Mathematics Sample Program: Year 3



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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 3 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

|  |  |  |
| --- | --- | --- |
| **Week\*** | **Semester 1** | **Semester 2** |
| **1** | *3.1.1 Odd and Even Numbers*  Strand: Number and Algebra Sub-strand: Number and Place Value | 3.2.1 Multiplication and Division  Strand: Number and Algebra Sub-strand: Number and Place Value |
| **2** |
| **3** | *3.1.2 3D Shapes* Strand: Measurement and Geometry  Sub-strand: Shape | *3.2.2 Solids* Strand: Measurement and Geometry Sub-strand: Shape |
| **4** |
| **5** | *3.1.3 Measurement - Length*  Strand: Measurement and Geometry Sub-strand: Using Units of Measurement | *3.2.3 Volume Capacity Mass*  Strand: Measurement and Geometry  Sub-strand: Using Units of Measurement |
| **6** | *3.1.4 Counting with Fractions*  Strand: Number and Algebra Sub-strand: Fractions and Decimals | *3.2.4 Fractions and Decimals*  Strand: Number and Algebra  Sub-strand: Fractions and Decimals |
| **7** |
| **8** | *3.1.5 Data Representation and Interpretation*  Strand: Statistics and Probability  Sub-strand: Data Representation and Interpretation | *3.2.5 Chance and Probability*  Strand: Statistics and Probability  Sub-strand: Chance |
| **9** | *3.1.6 Number Patterns* Strand: Number and Algebra Sub-strand: Patterns and Algebra |
| **10** | *3.1.7 Addition and Subtraction*  Strand: Number and Place Value Sub-strand: Number and Place Value | *3.2.6 Number Sentences*  Strand: Number and Algebra Sub-strand: Number and Place Value |
| **11** |
| **12** | *3.1.8 Space - Shape and Symmetry* Strand: Measurement and Geometry  Sub-strand: Location and Transformation | *3.2.7 Whole Numbers - Multiplication* Strand: Number and Algebra Sub-strand: Number and Place Value |
| **13** | *3.2.8 Space, Maps, Scales and Networks*  Strand: Measurement and geometry Sub-strand: Location and Transformation |
| **14** | *3.1.9 Geometric Reasoning - Angles*  Strand: Measurement and Geometry Sub-strand: Geometric Reasoning | *3.2.9 Time and Temperature* Strand: Measurement and Geometry  Sub-strand: Using Units of Measurement |
| **15** | *3.2.10 Fractions, Multiples to a Whole Number* Strand: Number and Algebra Sub-strand: Fractions and Decimals |
| **16** | *3.1.10 Money*  Strand: Number and Algebra Sub-strand: Money and Financial Mathematics |
| **17** | *3.1.11 Whole Numbers – to 10 000* Strand: Number and Algebra Sub-strand: Number and Place Value | *3.2.11 Whole Numbers and Place Value – to 10 000* Strand: Number and Algebra Sub-strand: Number and Place Value |
| **18** |

\* Based on 3 hours teaching time per week

Content descriptions coverage within each topic

|  |  |
| --- | --- |
| **Level 3 content descriptions** | **Topic/s** |
| **Strand: Number and Algebra** | |
| **Sub-strand: Number and Place Value** | |
| Investigate the conditions required for a number to be odd or even and identify odd and even numbers [(VCMNA129)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA129) | 3.1.1 |
| Recognise, model, represent and order numbers to at least 10 000 [(VCMNA130)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA130) | 3.1.11 |
| Apply place value to partition, rearrange and regroup numbers to at least 10 000 to assist calculations and solve problems [(VCMNA131)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA131) | 3.2.11 |
| Recognise and explain the connection between addition and subtraction [(VCMNA132)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA132) | 3.1.7 |
| Recall addition facts for single-digit numbers and related subtraction facts to develop increasingly efficient mental strategies for computation [(VCMNA133)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA133) | 3.1.7 |
| Recall multiplication facts of two, three, five and ten and related division facts [(VCMNA134)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA134) | 3.2.1  3.2.6  3.2.7 |
| Represent and solve problems involving multiplication using efficient mental and written strategies and appropriate digital technologies [(VCMNA135)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA135) | 3.2.1  3.2.6  3.2.7 |
| **Sub-strand: Fractions and Decimals** | |
| Model and represent unit fractions including 1/2, 1/4, 1/3, 1/5 and their multiples to a complete whole [(VCMNA136)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA136) | 3.1.4  3.2.4  3.2.10 |
| **Sub-strand: Money and Financial Mathematics** | |
| Represent money values in multiple ways and count the change required for simple transactions to the nearest five cents [(VCMNA137)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA137) | 3.1.10 |
| **Sub-strand: Patterns and Algebra** | |
| Describe, continue, and create number patterns resulting from performing addition or subtraction [(VCMNA138)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA138) | 3.1.6 |
| Use a function machine and the inverse machine as a model to apply mathematical rules to numbers or shapes [(VCMNA139)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA139) | 3.1.6 |

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| **Strand: Measurement and Geometry** | |
| **Sub-strand: Using Units of Measurement** | |
| Measure, order and compare objects using familiar metric units of length, area, mass and capacity [(VCMMG140)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG140) | 3.1.3  3.2.3 |
| Tell time to the minute and investigate the relationship between units of time [(VCMMG141)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG141) | 3.2.9 |
| **Sub-strand: Shape** | |
| Make models of three-dimensional objects and describe key features [(VCMMG142)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG142) | 3.1.2  3.2.2 |
| **Sub-strand: Location and Transformation** | |
| Create and interpret simple grid maps to show position and pathways [(VCMMG143)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG143) | 3.2.8 |
| Identify symmetry in the environment [(VCMMG144)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG144) | 3.1.8 |
| Identify and describe slides and turns found in the natural and built environment [(VCMMG145)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG145) | 3.1.8 |
| **Sub-strand: Geometric Reasoning** | |
| Identify angles as measures of turn and compare angle sizes in everyday situations [(VCMMG146)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG146) | 3.1.9 |
| **Strand: Statistics and Probability** | |
| **Sub-strand: Chance** | |
| Conduct chance experiments, identify and describe possible outcomes and recognise variation in results [(VCMSP147)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP147) | 3.2.5 |
| **Sub-strand: Data Representation and Interpretation** | |
| Identify questions or issues for categorical variables. Identify data sources and plan methods of data collection and recording [(VCMSP148)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP148) | 3.1.5 |
| Collect data, organise into categories and create displays using lists, tables, picture graphs and simple column graphs, with and without the use of digital technologies [(VCMSP149)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP149) | 3.1.5 |
| Interpret and compare data displays [(VCMSP150)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP150) | 3.1.5 |

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

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| Level 2 | Level 3 | Level 4 |
| **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. | **Number and algebra**  Students recall multiplication facts to 10 x 10 and related division facts. They choose appropriate strategies for calculations involving multiplication and division, with and without the use of digital technology, and estimate answers accurately enough for the context. Students solve simple purchasing problems with and without the use of digital technology. They locate familiar fractions on a number line, recognise common equivalent fractions in familiar contexts and make connections between fractions and decimal notations up to two decimal places. Students identify unknown quantities in number sentences. They use the properties of odd and even numbers and describe number patterns resulting from multiplication. Students continue number sequences involving multiples of single-digit numbers and unit fractions, and locate them on a number line. |
| **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. | **Measurement and geometry**  Students compare areas of regular and irregular shapes, using informal units. They solve problems involving time duration. Students use scaled instruments to measure length, angle, area, mass, capacity and temperature of shapes and objects. They convert between units of time. Students create symmetrical simple and composite shapes and patterns, with and without the use of digital technology. They classify angles in relation to a right angle. Students interpret information contained in maps. |
| **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. | **Statistics and probability**  Students describe different methods for data collection and representation, and evaluate their effectiveness. They construct data displays from given or collected data, with and without the use of digital technology. Students list the probabilities of everyday events. They identify dependent and independent events. |

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 3 Semester 1



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| Topic 3.1.1 Odd and Even Numbers | | |
| 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 the conditions required for a number to be odd or even and identify odd and even numbers [(VCMNA129)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA129) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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. | Students recall multiplication facts to 10 x 10 and related division facts. They choose appropriate strategies for calculations involving multiplication and division, with and without the use of digital technology, and estimate answers accurately enough for the context. Students solve simple purchasing problems with and without the use of digital technology. They locate familiar fractions on a number line, recognise common equivalent fractions in familiar contexts and make connections between fractions and decimal notations up to two decimal places. Students identify unknown quantities in number sentences. They use the properties of odd and even numbers and describe number patterns resulting from multiplication. Students continue number sequences involving multiples of single-digit numbers and unit fractions, and locate them on a number line. |

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| **Activities** | **Proficiencies** |
| * Discuss the features of even and odd numbers, e.g. that even numbers represent pairs, and odd numbers have 'one left over'. * Illustrate even and odd by: * Having a number of students hold hands in pairs, and seeing whether or not there is one over * Using counters as models – by pairing up the counters and looking for the ‘odd one out’ * By a diagram * By explaining the arithmetic relationship e.g. 7 = 3 lots of 2 + 1 (odd), 8 = 4 lots of 2 (even) | * **Understanding** through identifying the key features of even and odd numbers * **Fluency** in recognising odd and even numbers (small and large) from a list * **Problem solving** through asking questions and formulating rules about odd and even numbers * **Reasoning** through explaining different way to illustrate odd and even numbers |

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| **Considering different levels** |
| Level 2  Students who are working at this level could:   * Identify odd and even numbers from a list.   Level 4  Students who are working at this level could:   * Use the four operations with pairs of odd or even numbers or one odd and one even number, then using the relationships established to check the accuracy of calculations. |

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| **Assessment ideas** |
| Students:   * Identify even numbers using skip counting by twos or by grouping even collections of objects in twos * Explaining 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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| **Resources** |
| **ABC Splash**  [Odd and Even Numbers](http://splash.abc.net.au/home#!/media/2549569/odd-and-even-numbers)  **FUSE**  [Musical Number Patterns: Odds and Evens](http://fuse.education.vic.gov.au/?AQAD63) |

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| **Notes** |
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| Topic 3.1.2 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** | | |
| * Make models of three-dimensional objects and describe key features [(VCMMG142)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG142) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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. | Students compare areas of regular and irregular shapes, using informal units. They solve problems involving time duration. Students use scaled instruments to measure length, angle, area, mass, capacity and temperature of shapes and objects. They convert between units of time. Students create symmetrical simple and composite shapes and patterns, with and without the use of digital technology. They classify angles in relation to a right angle. Students interpret information contained in maps. |

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| **Activities** | **Proficiencies** |
| * Describe features of three-dimensional objects using everyday language * Explore the creation of three-dimensional objects using prisms and pyramids * Provide students with nets to explore 3D objects * Manipulate and sort three-dimensional objects found in the environment | * **Fluency** through recognising and classifying familiar three-dimensional objects using obvious features * **Understanding** through identifying key properties of 3D objects; presenting pictures of shapes in different orientations * **Problem solving** through using shapes in problem solving such as puzzles, tessellations, drawings, flip, slide and turn; matching transformations with their original shape * **Reasoning** through identifying and naming 3D objects in the environment and describing their features using a common language |

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| **Considering different levels** |
| Level 2  Students who are working at this level could:   * Identifying geometric features of 3D objects such as the number of faces, corners or edges.   Level 4  Students who are working at this level could:   * Recognise two-dimensional shapes as the faces for three-dimensional objects such as prisms, pyramids and platonic solids (including tetrahedrons, cubes and dodecahedrons). |

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| **Assessment ideas** |
| Students:   * Go on a shape hunt of their school and get students to recognise and identify 3D objects in the environment. * Make designs using a selection of 3D shapes. |

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| **Resources** |
| **FUSE**  [Various FUSE Activities and Resources](http://fuse.education.vic.gov.au/VCAA/VCMMG142)  **NLVM**  [Concentration: Match Shapes](http://illuminations.nctm.org/Activity.aspx?id=3563" \o "畐ƥ怀)  [Virtual Manipulatives for Geometry (Various)](http://nlvm.usu.edu/en/nav/category_g_2_t_3.html) |

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| Topic 3.1.3 Measurement – Length | | |
| Strand:  Measurement and Geometry | Sub-strand:  Using Units of Measurement | Recommended teaching time:  1 week |

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| **Mapping to F–10 curriculum in Victoria** | | |
| **Content descriptions** | | |
| * Measure, order and compare objects using familiar metric units of length, area, mass and capacity [(VCMMG140)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG140) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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. | Students compare areas of regular and irregular shapes, using informal units. They solve problems involving time duration. Students use scaled instruments to measure length, angle, area, mass, capacity and temperature of shapes and objects. They convert between units of time. Students create symmetrical simple and composite shapes and patterns, with and without the use of digital technology. They classify angles in relation to a right angle. Students interpret information contained in maps. |

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| **Activities** | **Proficiencies** |
| * Measure various objects using familiar metric units of length * Informally compare and order objects according to their length * Recognise the importance of using common units of measurement formal and informal – hand spans, footsteps, rulers, tape measures, etc. * Use centimetres and metres to measure and compare the length of objects | * **Fluency** through choosing and using familiar metric units to order and compare the lengths of objects * **Understanding** by building on concepts already known about informal units of measuring length and relating known skills to new learning * **Problem solving** involving investigating measurement and verifying that their answers are reasonable by using various measuring tools * **Reasoning** through comparing and contrasting related ideas and explain their choices when analysing the lengths of different objects |

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| **Considering different levels** |
| Level 2  Students who are working at this level could:   * Comparing lengths of a set of objects informally using finger length, hand span or a piece of string.   Level 4  Students who are working at this level could:   * Comparing lengths of a set of objects formally using graduated scales on a range of measuring instruments. |
| **Assessment ideas** |
| Students:   * Measurement the height of each other as a whole class using different formal and informal measures; compare findings and analyse as a class the various methods of measuring and how accurate they are. |

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| **Resources** |
| **NZ Maths**  [Length - Unit of Work](http://www.nzmaths.co.nz/search/node/length)  **FUSE**  [High Rise Living](http://fuse.education.vic.gov.au/?G9K8GN) |

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| **Notes** |
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| Topic 3.1.4 Counting with Fractions | | |
| 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** | | |
| * Model and represent unit fractions including 1/2, 1/4, 1/3, 1/5 and their multiples to a complete whole [(VCMNA136)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA136) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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. | Students recall multiplication facts to 10 x 10 and related division facts. They choose appropriate strategies for calculations involving multiplication and division, with and without the use of digital technology, and estimate answers accurately enough for the context. Students solve simple purchasing problems with and without the use of digital technology. They locate familiar fractions on a number line, recognise common equivalent fractions in familiar contexts and make connections between fractions and decimal notations up to two decimal places. Students identify unknown quantities in number sentences. They use the properties of odd and even numbers and describe number patterns resulting from multiplication. Students continue number sequences involving multiples of single-digit numbers and unit fractions, and locate them on a number line. |

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| **Activities** | **Proficiencies** |
| * Review the meaning of *wholes*, *halves* and *quarters* in relation to one another * Explore the meaning of *thirds* and *fifths* in practical contexts * Use concrete materials to examine and explore fractions of *shapes* and *quantities* * Pose and answer written worded problems that explore fractions, e.g. Two apple pies are sliced into 1/10s, 2/10s of one apple pie is eaten with custard and 7/10s of the other apple pie are eaten with cream. How many pieces of apple pie are left? | * **Fluency** shows students readily make, describe and compare models of fractions * **Understanding** representing unit fractions, using appropriate language to communicate and compare number of parts with their wholes * **Problem solving** through making models of fraction equivalent lines * **Reasoning** includes identifying and ordering fractions on a number line |

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| **Considering different levels** |
| Level 2  Students who are working at this level could:   * Recognise and interpret common uses of halves and quarters of shapes and collections.   Level 4  Students who are working at this level could:   * Illustrate the relationship between families of fractions (halves, quarters and thirds). |

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| **Assessment ideas** |
| Students:   * Investigate words used associating counting numbers with unit fractions (e.g. one ~ whole, two ~ half, three ~ third, four ~ fourth or quarter, five ~ fifth) * Work with a collection of different coloured counters, naming matching fractions as counters are drawn from a bag; repeat having reduced the total number of counters. |

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| **Resources** |
| **FUSE**  [Fraction Matcher](http://fuse.education.vic.gov.au/?TKGS2J)  [Other FUSE Activities and Resources](http://fuse.education.vic.gov.au/VCAA/VCMNA136) |

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| Topic 3.1.5 Data Representation and Interpretation | | |
| Strand:  Statistics and Probability | Sub-strand:  Data Representation and Interpretation | Recommended teaching time:  1 week |

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| **Mapping to F–10 curriculum in Victoria** | | |
| **Content descriptions** | | |
| * Identify questions or issues for categorical variables. Identify data sources and plan methods of data collection and recording [(VCMSP148)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP148) * Collect data, organise into categories and create displays using lists, tables, picture graphs and simple column graphs, with and without the use of digital technologies [(VCMSP149)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP149) * Interpret and compare data displays [(VCMSP150)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP150) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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. | Students describe different methods for data collection and representation, and evaluate their effectiveness. They construct data displays from given or collected data, with and without the use of digital technology. Students list the probabilities of everyday events. They identify dependent and independent events. |

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| **Activities** | **Proficiencies** |
| * Identify questions or issues with categorical variables * Identify data sources and plan methods of data collection and recording * Collect data, organise into categories and create displays using lists, tables, picture graphs and simple column graphs, with and without the use of digital technologies * Refining questions that involve collecting data * Explore meaningful and increasingly efficient ways to record data, and represent and report the results of these investigations * Interpret and compare data displays | * **Understanding:** the characteristics of an effective data display; why it is necessary to refine questions that involve data * **Fluency** in organising data into categories * **Problem solving** by carrying out a simple data investigation * **Reasoning** through comparing data displays and making a judgement (and justifying it) about the most effective display |

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| **Considering different levels** |
| Level 2  Students who are working at this level could:   * Create displays of data using lists, table and picture graphs.   Level 4  Students who are working at this level could:   * Construct suitable data displays, with and without the use of digital technologies, from given or collected data. |

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| **Assessment ideas** |
| Students:   * Carry out an investigation based around data collection, analysis and reasoning; write sentences to demonstrate an understanding of data analysis. * Respond to a set of questions that require them to interpret and compare statistics from a given data display. |

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| **Resources** |
| **NZ Maths**  [Data Squares – Unit of Work](https://nzmaths.co.nz/resource/data-squares-level-3)  **FUSE**  [Tallying up Favourite Foods](http://fuse.education.vic.gov.au/?D7D2ZK)  [Strawberry Milkshake Warrior Princess](http://fuse.education.vic.gov.au/?PB2ZXT)  **Maths Is Fun (USA)**  [Data](http://www.mathsisfun.com/data/data-graph.php#instr)  **Teaching Ideas (UK)**  [Statistics](http://www.teachingideas.co.uk/maths/contents_datahandling.htm) |

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| Topic 3.1.6 Number Patterns | | |
| Strand:  Number and Algebra | Sub-strands:  Patterns and Algebra | Recommended teaching time:  1 week |

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| **Mapping to F–10 curriculum in Victoria** | | |
| **Content descriptions** | | |
| * Describe, continue, and create number patterns resulting from performing addition or subtraction [(VCMNA138)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA138) * Use a function machine and the inverse machine as a model to apply mathematical rules to numbers or shapes [(VCMNA139)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA139) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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. | Students recall multiplication facts to 10 x 10 and related division facts. They choose appropriate strategies for calculations involving multiplication and division, with and without the use of digital technology, and estimate answers accurately enough for the context. Students solve simple purchasing problems with and without the use of digital technology. They locate familiar fractions on a number line, recognise common equivalent fractions in familiar contexts and make connections between fractions and decimal notations up to two decimal places. Students identify unknown quantities in number sentences. They use the properties of odd and even numbers and describe number patterns resulting from multiplication. Students continue number sequences involving multiples of single-digit numbers and unit fractions, and locate them on a number line. |

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| **Activities (continued on next page)** | **Proficiencies** |
| * Describe, continue, and create number patterns * Recognise and explain the connection between addition and subtraction in generating number patterns * Investigate number sequences increasing and decreasing by two’s, threes, fives and ten from any starting point, then moving to other sequences * Given a starting point, skip count by twos, threes, fives and tens * Use number lines and concrete materials to model representations of skip counting * Identify and write rules for number patterns and then create the pattern * Recognise and demonstrate that the element that makes a pattern is repetition | * **Fluency** involves counting numbers in sequence readily including skip counting * **Understanding** through multiple representations of patterns, such as a description in words, a list or table of values and diagrams * **Problem solving** through formulating a systematic approach to find patterns and making and testing predictions based on the patterns; using concrete materials to generate sequences from given rules in words |

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| **Activities (continued)** | **Proficiencies (continued)** |
| * Investigate the link between recursive rules and patterns on a hundreds chart * Use simple function machines to represent and apply a process or the inverse process, such as increase or decrease the value of a number by a specified amount | * **Reasoning** through describing, continuing and creating number patterns resulting from addition of a number |

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| **Considering different levels** |
| Level 2  Students who are working at this level could:   * Describe patterns with numbers and identify missing elements, e.g. 24, 27, 30, \_\_, 36.   Level 4  Students who are working at this level could:   * Identify examples of number patterns in everyday life * Explore and describe number patterns resulting from performing multiplication. |

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| **Assessment ideas** |
| Students:   * Give students various starting points to skip count from by two’s, threes, fives and tens. |

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| **Resources** |
| **NZ Maths**  [Hundreds of Patterns](https://nzmaths.co.nz/resource/hundreds-patterns)  **FUSE**  [How Many Are Left?](http://fuse.education.vic.gov.au/?R2R9CF)  [Function Machine](http://fuse.education.vic.gov.au/?ZJ8Z4Z) |

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| Topic 3.1.7 Addition and Subtraction | | |
| 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** | | |
| * Recognise and explain the connection between addition and subtraction [(VCMNA132)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA132) * Recall addition facts for single-digit numbers and related subtraction facts to develop increasingly efficient mental strategies for computation [(VCMNA133)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA133) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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. | Students recall multiplication facts to 10 x 10 and related division facts. They choose appropriate strategies for calculations involving multiplication and division, with and without the use of digital technology, and estimate answers accurately enough for the context. Students solve simple purchasing problems with and without the use of digital technology. They locate familiar fractions on a number line, recognise common equivalent fractions in familiar contexts and make connections between fractions and decimal notations up to two decimal places. Students identify unknown quantities in number sentences. They use the properties of odd and even numbers and describe number patterns resulting from multiplication. Students continue number sequences involving multiples of single-digit numbers and unit fractions, and locate them on a number line. |

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| **Activities (continued on next page)** | **Proficiencies** |
| * Apply place value to partition, rearrange and regroup number to at least 10 000 to assist with calculations and solve problems * Place four-digit numbers on a number line using an appropriate scale * Reproduce numbers in words using their numerical representations and vice versa * Demonstrate the connection between addition and subtraction using partitioning or by writing equivalent number sentences * Recognise and explain the connection between addition and subtraction, and model this connection by breaking 100 with concrete materials | * **Fluency** through recalling addition and subtraction facts to build to the ten * **Understanding** through modelling addition and subtraction of whole numbers using concrete materials * **Problem solving** through making appropriate choice of strategies to solve open ended problems involving whole numbers using addition and subtraction; solve problems by using number sentences for addition and subtraction |

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| **Activities (continued)** | **Proficiencies (continued)** |
| * Recall addition facts for single-digit numbers and related subtraction facts to develop increasingly efficient mental strategies for computation * Develop and consolidate ideas associated with addition and subtraction of whole numbers from concrete contexts to abstract settings including written problem solving * Partition given numbers and recognise the connection between the addition and subtraction, e.g. 96 partitioned could be written and represented in various forms like 60+36, 96–36 = 60, 96-60+36 | * **Reasoning** through the ability to explain and justify strategies and judge the reasonableness of the result |

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| **Considering different levels** |
| Level 2  Students who are working at this level could:   * Solve simple addition and subtraction problems using a range of efficient mental and written strategies.   Level 4  Students who are working at this level could:   * Use known facts and strategies, such as commutativity, doubling and halving for multiplication. |

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| **Assessment ideas** |
| Students:   * Answer the question: *What I Know About 100* by generating as many combinations as possible, e.g. 63 and 37 or 23 and 19 and 58. |

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| **Resources** |
| **FUSE**  [How Many Are Left?](http://fuse.education.vic.gov.au/?R2R9CF)  [Wishball: Hundreds](http://fuse.education.vic.gov.au/?SSN5DU)  **Primary Resources (UK)**  [Basic Addition / Subtraction, Number Bonds and Facts](http://www.primaryresources.co.uk/maths/mathsC1.htm) |

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| Topic 3.1.8 Space – Shape and Symmetry | | |
| 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** | | |
| * Identify symmetry in the environment [(VCMMG144)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG144) * Identify and describe slides and turns found in the natural and built environment [(VCMMG145)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG145) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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. | Students compare areas of regular and irregular shapes, using informal units. They solve problems involving time duration. Students use scaled instruments to measure length, angle, area, mass, capacity and temperature of shapes and objects. They convert between units of time. Students create symmetrical simple and composite shapes and patterns, with and without the use of digital technology. They classify angles in relation to a right angle. Students interpret information contained in maps. |

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| **Activities** | **Proficiencies** |
| * Identify symmetry in art, pictures and the natural and built environment * Create symmetrical designs and pictures using concrete materials, e.g. with pattern blocks * Recognise lines of symmetry in pictures, letters, tessellations or nature * Draw pictures that have symmetry; compare and discuss where the line of symmetry is in each picture * Draw pictures that do not have symmetry; compare with pictures that do have symmetry and discuss * Recognise and represent slides and turn used in brickwork around the school * Recognise and represent slides and turn used in sporting activities | * **Fluency** is recognising shape and symmetry in art and the environment * **Understanding** includes making connections between the features of shape and how shapes they appear in real life and in symmetry * **Problem solving** including matching transformations with their original shape, creating continuous patterns using the same shape including rotation and flipping * **Reasoning** including describing with accuracy and correct vocabulary the features of a symmetrical pattern or picture |

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| **Considering different levels** |
| Level 2  Students who are working at this level could:   * Demonstrate recognition of the difference between symmetrical and non-symmetrical representations.   Level 4  Students who are working at this level could:   * Create symmetrical patterns, pictures and shapes with and without digital technologies. |

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| **Assessment ideas** |
| Students:   * Design, make and describe a unique tile tessellation. |

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| **Resources** |
| **FUSE**  [Various FUSE Resources and Activities](http://fuse.education.vic.gov.au/Search/Results?AssociatedPackageId=&QueryText=symmetry&SearchScope=All)  **Illuminations**  [Analyzing Designs](http://illuminations.nctm.org/Lesson.aspx?id=1246)  [Finding Lines of Symmetry](http://illuminations.nctm.org/Lesson.aspx?id=1800) |

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| Topic 3.1.9 Geometric Reasoning –Angles | | |
| Strand:  Measurement and Geometry | Sub-strand:  Geometric Reasoning | Recommended teaching time:  2 weeks |

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| **Mapping to F–10 curriculum in Victoria** | | |
| **Content descriptions** | | |
| * Identify angles as measures of turn and compare angle sizes in everyday situations [(VCMMG146)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG146) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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. | Students compare areas of regular and irregular shapes, using informal units. They solve problems involving time duration. Students use scaled instruments to measure length, angle, area, mass, capacity and temperature of shapes and objects. They convert between units of time. Students create symmetrical simple and composite shapes and patterns, with and without the use of digital technology. They classify angles in relation to a right angle. Students interpret information contained in maps. |

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| **Activities** | **Proficiencies** |
| * Open doors partially and fully and compare the size of the angles created; share other examples from real life that demonstrate turn (large and small) * Recognise that analogue clocks use the turning of arms to indicate time, and compare the size of angles between the arms for familiar times * Ordering angles from smallest to largest as applied in real situations * Introduce the idea of a right angles and its properties | * **Understanding** the relationship between angle / turn and elapsed time (the bigger the turn, the longer the elapsed time) * **Fluency** in ordering angles found in the classroom and school * **Problem solving** through comparing the size of the turns required in typical everyday scenarios (e.g. tap on, door open, lid off) * **Reasoning** whether a given angle is bigger or smaller than another angle |

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| **Considering different levels** |
| Level 2  Students who are working at this level could:   * Use analogue clocks to connect turn angles to elapsed time (bigger and smaller).   Level 4  Students who are working at this level could:   * Compare turn angles and classify them as equal to, greater than or less than a right angle. |

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| **Assessment ideas** |
| Students:   * Identify five objects in real life that have turn angles; rank and draw them. |

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| **Resources** |
| **NZ Maths**  [Angles](http://www2.nzmaths.co.nz/LearningObjects/angles/angles.htm)  **FUSE**  [Turning](http://fuse.education.vic.gov.au/?98LBZQ)  [Daredevil Geometry](http://fuse.education.vic.gov.au/?82CTDJ) |

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| Topic 3.1.10 Money | | |
| Strand:  Number and Algebra | Sub-strand:  Money and Financial Mathematics | Recommended teaching time:  1 week |

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| **Mapping to F–10 curriculum in Victoria** | | |
| **Content descriptions** | | |
| * Represent money values in multiple ways and count the change required for simple transactions to the nearest five cents [(VCMNA137)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA137) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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. | Students recall multiplication facts to 10 x 10 and related division facts. They choose appropriate strategies for calculations involving multiplication and division, with and without the use of digital technology, and estimate answers accurately enough for the context. Students solve simple purchasing problems with and without the use of digital technology. They locate familiar fractions on a number line, recognise common equivalent fractions in familiar contexts and make connections between fractions and decimal notations up to two decimal places. Students identify unknown quantities in number sentences. They use the properties of odd and even numbers and describe number patterns resulting from multiplication. Students continue number sequences involving multiples of single-digit numbers and unit fractions, and locate them on a number line. |

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| **Activities** | **Proficiencies** |
| * Represent money values in multiple ways, including recognition of the relationship between dollars and cents and that this is not the case in all other countries * Count the change required for simple transactions to the nearest five cent * Relate small collections of Australian coins and notes to a number or fraction line * Identify equivalent values in collections of coins or notes * Develop efficient strategies for counting money | * **Fluency** shows students readily recognise Australian notes and coins * **Understanding** is counting and ordering small collections of Australian coins and notes according to their value * **Problem solving** through using money to solve real life problems such as creating shopping lists or ordering lunch at the school canteen * **Reasoning** includes identifying and ordering coins and notes into their value on a number line |

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| **Considering different levels** |
| Level 2  Students who are working at this level could:   * Count and order small collections of Australian coins and notes according to their value.   Level 4  Students who are working at this level could:   * Respond to a shopping task that requires them to spend less than a particular amount of money on a shopping list using a supermarket catalogue to determine the value of items. |

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| **Assessment ideas** |
| Students:   * Calculate change from financial transactions in a classroom ‘shop’ that simulates trading of money for goods. |

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| **Resources** |
| **FUSE**  [Funny Money](http://fuse.education.vic.gov.au/?HLQFF9)  **Primary Resources (UK)**  [Money Word Problems](http://www.primaryresources.co.uk/maths/mathsD2.htm)  **NZ Maths**  [Money Units of Work](https://nzmaths.co.nz/search/node/money) |

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| Topic 3.1.11 Whole Numbers – to 10 000 | | |
| 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** | | |
| * Recognise, model, represent and order numbers to at least 10 000 [(VCMNA130)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA130) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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. | Students recall multiplication facts to 10 x 10 and related division facts. They choose appropriate strategies for calculations involving multiplication and division, with and without the use of digital technology, and estimate answers accurately enough for the context. Students solve simple purchasing problems with and without the use of digital technology. They locate familiar fractions on a number line, recognise common equivalent fractions in familiar contexts and make connections between fractions and decimal notations up to two decimal places. Students identify unknown quantities in number sentences. They use the properties of odd and even numbers and describe number patterns resulting from multiplication. Students continue number sequences involving multiples of single-digit numbers and unit fractions, and locate them on a number line. |

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| **Activities** | **Proficiencies** |
| * Recognise, model, represent and order numbers to at least 10 000 * Understand that four digit numbers are made up of thousands, hundreds, tens and ones/units by using models such as linking blocks, sticks in bundles, place value blocks and explaining the reasoning behind these models. * Recognise patterns in number sequences, such as adding 10, 100 or 1000 always results in the same final digit * Recognise that there are different ways of representing numbers and identifying patterns in whole number sequences * Demonstrate the ability to reproduce numbers in words using their numerical representations and vice versa   *Note: The term ‘whole number’ is used informally to distinguish between a fraction such as and a number such as* 2. *The term ‘the set of whole numbers’ is sometimes used to refer to the infinite set* {1, 2, 3 …}; *sometimes it is used to refer to the infinite set* {0, 1, 2, 3 …} *and sometimes it is used to refer to the set of integers* { …-3, -2, -2, 0, 1, 2, 3 …}. *Integers are introduced at Level 6.* | * **Fluency** ordering whole numbers from smallest to largest and connecting number calculations with counting sequences * **Understanding** including making connections between representations of numbers and the ability to flexibly rename numbers * **Problem solving** includes formulating and solving authentic problems using whole numbers and materials to model numbers * **Reasoning** includes investigating strategies to perform calculations efficiently, continuing patterns |

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| **Considering different levels** |
| Level 2  Students who are working at this level could:   * Reproduce three-digit numbers in words using their numerical representations, and vice versa.   Level 4  Students who are working at this level could:   * Reproduce five-digit numbers in words using their numerical representations, and vice versa. |

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| **Assessment ideas** |
| Students:   * Place four-digit numbers on a number line using an appropriate scale. |

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| **Resources** |
| **FUSE**  [Place Value and Modelling Numbers](http://fuse.education.vic.gov.au/?PCDR2C)  [Place Value Headings](http://fuse.education.vic.gov.au/?SS4BH2) |

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Year 3 Semester 2



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| Topic 3.2.1 Multiplication and Division | | |
| 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** | | |
| * Recall multiplication facts of two, three, five and ten and related division facts [(VCMNA134)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA134) * Represent and solve problems involving multiplication using efficient mental and written strategies and appropriate digital technologies [(VCMNA135)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA135) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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. | Students recall multiplication facts to 10 x 10 and related division facts. They choose appropriate strategies for calculations involving multiplication and division, with and without the use of digital technology, and estimate answers accurately enough for the context. Students solve simple purchasing problems with and without the use of digital technology. They locate familiar fractions on a number line, recognise common equivalent fractions in familiar contexts and make connections between fractions and decimal notations up to two decimal places. Students identify unknown quantities in number sentences. They use the properties of odd and even numbers and describe number patterns resulting from multiplication. Students continue number sequences involving multiples of single-digit numbers and unit fractions, and locate them on a number line. |

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| **Activities** | **Proficiencies** |
| * Establish multiplication facts using number sequences * Use strategies to recall the multiplication and related division facts for the twos, threes, fives and tens * Write simple word problems in numerical form and vice versa * Use technology to check solution and reasonableness of answer to problems * Explore multiplicative situations from real life, e.g. calculating the number of seats in a theatre that has 30 rows of 24 seats | * **Understanding** the relationship between related multiplication and division facts * **Fluency** in writing simple word problems in numerical form and vice versa * **Problem solving** using different strategies to recall multiplication and related division facts * **Reasoning** by using technology to check solutions |
| **Considering different levels** | |
| Level 2  Students who are working at this level could:   * Represent array problems with available materials and explaining reasoning.   Level 4  Students who are working at this level could:   * Use known facts and strategies, such as commutativity, doubling and halving for multiplication, and connecting division to multiplication when there is no remainder. | |

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| **Assessment ideas** |
| Students:   * Write simple multiplication and division word problems in numerical form and vice versa. |

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| **Resources** |
| **FUSE**  [How Many Are Left?](http://fuse.education.vic.gov.au/?R2R9CF)  [The Array](http://fuse.education.vic.gov.au/?Y2ZCF7)  **Primary Resources (UK)**  [General Multiplication and Division](http://www.primaryresources.co.uk/maths/mathsC2.htm)  **NZ Maths**  [Multiplication Units of Works](https://nzmaths.co.nz/search/node/multiplication) |

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| Topic 3.2.2 Solids | | |
| Strand:  Measurement and Geometry | Sub-strands:  Shape | Recommended teaching time:  2 weeks |

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| **Mapping to F–10 curriculum in Victoria** | | |
| **Content descriptions** | | |
| * Make models of three-dimensional objects and describe key features [(VCMMG142)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG142) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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. | Students compare areas of regular and irregular shapes, using informal units. They solve problems involving time duration. Students use scaled instruments to measure length, angle, area, mass, capacity and temperature of shapes and objects. They convert between units of time. Students create symmetrical simple and composite shapes and patterns, with and without the use of digital technology. They classify angles in relation to a right angle. Students interpret information contained in maps. |

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| **Activities** | **Proficiencies** |
| * Describe the features of three-dimensional objects * Develop and use geometric vocabulary * Connect three-dimensional objects with their nets and other two-dimensional representations * Build a 3D object using 24 toothpicks and blu-tack; draw a diagram of it, and label key features * Use pre-drawn nets to make cubes, boxes (cuboids), triangular prisms, triangular and square pyramids; count vertices, faces and edges for many solid shapes; for edges, use the words ‘vertical’ and ‘horizontal’ to describe what has been made | * **Fluency** demonstrated by the success of being able to rotate mental images of objects * **Understanding** through spatial visualisation * **Problem solving** through experience of real objects: flipping, sliding and turning to create spatial visualisation awareness * **Reasoning** through describing features, recognising shapes in the environment and comparisons of objects using obvious features |

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| **Considering different levels** |
| Level 2  Students who are working at this level could:   * Identify geometric features such as the number of faces, corners or edges.   Level 4  Students who are working at this level could:   * Recognise two-dimensional shapes that are the faces for three-dimensional objects such as prisms, pyramids and platonic solids (including tetrahedrons, cubes and dodecahedrons). |

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| **Assessment ideas** |
| Students:   * Copy drawings of solids they have made and learn to draw them in different positions. |

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| **Resources** |
| **FUSE**  [Various FUSE Activities and Resources](http://fuse.education.vic.gov.au/VCAA/VCMMG142)  **NLVM**  [Virtual Manipulatives for Geometry (Various)](http://nlvm.usu.edu/en/nav/category_g_2_t_3.html)  **NZ Maths**  [Shape Units of Work](https://nzmaths.co.nz/search/node/shape) |

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| Topic 3.2.3 Volume Capacity Mass | | |
| Strand:  Measurement and Geometry | Sub-strand:  Using Units of Measurement | Recommended teaching time:  1 week |

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| **Mapping to F–10 curriculum in Victoria** | | |
| **Content descriptions** | | |
| * Measure, order and compare objects using familiar metric units of length, area, mass and capacity [(VCMMG140)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG140) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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. | Students compare areas of regular and irregular shapes, using informal units. They solve problems involving time duration. Students use scaled instruments to measure length, angle, area, mass, capacity and temperature of shapes and objects. They convert between units of time. Students create symmetrical simple and composite shapes and patterns, with and without the use of digital technology. They classify angles in relation to a right angle. Students interpret information contained in maps. |

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| **Activities** | **Proficiencies** |
| * Recognise the importance of using common units of measurement for mass and capacity * Recognise and use centimetres and metres, grams and kilograms, and millilitres and litres * Measure, order and compare objects using familiar metric units of mass; compare masses of objects using balance scales * Measure, order and compare objects using familiar metric units of capacity * Compare and order several shapes and objects based on capacity and volume using appropriate uniform informal units * Select the appropriate units of measurement for mass and capacity and using scaled instruments to measure these quantities * Select appropriate units for measuring a given quantity * Be able to read a set of weighing scales, a measuring jug or a ruler and identify the appropriate unit * Measure in real life using centimetres and metres, grams and kilograms, and millilitres and litres | * **Fluency** demonstrated by using familiar metric units to measure order and compare objects. * **Understanding** through connecting units of measurement to compare objects; recognise the importance of using common units of measurement * **Problem solving** includes planning methods of comparison of objects when measuring mass, volume and capacity * **Reasoning** through generalising facts related to the measurement and comparison of familiar metric units, including descriptions and explanations for comparisons of mass and capacity |

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| **Considering different levels** |
| Level 2  Students who are working at this level could:   * Compare and order several shapes and objects based on mass, volume and capacity using informal units.   Level 4  Students who are working at this level could:   * Compare and order several shapes and objects based on mass, volume and capacity using scaled instruments. |

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| **Assessment ideas** |
| Students:   * Identify five examples from everyday life that require the use of familiar metric units of mass and capacity. |

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| **Resources** |
| **Department of Education and Training (Victoria)**  [Developmental Overview of Measurement Attributes](https://www.eduweb.vic.gov.au/edulibrary/public/teachlearn/student/mathscontinuum/mcdomeasure.pdf)  **FUSE**  [How Many Glasses of Juice will you Get?](http://fuse.education.vic.gov.au/?SM8JX7)  [Make a Cake: Measure Ingredients](http://fuse.education.vic.gov.au/?2KCQPL)  [How Many Litres Does it Hold?](http://fuse.education.vic.gov.au/?7LYXDK) |

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| Topic 3.2.4 Fractions and Decimals | | |
| 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** | | |
| * Model and represent unit fractions including 1/2, 1/4, 1/3, 1/5 and their multiples to a complete whole [(VCMNA136)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA136) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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. | Students recall multiplication facts to 10 x 10 and related division facts. They choose appropriate strategies for calculations involving multiplication and division, with and without the use of digital technology, and estimate answers accurately enough for the context. Students solve simple purchasing problems with and without the use of digital technology. They locate familiar fractions on a number line, recognise common equivalent fractions in familiar contexts and make connections between fractions and decimal notations up to two decimal places. Students identify unknown quantities in number sentences. They use the properties of odd and even numbers and describe number patterns resulting from multiplication. Students continue number sequences involving multiples of single-digit numbers and unit fractions, and locate them on a number line. |

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| **Activities** | **Proficiencies** |
| * Partitioning paper, string or concrete materials of collections to create halves, thirds, quarters and fifths, such as folding the same sized sheets of paper to illustrate different unit fractions and comparing the number of parts with their sizes. * Locating fractions on a number line * Fractions of *wholes*, *halves*, *quarters* and *eighths*; fractions of *thirds* and *fifths* * Fractions of shapes: * What fraction of each of shapes has been coloured? * Colour the correct fraction of given divided up shapes * Fractions of quantities – students work with concrete materials to divide quantities into amounts and represent these written as a fraction * Recognising that sets of objects can be partitioned in different ways to demonstrated fractions | * **Fluency** shows students readily make, describe and compare models of fractions * **Understanding** representing unit fractions, using appropriate language to communicate and compare number of parts with their wholes. * **Problem solving** through making models of fraction equivalent lines. Using money to solve real life problems such as creating shopping lists or ordering lunch at the school canteen. * **Reasoning** includes identifying and ordering coins and notes into their value on a number line. |

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| **Considering different levels of student ability** |
| Level 2  Students who are working at this level could:   * Recognise and interpret common uses of halves, quarters and eighths of shapes and collections.   Level 4  Students who are working at this level could:   * Investigate equivalent fractions used in contexts. |

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| **Assessment ideas** |
| Students:   * Explore fair division in real life contexts through estimating (e.g. using sour straps or strips of paper of fixed width): between 2 people, between 4 people, between 3 people; then explore unfair division by changing the scenarios (e.g. what if one person gets a double share, what if one person doesn’t want their share?) |

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| **Resources** |
| **FUSE**  [Fraction Match](http://fuse.education.vic.gov.au/?FKNJS5)  [Various FUSE Activities and Resources](http://fuse.education.vic.gov.au/VCAA/VCMNA136) |

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| Topic 3.2.5 Chance and Probability | | |
| 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** | | |
| * Conduct chance experiments, identify and describe possible outcomes and recognise variation in results [(VCMSP147)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP147) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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.** | Students describe different methods for data collection and representation, and evaluate their effectiveness. They construct data displays from given or collected data, with and without the use of digital technology. Students list the probabilities of everyday events. They identify dependent and independent events. |

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| **Activities** | **Proficiencies** |
| * Identify and describe possible outcomes of chance activities, e.g. rolling a dice * Recognise variation in results when playing games of chance * Conduct repeated trials of chance experiments such as tossing a coin or drawing from a bag and identifying the variations between trials * Explore written problems related to chance experiments, e.g. I chose 5 balls from a bag of balls without looking. There were 2 red and 3 blue. What might the colour of the balls in the bag be and how many balls might there be? | * **Fluency** in identifying practical activities and everyday events that involve chance, and identifying and describing the outcomes of chance experiments * **Understanding** of outcomes of some chance experiments as varied * **Problem solving** including devising and carrying out common chance scenarios and explain results * **Reasoning** by explaining variance in some chance experiments |

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| **Considering different levels** |
| Level 2  Students who are working at this level could:   * Classify a list of events as ‘likely’ or ‘unlikely’ and as ‘certain’ or ‘impossible’.   Level 4  Students who are working at this level could:   * Identify everyday events where one cannot happen if the other happens * Identify events where the chance of one will not be affected by the occurrence of the other. |

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| **Assessment ideas** |
| Students:   * Design a game where it is easier for them to win than their opponent. |

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| **Resources** |
| **FUSE**  [The Foul Food Maker: Best Guess](http://fuse.education.vic.gov.au/?JLALG8)  [Chance: What is Fair; What is Likely?](http://fuse.education.vic.gov.au/?MH7GB4)  **Primary Resources (UK)**  [Probability](http://www.primaryresources.co.uk/maths/mathsF2.htm)  **NZ Maths**  [Left to Chance](http://www.nzmaths.co.nz/resource/left-chance) (Student Activity)  [What’s the Chance?](http://www.nzmaths.co.nz/resource/whats-chance) (Student Activity) |

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| Topic 3.2.6 Number Sentences | | |
| 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** | | |
| * Represent and solve problems involving multiplication using efficient mental and written strategies and appropriate digital technologies [(VCMNA135)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA135) * Recall multiplication facts of two, three, five and ten and related division facts [(VCMNA134)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA134) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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.** | Students recall multiplication facts to 10 x 10 and related division facts. They choose appropriate strategies for calculations involving multiplication and division, with and without the use of digital technology, and estimate answers accurately enough for the context. Students solve simple purchasing problems with and without the use of digital technology. They locate familiar fractions on a number line, recognise common equivalent fractions in familiar contexts and make connections between fractions and decimal notations up to two decimal places. Students identify unknown quantities in number sentences. They use the properties of odd and even numbers and describe number patterns resulting from multiplication. Students continue number sequences involving multiples of single-digit numbers and unit fractions, and locate them on a number line. |

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| **Activities** | **Proficiencies** |
| * Write simple word problems in numerical form and vice versa * Explore how number sentences display mathematical structure * Construct number sentence from real-world situations (e.g. a student writes 10 + 10 = 3 + 7 + 5 + 5 to describe a situation where 2 packets of 10 coloured pins contained 3 red, 7 green, 5 yellow and 5 white) * Solve problems by using number sentences, representing various word problems for multiplication as a number sentence | * **Understanding** through multiple representations of patterns, such as a description in words, a list or table of values and diagrams * **Fluency** in constructing number sentences from real-world situations * **Problem solving** through formulating a systematic approach to find patterns and making and testing predictions based on the patterns, and using concrete materials to generate sequences from given rules in words * **Reasoning** through describing, continuing and creating number patterns resulting from multiplication of numbers |

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| **Considering different levels** |
| Level 2  Students who are working at this level could:   * Create a number sentence(s) that represents a real-life division problem.   Level 4  Students who are working at this level could:   * Create stories that place number sentences in real-life contexts, and that include remainders. |

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| **Assessment ideas** |
| Students:   * Create stories that place number sentences in real-life contexts. |

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| **Resources** |
| **FUSE**  [Musical Number Patterns: Counting Rules](http://fuse.education.vic.gov.au/?6YYVEY)  [Musical Number Patterns: Musical Times](http://fuse.education.vic.gov.au/?7Z9FEX)  **NZ Maths**  [Hundreds of Patterns](https://nzmaths.co.nz/resource/hundreds-patterns) |

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| Topic 3.2.7 Whole Numbers – Multiplication | | |
| Strand:  Number and Algebra | Sub-strand:  Number and Place Value | Recommended teaching time:  1 week |

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| **Mapping to F–10 curriculum in Victoria** | | |
| **Content descriptions** | | |
| * Represent and solve problems involving multiplication using efficient mental and written strategies and appropriate digital technologies [(VCMNA135)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA135) * Recall multiplication facts of two, three, five and ten and related division facts [(VCMNA134)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA134) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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. | Students recall multiplication facts to 10 x 10 and related division facts. They choose appropriate strategies for calculations involving multiplication and division, with and without the use of digital technology, and estimate answers accurately enough for the context. Students solve simple purchasing problems with and without the use of digital technology. They locate familiar fractions on a number line, recognise common equivalent fractions in familiar contexts and make connections between fractions and decimal notations up to two decimal places. Students identify unknown quantities in number sentences. They use the properties of odd and even numbers and describe number patterns resulting from multiplication. Students continue number sequences involving multiples of single-digit numbers and unit fractions, and locate them on a number line. |

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| **Activities (continued on next page)** | **Proficiencies** |
| * Recall multiplication facts of two, three, five and ten and related division facts * Use arrays to model multiplication and show division of objects into groups * Recognise and represent multiplication as repeated addition, groups and arrays – when counting arrays fill shapes to represent an area covered * Represent and solve problems involving multiplication using efficient mental and written strategies | * **Fluency** in recall of multiplication facts for the 2,3,4,5 and 10 times-tables * **Understanding** that to solve problems they must using efficient strategies for multiplication and recognise how this relates to division * **Problem solving** by choosing appropriate and efficient strategies to solve problems in relation to multiplication and division, including solving simple problems that involve dividing objects into equal sets |
| **Activities (continued)** | **Proficiencies (continued)** |
| * Develop efficient mental and written strategies and use appropriate digital technologies for multiplication and for division where there is no remainder * Use knowledge of fact families to solve related multiplication and division tasks.   *Note: The term ‘whole number’ is used informally to distinguish between a fraction such as and a number such as* 2. *The term ‘the set of whole numbers’ is sometimes used to refer to the infinite set* {1, 2, 3 …}; *sometimes it is used to refer to the infinite set*  {0, 1, 2, 3 …} *and sometimes it is used to refer to the set of integers*  { …-3, -2, -2, 0, 1, 2, 3 …}. *Integers are introduced at Level 6.* | * **Reasoning** through describing the connection between multiplication and division when solving problems related to repeated addition and equal groups |

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| **Considering different levels** |
| Level 2  Students who are working at this level could:   * Recognise and represent multiplication as repeated addition.   Level 4  Students who are working at this level could:   * Extend key multiplication facts (e.g. 4 by 7 is 28 so 4 by 7 tens is 28 tens). |

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| **Assessment ideas** |
| Students:   * Complete the [following](http://images.pcmac.org/Uploads/HuronISD/HuronISD/Departments/DocumentsCategories/Documents/Multiplication%20and%20Division%20Assessment.pdf) multiplication and division assessment. |

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| **Resources** |
| **FUSE**  [The Array](http://fuse.education.vic.gov.au/?Y2ZCF7)  **Department of Education and Training (Victoria)**  [Fact Families (Multiplication and Division)](http://www.education.vic.gov.au/school/teachers/teachingresources/discipline/maths/continuum/pages/factfamilies275.aspx)  [Common Misunderstandings – Multiplicative Thinking](http://www.education.vic.gov.au/school/teachers/teachingresources/discipline/maths/assessment/pages/lvl3multi.aspx)  **Fun 4 the Brain**  [Various Activities](http://www.fun4thebrain.com/division.html) |

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| Topic 3.2.8 Space, Maps, Scales and Networks | | |
| Strand:  Measurement and Geometry | Sub-strand:  Location and Transformation | Recommended teaching time:  1 week |

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| **Mapping to F–10 curriculum in Victoria** | | |
| **Content descriptions** | | |
| * Create and interpret simple grid maps to show position and pathways [(VCMMG143)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG143) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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.** | Students compare areas of regular and irregular shapes, using informal units. They solve problems involving time duration. Students use scaled instruments to measure length, angle, area, mass, capacity and temperature of shapes and objects. They convert between units of time. Students create symmetrical simple and composite shapes and patterns, with and without the use of digital technology. They classify angles in relation to a right angle. Students interpret information contained in maps. |

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| **Activities** | **Proficiencies** |
| * Creating a map to show position and pathways * Interpret simple maps of familiar locations and identify the relative positions of key features * Understand that we use maps *representations* of objects and their positions on a map * Understand how to give and take directions to get to a place on a map * Understand the meaning and importance of words such as clockwise, anticlockwise, forward and under when giving and following directions * Read co-ordinates on a map that indicate position, e.g. A4 or B7 | * **Fluency** in choosing language to communicate pathways on a map. * **Understanding** the meaning and importance of vocabulary to give and follow directions to and from a place * **Problem solving** to make choices when reading maps to decide on a path to a given object or location * **Reasoning** includes giving accurate directions for someone to be able to follow to a given location |

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| **Considering different levels** |
| Level 2  Students who are working at this level could:   * Interpret simple maps of familiar locations and identify the relative positions of key features.   Level 4  Students who are working at this level could:   * Use simple scales and legends to interpret information contained in basic maps. |

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| **Assessment ideas** |
| Students:   * Create a self-guided tour of the school for new students, making sure you visit relevant landmarks; map the suggested route, including alphanumeric coordinates; include reference to these coordinates in your tour script. |

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| **Resources** |
| **FUSE**  [Rainforest: Use a Grid Map](http://fuse.education.vic.gov.au/?7R4LQM)  [Using a Map Grid](http://fuse.education.vic.gov.au/?5NGQL2)  **Primary Resources (UK)**  [Position and Direction](http://www.primaryresources.co.uk/maths/mathsE6.htm) |

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| Topic 3.2.9 Time and Temperature | | |
| Strand:  Measurement and Geometry | Sub-strand:  Using Units of Measurement | Recommended teaching time:  1 week |

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| **Mapping to F–10 curriculum in Victoria** | | |
| **Content descriptions** | | |
| * Tell time to the minute and investigate the relationship between units of time [(VCMMG141)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG141) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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. | Students compare areas of regular and irregular shapes, using informal units. They solve problems involving time duration. Students use scaled instruments to measure length, angle, area, mass, capacity and temperature of shapes and objects. They convert between units of time. Students create symmetrical simple and composite shapes and patterns, with and without the use of digital technology. They classify angles in relation to a right angle. Students interpret information contained in maps. |

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| **Activities** | **Proficiencies** |
| * Tell time to the minute * Read hours, minutes and seconds on analogue and digital clocks * Investigate the relationship between units of time, recognising that there are 60 minutes in an hour and 60 seconds in a minute * Calculate the time required to travel between two locations, using hours and minutes * Calculate common arrival times and departure times between two locations (e.g. home and school)   determining arrival time given departure time | * **Fluency** is describing and comparing time durations including hours and minutes * **Understanding** is the ability to use appropriate language to communicate times demonstrated by clocks * **Problem solving** by choosing appropriate and efficient strategies to solve problems in relation to time including calculation of time required to travel between two locations or determining arrival time and departure times * **Reasoning** the relationships between units of time, e.g. there are 60 minutes in an hour and 60 seconds in a minute |

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| **Considering different levels** |
| Level 2  Students who are working at this level could:   * Estimate, to the quarter-hour, the duration of three or four everyday events (e.g. school, dinner, sport on the weekend, travel to a relative’s house).   Level 4  Students who are working at this level could:   * Create a list of key events in a day that reference ‘am’ and ‘pm’ and show calculation of duration in more than one unit of time. |

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| **Assessment ideas** |
| Students:   * Identify two or three other occasions in the week where it is important to accurately calculate departure and arrival times between two locations, and calculate, write and illustrate these (e.g. home to sports field; shops to home). |

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| **Resources** |
| **FUSE**  [Various FUSE Resources and Activities](http://fuse.education.vic.gov.au/Search/Results?AssociatedPackageId=&QueryText=time&SearchScope=All)  **Teaching Ideas (UK)**  [Time](http://www.teachingideas.co.uk/subjects/time)  **Pinterest**  [Teaching Time](https://au.pinterest.com/smidgie421/teaching-time/)  **Primary Resources**  [Time](http://www.primaryresources.co.uk/maths/mathsE2.htm) |

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| Topic 3.2.10 Fractions: Multiples to a Whole Number | | |
| 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** | | |
| * Model and represent unit fractions including 1/2, 1/4, 1/3, 1/5 and their multiples to a complete whole [(VCMNA136)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA136) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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. | Students recall multiplication facts to 10 x 10 and related division facts. They choose appropriate strategies for calculations involving multiplication and division, with and without the use of digital technology, and estimate answers accurately enough for the context. Students solve simple purchasing problems with and without the use of digital technology. They locate familiar fractions on a number line, recognise common equivalent fractions in familiar contexts and make connections between fractions and decimal notations up to two decimal places. Students identify unknown quantities in number sentences. They use the properties of odd and even numbers and describe number patterns resulting from multiplication. Students continue number sequences involving multiples of single-digit numbers and unit fractions, and locate them on a number line. |

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| **Activities** | **Proficiencies** |
| * Group dots to represent various fractions counted to a whole unit (e.g. 1/5, 2/5, 3/5, 4/5, 5/5), including tenths * Shade in objects to represent various fractions counted to a whole unit (e.g. 1/5, 2/5, 3/5, 4/5, 5/5), including tenths * Explore the use of ‘0’ as a numerator in fractions (e.g. 0/5) * Explore simple scenarios that model sharing (e.g. 1/3 each for 3 people)   *Note: The term ‘whole number’ is used informally to distinguish between a fraction such as and a number such as* 2. *The term ‘the set of whole numbers’ is sometimes used to refer to the infinite set* {1, 2, 3 …}; *sometimes it is used to refer to the infinite set*  {0, 1, 2, 3 …} *and sometimes it is used to refer to the set of integers* { …-3, -2, -2, 0, 1, 2, 3 …}. *Integers are iintroduced at Level 6.* | * **Fluency** when students readily make, describe and compare models of fractions * **Understanding** representing unit fractions, using appropriate language to communicate and compare number of parts with a whole unit * **Problem solving** through exploring and creating different scenarios that require fair sharing * **Reasoning** what ‘0’ as a numerator means in the context of counting fractions to a whole unit |

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| **Considering different levels** |
| Level 2  Students who are working at this level could:   * Relate the number of parts to the size of a fraction (e.g. there are two halves in a unit and three thirds in a unit, a half of a unit is larger than a third of a unit).   Level 4  Students who are working at this level could:   * Count by quarters, halves and thirds, including with mixed numerals. |

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| **Assessment ideas** |
| Students:   * Tell a story about sharing where objects are distributed fairly; include a change in the story that requires sharing of a left-over. |

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| **Resources** |
| **FUSE**  [Various FUSE Activities and Resources](http://fuse.education.vic.gov.au/VCAA/VCMNA136)  **Primary Resources (UK)**  [Fractions](http://www.primaryresources.co.uk/maths/mathsB6.htm) |

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| Topic 3.2.11 Whole Numbers and Place Value – to 10 0000 | | |
| 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** | | |
| * Apply place value to partition, rearrange and regroup numbers to at least 10 000 to assist calculations and solve problems [(VCMNA131)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA131) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 2 | **Level 3** | Level 4 |
| 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. | Students recall multiplication facts to 10 x 10 and related division facts. They choose appropriate strategies for calculations involving multiplication and division, with and without the use of digital technology, and estimate answers accurately enough for the context. Students solve simple purchasing problems with and without the use of digital technology. They locate familiar fractions on a number line, recognise common equivalent fractions in familiar contexts and make connections between fractions and decimal notations up to two decimal places. Students identify unknown quantities in number sentences. They use the properties of odd and even numbers and describe number patterns resulting from multiplication. Students continue number sequences involving multiples of single-digit numbers and unit fractions, and locate them on a number line. |

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| **Activities** | **Proficiencies** |
| * Apply place value to partition, rearrange and regroup numbers to at least 10 000 to assist calculations and solve problems * Recognise that 10 000 equals 10 thousands, 100 hundreds, 1000 tens and 10 000 ones * Justify choices about partitioning and regrouping numbers in terms of their usefulness for particular calculations   *Note: The term ‘whole number’ is used informally to distinguish between a fraction such as and a number such as* 2. *The term ‘the set of whole numbers’ is sometimes used to refer to the infinite set* {1, 2, 3 …}; *sometimes it is used to refer to the infinite set*  {0, 1, 2, 3 …} *and sometimes it is used to refer to the set of integers*  { …-3, -2, -2, 0, 1, 2, 3 …}. *Integers are introduced at Level 6.* | * **Understanding** including making connections between representations of numbers and the ability to flexibly rename numbers * **Fluency** through ordering whole numbers from smallest to largest, and connecting number calculations with counting sequences * **Problem solving** including formulating and solving authentic problems using whole numbers and materials to model numbers * **Reasoning** including investigating strategies to perform calculations efficiently |

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| **Considering different levels** |
| Level 2  Students who are working at this level could:   * Group, partition and rearrange collections up to 1000 in hundreds, tens and ones.   Level 4  Students who are working at this level could:   * Apply place value to partition, rearrange and regroup numbers to at least tens of thousands. |

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| **Assessment ideas** |
| Students:   * Use a digital abacus, scale and numerals to demonstrate and test their understanding of the structure of four digit numbers. |

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| **Resources** |
| **FUSE**  [Maths Partitioning Method (4-Digit Numbers) (Teacher Video)](http://fuse.education.vic.gov.au/?7FHDWP)  [Place Value Charts](http://fuse.education.vic.gov.au/?S7RZJH)  [Whole Numbers Level 5: Four-Digit Numbers](http://fuse.education.vic.gov.au/?WM4WPN) |

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