

# Introduction to the Victorian Curriculum 7-10: Mathematics

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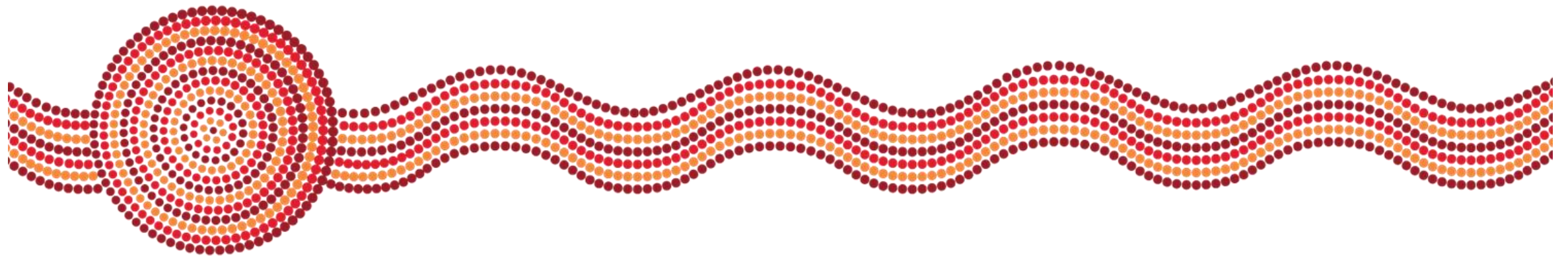
# Acknowledgment of Country

*I would like to acknowledge the traditional custodians of the many lands across Victoria on which each of you are living, learning and working from today.*

*For myself and those of us in the Melbourne metropolitan area, we acknowledge the traditional custodians of the Kulin Nations.*

*When acknowledging country, we recognise Aboriginal and Torres Strait Islander peoples' spiritual and cultural connection to country and acknowledge their continued care of the lands and waterways over generations, while celebrating the continuation of a living culture that has a unique role in this region.*

*I would like to pay my respects to Elders past, present and emerging, for they hold the memories, traditions, culture and hopes of all Aboriginal and Torres Strait Islander peoples across the nation, and hope they will walk with us on our journey.*



# The VCAA

- The VCAA is a statutory authority primarily accountable to the Minister for Education, serving both government and non-government schools.
- The vision of the Victorian Curriculum and Assessment Authority (VCAA) is to be a global education leader.
- The VCAA's mission is to provide high quality curricula, assessment and reporting to enable learning for life.

# Purpose

- **Introduction to the Victorian Mathematics Curriculum 7-10**

# Victorian Curriculum F-10

- Provides a stable foundation for the development and implementation of whole-school teaching and learning programs
- The Victorian Curriculum F–10 incorporates the Australian Curriculum and reflects Victorian priorities and standards

The Victorian Curriculum Foundation–10 (F–10) sets out what every student should learn during their first eleven years of schooling. The curriculum is the common set of knowledge and skills required by students for life-long learning, social development and active and informed citizenship.

The Victorian Curriculum F–10 incorporates the Australian Curriculum and reflects Victorian priorities and standards.

**Curriculum planning**

The [Curriculum Planning Resource](#) offers schools a range of resources to support planning and documenting a comprehensive whole-school teaching and learning program based on the curriculum.

LEARNING AREAS	CAPABILITIES
<b>The Arts</b> <ul style="list-style-type: none"><li>• Dance</li><li>• Drama</li><li>• Media Arts</li><li>• Music</li><li>• Visual Arts</li><li>• Visual Communication Design</li></ul>	Critical and Creative Thinking Ethical Intercultural Personal and Social
<b>English</b> <b>Health and Physical Education</b> <b>The Humanities</b> <ul style="list-style-type: none"><li>• Civics and Citizenship</li><li>• Economics and Business</li><li>• Geography</li><li>• History</li></ul>	
<b>Languages</b> <b>Mathematics</b> <b>Science</b> <b>Technologies</b> <ul style="list-style-type: none"><li>• Design and Technologies</li><li>• Digital Technologies</li></ul>	

<http://victoriantcurriculum.vcaa.vic.edu.au/>

# F – 10 Curriculum website

## Curriculum area resources

Access curriculum area-specific resources organised by 'Help me plan', 'Help me find a teaching resource' and 'Help me assess'.

Help me find curriculum area resources



## Cross-curriculum resources

Find resources for topics that draw on and link to multiple curriculum areas, such as Respectful Relationships and STEM.

Help me find cross-curriculum resources



## Professional learning

View all upcoming online and face-to-face F–10 professional learning events, access specific event information and register to attend an event.

Help me find professional learning opportunities



# Mathematics

## Resources

Curriculum area-specific resources have been developed to support teachers implementing the curriculum, organised by 'Help me plan', 'Help me find a teaching resource' and 'Help me assess'.

For F-10 curriculum area advice to support remote learning, see [Curriculum advice for remote and flexible learning](#) for this curriculum area.

Help me plan



Help me find a teaching  
resource



Help me assess



Frequently asked questions



# Victorian Mathematics Curriculum F-10

The Mathematics curriculum aims to ensure that students:

- develop useful mathematical and numeracy skills for everyday life, work and as active and critical citizens in a technological world
- see connections and apply mathematical concepts, skills and processes to pose and solve problems in mathematics and in other disciplines and contexts
- acquire specialist knowledge and skills in mathematics that provide for further study in the discipline
- appreciate mathematics as a discipline – its history, ideas, problems and applications, aesthetics and philosophy.



# Mathematics Curriculum Structure

- **Strands and Sub strands**

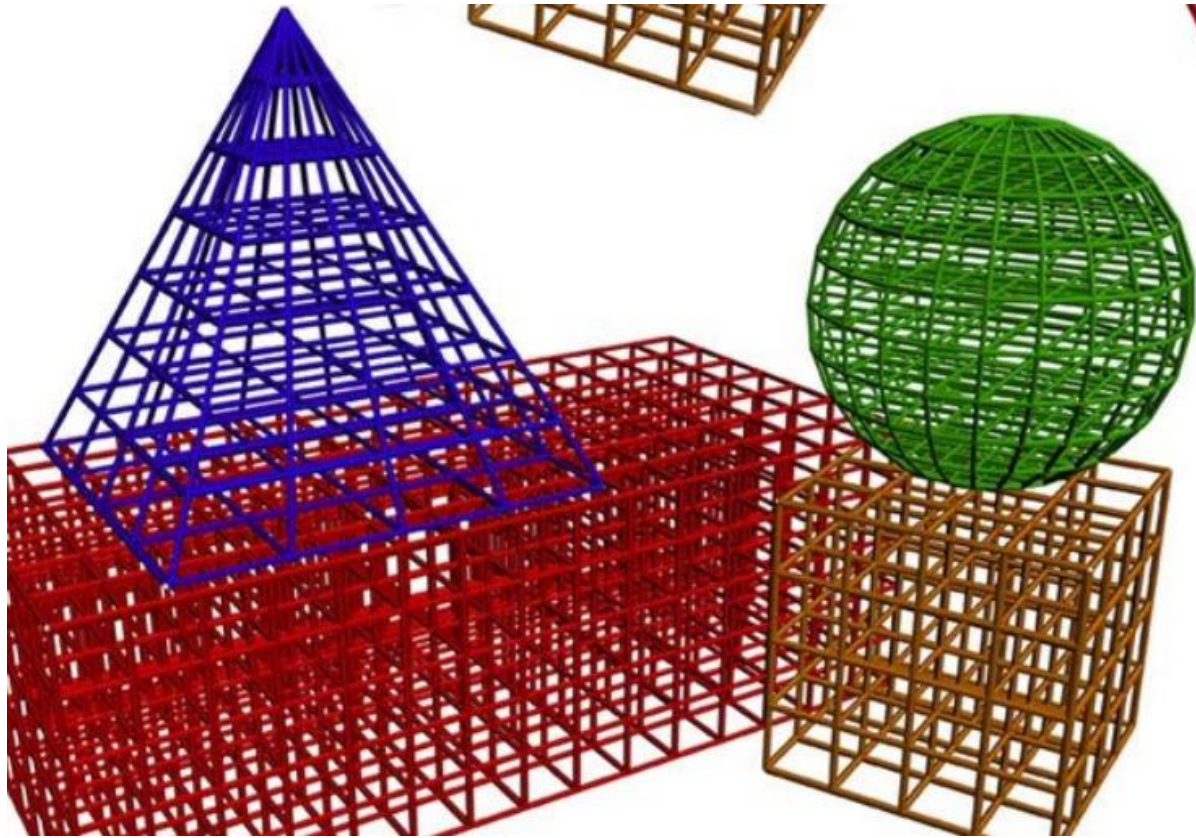
Number and Algebra	Measurement and Geometry	Statistics and Probability
Number and place value	Using units of measurement	Chance
Fractions and decimals	Shape	Data representation and interpretation
Real numbers	Geometric reasoning	
Money and financial mathematics	Location and transformation	
Patterns and algebra	Pythagoras and trigonometry	
Linear and non-linear relationships		

# Number and Algebra



- **Number and Place Value**
- **Fractions and Decimals**
- **Real Numbers**
- **Money and Financial mathematics**
- **Patterns and Algebra**
- **Linear and Non Linear relationships**

# Measurement and Geometry



- Using units of measurement
- Geometric reasoning
- Location and transformation
- Pythagoras and Trigonometry

# Statistics and Probability



- **Chance**
- **Data representation and interpretation**

# Level Descriptions

## Mathematics

Introduction **Curriculum**

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Show  Level descriptions  Content descriptions  Achievement standards

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**Foundation Level**      **Level 1**      **Level 2**

### Foundation Level Description

In Foundation level, students play with objects and draw pictures to develop links between their immediate environment, everyday language and mathematical activity.

Students classify and sort objects into sets and form simple correspondences between them. They decide when two sets are of equal size, or one is smaller or bigger than another. They develop an understanding of the concepts of number and numeral, count, order, add and share using small sets of objects. They create and continue simple patterns.

Students compare common objects with respect to length, mass and capacity, and order events and compare their duration. They make rough estimates and simple measurements with respect to informal units. Students name, sort and describe familiar everyday shapes and objects, and describe position and movement in their immediate environment.

Students investigate situations requiring data collection and presentation in simple displays, and recognise unpredictability and uncertainty in some events.

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### Level 1 Description

In Level 1, students use mathematical symbols and language as well as materials and drawings in their mathematical explorations of daily life.

Students recognise, represent and order numbers to at least 100 using materials, diagrams, words, numerals and a number line, and apply this with respect to the value of Australian coins. They group and skip count by twos, fives and tens, and count to 100 by partitioning and using place value. Students solve simple addition problems, and share into two equal groups or parts to model one-half.

Students use uniform informal units to measure and compare length and capacity. They tell time to the half-hour and use time and calendar terms such as hours, days, weeks and months to describe duration. Students use terms such as corner, edge and face to classify familiar shapes and objects, and are able to give and follow directions to familiar locations.

Students use one-to-one correspondences to display categorical data obtained from a simple investigation. They identify chance events in familiar contexts and use everyday language such as 'will happen', 'won't happen' or 'might happen' in relation to these.

### Level 2 Description

In Level 2, students use group arrangement to apply place value and range of numbers they use an

Students recognise, model an

[Show more](#)

**Level 2 Content Descriptive**

# Content Descriptions

## Mathematics

Introduction **Curriculum**

Filter Showing all levels

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Show  Level descriptions  Content descriptions  Achievement standards

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### Level 7

#### Level 7 Description

In Level 7, students work with powers of whole numbers, use index notation, represent numbers as products of powers of prime numbers, and investigate square roots of perfect squares. They use number...

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#### Level 7 Content Descriptions

##### Number and Algebra

###### Number and place value

Investigate index notation and represent whole numbers as products of powers of prime numbers (VCMNA238)

Investigate and use square roots of perfect square numbers (VCMNA239)

Apply the associative, commutative and distributive laws to aid mental and written computation and make estimates for these computations (VCMNA240)

Compare, order, add and subtract integers (VCMNA241)

###### Real numbers

Compare fractions using equivalence. Locate and represent positive and negative fractions and mixed

### Level 8

#### Level 8 Description

In Level 8, students consolidate their proficiency with the four arithmetic operations, and combinations of these, for general computation involving natural numbers, integers and rational numbers...

Show more

#### Level 8 Content Descriptions

##### Number and Algebra

###### Number and place value

Use index notation with numbers to establish the index laws with positive integral indices and the zero index (VCMNA272)

Carry out the four operations with rational numbers and integers, using efficient mental and written strategies and appropriate digital technologies and make estimates for these computations (VCMNA273)

###### Real numbers

Investigate terminating and recurring decimals (VCMNA274)

Investigate the concept of irrational numbers, including  $\pi$  (VCMNA275)

Solve problems involving the use of percentages

### Level 9

#### Level 9 Description

In Level 9, students develop familiarity with a broader range of non-linear and linear functions and relations, and related algebra and graphs.

Students apply index laws with integer indices to a...

Show more

#### Level 9 Content Descriptions

##### Number and Algebra

###### Real numbers

Solve problems involving direct proportion. Explore the relationship between graphs and equations corresponding to simple rate problems (VCMNA301)

Apply index laws to numerical expressions with integer indices (VCMNA302)

Express numbers in scientific notation (VCMNA303)

###### Money and financial mathematics

Solve problems involving simple interest (VCMNA304)

###### Patterns and algebra

Extend and apply the index laws to variables, using positive integer indices and the zero index (VCMNA305)

## Mathematics / Level 7 / Number and Algebra / Number and place value

Content description	Elaborations
Investigate index notation and represent whole numbers as products of powers of prime numbers	<ul style="list-style-type: none"> <li>defining and comparing prime and composite numbers and explaining the difference between them</li> <li>applying knowledge of factors to strategies for expressing whole numbers as products of powers of prime factors, such as repeated division by prime factors or creating factor trees</li> <li>solving problems involving lowest common multiples and greatest common divisors (highest common factors) for pairs of whole numbers by comparing their prime factorisation</li> </ul>

Code

VCMNA238

ScOT catalogue terms

Indices: [Prime numbers](#)

Curriculum resources and support

FUSE

Find related teaching and learning resources in FUSE\*

\*[Disclaimer](#) about use of these sites

 VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

Find related curriculum resources on the [VCAA resources site](#)

# Achievement Standards

- **Achievement Standard statement is what we are requiring students to achieve, and what we report against.**
- **The Content Descriptions are developed, as ‘stepping stones’ to reach the Achievement Standard at a given level**

## Level 7

### Level 7 Achievement Standard

#### Number and Algebra

Students solve problems involving the order, addition and subtraction of integers. They make the connections between whole numbers and index notation and the relationship between perfect squares and square roots. They solve problems involving all four operations with fractions, decimals, percentages and their equivalences, and express fractions in their simplest form. Students compare the cost of items to make financial decisions, with and without the use of digital technology. They make simple estimates to judge the reasonableness of results. Students use variables to represent arbitrary numbers and connect the laws and properties of number to algebra and substitute numbers into algebraic expressions. They assign ordered pairs to given points on the Cartesian plane and interpret and analyse graphs of relations from real data. Students develop simple linear models for situations, make predictions based on these models, solve related equations and check their solutions.

#### Measurement and Geometry

Students use formulas for the area and perimeter of rectangles. They classify triangles and quadrilaterals and represent transformations of these shapes on the Cartesian plane, with and without the use of digital technology. Students name the types of angles formed by transversals crossing parallel lines and solve simple numerical problems involving these lines and angles. They describe different views of three-dimensional objects, and use models, sketches and digital technology to represent these views. Students calculate volumes of rectangular prisms.

#### Statistics and Probability

Students identify issues involving the collection of discrete and continuous data from primary and secondary sources. They construct stem-and-leaf plots and dot-plots. Students identify or calculate mean, mode, median and range for data sets, using digital technology for larger data sets. They describe the relationship between the median and mean in data displays. Students determine the sample space for

## Level 8

### Level 8 Achievement Standard

#### Number and Algebra

Students use efficient mental and written strategies to make estimates and carry out the four operations with integers, and apply the index laws to whole numbers. They identify and describe rational and irrational numbers in context. Students estimate answers and solve everyday problems involving profit and loss rates, ratios and percentages, with and without the use of digital technology. They simplify a variety of algebraic expressions and connect expansion and factorisation of linear expressions. Students solve linear equations and graph linear relationships on the Cartesian plane.

#### Measurement and Geometry

Students convert between units of measurement for area and for volume. They find the perimeter and area of parallelograms, rhombuses and kites. Students name the features of circles, calculate circumference and area, and solve problems relating to the volume of prisms. They make sense of time duration in real applications, including the use of 24-hour time. Students identify conditions for the congruence of triangles and deduce the properties of quadrilaterals. They use tools, including digital technology, to construct congruent shapes.

#### Statistics and Probability

Students explain issues related to the collection of sample data and discuss the effect of outliers on means and medians of the data. They use various approaches, including the use of digital technology, to generate simple random samples from a population. Students model situations with Venn diagrams and two-way tables and explain the use of ‘not’, ‘and’ and ‘or’. Students choose appropriate language to describe events and experiments. They determine complementary events and calculate the sum of probabilities.

Show less

## Level 9

### Level 9 Achievement Standard

#### Number and Algebra

Students apply the index laws using integer indices to variables and numbers, express numbers in scientific notation, solve problems involving very small and very large numbers, and check the order of magnitude of calculations. They solve problems involving simple interest. Students use the distributive law to expand algebraic expressions, including binomial expressions, and simplify a range of algebraic expressions. They find the distance between two points on the Cartesian plane and the gradient and midpoint of a line segment using a range of strategies including the use of digital technology. Students sketch and draw linear and non-linear relations, solve simple related equations and explain the relationship between the graphical and symbolic forms, with and without the use of digital technology.

#### Measurement and Geometry

Students solve measurement problems involving perimeter and area of composite shapes, surface area and volume of rectangular prisms and cylinders, with and without the use of digital technology. They relate three-dimensional objects to two-dimensional representations. Students explain similarity of triangles, interpret ratios and scale factors in similar figures, and apply Pythagoras’s theorem and trigonometry to solve problems involving angles and lengths in right-angled triangles.

#### Statistics and Probability

Students compare techniques for collecting data from primary and secondary sources, and identify questions and issues involving different data types. They construct histograms and back-to-back stem-and-leaf plots with and without the use of digital technology. Students identify mean and median in skewed, symmetric and bi-modal displays and use these to describe and interpret the distribution of the data. They calculate relative frequencies to estimate probabilities. Students list outcomes for two-step experiments and assign probabilities for those outcomes and related events.

# Proficiencies

- **Understanding**
- **Fluency**
- **Problem Solving**
- **Reasoning**



# Scope and Sequence

Level 7	Level 8	Level 9	Level 10	Level 10A
<b>Number and Algebra</b>				
<b>Number and place value</b>				
Investigate index notation and represent whole numbers as products of powers of prime numbers	Use index notation with numbers to establish the index laws with positive integral indices and the zero index			
Investigate and use square roots of perfect square numbers	Carry out the four operations with rational numbers and integers, using efficient mental and written strategies and appropriate digital technologies and make estimates for these computations			
Apply the associative, commutative and distributive laws to aid mental and written computation and make estimates for these computations				
Compare, order, add and subtract integers				
<b>Real numbers</b>				
Compare fractions using equivalence. Locate and represent positive and negative fractions and mixed numbers on a number line	Investigate terminating and recurring decimals	Solve problems involving direct proportion. Explore the relationship between graphs and equations corresponding to simple rate problems	Solve simple problems involving inverse proportion	Define rational and irrational numbers and perform operations with surds and fractional indices
Solve problems involving addition and subtraction of fractions, including those with unrelated denominators	Investigate the concept of irrational numbers, including $\pi$	Apply index laws to numerical expressions with integer indices		Use the definition of a logarithm to establish and apply the laws of logarithms and investigate logarithmic scales in measurement
Multiply and divide fractions and decimals using efficient written strategies and digital technologies	Solve problems involving the use of percentages, including percentage increases and decreases and percentage error, with and without digital technologies	Express numbers in scientific notation		
Express one quantity as a fraction of another, with and without the use of digital technologies	Solve a range of problems involving rates and ratios, including distance-time problems for travel at a constant speed, with and without digital technologies			
Round decimals to a specified number of decimal places				
Connect fractions, decimals and percentages and carry out simple conversions				
Find percentages of quantities and express one quantity as a percentage of another, with and without digital technologies				
Recognise and solve problems involving simple ratios				
<b>Money and financial mathematics</b>				
Investigate and calculate 'best buys', with and without digital technologies	Solve problems involving profit and loss, with and without digital technologies	Solve problems involving simple interest	Connect the compound interest formula to repeated applications of simple interest using appropriate digital technologies	
<b>Patterns and algebra</b>				
Introduce the concept of variables as a way of representing numbers using letters	Extend and apply the distributive law to the expansion of algebraic expressions	Extend and apply the index laws to variables, using positive integer indices and the zero index	Factorise algebraic expressions by taking out a common algebraic factor	Investigate the concept of a polynomial and apply the factor and remainder theorems to solve problems
Create algebraic expressions and evaluate them by substituting a given value for each variable	Factorise algebraic expressions by identifying numerical factors	Apply the distributive law to the expansion of algebraic expressions, including binomials, and collect like terms where appropriate	Simplify algebraic products and quotients using index laws	Devise and use algorithms and simulations to solve mathematical problems
Extend and apply the laws and properties of arithmetic to algebraic terms and expressions	Simplify algebraic expressions involving the four operations	Apply set structures to solve real-world problems	Apply the four operations to simple algebraic fractions with numerical denominators	
Design and implement mathematical algorithms using a simple general purpose programming language	Use algorithms and related testing procedures to identify and correct errors		Expand binomial products and factorise monic quadratic expressions using a variety of strategies	
			Substitute values into formulas to determine an unknown and rearrange formulas to solve for a particular term	

# 10A

10A provides optional, additional content at level 10 for students to be extended in their mathematical studies.

**How should schools deal with the selection of optional content from 10A so that students are suitably prepared for subsequent study of VCE Mathematical Methods Units 1 and 2?**

Schools use a variety of teaching and learning strategies and organisational structures, suited to their context, to ensure that students have relevant mathematical background from the Victorian Curriculum Mathematics that enables them to pursue various pathways of post-secondary study.

Relevant content from 10A for subsequent study of Mathematical Methods Units 1 and 2 is covered in the content descriptions: VCMNA355, VCMNA356, VCMNA358, VCMNA359, VCMNA360, VCMNA362, VCMNA363, VCMNA364, VCMNA368.

# Numeracy

- **Victorian Curriculum F-10 Mathematics**
- **Numeracy**
- **The ‘[Numeracy across the Victorian Curriculum](#)’ resources**

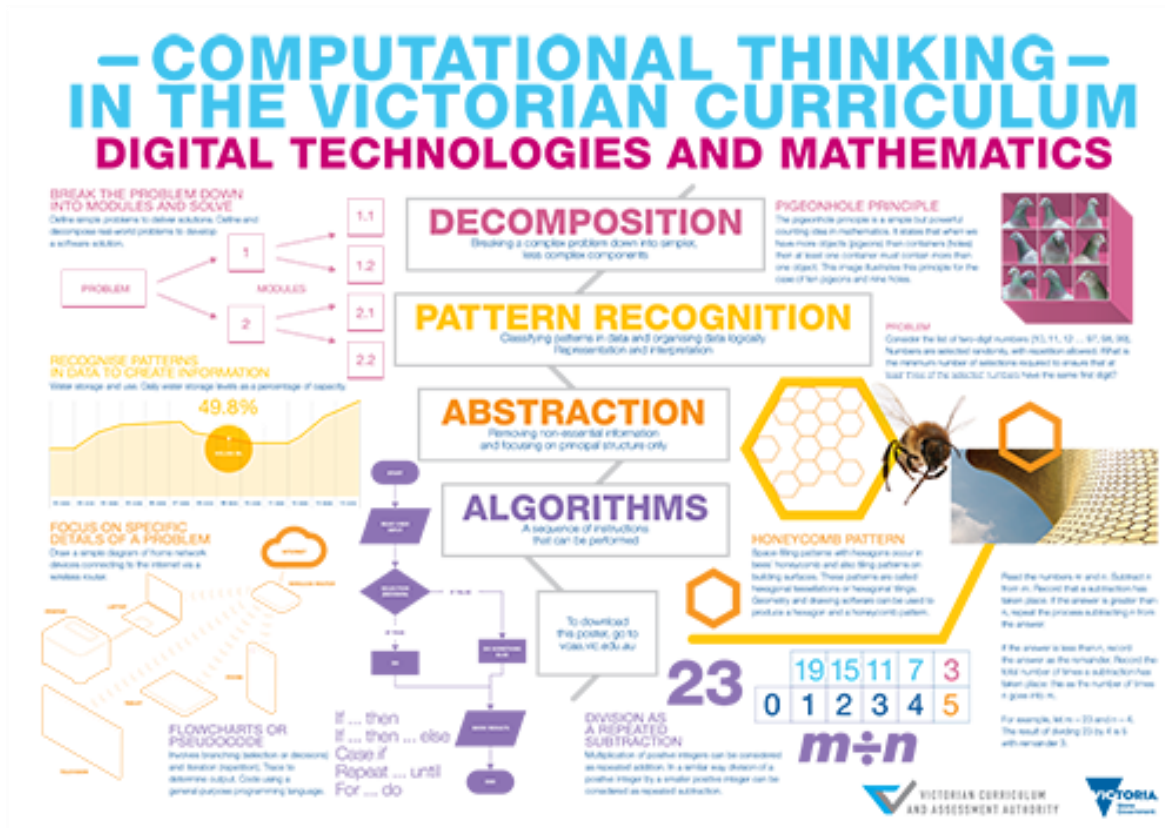
# Resources

Planning	Teaching	Assessing
<a href="https://vcaa.vic.edu.au">Pages - Curriculum mapping templates (vcaa.vic.edu.au)</a>	<a href="https://vcaa.vic.edu.au">Pages - Help me find a teaching resource (vcaa.vic.edu.au)</a>	<a href="https://vcaa.vic.edu.au">Pages - Annotated work samples (vcaa.vic.edu.au)</a>
<a href="https://vcaa.vic.edu.au">Pages - Scope and sequence (vcaa.vic.edu.au)</a>		<a href="https://vcaa.vic.edu.au">Pages - Mathematics - Indicative progress (vcaa.vic.edu.au)</a>
<a href="https://vcaa.vic.edu.au">Home   Victorian Curriculum Planning (vcaa.vic.edu.au)</a>		<a href="https://vcaa.vic.edu.au">Pages - Formative Assessment (vcaa.vic.edu.au)</a>

# Resources (ctd)

- **Sample Programs**
- **Annotated student work samples F, 3, 5, 7 and 9**
- **Computational thinking poster and activities**
- **Formative assessment guides**
- **External resources links**
- **DET - FUSE (Numeracy Guide, Mathematics Toolkit and Companion)**

# Computational Thinking



- **Decomposition**
  - Break down the problem into simpler, less complex components
- **Pattern Recognition**
  - Classify patterns in data and organizing data logically
  - Representation and interpretation
- **Abstraction**
  - Removing non essential information and focusing on principal structure only
- **Algorithms**
  - A sequence of instructions that can be performed

# Frequently Asked Questions

- We have a [FAQ webpage](#)
- Do you have any mathematics curriculum questions?
- Contact

[dianna.chapman@education.vic.gov.au](mailto:dianna.chapman@education.vic.gov.au)

# Four questions received

Is there a website or place where resources are dedicated to hands on material? (i.e unifex cubes and relevant activities [click here](#), dice and relevant activities to go with it [click here](#) etc.)

What are the most effective ways of differentiating learning using the Victorian curriculum when your class has a large range of abilities? Is it better to move students between levels or just deepen their knowledge of a concept/skill?

What is important to focus on with students who are well below standard, eg our school's year 9 & 10 vocational maths programme?

When will the next review of the Victorian Curriculum occur and what changes will we be expecting?



# Contacts

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**For further advice about the implementation of the F–10 curriculum in Victorian schools, including developments, resources and professional learning opportunities, please subscribe to the F–10 Curriculum Update:**

<https://www.vision6.com.au/em/forms/subscribe.php?db=399327&s=112201&a=18689&k=799b5d6>