond that are used in current technologies.

## Financial literacy

Students learn to create a plan to reach financial goals and identify ways to maintain balanced budgets. Students compare different ways that consumers can get value for their money when spending, such as using reward programs or taking advantage of sales. Students investigate the concepts of simple and compound interest using technology, (for example, a spreadsheet program) and explain how interest affects long-term financial planning.

## Social emotional learning skills and mathematical processes

Students continue to build healthy relationship skills. They will use data in an infographic to communicate and tell a story and build awareness about others. This will help them understand things they have in common with their peers and what makes different groups unique.

## How we developed the new curriculum

This new curriculum was informed by the results of Ontario's 2018 [public consultation \(http://www.edu.gov.on.ca/eng/parents/consultations.html\)](http://www.edu.gov.on.ca/eng/parents/consultations.html) with parents, educators and stakeholders about the areas of focus that would help improve student achievement.

The curriculum has also been informed by extensive research led by Dr. Christine Suurtamm, Vice-Dean of Research and Professional Development and Full Professor of Mathematics Education at the Faculty of Education, University of Ottawa, with input from academics and education experts in the area of math learning.

To understand current approaches to teaching math, we researched trends in high achieving regions and reviewed best practices in math education.

We continue to work with leaders, researchers and teachers in math education to ensure the new curriculum is relevant and meets the needs of Ontario.

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## Related

- [Current elementary math curriculum \(http://www.edu.gov.on.ca/eng/curriculum/elementary/math.html\)](http://www.edu.gov.on.ca/eng/curriculum/elementary/math.html) (2020)
- [Current Grade 9-10 math curriculum \(http://www.edu.gov.on.ca/eng/curriculum/secondary/math.html\)](http://www.edu.gov.on.ca/eng/curriculum/secondary/math.html) (2005)
- [Current Grade 11-12 math curriculum \(http://www.edu.gov.on.ca/eng/curriculum/secondary/math.html\)](http://www.edu.gov.on.ca/eng/curriculum/secondary/math.html) (2007)
- [Help your child with math at home \(https://www.ontario.ca/page/support-your-childs-math-learning\)](https://www.ontario.ca/page/support-your-childs-math-learning)
- [Mathify \(https://www.tvomathify.com/students\)](https://www.tvomathify.com/students)
- [Eureka \(https://moneureka.ca/\)](https://moneureka.ca/) (formerly SOS Devoirs)
- [TVO mPower \(https://mpower.tv.org/#/login/\)](https://mpower.tv.org/#/login/)