Mathematics Sample Program: Year 2



**Contents**

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Level 7, 2 Lonsdale Street
Melbourne VIC 3000

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Abbreviations

ABS Australian Bureau of Statistics

AMSI Australian Mathematical Sciences Institute

CIMT Centre for Innovation in Mathematical Teaching (Plymouth, United Kingdom)

DET Department of Education and Training

ESA Educational Services Australia

NCTM National Council Teachers of Mathematics

NLVM National Library of Virtual Manipulatives

MAV Mathematical Association of Victoria

Hyperlinks

At the time of publication the URLs (website addresses) cited were checked for accuracy and appropriateness of content. However, due to the transient nature of material placed on the web, their continuing accuracy cannot be verified. Teachers are strongly advised to prepare their own indexes of sites that are suitable and applicable to the courses they teach, and to check these addresses prior to allowing student access.

Overview

This Mathematics Sample Program: Year 2 is an example of how the Mathematics curriculum could be organised into a teaching and learning program.

This sample program provides comprehensive coverage of content descriptions from the three strands of the mathematics curriculum and is sequenced to develop knowledge and skills; however, there are many other ways that the curriculum content can be arranged to suit the learning needs of students.

Topics, suggested time allocations and sequencing

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| --- | --- | --- |
| **Week\*** | **Semester 1** | **Semester 2** |
| **1** | *2.1.1 Skip Counting and Number Sequences* Strand: Number and AlgebraSub-strand: Number and Place Value   | *2.2.1 Recognising and Representing Multiplication and Division*Strand: Number and Algebra Sub-strand: Number and Place Value    |
| **2** |
| **3** | *2.1.2 Measurement - Comparing Length, Area*Strand: Measurement and GeometrySub-strand: Using Units of Measurement   |
| **4** | *2.2.2 Measuring Mass, Volume and Capacity*Strand: Measurement and GeometrySub-strand: Using Units of Measurement   |
| **5** |
|   |
| **6** | *2.1.3 Language of Chance*Strand: Statistics and Probability Sub-strand: Chance  |
| **7** | *2.2.3 Asking Questions, and Collecting, Showing and Interpreting Data*Strand: Statistics and ProbabilitySub-strand: Data Representation and Interpretation |
| **8** | *2.1.4 Place Value to 1000*Strand: Number and AlgebraSub-strand: Number and Place Value   |
| **9** | *2.2.4 Halves, Quarters and Eighths of Wholes and Groups* Strand: Number and AlgebraSub-strand: Fractions and Decimals  |
| **10** |
| **11** | *2.1.5 Counting and Making Money Amounts*Strand: Number and AlgebraSub-strand: Money and Financial Mathematics   | *2.2.5 Describing 2D Shapes and Transformations* Strand: Measurement and GeometrySub-strand: Shape  |
| **12** |

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| **13** | *2.1.6 Strategies for Addition and Subtraction*Strand: Number and AlgebraSub-strand: Number and Place Value  | *2.2.6 Finding a Missing Element* Strand: Number and AlgebraSub-strand: Patterns and Algebra  |
| **14** |
| **15** | *2.2.7 Mapping and Giving Directions*Strand: Measurement and Geometry Sub-strand: Location and Transformation  |
|   |
| **16** |  |
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| **17** | *2.1.7 Clock Times, Months, Seasons and the Calendar*Strand: Measurement and GeometrySub-strand: Using Units of Measurement  | *2.2.8 Describing 3D Shapes* Strand: Measurement and GeometrySub-strand: Shape  |
| **18** |

\* Based on 3 hours teaching time per week

Content descriptions coverage within each topic

|  |  |
| --- | --- |
| **Level 2 content descriptions** | **Topic/s** |
| **Strand: Number and Algebra** |
| **Sub-strand: Number and Place Value**  |
| Investigate number sequences, initially those increasing and decreasing by twos, threes, fives and ten from any starting point, then moving to other sequences. [(VCMNA103)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA103) | 2.1.1 |
| Recognise, model, represent and order numbers to at least 1000 [(VCMNA104)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA104) | 2.1.4 |
| Group, partition and rearrange collections up to 1000 in hundreds, tens and ones to facilitate more efficient counting [(VCMNA105)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA105)  | 2.1.4 |
| Explore the connection between addition and subtraction [(VCMNA106)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA106) | 2.1.6 |
| Solve simple addition and subtraction problems using a range of efficient mental and written strategies [(VCMNA107)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA107) | 2.1.6 |
| Recognise and represent multiplication as repeated addition, groups and arrays [(VCMNA108)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA108) | 2.2.1 |
| Recognise and represent division as grouping into equal sets and solve simple problems using these representations ([VCMNA109)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA109) | 2.2.1 |
| **Sub-strand: Fractions and Decimals**  |
| Recognise and interpret common uses of halves, quarters and eighths of shapes and collections [(VCMNA110)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA110) | 2.2.4 |
| **Sub-strand: Money and Financial Mathematics** |
| Count and order small collections of Australian coins and notes according to their value [(VCMNA111)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA111) | 2.1.5 |
| **Sub-strand: Patterns and Algebra**  |
| Describe patterns with numbers and identify missing elements [(VCMNA112)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA112) | 2.2.6 |
| Solve problems by using number sentences for addition or subtraction [(VCMNA113)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA113) | 2.1.6 |
| Apply repetition in arithmetic operations, including multiplication as repeated addition and division as repeated subtraction [(VCMNA114)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA114) | 2.2.1 |
| **Strand: Measurement and Geometry** |
| **Sub-strand: Using Units of Measurement**  |
| Compare and order several shapes and objects based on length, area, volume and capacity using appropriate uniform informal units [(VCMMG115)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG115) | 2.1.22.2.2 |
| Compare masses of objects using balance scales [(VCMMG116)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG116) | 2.2.2 |
| Tell time to the quarter-hour, using the language of 'past' and 'to' [(VCMMG117)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG117) | 2.1.7 |
| Name and order months and seasons [(VCMMG118)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG118) | 2.1.7 |
| Use a calendar to identify the date and determine the number of days in each month [(VCMMG119)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG119) | 2.1.7 |
| **Sub-strand: Shape** |
| Describe and draw two-dimensional shapes, with and without digital technologies [(VCMMG120)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG120) | 2.2.5 |
| Describe the features of three-dimensional objects [(VCMMG121)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG121) | 2.2.8 |
| **Sub-strand: Location and Transformation** |  |
| Interpret simple maps of familiar locations and identify the relative positions of key features [(VCMMG122)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG122) | 2.2.7 |
| Investigate the effect of one-step slides and flips with and without digital technologies [(VCMMG123)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG123) | 2.2.5 |
| Identify and describe half and quarter turns [(VCMMG124)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG124) | 2.2.5 |
| **Strand: Statistics and Probability** |
| **Sub-strand: Chance** |
| Identify practical activities and everyday events that involve chance. Describe outcomes as ‘likely’ or ‘unlikely’ and identify some events as ‘certain’ or ‘impossible’.[(VCMSP125)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP125)  | 2.1.3 |
| **Sub-strand: Data Representation and Interpretation** |  |
| Identify a question of interest based on one categorical variable. Gather data relevant to the question [(VCMSP126)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP126) | 2.2.3 |
| Collect, check and classify data [(VCMSP127)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP127) | 2.2.3 |
| Create displays of data using lists, table and picture graphs and interpret them [(VCMSP128)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP128) | 2.2.3 |

Achievement standards (for three levels to support planning for a continuum of learning)

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| Level 1 | Level 2 | Level 3 |
| **Number and algebra**Students count to and from 100 and locate these numbers on a number line. They partition numbers using place value and carry out simple additions and subtractions, using counting strategies. Students recognise Australian coins according to their value. They identify representations of one half. Students describe number sequences resulting from skip counting by 2s, 5s and 10s. They continue simple patterns involving numbers and objects with and without the use of digital technology. | **Number and algebra**Students count to and from, and order numbers up to 1000. They perform simple addition and subtraction calculations, using a range of strategies. They find the total value of simple collections of Australian notes and coins. Students represent multiplication and division by grouping into sets and divide collections and shapes into halves, quarters and eighths. They recognise increasing and decreasing number sequences involving 2s, 3s, 5s and 10s, identify the missing element in a number sequence, and use digital technology to produce sequences by constant addition. | **Number and algebra**Students count and order numbers to and from 10 000. They recognise the connection between addition and subtraction, and solve problems using efficient strategies for multiplication with and without the use of digital technology. Students recall addition and multiplication facts for single-digit numbers. They represent money values in various ways and correctly count out change from financial transactions. Students model and represent unit fractions for halves, thirds, quarters, fifths and eighths, and multiples of these up to one. They classify numbers as either odd or even, continue number patterns involving addition or subtraction, and explore simple number sequences based on multiples. |
| **Measurement and geometry**Students use informal units of measurement to order objects based on length, mass and capacity. They tell time to the half-hour and explain time durations. Students describe two-dimensional shapes and three-dimensional objects. They use the language of distance and direction to move from place to place. | **Measurement and geometry**Students order shapes and objects, using informal units for a range of measures. They tell time to the quarter hour and use a calendar to identify the date, days, weeks and months included in seasons and other events. Students draw two-dimensional shapes, specify their features and explain the effects of one-step transformations. They recognise the features of three-dimensional objects. They interpret simple maps of familiar locations. | **Measurement and geometry**Students use metric units for length, area, mass and capacity. They tell time to the nearest minute. Students identify symmetry in natural and constructed environments. They use angle size as a measure of turn in real situations and make models of three-dimensional objects. Students match positions on maps with given information and create simple maps. |
| **Statistics and probability**Students describe data displays. They ask questions to collect data and draw simple data displays. Students classify outcomes of simple familiar events. | **Statistics and probability**Students collect data from relevant questions to create lists, tables and picture graphs with and without the use of digital technology. They interpret data in context. Students use everyday language to describe outcomes of familiar events. | **Statistics and probability**Students carry out simple data investigations for categorical variables. They interpret and compare data displays. Students conduct chance experiments, list possible outcomes and recognise variations in results. |

Learning in Mathematics

The proficiencies of Understanding, Fluency, Problem Solving and Reasoning are fundamental to learning mathematics and working mathematically, and are applied across all three strands Number and Algebra, Measurement and Geometry, and Statistics and Probability.

Understanding refers to students building a robust knowledge of adaptable and transferable mathematical concepts and structures. Students make connections between related concepts and progressively apply the familiar to develop new ideas. They develop an understanding of the relationship between the ‘why’ and the ‘how’ of mathematics. Students build understanding when they:

* Connect related ideas
* Represent concepts in different ways
* Identify commonalities and differences between aspects of content
* Describe their thinking mathematically
* Interpret mathematical information.

Fluency describes students developing skills in choosing appropriate procedures, carrying out procedures flexibly, accurately, efficiently and appropriately, and recalling factual knowledge and concepts readily. Students are fluent when they:

* Make reasonable estimates
* Calculate answers efficiently
* Recognise robust ways of answering questions
* Choose appropriate methods and approximations
* Recall definitions and regularly use facts,
* Can manipulate expressions and equations to find solutions.

Problem solving is the ability of students to make choices, interpret, formulate, model and investigate problem situations, select and use technological functions and communicate solutions effectively. Students pose and solve problems when they:

* Use mathematics to represent unfamiliar or meaningful situations
* Design investigations and plan their approaches
* Apply their existing strategies to seek solutions
* Verify that their answers are reasonable.

Reasoning refers to students developing an increasingly sophisticated capacity for logical, statistical and probabilistic thinking and actions, such as conjecturing, hypothesising, analysing, proving, evaluating, explaining, inferring, justifying, refuting, abstracting and generalising. Students are reasoning mathematically when they:

* Explain their thinking
* Deduce and justify strategies used and conclusions reached
* Adapt the known to the unknown
* Transfer learning from one context to another
* Prove that something is true or false
* Make inferences about data or the likelihood of events
* Compare and contrast related ideas and explain their choices.

Year 2 Semester 1



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| Topic 2.1.1 Skip Counting and Number Sequences  |
| Strand: Number and Algebra | Sub-strand: Number and Place Value  | Recommended teaching time: 2 weeks |

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| **Mapping to F–10 curriculum in Victoria** |
| **Content descriptions** |
| * Investigate number sequences, initially those increasing and decreasing by twos, threes, fives and ten from any starting point, then moving to other sequences [(VCMNA103)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA103)
 |
| **Achievement standard (excerpt in bold)** |
| Level 1 | **Level 2** | Level 3 |
| Students count to and from 100 and locate these numbers on a number line. They partition numbers using place value and carry out simple additions and subtractions, using counting strategies. Students recognise Australian coins according to their value. They identify representations of one half. Students describe number sequences resulting from skip counting by 2s, 5s and 10s. They continue simple patterns involving numbers and objects with and without the use of digital technology. | Students count to and from, and order numbers up to 1000. They perform simple addition and subtraction calculations, using a range of strategies. They find the total value of simple collections of Australian notes and coins. Students represent multiplication and division by grouping into sets and divide collections and shapes into halves, quarters and eighths. **They recognise increasing and decreasing number sequences involving 2s, 3s, 5s and 10s, identify the missing element in a number sequence**, and use digital technology to produce sequences by constant addition. | Students count and order numbers to and from 10 000. They recognise the connection between addition and subtraction, and solve problems using efficient strategies for multiplication with and without the use of digital technology. Students recall addition and multiplication facts for single-digit numbers. They represent money values in various ways and correctly count out change from financial transactions. Students model and represent unit fractions for halves, thirds, quarters, fifths and eighths, and multiples of these up to one. They classify numbers as either odd or even, continue number patterns involving addition or subtraction, and explore simple number sequences based on multiples. |

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| **Activities** | **Proficiencies** |
| * Recognising pattern in number sequences
* Skip counting and finding patterns for counting by tens, fives, twos then threes from zero initially then from any number
* Skip counting and finding patterns for counting by fours, sixes, eights, nines and sevens
* Finding relationships between counting patterns, e.g. fours is double twos, sixes is double threes, etc.
* Generalising about counting patterns, eg. counting by fives will always have two steps, tens just increases in the tens place with ones staying the same, twos are either all odd or all even numbers depending on the starting point
 | * **Fluency** includes counting numbers in sequences readily,
* **Understanding** by connecting number calculations with counting sequences
* **Problem solving** by investigating number patterns and finding connections between skip counting patterns
* **Reasoning** includes generalising the pattern from number sequences
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| **Considering different levels of student ability** |
| Level 1Students who are working at this level could:* Develop fluency with forwards and backwards counting in circle games.

Level 3Students who are working at this level could:* Explain why all numbers that end in the digits 0, 2, 4, 6 and 8 are even and that numbers ending in 1, 3, 5, 7 and 9 are odd.
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| **Assessment ideas** |
| * Students:

Use the FUSE [Number Trains: Skip Counting](http://fuse.education.vic.gov.au/?JHHKR9) Google Play app to 'skip count' by twos, fives and tens. |

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| **Resources** |
| **FUSE**[Various Resources](http://fuse.education.vic.gov.au/VCAA/VCMNA103)**Illuminations**[Displaying Number Patterns](http://www.nctm.org/standards/content.aspx?id=25013)**NZ Maths**[‘Pede’ Patterns](http://www.nzmaths.co.nz/resource/pede-patterns)  |

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| **Notes** |
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| Topic 2.1.2 Measurement – Comparing Length, Area  |
| Strand: Measurement and Geometry | Sub-strand: Using Units of Measurement | Recommended teaching time: 3 weeks |

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| **Mapping to F–10 curriculum in Victoria** |
| **Content descriptions** |
| * Compare and order several shapes and objects based on length, area, volume and capacity using appropriate uniform informal units [(VCMMG115)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG115)
 |
| **Achievement standard (excerpt in bold)** |
| Level 1 | **Level 2** | Level 3 |
| Students use informal units of measurement to order objects based on length, mass and capacity. They tell time to the half-hour and explain time durations. Students describe two-dimensional shapes and three-dimensional objects. They use the language of distance and direction to move from place to place. | **Students order shapes and objects, using informal units for a range of measures.** They tell time to the quarter hour and use a calendar to identify the date, days, weeks and months included in seasons and other events. Students draw two-dimensional shapes, specify their features and explain the effects of one-step transformations. They recognise the features of three-dimensional objects. They interpret simple maps of familiar locations. | Students use metric units for length, area, mass and capacity. They tell time to the nearest minute. Students identify symmetry in natural and constructed environments. They use angle size as a measure of turn in real situations and make models of three-dimensional objects. Students match positions on maps with given information and create simple maps. |

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| **Activities** | **Proficiencies** |
| * Introduce the language of length, such as *longer*, *shorter*, *longest*, *shortest* and area, such as *more or less* area, *covers more* area, *covers less* area
* Compare length and area both directly and indirectly using a third object, e.g. two lines or shapes are drawn on the concrete a distance apart, how can we compare them?
* Order three or more lengths and areas by eye and by measuring with appropriate units
* Clarify that length is one dimension but area is two, length and width, so different units are needed to measure each attribute
 | * **Fluency** includes using informal units iteratively to compare measurements
* **Understanding** the similarities and differences between length and area
* **Problem solving** to investigate problem involving comparing and ordering lengths and areas, e.g. Will this doorway be wide enough for the table to go through? How could we check?
* **Reasoning** includes comparing the use of various units for measurement to assess the most appropriate unit for the attribute
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| **Considering different levels** |
| Level 1Students who are working at this level could:* Measure and compare the lengths of pairs of objects using uniform informal units (e.g. handspan)

Level 3Students who are working at this level could:* Measure and compare the lengths of pairs of objects using metric units of length.
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| **Assessment ideas** |
| * Students:
* Design a placemat for their desk with enough area for their workbook and pencil case to fit well but without directly comparing these items to the paper for the placemat.
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| **Resources** |
| **FUSE**[Measuring Familiar Things](http://fuse.education.vic.gov.au/?NN8TJH)**NZ Maths**[Making Benchmarks – Length](http://www.nzmaths.co.nz/resource/making-benchmarks-length)**Illuminations**[What’s My Area?](http://illuminations.nctm.org/lesson.aspx?id=4139) |

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| **Notes** |
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| Topic 2.1.3 Language of Chance  |
| Strand: Statistics and Probability  | Sub-strand: Chance | Recommended teaching time: 2 weeks |

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| **Mapping to F–10 curriculum in Victoria** |
| **Content descriptions** |
| * Identify practical activities and everyday events that involve chance. Describe outcomes as ‘likely’ or ‘unlikely’ and identify some events as ‘certain’ or ‘impossible’ [(VCMSP125)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP125)
 |
| **Achievement standard (excerpt in bold)** |
| Level 1 | **Level 2** | Level 3 |
| Students describe data displays. They ask questions to collect data and draw simple data displays. Students classify outcomes of simple familiar events. | Students collect data from relevant questions to create lists, tables and picture graphs with and without the use of digital technology. They interpret data in context. **Students use everyday language to describe outcomes of familiar events.** | Students carry out simple data investigations for categorical variables. They interpret and compare data displays. Students conduct chance experiments, list possible outcomes and recognise variations in results. |

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| **Activities** | **Proficiencies** |
| * Introduce the language of chance such as “likely”, “unlikely”, “certain” and “impossible” and match these terms to everyday events, e.g. it is likely that I will go swimming today because the weather is hot; it is unlikely that I will be given a present today because it is not my birthday
* Recognise the meaning of *certain* and *impossible* as definitive terms , e.g. it is certain that I am breathing, it is impossible for humans to fly unassisted
* Connect chance language events that have *equal chance*, such as rolling one dice, or a spinner with equal sized segments, and *unequal chance* such as the total found by rolling two dice and adding them or spinners with unequal sized segments
* Create situations with both equal chance and unequal chance such as fair and unfair board games
 | * **Fluency** in using the language of chance to describe outcomes of familiar chance events
* **Understanding** that the chance of an event occurring can differ with some event having an equal chance and some an unequal chance
* **Problem solving** by creating or describing situations with an equal chance of event occurring and an unequal chance
* **Reasoning** by explaining the language of chance and giving examples for each term
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| **Considering different levels** |
| Level 1Students who are working at this level could:* Justify why some events are certain or impossible.

Level 3Students who are working at this level could:* Conduct repeated trials of tossing a coin or drawing a ball from a bag and identifying the variations between trials.
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| **Assessment ideas** |
| * Students:
* Draw and describe an event for each chance term – *unlikely*, *likely*, *certain* and *impossible.*
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| **Resources** |
| **FUSE**[The Giraffe Ate It](http://fuse.education.vic.gov.au/?D4DXWC)[Chance: What is fair; what is likely?](http://fuse.education.vic.gov.au/?MH7GB4)[What’s the Chance?](http://fuse.education.vic.gov.au/?CM4WZD)**NZ Maths**[No Way Jose](http://www.nzmaths.co.nz/resource/no-way-jose)**nRich**[In the Playground](http://nrich.maths.org/7248/note)  |

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| **Notes** |
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| Topic 2.1.4 Place Value to 1000  |
| Strand: Number and Algebra  | Sub-strand:  Number and Place Value  | Recommended teaching time: 3 weeks |

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| **Mapping to F–10 curriculum in Victoria** |
| **Content descriptions** |
| * Recognise, model, represent and order numbers to at least 1000 [(VCMNA104)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA104)
* Group, partition and rearrange collections up to 1000 in hundreds, tens and ones to facilitate more efficient counting [(VCMNA105)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA105)
 |
| **Achievement standard (excerpt in bold)** |
| Level 1 | **Level 2** | Level 3 |
| Students count to and from 100 and locate these numbers on a number line. They partition numbers using place value and carry out simple additions and subtractions, using counting strategies. Students recognise Australian coins according to their value. They identify representations of one half. Students describe number sequences resulting from skip counting by 2s, 5s and 10s. They continue simple patterns involving numbers and objects with and without the use of digital technology. | **Students count to and from, and order numbers up to 1000.** They perform simple addition and subtraction calculations, using a range of strategies. They find the total value of simple collections of Australian notes and coins. Students represent multiplication and division by grouping into sets and divide collections and shapes into halves, quarters and eighths. They recognise increasing and decreasing number sequences involving 2s, 3s, 5s and 10s, identify the missing element in a number sequence, and use digital technology to produce sequences by constant addition. | Students count and order numbers to and from 10 000. They recognise the connection between addition and subtraction, and solve problems using efficient strategies for multiplication with and without the use of digital technology. Students recall addition and multiplication facts for single-digit numbers. They represent money values in various ways and correctly count out change from financial transactions. Students model and represent unit fractions for halves, thirds, quarters, fifths and eighths, and multiples of these up to one. They classify numbers as either odd or even, continue number patterns involving addition or subtraction, and explore simple number sequences based on multiples. |

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| **Activities** | **Proficiencies** |
| * Recognise the place value structure of *hundreds*, *tens* and *ones* and that the place where the digit is gives its value, e.g. a 2 in the hundreds place has a value of 200
* Partition numbers to 1000 into hundreds, tens and ones
* Rename numbers such as 345 as 34 tens and 5 ones
* Know the number *ten more*, *ten less*, **one hundred more** and *one hundred less* a given number and using renaming and materials to support this, e.g. ten less than 204, 204 can be renamed as 20 tens and 4 ones so take ten is 19 tens and 4 ones or 194 and 204 is two hundred flats and 4 so one hundred must be broken into ten tens for one to be taken away
 | * **Fluency** in reading and writing numbers to 1000
* **Understanding** by partitioning and combining numbers flexibly
* **Problem solving** by using partitioning and renaming numbers
* **Reasoning** by explaining how to find the number 100 more or less, or 10 more or less
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| **Considering different levels** |
| Level 1Students who are working at this level could:* As below (Assessment ideas), but for a 2-digit number.

Level 3Students who are working at this level could:* As below (Assessment ideas), but for a 4-digit number.
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| **Assessment ideas** |
| * Students:
* Use a thinkboard with four quadrants to rename a 3-digit number in two ways (Q1 and Q2) and to write the number 100 more and less (Q3) and 10 more and less (Q4).
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| **Resources** |
| **FUSE**[Number Trains](http://fuse.education.vic.gov.au/?K5W9Q2)[Place Value and Modelling Numbers](https://fuse.education.vic.gov.au/Search/Results?AssociatedPackageId=&QueryText=place+value+and+modelling+numbers&SearchScope=All)**Illuminations**[Expand That Number!](http://illuminations.nctm.org/Lesson.aspx?id=3691) |

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| **Notes** |
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| Topic 2.1.5 Counting and Making Money Amounts |
| Strand: Number and Algebra  | Sub-strand: Money and Financial Mathematics  | Recommended teaching time: 2 weeks |

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| **Mapping to F–10 curriculum in Victoria** |
| **Content descriptions** |
| * Count and order small collections of Australian coins and notes according to their value [(VCMNA111)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA111)
 |
| **Achievement standard (excerpt in bold)** |
| Level 1 | **Level 2** | Level 3 |
| Students count to and from 100 and locate these numbers on a number line. They partition numbers using place value and carry out simple additions and subtractions, using counting strategies. Students recognise Australian coins according to their value. They identify representations of one half. Students describe number sequences resulting from skip counting by 2s, 5s and 10s. They continue simple patterns involving numbers and objects with and without the use of digital technology. | Students count to and from, and order numbers up to 1000. They perform simple addition and subtraction calculations, using a range of strategies. **They find the total value of simple collections of Australian notes and coins.** Students represent multiplication and division by grouping into sets and divide collections and shapes into halves, quarters and eighths. They recognise increasing and decreasing number sequences involving 2s, 3s, 5s and 10s, identify the missing element in a number sequence, and use digital technology to produce sequences by constant addition. | Students count and order numbers to and from 10 000. They recognise the connection between addition and subtraction, and solve problems using efficient strategies for multiplication with and without the use of digital technology. Students recall addition and multiplication facts for single-digit numbers. They represent money values in various ways and correctly count out change from financial transactions. Students model and represent unit fractions for halves, thirds, quarters, fifths and eighths, and multiples of these up to one. They classify numbers as either odd or even, continue number patterns involving addition or subtraction, and explore simple number sequences based on multiples. |

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| **Activities** | **Proficiencies** |
| * Recognise the coins and notes from Australia and their value
* Count collections of coins, and then coins and notes using strategies such as making dollars, or counting dollars first then cents
* Order collections of coins and notes according to their value rather than the number of coins or notes in the collection, e.g. 20c and 20c and 10c has a lesser value than 50c and 50c even though there are more coins in the first collection
* Make a given money amount using different combinations of coins and notes, e.g. $4 can be made with two $2 coins *or* $1 and two 50c
 | * **Fluency** in recognising the coins and notes we have in Australia
* **Understanding** that money amounts can be made up of different combinations of coins and notes
* **Problem solving** to solve problems involving ordering money amounts
* **Reasoning** through explaining the order of money amounts according to the value of the coins or notes not the number of coins or notes
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| **Considering different levels** |
| Level 1Students who are working at this level could:* Demonstrate understanding that the value of Australian coins is not related to size, and describe how the features of coins make it possible to identify them.

Level 3Students who are working at this level could:* Represent money values in multiple ways and count the change required for simple transactions to the nearest five cents.
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| **Assessment ideas** |
| Students:* Count and order small collections of Australian coins and notes according to their value.
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| **Resources** |
| **FUSE**[MoneySmart: Kieren's Coin (Unit of Work)](http://fuse.education.vic.gov.au/?SWQ2QZ)**Swirk**[Using Money](http://www.skwirk.com.au/esa/Using_Money.html)**Illuminations**[Primary Economics](http://illuminations.nctm.org/Lesson.aspx?id=3289) |

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| **Notes** |
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| Topic 2.1.6 Strategies for Addition and Subtraction  |
| Strand: Number and Algebra  | Sub-strands: Number and Place Value  | Recommended teaching time: 4 weeks |

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| **Mapping to F–10 curriculum in Victoria** |
| **Content descriptions** |
| * Explore the connection between addition and subtraction [(VCMNA106)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA106)
* Solve simple addition and subtraction problems using a range of efficient mental and written strategies [(VCMNA107)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA107)
* Solve problems by using number sentences for addition or subtraction [(VCMNA113)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA113)
 |
| **Achievement standard (excerpt in bold)** |
| Level 1 | **Level 2** | Level 3 |
| Students count to and from 100 and locate these numbers on a number line. They partition numbers using place value and carry out simple additions and subtractions, using counting strategies. Students recognise Australian coins according to their value. They identify representations of one half. Students describe number sequences resulting from skip counting by 2s, 5s and 10s. They continue simple patterns involving numbers and objects with and without the use of digital technology. | Students count to and from, and order numbers up to 1000. **They perform simple addition and subtraction calculations, using a range of strategies.** They find the total value of simple collections of Australian notes and coins. Students represent multiplication and division by grouping into sets and divide collections and shapes into halves, quarters and eighths. They recognise increasing and decreasing number sequences involving 2s, 3s, 5s and 10s, identify the missing element in a number sequence, and use digital technology to produce sequences by constant addition. | Students count and order numbers to and from 10 000. They recognise the connection between addition and subtraction, and solve problems using efficient strategies for multiplication with and without the use of digital technology. Students recall addition and multiplication facts for single-digit numbers. They represent money values in various ways and correctly count out change from financial transactions. Students model and represent unit fractions for halves, thirds, quarters, fifths and eighths, and multiples of these up to one. They classify numbers as either odd or even, continue number patterns involving addition or subtraction, and explore simple number sequences based on multiples. |

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| **Activities** | **Proficiencies** |
| * Introduce mental strategies for addition and subtraction, such as doubles, near doubles, tens facts, making ten, adding ten, counting up to, counting back, fact families, etc.
* Introduce multi-digit written strategies, such as number splitting
* Link addition and subtraction as the “do and undo” or inverse operation
* Link addition and subtraction to everyday events through solving and creating number sentences to match an equation
* Connect the use of strategies to the problems posed, and appropriate strategies for a particular equation
 | * **Fluency** in strategies for addition and subtraction, including doubles, near doubles, facts to ten, ten more or ten less and build to ten.
* **Understanding** through identifying and describing the relationship between addition and subtraction
* **Problem solving** by making models and using number sentences that represent problem situations
* **Reasoning** includes using known facts to derive strategies for unfamiliar calculations, and comparing and contrasting related models of operations
 |
| **Considering different levels** |
| Level 1Students who are working at this level could:* Represent and solve simple addition and subtraction problems using a range of strategies including counting on, partitioning and rearranging parts.

Level 3Students who are working at this level could:* Demonstrate the connection between addition and subtraction using partitioning or by writing equivalent number sentences.
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| **Assessment ideas** |
| * Students:
* Make a poster or video explaining some of the mental strategies for addition or subtraction.
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| **Resources** |
| **FUSE**[Exploring Addition and Subtraction](http://fuse.education.vic.gov.au/?9GMM2K)[The Take-Away Bar: Generate Easy Subtractions](http://fuse.education.vic.gov.au/?9GMM2K)[Balance the Cups: Use the Rule 1](http://fuse.education.vic.gov.au/?723TXP)**Illuminations** [Fact Families](http://illuminations.nctm.org/Lesson.aspx?id=329) |

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| **Notes** |
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| Topic 2.1.7 Clock Times, Months, Seasons and the Calendar  |
| Strand: Measurement and Geometry  | Sub-strand: Using Units of Measurement | Recommended teaching time: 2 weeks |

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| **Mapping to F–10 curriculum in Victoria** |
| **Content descriptions** |
| * Tell time to the quarter-hour, using the language of 'past' and 'to' [(VCMMG117)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG117)
* Name and order months and seasons [(VCMMG118)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG118)
* Description: Aboriginal and Torres Strait Islander histories and cultures
* Use a calendar to identify the date and determine the number of days in each month [(VCMMG119)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG119)
 |
| **Achievement standard (excerpt in bold)** |
| Level 1 | **Level 2** | Level 3 |
| Students use informal units of measurement to order objects based on length, mass and capacity. They tell time to the half-hour and explain time durations. Students describe two-dimensional shapes and three-dimensional objects. They use the language of distance and direction to move from place to place. | Students order shapes and objects, using informal units for a range of measures. **They tell time to the quarter hour and use a calendar to identify the date, days, weeks and months included in seasons and other events.** Students draw two-dimensional shapes, specify their features and explain the effects of one-step transformations. They recognise the features of three-dimensional objects. They interpret simple maps of familiar locations. | Students use metric units for length, area, mass and capacity. They tell time to the nearest minute. Students identify symmetry in natural and constructed environments. They use angle size as a measure of turn in real situations and make models of three-dimensional objects. Students match positions on maps with given information and create simple maps. |

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| **Activities** | **Proficiencies** |
| * Further introduce analogue time, including *quarter to* and *quarter past*
* Introduce, in order, the months and seasons
* Describe the features of calendars and how to use calendars
* Link events to months, seasons and dates on a calendar
 | * **Fluency** in describing and comparing time durations
* **Understanding** through connecting the measurement of time to tools such as clocks and calendars
* **Problem solving** by interpreting calendars to identify how many Mondays are in the month, which day of the week the next month will start on, etc.
* **Reasoning** about how hours, days, weeks, months, seasons and years relate to each other
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| **Considering different levels** |
| Level 1Students who are working at this level could:* Describing the duration of familiar situations such as ‘how long is it until we next come to school?’

Level 3Students who are working at this level could:* Investigate and report on the seasons used by Aboriginal people, comparing them to those used in Western society and recognising the connection to weather patterns.
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| **Assessment ideas** |
| * Students:
* Make a calendar for their birthday month, marking all important features such as days of the week, dates, 30 or 31 days, etc.
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| **Resources** |
| **FUSE**[What's in a Year?](http://fuse.education.vic.gov.au/?H9WRYM)**Illuminations**[The Grouchy Ladybug](http://illuminations.nctm.org/Lesson.aspx?id=707)**AMSI**[Development of Time Concepts (Module)](http://www.amsi.org.au/teacher_modules/time.html) |

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| **Notes** |
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Year 2 Semester 2



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| Topic 2.2.1 Recognising and Representing Multiplication and Division  |
| Strand: Number and Algebra | Sub-strand: Number and Place Value  | Recommended teaching time: 3 weeks |

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| **Mapping to F–10 curriculum in Victoria** |
| **Content descriptions** |
| * Recognise and represent multiplication as repeated addition, groups and arrays [(VCMNA108)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA108)
* Recognise and represent division as grouping into equal sets and solve simple problems using these representations ([VCMNA109)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA109)
* Apply repetition in arithmetic operations, including multiplication as repeated addition and division as repeated subtraction [(VCMNA114)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA114)
 |
| **Achievement standard (excerpt in bold)** |
| Level 1 | **Level 2** | Level 3 |
| Students count to and from 100 and locate these numbers on a number line. They partition numbers using place value and carry out simple additions and subtractions, using counting strategies. Students recognise Australian coins according to their value. They identify representations of one half. Students describe number sequences resulting from skip counting by 2s, 5s and 10s. They continue simple patterns involving numbers and objects with and without the use of digital technology. | Students count to and from, and order numbers up to 1000. They perform simple addition and subtraction calculations, using a range of strategies. They find the total value of simple collections of Australian notes and coins. **Students represent multiplication and division by grouping into sets and divide collections and shapes into halves, quarters and eighths. They recognise increasing and decreasing number sequences involving 2s, 3s, 5s and 10s, identify the missing element in a number sequence, and use digital technology to produce sequences by constant addition.** | Students count and order numbers to and from 10 000. They recognise the connection between addition and subtraction, and solve problems using efficient strategies for multiplication with and without the use of digital technology. Students recall addition and multiplication facts for single-digit numbers. They represent money values in various ways and correctly count out change from financial transactions. Students model and represent unit fractions for halves, thirds, quarters, fifths and eighths, and multiples of these up to one. They classify numbers as either odd or even, continue number patterns involving addition or subtraction, and explore simple number sequences based on multiples. |

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| **Activities** | **Proficiencies** |
| * Represent multiplication as arrays and recognising that knowing how many in each row and how many rows gives the total for the set
* Link rows of and groups of to skip counting
* Represent division using materials to make equal shares (division as shared between – partition) and to make equal quotas (division as how many – quotation)
* Connect multiplication and division
* Use technology to construct a sequence of numbers based on constant addition or subtraction from a given starting value
* Share a set of objects equally between a small number of groups
 | * **Fluency** in skip counting and linking this to multiplication and division situations
* **Understanding** identifying and describing the relationship between multiplication and division
* **Problem solving** by making models and using number sentences that represent problem situations,
* **Reasoning** includes using known facts to derive strategies for unfamiliar calculations, and comparing and contrasting related models of operations
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| **Considering different levels** |
| Level 1Students who are working at this level could:* Recognise and represent multiplication as repeated addition.

Level 3Students who are working at this level could:* Use strategies to recall the multiplication and related division facts for the twos, threes, fives and tens.
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| **Assessment ideas** |
| * Students:
* Students write a multiplication equation as a repeated addition, write a number sentence or story to match, draw a picture representing the equation, and draw an array to represent the equation
* As above, but for division.
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| **Resources** |
| **FUSE**[Gobbling Goblins](http://fuse.education.vic.gov.au/?WLX4TD)[The Array](http://fuse.education.vic.gov.au/?Y2ZCF7)**AMSI**[Multiplication and Division (Module)](http://www.amsi.org.au/teacher_modules/multiplication_and_division.html)**NZ Maths**[Multiplication Stories](http://www.nzmaths.co.nz/resource/multiplication-stories) |

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| Topic 2.2.2 Measuring Mass, Volume and Capacity |
| Strand: Measurement and Geometry  | Sub-strands: Using Units of Measurement  | Recommended teaching time: 3 weeks |

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| **Mapping to F–10 curriculum in Victoria** |
| **Content descriptions** |
| * Compare and order several shapes and objects based on length, area, volume and capacity using appropriate uniform informal units [(VCMMG115)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG115)
* Compare masses of objects using balance scales [(VCMMG116)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG116)
 |
| **Achievement standard (excerpt in bold)** |
| Level 1 | **Level 2** | Level 3 |
| Students use informal units of measurement to order objects based on length, mass and capacity. They tell time to the half-hour and explain time durations. Students describe two-dimensional shapes and three-dimensional objects. They use the language of distance and direction to move from place to place. | **Students order shapes and objects, using informal units for a range of measures.** They tell time to the quarter hour and use a calendar to identify the date, days, weeks and months included in seasons and other events. Students draw two-dimensional shapes, specify their features and explain the effects of one-step transformations. They recognise the features of three-dimensional objects. They interpret simple maps of familiar locations. | Students use metric units for length, area, mass and capacity. They tell time to the nearest minute. Students identify symmetry in natural and constructed environments. They use angle size as a measure of turn in real situations and make models of three-dimensional objects. Students match positions on maps with given information and create simple maps. |

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| **Activities** | **Proficiencies** |
| * Attend to the attributes informally, e.g. How much to fill the inside space of an object either with solid cubes (volume) or liquid (capacity); How much does this weigh?
* Compare and order objects based on volume or capacity by attending to *height*, *width* and *length* rather than *height* or *length* only
* Investigate objects that have the same volume or capacity but look different
* Compare and estimate mass by hefting with hands and then using balance scales
* Understand that if A is heavier than B and B is heavier than C then C will be lighter than A (transitivity)
 | * **Fluency** includes using informal units iteratively to compare measurements
* **Understanding** includes connecting the attributes of length, height and width when estimating volume and capacity
* **Problem solving** involving authentic problems with volume, capacity and mass
* **Reasoning** that objects can look different but have the same volume or capacity; when comparing three or more objects (transitive reasoning)
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| **Considering different levels** |
| Level 1Students who are working at this level could:* Lift to compare the mass of objects using words, for example, heavier, lighter, same
* Measure the capacity of containers using uniform material, for example cups or buckets.

Level 3Students who are working at this level could:* Recognise and use grams and kilograms, and millilitres and litres.
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| **Assessment ideas** |
| * Students:
* Compare, and estimate the order of the volumes of three or four lunchboxes, and justify their estimations; students then measure the volume of each lunchbox to check estimations; they record any surprises or explain why they their estimations were correct.
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| **Resources** |
| **FUSE**[Nonstandard Measurement – Sid The Science Kid](http://fuse.education.vic.gov.au/?9BXMC2)[Measuring Familiar Things](http://fuse.education.vic.gov.au/?NN8TJH)**Swirk**[Volume](http://www.skwirk.com.au/esa/Volume.html)[Mass](http://www.skwirk.com.au/esa/Mass.html) |

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| **Notes** |
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| Topic 2.2.3 Asking Questions, and Collecting, Showing and Interpreting Data  |
| Strand: Statistics and Probability  | Sub-strand: Data Representation and Interpretation | Recommended teaching time: 2 weeks |

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| **Mapping to F–10 curriculum in Victoria** |
| **Content descriptions** |
| * Identify a question of interest based on one categorical variable. Gather data relevant to the question [(VCMSP126)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP126)
* Description: Sustainability
* Collect, check and classify data [(VCMSP127)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP127)
* Create displays of data using lists, table and picture graphs and interpret them [(VCMSP128)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP128)
 |
| **Achievement standard (excerpt in bold)** |
| Level 1 | **Level 2** | Level 3 |
| Students describe data displays. They ask questions to collect data and draw simple data displays. Students classify outcomes of simple familiar events. | **Students collect data from relevant questions to create lists, tables and picture graphs with and without the use of digital technology. They interpret data in context.** Students use everyday language to describe outcomes of familiar events. | Students carry out simple data investigations for categorical variables. They interpret and compare data displays. Students conduct chance experiments, list possible outcomes and recognise variations in results. |

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| **Activities** | **Proficiencies** |
| * Involve students in a whole-class data collection and representation process, from formulating questions to representing results and interpreting these results
* Introduce various ways of representing data including lists, tables and picture graphs, and compare these representations
* Interpret data displays and evaluate the accuracy and clarity of the display
* Use technology to create graphs
 | * **Fluency** includes recognising the features of graphs
* **Understanding** that the way data is represented can affect the interpretation of this data
* **Problem solving** to find effective ways to gather and represent data
* **Reasoning** by creating and interpreting simple representations of data
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| **Considering different levels** |
| Level 1Students who are working at this level could:* Represent data with objects and drawings where one object or drawing represents one data value, and describe the display.

Level 3Students who are working at this level could:* As below (Assessment ideas) but uncluding a process of question refinement
* As below (Assessment ideas) but in relation to an issue.
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| **Assessment ideas** |
| * Students:
* Plan, implement and evaluate the collection and representation of data about a question of interest.
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| **Resources** |
| **FUSE**[Tallying Up Favourite Foods](http://fuse.education.vic.gov.au/?D7D2ZK)[Using Data About Favourite Foods](http://fuse.education.vic.gov.au/?F2FKKF)**Illuminations**[Up on Top: Generating Bar Graphs](http://illuminations.nctm.org/Lesson.aspx?id=549)**nRich**[If the World Were a Village](http://nrich.maths.org/7725) |

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| **Notes** |
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| Topic 2.2.4 Halves, Quarters and Eighths of Wholes and Groups  |
| Strand: Number and Algebra  | Sub-strand: Fractions and Decimals  | Recommended teaching time: 2 weeks |

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| **Mapping to F–10 curriculum in Victoria** |
| **Content descriptions** |
| * Recognise and interpret common uses of halves, quarters and eighths of shapes and collections [(VCMNA110)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA110)
 |
| **Achievement standard (excerpt in bold)** |
| Level 1 | **Level 2** | Level 3 |
| Students count to and from 100 and locate these numbers on a number line. They partition numbers using place value and carry out simple additions and subtractions, using counting strategies. Students recognise Australian coins according to their value. They identify representations of one half. Students describe number sequences resulting from skip counting by 2s, 5s and 10s. They continue simple patterns involving numbers and objects with and without the use of digital technology. | Students count to and from, and order numbers up to 1000. They perform simple addition and subtraction calculations, using a range of strategies. They find the total value of simple collections of Australian notes and coins. **Students represent multiplication and division by grouping into sets and divide collections and shapes into halves, quarters and eighths.** They recognise increasing and decreasing number sequences involving 2s, 3s, 5s and 10s, identify the missing element in a number sequence, and use digital technology to produce sequences by constant addition. | Students count and order numbers to and from 10 000. They recognise the connection between addition and subtraction, and solve problems using efficient strategies for multiplication with and without the use of digital technology. Students recall addition and multiplication facts for single-digit numbers. They represent money values in various ways and correctly count out change from financial transactions. Students model and represent unit fractions for halves, thirds, quarters, fifths and eighths, and multiples of these up to one. They classify numbers as either odd or even, continue number patterns involving addition or subtraction, and explore simple number sequences based on multiples. |

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| **Activities** | **Proficiencies** |
| * Note that fractions are equal part of a whole, either of a shape or of a collection
* Note that halves, quarters and eighths relate to each other because they can be made by repeated halving (e.g. half a half to get a quarter, half a quarter to get an eighth)
* Note that halves, quarters and eighths relate to sharing or dividing evenly
* Note that the number of shares required relates to the size of the piece each will receive, e.g. if four people share one lamington, each will receive one quarter
* Introduce rectangular, linear or square models as the best to use as these are easier to accurately divide than circular models
 | * **Fluency** in recognising halves, quarter and eighths
* **Understanding** the relationship between the whole and the fraction
* **Problem solving** using fractions of halves, quarters or eighths in everyday sharing situations
* **Reasoning** about how a half of a shape relates to half of a group (e.g.)
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| **Considering different levels** |
| Level 1Students who are working at this level could:* Recognise and interpret common uses of halves, and that halves can be halved (quarters) and that quarters can be halved again (eighths)

Level 3Students who are working at this level could:* Model and represent unit fractions including ½, 1/3, ¼ and 1/5 and their multiples to a complete whole.
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| **Assessment ideas** |
| * Students:
* Identify and write up a practical situation where a fraction (half, quarter and eighth) might occur and draw the fraction as part of a whole shape and part of a group.
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| **Resources** |
| **FUSE**[Cut and Find Activities](http://fuse.education.vic.gov.au/?W9RYZW)[Alien Fractions](http://fuse.education.vic.gov.au/?RT9N7J)**Top Drawer**[Fractions](http://topdrawer.aamt.edu.au/Fractions)**Swirk**[Everyday Halves and Quarters](http://www.skwirk.com.au/esa/WholesHalvesQuarters.html) |

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| Topic 2.2.5 Describing 2D Shapes and Transformations  |
| Strand: Measurement and Geometry | Sub-strand: Shape | Recommended teaching time: 2 weeks |

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| **Mapping to F–10 curriculum in Victoria** |
| **Content descriptions** |
| * Describe and draw two-dimensional shapes, with and without digital technologies [(VCMMG120)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG120)
 |
| **Achievement standard (excerpt in bold)** |
| Level 1 | **Level 2** | Level 3 |
| Students use informal units of measurement to order objects based on length, mass and capacity. They tell time to the half-hour and explain time durations. Students describe two-dimensional shapes and three-dimensional objects. They use the language of distance and direction to move from place to place. | Students order shapes and objects, using informal units for a range of measures. They tell time to the quarter hour and use a calendar to identify the date, days, weeks and months included in seasons and other events. **Students draw two-dimensional shapes, specify their features and explain the effects of one-step transformations**. They recognise the features of three-dimensional objects. They interpret simple maps of familiar locations. | Students use metric units for length, area, mass and capacity. They tell time to the nearest minute. Students identify symmetry in natural and constructed environments. They use angle size as a measure of turn in real situations and make models of three-dimensional objects. Students match positions on maps with given information and create simple maps. |

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| **Activities** | **Proficiencies** |
| * Draw 2D shapes with some accuracy, e.g. squares, rectangles, triangles, kites, rhombuses and circles
* Describe the properties of 2D shapes using language such as sides, corners, curved or straight
* Predict the effect of a slide or a flip on a shape, then check using materials
* Use the terms “half turn” and “quarter turn” accurately and demonstrate what these mean
 | * **Fluency** in naming 2D shapes using the properties of these shapes
* **Understanding** that slides and flips can change how some shapes look but do not change their name
* **Problem solving** by matching transformations with their original shape
* **Reasoning** by visualising the effect of slides, flips and half and quarter turns
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| **Considering different levels** |
| Level 1Students who are working at this level could:* Describe simple shapes using everyday words such as 'corners'

Level 3Students who are working at this level could:* Use technology to draw simple and more complex two-dimensional shapes and describe key features
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| **Assessment ideas** |
| * Students:
* Write clues for a “What am I?” for 2D shapes; they must include all important properties of each shape
* Describe a path or route using the terms “half turn” and “quarter turn” accurately
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| **Resources** |
| **FUSE**[Diagrams](http://fuse.education.vic.gov.au/?9KR82N)[Shape Sorter: Polygons](http://fuse.education.vic.gov.au/?8HNSJZ)**Swirk**[Flips, Slides and Turns](http://www.skwirk.com.au/esa/FlipSlide_Turn.html)**iTunes**[Bee-Bot App](https://itunes.apple.com/au/app/bee-bot/id500131639?mt=8)**nRich**[Turning Man](http://nrich.maths.org/5560/note) |

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| Topic 2.2.6 Finding a Missing Element  |
| Strand: Number and Algebra  | Sub-strand: Patterns and Algebra | Recommended teaching time: 2 weeks |

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| **Mapping to F–10 curriculum in Victoria** |
| **Content descriptions** |
| * Describe patterns with numbers and identify missing elements [(VCMNA112)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA112)
 |
| **Achievement standard (excerpt in bold)** |
| Level 1 | **Level 2** | Level 3 |
| Students count to and from 100 and locate these numbers on a number line. They partition numbers using place value and carry out simple additions and subtractions, using counting strategies. Students recognise Australian coins according to their value. They identify representations of one half. Students describe number sequences resulting from skip counting by 2s, 5s and 10s. They continue simple patterns involving numbers and objects with and without the use of digital technology. | Students count to and from, and order numbers up to 1000. They perform simple addition and subtraction calculations, using a range of strategies. They find the total value of simple collections of Australian notes and coins. Students represent multiplication and division by grouping into sets and divide collections and shapes into halves, quarters and eighths. **They recognise increasing and decreasing number sequences involving 2s, 3s, 5s and 10s, identify the missing element in a number sequence, and use digital technology to produce sequences by constant addition.** | Students count and order numbers to and from 10 000. They recognise the connection between addition and subtraction, and solve problems using efficient strategies for multiplication with and without the use of digital technology. Students recall addition and multiplication facts for single-digit numbers. They represent money values in various ways and correctly count out change from financial transactions. Students model and represent unit fractions for halves, thirds, quarters, fifths and eighths, and multiples of these up to one. They classify numbers as either odd or even, continue number patterns involving addition or subtraction, and explore simple number sequences based on multiples. |

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| **Activities** | **Proficiencies** |
| * Interpret patterns by identifying by how much the numbers are changing; look for repeated elements of change, e.g. numbers increasing by 3
* Investigate features of number patterns resulting from adding twos, fives or 10s
* Find unknown numbers in a range of number patterns
 | * **Fluency** in skip counting by 10s, 5s, 2s then other numbers
* **Understanding** that number patterns must have a repeated element
* **Problem solving** to find the missing numbers in a pattern by identifying the pattern and using the other numbers in the pattern
* **Reasoning** by explaining the pattern of a particular number pattern and proving this by finding unknown numbers
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| **Considering different levels** |
| Level 1Students who are working at this level could:* Investigate patterns in the number system, such as the occurrence of a particular digit in the numbers to 100

Level 3Students who are working at this level could: * Identify and write the rules for existing number patterns, then create their own rules and pattern.
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| **Assessment ideas** |
| * Students:
* Find the missing number in a variety of number patterns, both forward and backwards, and describe what the pattern is for the sequence.
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| **Resources** |
| **FUSE**[Number Trains: Patterns (Teacher Guide)](http://fuse.education.vic.gov.au/?77C3HT)**nRich**[Domino Patterns](http://nrich.maths.org/9970) |

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| Topic 2.2.7 Mapping and Giving Directions  |
| Strand: Measurement and Geometry  | Sub-strand: Location and Transformation | Recommended teaching time: 2 weeks |

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| **Mapping to F–10 curriculum in Victoria** |
| **Content descriptions** |
| * Interpret simple maps of familiar locations and identify the relative positions of key features [(VCMMG122)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG122)
 |
| **Achievement standard (excerpt in bold)** |
| Level 1 | **Level 2** | Level 3 |
| Students use informal units of measurement to order objects based on length, mass and capacity. They tell time to the half-hour and explain time durations. Students describe two-dimensional shapes and three-dimensional objects. They use the language of distance and direction to move from place to place. | Students order shapes and objects, using informal units for a range of measures. They tell time to the quarter hour and use a calendar to identify the date, days, weeks and months included in seasons and other events. Students draw two-dimensional shapes, specify their features and explain the effects of one-step transformations. They recognise the features of three-dimensional objects. **They interpret simple maps of familiar locations.** | Students use metric units for length, area, mass and capacity. They tell time to the nearest minute. Students identify symmetry in natural and constructed environments. They use angle size as a measure of turn in real situations and make models of three-dimensional objects. Students match positions on maps with given information and create simple maps. |

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| **Activities** | **Proficiencies** |
| * Interpret a school map or a map of the local area
* Identify that maps give a *bird’s eye view* of a location and are not a picture of that place
* Find landmarks and describe their position; describe the position of other key features such as parks or playgrounds
* Create simple maps of familiar locations such as the classroom, the playground, students’ bedrooms or houses; in each case, identify key features
* Describe a simple route using a map of a familiar place, such as an obstacle course through the playground, using location words such as *left* and *right*, distance (e.g. ten *steps*), and position such as *beside*, *between*, *under*, *over*, *through*, etc.
 | * **Fluency** in identifying left and right
* **Understanding** that maps have a purpose which necessitates a bird’s eye view, accuracy of the placement of landmarks and representing permanent features only
* **Problem solving** to describe a route using appropriate language and accurate maps
* **Reasoning** by explaining the purpose of maps as opposed to pictures (e.g.)
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| **Considering different levels** |
| Level 1Students who are working at this level could:* Give and follow directions to familiar locations.

Level 3Students who are working at this level could: * As below (Assessment ideas), but add a grid overlay; they write a description of a simple route through this map with reference to grid positions.
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| **Assessment ideas** |
| Students:* Using a map of a familiar location such as the school, and mark in the position of familiar landmarks or features; they write a description of a simple route through this map with reference to the relative positions of key features.
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| **Resources** |
| **FUSE**[Pirate Treasure Hunt: Eight Challenges](http://fuse.education.vic.gov.au/?TH3R8Y)[Treasure Hunt](http://fuse.education.vic.gov.au/?S9DF5N)**Department of Education and Training (NSW)**[Space and Geometry for Primary](http://www.resources.det.nsw.edu.au/Resource/Access/2c81770e-a818-493b-9622-13ea1f6d7185/1)**Swirk**[Position](http://www.skwirk.com.au/esa/Position.html)**Illuminations**[Turtle Pond](http://illuminations.nctm.org/Activity.aspx?id=3534) |

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| Topic 2.2.8 Describe 3D Shapes  |
| Strand: Measurement and Geometry | Sub-strand: Shape | Recommended teaching time: 2 weeks |

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| **Mapping to F–10 curriculum in Victoria** |
| **Content descriptions** |
| * Describe the features of three-dimensional objects [(VCMMG121)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG121)
 |
| **Achievement standard (excerpt in bold)** |
| Level 1 | **Level 2** | Level 3 |
| Students use informal units of measurement to order objects based on length, mass and capacity. They tell time to the half-hour and explain time durations. Students describe two-dimensional shapes and three-dimensional objects. They use the language of distance and direction to move from place to place. | Students order shapes and objects, using informal units for a range of measures. They tell time to the quarter hour and use a calendar to identify the date, days, weeks and months included in seasons and other events. Students draw two-dimensional shapes, specify their features and explain the effects of one-step transformations. **They recognise the features of three-dimensional objects.** They interpret simple maps of familiar locations. | Students use metric units for length, area, mass and capacity. They tell time to the nearest minute. Students identify symmetry in natural and constructed environments. They use angle size as a measure of turn in real situations and make models of three-dimensional objects. Students match positions on maps with given information and create simple maps. |

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| **Activities** | **Proficiencies** |
| * Introduce student to the language of 3D shapes – faces, edges, corners (as distinct from 2D shapes)
* Identify common 3D shapes, such as spheres, cubes, cones, and cylinders
* Create 3D shapes and describe them using appropriate language
 | * **Fluency** in recognising important features of 3D shapes
* **Understanding** that the features of a 3D shape names the shape
* **Problem solving** to create 3D shapes with the appropriate features
* **Reasoning** through explaining the features of 3D shapes and how they are similar or different to each other
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| **Considering different levels** |
| Level 1Students who are working at this level could:* Describe simple shapes using everyday words such as 'edges' and 'faces'

Level 3Students who are working at this level could: * Use technology to draw three-dimensional shapes including prisms and pyramids, and describe key features.
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| **Assessment ideas** |
| Students:* Write clues for a “What am I?” for 3D shapes; they must include all important properties of each shape
* Make models of 3D shapes from playdough or matchsticks.
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| **Resources** |
| **FUSE**[Face Painter: Finding Faces 1](http://fuse.education.vic.gov.au/?34UYGZ)[Count and Compare Sides, Edges, Faces and Vertices](http://fuse.education.vic.gov.au/?KGT5SQ)**Illuminations**[Geometric Solids](http://illuminations.nctm.org/Activity.aspx?id=3521)**Mathsbuilder**[3D Space Worksheets](http://worksheets.mathsbuilder.com.au/esa/6/ES041917#3D_Space+6_01) |

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