Mathematics Sample Program: Year 4



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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 4 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** | *4.1.1 Whole Numbers Place Value*  Strand: Number and Algebra  Sub-strand: Number and Place Value | *4.2.1 Multiplication and Division*  Strand: Number and Algebra Sub-strand: Patterns and Algebra |
| **2** | *4.1.2 2D Shapes and Area*  Strand: Measurement and Geometry Sub-strand: Shape |
| **3** | *4.2.2 Solids*  Strand: Measurement and Geometry Sub-strand: Shape |
| **4** | *4.1.3 Measurement - Length* Strand: Measurement and Geometry Sub-strand: Using Units of Measurement |
| **5** | *4.2.3 Volume Capacity Mass* Strand: Measurement and Geometry Sub-strand: Using Units of Measurement |
| **6** | *4.1.4 Number and Algebra – Simple Fractions and Decimals – Up to One* Strand: Number and Algebra Sub-strand: Fractions and Decimals | *4.2.4 Simple Fractions and Decimals – One and Beyond* Strand: Number and Algebra Sub-strand: Fractions and Decimals |
| **7** | *4.2.5 Chance and Probability*  Strand: Statistics and Probability Sub-strand: Chance |
| **8** | *4.1.5 Data Representation and Interpretation*  Strand: Statistics and Probability  Sub-strand: Data Representation and Interpretation |
| **9** | *4.1.6 Number Patterns* Strand: Number and Algebra Sub-strand: Patterns and Algebra |
| **10** | *4.1.7 Addition and Subtraction* Strand: Number and Algebra  Sub-strand: Patterns and Algebra | *4.2.6 Number Sentences* Strand: Number and Algebra Sub-strand: Patterns and Algebra |
| **11** |

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| **12** | *4.1.8 Space - Shape and Symmetry* Strand: Measurement and Geometry Sub-strand: Location and Transformation | *4.2.7 Whole Numbers - Multiplication and Area* Strand: Number and Algebra Sub-strand: Using Units of Measurement |
| **13** | *4.2.8 Space, Maps, Scales and Networks* Strand: Measurement and Geometry Sub-strand: Location and Transformation |
| **14** | *4.1.9 Geometric Reasoning - Angles*  Strand: Measurement and Geometry Sub-strand: Geometric Reasoning |
| **15** | *4.2.9 Time*  Strand: Measurement and Geometry Sub-strand: Using units of Measurement |
| **16** | *4.1.10 Money* Strand: Number and Algebra  Sub-strand: Money and Financial Mathematics |
| **17** | *4.1.11 Odd and Even Numbers* Strand: Number and Algebra Sub-strand: Number and Place Value | *4.2.10 Fractions and Decimals to Hundredths* Strand: Number and Algebra Sub-strand: Fractions and Decimals |
| **18** |

\* Based on 3 hours teaching time per week

Content descriptions coverage within each topic

|  |  |
| --- | --- |
| **Level 4 content descriptions** | **Topic/s** |
| **Strand: Number and Algebra** | |
| **Sub-strand: Number and Place Value** | |
| Investigate and use the properties of odd and even numbers [(VCMNA151)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA151) | 4.1.11 |
| Recognise, represent and order numbers to at least tens of thousands [(VCMNA152)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA152) | 4.1.1 |
| Apply place value to partition, rearrange and regroup numbers to at least tens of thousands to assist calculations and solve problems [(VCMNA153)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA153) | 4.1.1  4.1.7 |
| Investigate number sequences involving multiples of 3, 4, 6, 7, 8, and 9 [(VCMNA154)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA154) | 4.1.7  4.2.1 |
| Recall multiplication facts up to 10 × 10 and related division facts [(VCMNA155)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA155) | 4.2.1  4.2.7 |
| Develop efficient mental and written strategies and use appropriate digital technologies for multiplication and for division where there is no remainder [(VCMNA156)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA156) | 4.2.1  4.2.7 |
| **Sub-strand: Fractions and Decimals** | |
| Investigate equivalent fractions used in contexts [(VCMNA157)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA157) | 4.1.4  4.2.4 |
| Count by quarters, halves and thirds, including with mixed numerals. Locate and represent these fractions on a number line [(VCMNA158)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA158) | 4.1.4  4.2.4 |
| Recognise that the place value system can be extended to tenths and hundredths. Make connections between fractions and decimal notation [(VCMNA159)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA159) | 4.1.4  4.2.4  4.2.10 |
| **Sub-strand: Money and Financial Mathematics** | |
| Solve problems involving purchases and the calculation of change to the nearest five cents with and without digital technologies [(VCMNA160)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA160) | 4.1.10 |
| **Sub-strand: Patterns and Algebra** | |
| Explore and describe number patterns resulting from performing multiplication [(VCMNA161)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA161) | 4.1.6  4.2.1  4.2.6  4.2.7 |
| Solve word problems by using number sentences involving multiplication or division where there is no remainder [(VCMNA162)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA162) | 4.1.6  4.2.1  4.2.6 |
| Use equivalent number sentences involving addition and subtraction to find unknown quantities [(VCMNA163)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA163) | 4.1.6  4.1.7  4.2.6 |
| Define a simple class of problems and solve them using an effective algorithm that involves a short sequence of steps and decisions [(VCMNA164)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA164) | 4.2.7 |
| **Strand: Measurement and Geometry** | |
| **Sub-strand: Using Units of Measurement** | |
| Use scaled instruments to measure and compare lengths, masses, capacities and temperatures [(VCMMG165)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG165) | 4.2.3 |
| Compare objects using familiar metric units of area and volume [(VCMMG166)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG166) | 4.2.7 |
| Convert between units of time [(VCMMG167)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG167) | 4.2.9 |
| Use am and pm notation and solve simple time problems [(VCMMG168)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG168) | 4.2.9 |
| **Sub-strand: Shape** | |
| Compare the areas of regular and irregular shapes by informal means [(VCMMG169)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG169) | 4.1.2  4.2.2 |
| Compare and describe two dimensional shapes that result from combining and splitting common shapes, with and without the use of digital technologies [(VCMMG170)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG170) | 4.1.2  4.2.2 |
| Explain and compare the geometric properties of two-dimensional shapes and three-dimensional objects [(VCMMG171)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG171) | 4.2.1 |
| **Sub-strand: Location and Transformation** | |
| Use simple scales, legends and directions to interpret information contained in basic maps [(VCMMG172)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG172) | 4.1.3  4.2.8 |
| Create symmetrical patterns, pictures and shapes with and without digital technologies [(VCMMG173)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG173) | 4.1.8  4.2.2 |
| **Sub-strand: Geometric Reasoning** | |
| Compare angles and classify them as equal to, greater than or less than a right angle [(VCMMG174)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG174) | 4.1.9 |
| **Strand: Statistics and Probability** |  |
| **Sub-strand: Chance** | |
| Describe possible everyday events and order their chances of occurring [(VCMSP175)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP175) | 4.2.5 |
| Identify everyday events where one cannot happen if the other happens [(VCMSP176)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP176) | 4.25 |
| Identify events where the chance of one will not be affected by the occurrence of the other [(VCMSP177)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP177) | 4.2.5 |
| **Sub-strand: Data Representation and Interpretation** | |
| Select and trial methods for data collection, including survey questions and recording sheets [(VCMSP178)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP178) | 4.1.5 |
| Construct suitable data displays, with and without the use of digital technologies, from given or collected data. Include tables, column graphs and picture graphs where one picture can represent many data values [(VCMSP179)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP179) | 4.1.5 |
| Evaluate the effectiveness of different displays in illustrating data features including variability [(VCMSP180)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP180) | 4.1.5 |

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

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| --- | --- | --- |
| Level 3 | Level 4 | Level 5 |
| **Number and algebra**  Students recognise, model and order numbers to at least 10 000 and place four digit numbers on a number line with regard for scale. They partition and re-arrange to facilitate calculations involving addition and subtraction. Students have facility with single digit addition and related subtraction facts, and recall multiplication and related division facts for twos, threes, fives and tens. They formulate and solve simple multiplication and division problems, estimate answers and use technology to check calculations. Students group money to a specified value in several ways, and calculate change required in simple transactions. They model and represent multiples of unit fractions up to a whole, using arrays on a number line. They write simple rules for number patterns and generate those patterns. | **Number and algebra**  Students model, represent and order numbers to tens of thousands, and extend place value to tenths and hundredths. They investigate odd and even numbers and explore number patterns based on multiples of 3, 4, 6, 7, 8 and 9. Students develop facility with multiplication facts up to 10 x 10 and related division facts. They investigate simple equivalent fractions and count by halves, thirds and quarters, and locate corresponding elements on a number line. Students use simple decimals to solve money problems including total cost and change. They solve simple number sentences and word problems involving all four operations. | **Number and algebra**  Students use estimation and rounding for all four operations, with and without the use of technology for calculation. They solve multiple digit problems involving addition, subtraction, multiplication and division by single digit divisors with remainders. Students represent, compare and order unit fractions, and decimal fractions, and represent them on a number line. They construct simple budgets for familiar events and activities. They solve numbers sentences involving division, and create number patterns involving fractions and decimals. |
| **Measurement and geometry**  Students use metric units of length, mass and capacity to measure, order and compare objects. They associate angle with measure of turn and compare angles in everyday situations. They tell the time in minutes and convert between units of time. They use simple grids in maps and identify symmetry. | **Measurement and geometry**  Students use scaled instruments with metric units to measure and compare length, mass, capacity and temperature. They compare shapes and objects using familiar metric units for area and volume, and compare angles with respect to a right angle. Students use 'am' and 'pm' notations, and solve simple time problems, including conversions between units of time. They construct new shapes by combining or splitting common shapes, and create symmetric patterns, pictures and shapes with and without the use of technology. They interpret and use basic maps with simple scales, directions and legends. | **Measurement and geometry**  Students choose and use suitable metric and other units for measurement of length, angle, area, volume, capacity and mass. They calculate the perimeter and area of rectangles, and construct specified angles using protractors and other relevant technologies. Students use 12 and 24 hour time systems, with measurements and conversions to seconds. They use grid reference systems to describe location and connect three-dimension objects with two-dimensional representations. They translate, reflect and rotate shapes with and without the use of technology, and identify point and line symmetries. They explore similarity of familiar shapes through enlargement. |
| **Statistics and probability**  Students carry out investigations, collect and organise data into categories and use different methods with and without technology to display the data. They conduct experiments involving chance, describe possible outcomes and recognise variability in results. | **Statistics and probability**  Students select and trial different methods for collecting data, including surveys. They construct suitable data displays with and without the use of technology, where there is a many-to-one relationship between elements of graphs and data, and evaluate the effectiveness of different displays. They identify relative likelihood of everyday events, and identify events that are mutually exclusive and events that are independent. | **Statistics and probability**  Students pose questions to collect categorical and numerical data by observation and survey, and represent the data in a variety of ways with and without the use of technology. They describe and interpret data sets in context. Students recognise that probabilities are measured on a scale of 0 to 1 (inclusive), and represent the probability of events from simple experiments using fractions |

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 4 Semester 1



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| Topic 4.1.1 Whole Numbers Place Value | | |
| 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** | | |
| * Recognise, represent and order numbers to at least tens of thousands [(VCMNA152)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA152) * Apply place value to partition, rearrange and regroup numbers to at least tens of thousands to assist calculations and solve problems [(VCMNA153)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA153) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 3 | **Level 4** | Level 5 |
| Students recognise, model and order numbers to at least 10 000 and place four digit numbers on a number line with regard for scale. They partition and re-arrange to facilitate calculations involving addition and subtraction. Students have facility with single digit addition and related subtraction facts, and recall multiplication and related division facts for twos, threes, fives and tens. They formulate and solve simple multiplication and division problems, estimate answers and use technology to check calculations. Students group money to a specified value in several ways, and calculate change required in simple transactions. They model and represent multiples of unit fractions up to a whole, using arrays on a number line. They write simple rules for number patterns and generate those patterns. | **Students model, represent and order numbers to tens of thousands**, and extend place value to tenths and hundredths. They investigate odd and even numbers and explore number patterns based on multiples of 3, 4, 6, 7, 8 and 9. Students develop facility with multiplication facts up to 10 x 10 and related division facts. They investigate simple equivalent fractions and count by halves, thirds and quarters, and locate corresponding elements on a number line. Students use simple decimals to solve money problems including total cost and change. They solve simple number sentences and word problems involving all four operations. | Students use estimation and rounding for all four operations, with and without the use of technology for calculation. They solve multiple digit problems involving addition, subtraction, multiplication and division by single digit divisors with remainders. Students represent, compare and order unit fractions, and decimal fractions, and represent them on a number line. They construct simple budgets for familiar events and activities. They solve numbers sentences involving division, and create number patterns involving fractions and decimals. |

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| **Activities (continued on next page)** | **Proficiencies** |
| * Recognise, model, represent and order numbers to at least to at least tens of thousands * Apply place value to partition, rearrange and regroup numbers to at least 10 000 to assist calculations and solve problems * Recognise and demonstrate that the place-value pattern is built on the operations of multiplication or division of tens * Use the four operations with pairs of odd or even numbers or one odd and one even number; use the relationships established to check the accuracy of calculations | * **Fluency** through 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** including formulating and solving authentic problems using whole numbers and materials to model numbers |

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| **Activities (continued)** | **Proficiencies (continued)** |
| * Model numbers using base ten manipulatives such as Mathematics Attribute Blocks (MAB) blocks, both real and virtual   *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** including investigating strategies to perform calculations efficiently, continuing patterns |

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| **Considering different levels of student ability** |
| Level 3  Students who are working at this level could:   * Place five-digit numbers on a number line using an appropriate scale.   Level 5  Students who are working at this level could:   * Explore techniques for multiplication such as the area model, the Italian lattice method or the partitioning of numbers. |

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| **Assessment ideas** |
| Students:   * Reproduce five-digit numbers in words using their numerical representations, and vice versa. |

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| **Resources** |
| **FUSE**  [Wishball Challenge: Whole Numbers](http://fuse.education.vic.gov.au/?36U5BH)  [Place Value and Modelling Numbers (MAB)](http://fuse.education.vic.gov.au/?PCDR2C)  [Place Value Headings](http://fuse.education.vic.gov.au/?SS4BH2)  [Musical Number Patterns: Odds and Evens](http://fuse.education.vic.gov.au/?AQAD63) |

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| **Notes** |
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| Topic 4.1.2 2D Shapes and Area | | |
| 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** | | |
| * Compare the areas of regular and irregular shapes by informal means [(VCMMG169)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG169) * Compare and describe two dimensional shapes that result from combining and splitting common shapes, with and without the use of digital technologies [(VCMMG170)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG170) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 3 | **Level 4** | Level 5 |
| Students use metric units of length, mass and capacity to measure, order and compare objects. They associate angle with measure of turn and compare angles in everyday situations. They tell the time in minutes and convert between units of time. They use simple grids in maps and identify symmetry. | Students use scaled instruments with metric units to measure and compare length, mass, capacity and temperature. **They compare shapes and objects using familiar metric units for area and volume, and compare angles with respect to a right angle.** Students use 'am' and 'pm' notations, and solve simple time problems, including conversions between units of time. **They construct new shapes by combining or splitting common shapes, and create symmetric patterns, pictures and shapes with and without the use of technology.** They interpret and use basic maps with simple scales, directions and legends. | Students choose and use suitable metric and other units for measurement of length, angle, area, volume, capacity and mass. They calculate the perimeter and area of rectangles, and construct specified angles using protractors and other relevant technologies. Students use 12 and 24 hour time systems, with measurements and conversions to seconds. They use grid reference systems to describe location and connect three-dimension objects with two-dimensional representations. They translate, reflect and rotate shapes with and without the use of technology, and identify point and line symmetries. They explore similarity of familiar shapes through enlargement. |

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| **Activities** | **Proficiencies** |
| * Identify common two-dimensional shapes that are part of a composite shape by re-creating it from these shapes * Creating two-dimensional shapes from verbal or written instructions * Compare areas using metric units, such as counting the number of square centimetres required to cover two areas by overlaying the areas with a grid of centimetre squares | * **Fluency** through recognising and classifying familiar two-dimensional shapes using obvious features * **Understanding** through identifying key properties of 2D shapes; 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 circles, squares, triangles and rectangles in pictures and the environment and describing their features using a common language |

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| **Considering different levels** |
| Level 3  Students who are working at this level could:   * Explore the creation of three-dimensional objects, including prisms and pyramids, using origami.   Level 5  Students who are working at this level could:   * Connect three-dimensional objects with their nets and other two-dimensional representations. |

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| **Assessment ideas** |
| Students   * Use the [SpatialGenie](http://www.spatialgenie.edu.au/) tool to estimate and compare areas of objects and present their findings (Note: used as part of the Let’s Compare resource, below). |

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| **Resources** |
| **FUSE**  [Let’s Compare (Teacher Resource)](http://fuse.education.vic.gov.au/?HQMFK2)  [Shapes, Glorious Shapes](http://fuse.education.vic.gov.au/?F4CWKW)  **NLVM**  [Virtual Manipulatives for Geometry](http://nlvm.usu.edu/en/nav/category_g_2_t_3.html) |

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| **Notes** |
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| Topic 4.1.3 Measurement – Length | | |
| 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** | | |
| * Use scaled instruments to measure and compare lengths, masses, capacities and temperatures [(VCMMG165)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG165) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 3 | **Level 4** | Level 5 |
| Students use metric units of length, mass and capacity to measure, order and compare objects. They associate angle with measure of turn and compare angles in everyday situations. They tell the time in minutes and convert between units of time. They use simple grids in maps and identify symmetry. | **Students use scaled instruments with metric units to measure and compare length**, mass, capacity and temperature. They compare shapes and objects using familiar metric units for area and volume, and compare angles with respect to a right angle. Students use 'am' and 'pm' notations, and solve simple time problems, including conversions between units of time. They construct new shapes by combining or splitting common shapes, and create symmetric patterns, pictures and shapes with and without the use of technology. They interpret and use basic maps with simple scales, directions and legends. | Students choose and use suitable metric and other units for measurement of length, angle, area, volume, capacity and mass. They calculate the perimeter and area of rectangles, and construct specified angles using protractors and other relevant technologies. Students use 12 and 24 hour time systems, with measurements and conversions to seconds. They use grid reference systems to describe location and connect three-dimension objects with two-dimensional representations. They translate, reflect and rotate shapes with and without the use of technology, and identify point and line symmetries. They explore similarity of familiar shapes through enlargement. |

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| **Activities** | **Proficiencies** |
| * Identify and use different measuring instruments to compare the lengths of various objects * Read and interpret, to the nearest graduation, the graduated scales on a range of measuring instruments * Explore the size of a centimetre and measure objects using centimetre rulers * Explore the size of a metre and measure objects using centimetre rulers | * **Fluency** through choosing and using familiar metric units to order and compare the lengths of objects * **Understanding** by building on concepts already known about measuring length and relating known skills to new learning * **Problem solving** involves 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 3  Students who are working at this level could:   * Measure, order and compare objects using familiar metric units of length.   Level 5  Students who are working at this level could:   * Investigate alternative measures of length to demonstrate that these vary between countries and change over time. |

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| **Assessment ideas** |
| Students   * Complete a Maths trail (of 4 to 10 ‘stations,’ where each station has questions that can only be answered at that site by the application of length measurement skills; students then create their own. |

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| **Resources** |
| **FUSE**  [Length Strength: Centimetres](http://fuse.education.vic.gov.au/?RW9TYC)  [Measuring Length and Distance](http://fuse.education.vic.gov.au/?HCW5SF)  **NZ Maths**  [Length – Units of Work](https://nzmaths.co.nz/search/node/length) |

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| Topic 4.1.4 Number and Algebra – Simple Fractions and Decimals – Up to One | | |
| 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** | | |
| * Investigate equivalent fractions used in contexts [(VCMNA157)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA157) * Count by quarters, halves and thirds, including with mixed numerals. Locate and represent these fractions on a number line [(VCMNA158)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA158) * Recognise that the place value system can be extended to tenths and hundredths. Make connections between fractions and decimal notation [(VCMNA159)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA159) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 3 | **Level 4** | Level 5 |
| Students recognise, model and order numbers to at least 10 000 and place four digit numbers on a number line with regard for scale. They partition and re-arrange to facilitate calculations involving addition and subtraction. Students have facility with single digit addition and related subtraction facts, and recall multiplication and related division facts for twos, threes, fives and tens. They formulate and solve simple multiplication and division problems, estimate answers and use technology to check calculations. Students group money to a specified value in several ways, and calculate change required in simple transactions. They model and represent multiples of unit fractions up to a whole, using arrays on a number line. They write simple rules for number patterns and generate those patterns. | Students model, represent and order numbers to tens of thousands**, and extend place value to tenths and hundredths.** They investigate odd and even numbers and explore number patterns based on multiples of 3, 4, 6, 7, 8 and 9. Students develop facility with multiplication facts up to 10 x 10 and related division facts. **They investigate simple equivalent fractions and count by halves, thirds and quarters, and locate corresponding elements on a number line.** Students use simple decimals to solve money problems including total cost and change. They solve simple number sentences and word problems involving all four operations. | Students use estimation and rounding for all four operations, with and without the use of technology for calculation. They solve multiple digit problems involving addition, subtraction, multiplication and division by single digit divisors with remainders. Students represent, compare and order unit fractions, and decimal fractions, and represent them on a number line. They construct simple budgets for familiar events and activities. They solve numbers sentences involving division, and create number patterns involving fractions and decimals. |

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| **Activities** | **Proficiencies** |
| * Model and represent unit fractions including 1/2, 1/4, 1/3, 1/5 and their multiples to a complete whole * Locate fractions on a number line and write the matching decimal number, using equivalent fraction washing line * Recall and extend fractions of shapes * Recall and extend fractions of quantities * Consider ‘what does equal really mean?’ * Use knowledge of fractions to establish equivalences between fractions and decimal notation * Convert mixed numbers to improper fractions and vice versa | * **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** including explaining the concept of fractional equivalence |

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| **Considering different levels of student ability** |
| Level 3  Students who are working at this level could:   * Locate unit fractions on a number line.   Level 5  Students who are working at this level could:   * Compare and order common unit fractions and locate and represent them on a number line. |

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| **Assessment ideas** |
| * Explore decimal equivalents for ½, 1/3, ¼, 1/5, 1/8 and 1/10 and their features |

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| **Resources** |
| **FUSE**  Various FUSE Activities and Resources for [VCMNA157](http://fuse.education.vic.gov.au/VCAA/VCMNA157) and [VCMNA158](http://fuse.education.vic.gov.au/VCAA/VCMNA158)  **Primary Resources (UK)**  [Fractions](http://www.primaryresources.co.uk/maths/mathsB6.htm) |

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| Topic 4.1.5 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** | | |
| * Select and trial methods for data collection, including survey questions and recording sheets [(VCMSP178)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP178) * Construct suitable data displays, with and without the use of digital technologies, from given or collected data. Include tables, column graphs and picture graphs where one picture can represent many data values [(VCMSP179)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP179) * Evaluate the effectiveness of different displays in illustrating data features including variability [(VCMSP180)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP180) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 3 | **Level 4** | Level 5 |
| Students carry out investigations, collect and organise data into categories and use different methods with and without technology to display the data. They conduct experiments involving chance, describe possible outcomes and recognise variability in results. | **Students select and trial different methods for collecting data, including surveys. They construct suitable data displays with and without the use of technology, where there is a many-to-one relationship between elements of graphs and data, and evaluate the effectiveness of different displays.** They identify relative likelihood of everyday events, and identify events that are mutually exclusive and events that are independent. | Students pose questions to collect categorical and numerical data by observation and survey, and represent the data in a variety of ways with and without the use of technology. They describe and interpret data sets in context. Students recognise that probabilities are measured on a scale of 0 to 1 (inclusive), and represent the probability of events from simple experiments using fractions |

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| **Activities** | **Proficiencies** |
| * Compare the effectiveness of different methods of collecting data * Choose the most effective way to collect data for a given investigation * Explore ways of presenting data and showing the results of investigations * Investigate data displays using many-to-one correspondence * Interpret data representations in the media and other forums in which symbols represent more than one data value * Suggest questions that can be answered by a given data display and using the display to answer questions | * **Understanding** different methods for data collection * **Fluency** in constructing data displays with or without technology * **Problem solving** through selecting and trialling methods for data collection * **Reasoning** why some methods of collecting data are more effective than others |

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| **Considering different levels of student ability** |
| Level 3  Students who are working at this level could:   * Collect data, organise into categories and create displays using lists, tables, picture graphs and simple column graphs, with or without the use of digital technologies.   Level 5  Students who are working at this level could:   * Construct displays, including column graphs, dot plots and tables, appropriate for data type, with or without the use of digital technologies. |

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| **Assessment ideas** |
| Students:   * Write sentences to demonstrate an understanding of data analysis after being exposed to different displays in illustrating data features including variability. |

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| **Resources** |
| **FUSE**  [Fashion Design – Market Research](http://fuse.education.vic.gov.au/?ZHZ942)  **Teaching Ideas (UK)**  [Statistics](http://www.teachingideas.co.uk/subjects/statistics) |

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| Topic 4.1.6 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** | | |
| * Explore and describe number patterns resulting from performing multiplication [(VCMNA161)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA161) * Solve word problems by using number sentences involving multiplication or division where there is no remainder [(VCMNA162)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA162) * Use equivalent number sentences involving addition and subtraction to find unknown quantities [(VCMNA163)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA163) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 3 | **Level 4** | Level 5 |
| Students recognise, model and order numbers to at least 10 000 and place four digit numbers on a number line with regard for scale. They partition and re-arrange to facilitate calculations involving addition and subtraction. Students have facility with single digit addition and related subtraction facts, and recall multiplication and related division facts for twos, threes, fives and tens. They formulate and solve simple multiplication and division problems, estimate answers and use technology to check calculations. Students group money to a specified value in several ways, and calculate change required in simple transactions. They model and represent multiples of unit fractions up to a whole, using arrays on a number line. They write simple rules for number patterns and generate those patterns. | Students model, represent and order numbers to tens of thousands, and extend place value to tenths and hundredths. They investigate odd and even numbers and **explore number patterns based on multiples of 3, 4, 6, 7, 8 and 9**. Students develop facility with multiplication facts up to 10 x 10 and related division facts. They investigate simple equivalent fractions and count by halves, thirds and quarters, and locate corresponding elements on a number line. Students use simple decimals to solve money problems including total cost and change. **They solve simple number sentences and word problems involving all four operations.** | Students use estimation and rounding for all four operations, with and without the use of technology for calculation. They solve multiple digit problems involving addition, subtraction, multiplication and division by single digit divisors with remainders. Students represent, compare and order unit fractions, and decimal fractions, and represent them on a number line. They construct simple budgets for familiar events and activities. They solve numbers sentences involving division, and create number patterns involving fractions and decimals. |

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| **Activities** | **Proficiencies** |
| * Identify examples of number patterns in everyday life * Write number sentences to represent and answer questions such as: ‘When a number is added to 23 the answer is the same as 57 minus 19. What is the number?’ * Using partitioning to find unknown quantities in number sentences * Represent a word problem as a number sentence * Writing a word problem using a given number sentence * Explore and describe number patterns resulting from performing multiplication | * **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 * **Reasoning** through describing, continuing and creating number patterns resulting from addition of a number |

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| **Considering different levels** |
| Level 3  Students who are working at this level could:   * Describe, continue, and create number patterns resulting from performing addition or subtraction.   Level 5  Students who are working at this level could:   * Describe, continue and create patterns with fractions, decimals and whole numbers resulting from addition and subtraction. |

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| **Assessment ideas** |
| Students:   * Solve word problems by using number sentences involving multiplication or division where there is no remainder. |

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| **Resources** |
| **FUSE**  [Number Patterns (AITSL Illustration of Practice)](http://fuse.education.vic.gov.au/?YR2PB5)  [NLVM: Number Line Arithmetic](http://fuse.education.vic.gov.au/?S7FCN9)  **Primary Resources (UK)**  [Patterns and Number Sequences](http://www.primaryresources.co.uk/maths/mathsB3.htm) |

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| Topic 4.1.7 Addition and Subtraction | | |
| Strand:  Number and Algebra | Sub-strand:  Patterns and Algebra | Recommended teaching time:  2 weeks |

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| **Mapping to F–10 curriculum in Victoria** | | |
| **Content descriptions** | | |
| * Apply place value to partition, rearrange and regroup numbers to at least tens of thousands to assist calculations and solve problems [(VCMNA153)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA153) * Investigate number sequences involving multiples of 3, 4, 6, 7, 8, and 9 [(VCMNA154)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA154) * Use equivalent number sentences involving addition and subtraction to find unknown quantities [(VCMNA163)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA163) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 3 | **Level 4** | Level 5 |
| Students recognise, model and order numbers to at least 10 000 and place four digit numbers on a number line with regard for scale. They partition and re-arrange to facilitate calculations involving addition and subtraction. Students have facility with single digit addition and related subtraction facts, and recall multiplication and related division facts for twos, threes, fives and tens. They formulate and solve simple multiplication and division problems, estimate answers and use technology to check calculations. Students group money to a specified value in several ways, and calculate change required in simple transactions. They model and represent multiples of unit fractions up to a whole, using arrays on a number line. They write simple rules for number patterns and generate those patterns. | Students model, represent and order numbers to tens of thousands, and extend place value to tenths and hundredths. **They investigate odd and even numbers and explore number patterns based on multiples of 3, 4, 6, 7, 8 and 9.** Students develop facility with multiplication facts up to 10 x 10 and related division facts. They investigate simple equivalent fractions and count by halves, thirds and quarters, and locate corresponding elements on a number line. Students use simple decimals to solve money problems including total cost and change. They solve simple number sentences and word problems involving all four operations. | Students use estimation and rounding for all four operations, with and without the use of technology for calculation. They solve multiple digit problems involving addition, subtraction, multiplication and division by single digit divisors with remainders. Students represent, compare and order unit fractions, and decimal fractions, and represent them on a number line. They construct simple budgets for familiar events and activities. They solve numbers sentences involving division, and create number patterns involving fractions and decimals. |

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| **Activities (continued on next page)** | **Proficiencies** |
| * Students apply place value to partition, re arrange and regroup number to at least 10 000 to assist with calculations and solve problems * Students can place four-digit numbers on a number line using an appropriate scale * Students can reproduce numbers in words using their numerical representations and vice versa * Students can demonstrate the connection between addition and subtraction using partitioning or by writing equivalent number sentences | * **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)** |
| * Students model the connection between addition and subtraction by breaking 100 with concrete materials * 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 * Recognise that number sequences can be extended indefinitely, and determining any patterns in the sequences | * **Reasoning** through the ability to explain and justify strategies and judge the reasonableness of the result. |

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| **Considering different levels of student ability** |
| Level 3  Students who are working at this level could:   * Recognise and explain the connection between addition and subtraction.   Level 5  Students who are working at this level could:   * Use equivalent number sentences involving multiplication and division to find unknown quantities. |

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| **Assessment ideas** |
| Students:   * Use relevant problems to develop number sentences. |

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| **Resources** |
| **FUSE**  [Pobble Arrays: Make Multiples](http://fuse.education.vic.gov.au/?6JA89F)  [Additional and Subtraction](http://fuse.education.vic.gov.au/?ZMNPN7) |

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| Topic 4.1.8 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** | | |
| * Create symmetrical patterns, pictures and shapes with and without digital technologies [(VCMMG173)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG173) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 3 | **Level 4** | Level 5 |
| Students use metric units of length, mass and capacity to measure, order and compare objects. They associate angle with measure of turn and compare angles in everyday situations. They tell the time in minutes and convert between units of time. They use simple grids in maps and identify symmetry. | Students use scaled instruments with metric units to measure and compare length, mass, capacity and temperature. They compare shapes and objects using familiar metric units for area and volume, and compare angles with respect to a right angle. Students use 'am' and 'pm' notations, and solve simple time problems, including conversions between units of time. **They construct new shapes by combining or splitting common shapes, and create symmetric patterns, pictures and shapes with and without the use of technology.** They interpret and use basic maps with simple scales, directions and legends. | Students choose and use suitable metric and other units for measurement of length, angle, area, volume, capacity and mass. They calculate the perimeter and area of rectangles, and construct specified angles using protractors and other relevant technologies. Students use 12 and 24 hour time systems, with measurements and conversions to seconds. They use grid reference systems to describe location and connect three-dimension objects with two-dimensional representations. They translate, reflect and rotate shapes with and without the use of technology, and identify point and line symmetries. They explore similarity of familiar shapes through enlargement. |

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| **Activities** | **Proficiencies** |
| * Recognise lines of symmetry which are not vertical or horizontal * Identify multiple lines of symmetry in a shape * Recognise that there may be no lines of symmetry in a shape that appears to have 'two halves' * Explore symmetry using materials such as: * the motifs in Central Asian textiles * Tibetan artefacts * Indian lotus designs * Yolngu or Central and Western Desert art * Create symmetrical patterns, pictures and shapes with and without digital technologies | * **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** – includes matching transformations with their original shape, creating continuous patterns using the same shape including rotation and flipping. * **Reasoning** – describing with accuracy and correct vocabulary the features of a symmetrical pattern or picture. |

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| **Considering different levels** |
| Level 3  Students who are working at this level could:   * Identify symmetry in the environment.   Level 5  Students who are working at this level could:   * Identify line and rotational symmetries. |

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| **Assessment ideas** |
| Students:   * Take the Symmetry Challenge at the Victorian Maths Challenge (see below). |

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| **Resources** |
| **FUSE**  [The Symmetry Challenge](http://fuse.education.vic.gov.au/?K9L9XL)  [Tessellate: Geometry and Symmetry](http://fuse.education.vic.gov.au/?CXTVC4) |

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| Topic 4.1.9 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** | | |
| * Compare angles and classify them as equal to, greater than or less than a right angle [(VCMMG174)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG174) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 3 | **Level 4** | Level 5 |
| Students use metric units of length, mass and capacity to measure, order and compare objects. They associate angle with measure of turn and compare angles in everyday situations. They tell the time in minutes and convert between units of time. They use simple grids in maps and identify symmetry. | Students use scaled instruments with metric units to measure and compare length, mass, capacity and temperature. They compare shapes and objects using familiar metric units for area and volume, **and compare angles with respect to a right angle.** Students use 'am' and 'pm' notations, and solve simple time problems, including conversions between units of time. They construct new shapes by combining or splitting common shapes, and create symmetric patterns, pictures and shapes with and without the use of technology. They interpret and use basic maps with simple scales, directions and legends. | Students choose and use suitable metric and other units for measurement of length, angle, area, volume, capacity and mass. They calculate the perimeter and area of rectangles, and construct specified angles using protractors and other relevant technologies. Students use 12 and 24 hour time systems, with measurements and conversions to seconds. They use grid reference systems to describe location and connect three-dimension objects with two-dimensional representations. They translate, reflect and rotate shapes with and without the use of technology, and identify point and line symmetries. They explore similarity of familiar shapes through enlargement. |

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| **Activities** | **Proficiencies** |
| * Recognise the names and terminology to describe angles * Creating angles and compare them to a right angle using digital technologies * Identify and recognise right angles and their properties (e.g. a right angle is an internal angle which is equal to 90°) * Compare angles and classify them as equal to, greater than or less than a right angle | * **Understanding** through recognising a right angle and its properties * **Fluency** in classifying angles * **Problem solving** by creating angles using technology and comparing them to a right angle * **Reasoning** whether strategies for comparing and classifying angles rely on accurate measurements or estimates |

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| **Considering different levels** |
| Level 3  Students who are working at this level could:   * Identify angles as measures of turn and compare angle sizes in everyday situations.   Level 5  Students who are working at this level could:   * Estimate, measure and compare angles using degrees. |
| **Assessment ideas** |
| Students:   * Tesselate and decorate using right angled triangles * Find 5-10 objects that have right angles in them and draw the objects. |

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| **Resources** |
| **FUSE**  [Right Angles](http://fuse.education.vic.gov.au/?JTMD78)  [Angles (Estimating Angle Size)](http://fuse.education.vic.gov.au/?9PZG59)  **NZ Maths**  [Angles](http://www2.nzmaths.co.nz/LearningObjects/angles/angles.htm) |

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| Topic 4.1.10 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** | | |
| * Solve problems involving purchases and the calculation of change to the nearest five cents with and without digital technologies [(VCMNA160)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA160) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 3 | **Level 4** | Level 5 |
| Students recognise, model and order numbers to at least 10 000 and place four digit numbers on a number line with regard for scale. They partition and re-arrange to facilitate calculations involving addition and subtraction. Students have facility with single digit addition and related subtraction facts, and recall multiplication and related division facts for twos, threes, fives and tens. They formulate and solve simple multiplication and division problems, estimate answers and use technology to check calculations. Students group money to a specified value in several ways, and calculate change required in simple transactions. They model and represent multiples of unit fractions up to a whole, using arrays on a number line. They write simple rules for number patterns and generate those patterns. | Students model, represent and order numbers to tens of thousands, and extend place value to tenths and hundredths. They investigate odd and even numbers and explore number patterns based on multiples of 3, 4, 6, 7, 8 and 9. Students develop facility with multiplication facts up to 10 x 10 and related division facts. They investigate simple equivalent fractions and count by halves, thirds and quarters, and locate corresponding elements on a number line. **Students use simple decimals to solve money problems including total cost and change.** They solve simple number sentences and word problems involving all four operations. | Students use estimation and rounding for all four operations, with and without the use of technology for calculation. They solve multiple digit problems involving addition, subtraction, multiplication and division by single digit divisors with remainders. Students represent, compare and order unit fractions, and decimal fractions, and represent them on a number line. They construct simple budgets for familiar events and activities. They solve numbers sentences involving division, and create number patterns involving fractions and decimals. |

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| **Activities** | **Proficiencies** |
| * Represent money values in multiple ways and count the change required for simple transactions to the nearest five cents * Recognising that not all countries use dollars and cents, e.g. India uses rupees * Carry out calculations in another currency as well as in dollars and cents, and identifying both as decimal systems | * **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 3  Students who are working at this level could:   * Represent money values in multiple ways and count the change required for simple transactions to the nearest five cents.   Level 5  Students who are working at this level could:   * Create a simple budget for a class fundraising event. |

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| **Assessment ideas** |
| * Solve a series of worded money problems associated with real-life application using Add and Subtract Money Amounts: Word Problems, below. |

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| **Resources** |
| **FUSE**  [FunBrain: Change Maker](http://fuse.education.vic.gov.au/?Y5MJE7)  [Money](http://fuse.education.vic.gov.au/?B572QY)  [Add and Subtract Money Amounts: Word Problems](http://fuse.education.vic.gov.au/?G8WYQS" \o "손噕翿)  **Primary Resources (UK)**  [Money and Money Word Problems](http://www.primaryresources.co.uk/maths/mathsD2.htm) |

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| Topic 4.1.11 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 and use the properties of odd and even numbers [(VCMNA151)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA151) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 3 | **Level 4** | Level 5 |
| Students recognise, model and order numbers to at least 10 000 and place four digit numbers on a number line with regard for scale. They partition and re-arrange to facilitate calculations involving addition and subtraction. Students have facility with single digit addition and related subtraction facts, and recall multiplication and related division facts for twos, threes, fives and tens. They formulate and solve simple multiplication and division problems, estimate answers and use technology to check calculations. Students group money to a specified value in several ways, and calculate change required in simple transactions. They model and represent multiples of unit fractions up to a whole, using arrays on a number line. They write simple rules for number patterns and generate those patterns. | Students model, represent and order numbers to tens of thousands, and extend place value to tenths and hundredths. **They investigate odd and even numbers** and explore number patterns based on multiples of 3, 4, 6, 7, 8 and 9. Students develop facility with multiplication facts up to 10 x 10 and related division facts. They investigate simple equivalent fractions and count by halves, thirds and quarters, and locate corresponding elements on a number line. Students use simple decimals to solve money problems including total cost and change. **They solve simple number sentences and word problems involving all four operations.** | Students use estimation and rounding for all four operations, with and without the use of technology for calculation. They solve multiple digit problems involving addition, subtraction, multiplication and division by single digit divisors with remainders. Students represent, compare and order unit fractions, and decimal fractions, and represent them on a number line. They construct simple budgets for familiar events and activities. They solve numbers sentences involving division, and create number patterns involving fractions and decimals. |

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| **Activities** | **Proficiencies** |
| * Revisit what makes a number odd and even * Use the four operations with pairs of odd or even numbers or one odd and one even number * Predict an odd or even number before calculating * Establish odd and even rules for positive numbers across the four operations * Use the relationships established to check the accuracy of calculations | * **Fluency** involves identifying the odd or even nature of the result of computations involving combinations of odd and/or even numbers * **Understanding** involves recognisng that ‘even ’and ‘odd’ divide the infinite set of numbers   {0, 1, 2, 3, 4, 5, 6 … } into two distinct infinite sets {0, 2, 4, 6 …} and {1, 3, 5 …}.   * **Problem solving** includes formulating and solving authentic problems using sequences of odd and even numbers and their alternating location on the number line * **Reasoning** includes investigating strategies to perform calculations efficiently, continuing patterns and generating sets of odd or even numbers |

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| **Considering different levels** |
| Level 3  Students who are working at this level could:   * Investigate the conditions required for a number to be odd or even and identify odd and even numbers.   Level 5  Students who are working at this level could:   * Identify and describe factors and multiples of whole numbers and use them to solve problem. |

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| **Assessment ideas** |
| Students:   * Place the following multiplication problems on the correct side of a table (odd or even) by using odd and even rules, and then check their answers: 2 x 10, 4 x 7, 11 x 9, 32 x 6, 44 x 3, 77 x 5, 2 x 6, 8 x 3, 45 x 5, 92 x 2, 11 x 4, 7 x 3, 99 x 9. |

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| **Resources** |
| **FUSE**  [Musical Number Patterns: Odds and Evens](http://fuse.education.vic.gov.au/?AQAD63)  **Teachezy.com**  [Properties of Odds and Evens](https://teachezy.com/wp-content/uploads/2015/09/Properties-of-Odd-and-Even-Numbers.pdf) |

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Year 4 Semester 2



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| Topic 4.2.1 Multiplication and Division | | |
| Strand:  Number and Algebra | Sub-strand:  Patterns and Algebra | Recommended teaching time:  2 weeks |

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| **Mapping to F–10 curriculum in Victoria** | | |
| **Content descriptions** | | |
| * Investigate number sequences involving multiples of 3, 4, 6, 7, 8, and 9 [(VCMNA154)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA154) * Recall multiplication facts up to 10 × 10 and related division facts [(VCMNA155)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA155) * Develop efficient mental and written strategies and use appropriate digital technologies for multiplication and for division where there is no remainder [(VCMNA156)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA156) * Explore and describe number patterns resulting from performing multiplication [(VCMNA161)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA161) * Solve word problems by using number sentences involving multiplication or division where there is no remainder [(VCMNA162)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA162) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 3 | **Level 4** | Level 5 |
| Students recognise, model and order numbers to at least 10 000 and place four digit numbers on a number line with regard for scale. They partition and re-arrange to facilitate calculations involving addition and subtraction. Students have facility with single digit addition and related subtraction facts, and recall multiplication and related division facts for twos, threes, fives and tens. They formulate and solve simple multiplication and division problems, estimate answers and use technology to check calculations. Students group money to a specified value in several ways, and calculate change required in simple transactions. They model and represent multiples of unit fractions up to a whole, using arrays on a number line. They write simple rules for number patterns and generate those patterns. | Students model, represent and order numbers to tens of thousands, and extend place value to tenths and hundredths. They investigate odd and even numbers and **explore number patterns based on multiples of 3, 4, 6, 7, 8 and 9. Students develop facility with multiplication facts up to 10 x 10 and related division facts.** They investigate simple equivalent fractions and count by halves, thirds and quarters, and locate corresponding elements on a number line. Students use simple decimals to solve money problems including total cost and change. **They solve simple number sentences and word problems involving all four operations.** | Students use estimation and rounding for all four operations, with and without the use of technology for calculation. They solve multiple digit problems involving addition, subtraction, multiplication and division by single digit divisors with remainders. Students represent, compare and order unit fractions, and decimal fractions, and represent them on a number line. They construct simple budgets for familiar events and activities. They solve numbers sentences involving division, and create number patterns involving fractions and decimals. |

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| **Activities** | **Proficiencies** |
| * Recall multiplication facts up to 10 x 10 and related division facts * Recognise and represent multiplication as repeated addition, groups and arrays * Recognise that number sequences can be extended indefinitely, and determining any patterns in the sequences * Recall and be able to describe multiplication fact families * Use known facts and strategies, such as commutativity, doubling and halving for multiplication, and connecting division to multiplication when there is no remainder * Represent and solve problems involving multiplication and division using efficient mental and written strategies and appropriate technologies | * **Fluency** through recalling multiplication facts up to 10 x 10 and related division facts * **Understanding** through modelling repeated addition of whole numbers using concrete materials * **Problem solving** through making appropriate choice of strategies to solve open ended problems * **Reasoning** through explaining why a strategy has been chosen for a particular problem or task |

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| **Considering different levels of student ability** |
| Level 3  Students who are working at this level could:   * Represent and solve problems involving multiplication using efficient mental and written strategies and appropriate digital technologies.   Level 5  Students who are working at this level could:   * Use efficient mental and written strategies and apply appropriate digital technologies to solve problems. |

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| **Assessment ideas** |
| Students:   * Extend a set of multiplication facts. |

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| **Resources** |
| **Primary Resources (UK)**  [General Multiplication and Division](http://www.primaryresources.co.uk/maths/mathsC2.htm)  **Everyday Maths Online (US)**  [Multiplication and Division Fact Families](https://emccss.everydaymathonline.com/em-crosswalk/pdf/3/g3_tlg_lesson_4_6.pdf)  **University of Idaho**  [Assessing Students Levels of Understanding of Multiplication through Problem Solving and Problem Writing (Teacher Article)](http://www.webpages.uidaho.edu/cpiez/m235_sp10/assessing%20mult%20through%20problem%20writing.pdf) |

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| Topic 4.2.2 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** | | |
| * Compare the areas of regular and irregular shapes by informal means [(VCMMG169)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG169) * Compare and describe two dimensional shapes that result from combining and splitting common shapes, with and without the use of digital technologies [(VCMMG170)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG170) * Explain and compare the geometric properties of two-dimensional shapes and three-dimensional objects [(VCMMG171)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG171) * Create symmetrical patterns, pictures and shapes with and without digital technologies [(VCMMG173)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG173) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 3 | **Level 4** | Level 5 |
| Students use metric units of length, mass and capacity to measure, order and compare objects. They associate angle with measure of turn and compare angles in everyday situations. They tell the time in minutes and convert between units of time. They use simple grids in maps and identify symmetry. | Students use scaled instruments with metric units to measure and compare length, mass, capacity and temperature. **They compare shapes and objects using familiar metric units for area and volume**, and compare angles with respect to a right angle. Students use 'am' and 'pm' notations, and solve simple time problems, including conversions between units of time. **They construct new shapes by combining or splitting common shapes, and create symmetric patterns, pictures and shapes with and without the use of technology.** They interpret and use basic maps with simple scales, directions and legends. | Students choose and use suitable metric and other units for measurement of length, angle, area, volume, capacity and mass. They calculate the perimeter and area of rectangles, and construct specified angles using protractors and other relevant technologies. Students use 12 and 24 hour time systems, with measurements and conversions to seconds. They use grid reference systems to describe location and connect three-dimension objects with two-dimensional representations. They translate, reflect and rotate shapes with and without the use of technology, and identify point and line symmetries. They explore similarity of familiar shapes through enlargement. |

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| **Activities** | **Proficiencies** |
| * Compare areas using metric units, such as counting the number of square centimetres required to cover two areas by overlaying the areas with a grid of centimetre squares * Identify common two-dimensional shapes that are part of a composite shape by re-creating it from these shapes * Explain and compare the geometric properties of two-dimensional shapes and three-dimensional objects * Create two-dimensional shapes from verbal or written instructions * Make models of three dimensional objects and describe the key features, explore the creation of three-dimensional objects using prisms and pyramids * Manipulate and sort three-dimensional objects found in the environment | * **Fluency** through recognising and classifying familiar two-dimensional shapes and three-dimensional objects using obvious features * **Understanding** through identifying key properties of 2D shapes and 3D objects * **Problem solving** through using shapes in problem solving such as puzzles, tessellations, drawings, flip, slide and turn, and matching transformations with their original shape. * **Reasoning** through analysing and explaining the properties of shapes in comparison to each other. |

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| **Considering different levels** |
| Level 3  Students who are working at this level could:   * Make models of three-dimensional objects and describe key features.   Level 5  Students who are working at this level could:   * Connect three-dimensional objects with their nets and other two-dimensional representations. |

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| **Assessment ideas** |
| Students:   * Develop and label models that demonstrate understanding that 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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| **Resources** |
| **FUSE**  [Shapes, Glorious Shapes](http://fuse.education.vic.gov.au/?F4CWKW)  [The Symmetry Challenge](http://fuse.education.vic.gov.au/?K9L9XL)  [Tessellate: Geometry and Symmetry](http://fuse.education.vic.gov.au/?CXTVC4)  **NLVM**  [Virtual manipulatives for Geometry](http://nlvm.usu.edu/en/nav/category_g_2_t_3.html) |

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| Topic 4.2.3 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** | | |
| * Use scaled instruments to measure and compare lengths, masses, capacities and temperatures [(VCMMG165)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG165) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 3 | **Level 4** | Level 5 |
| Students use metric units of length, mass and capacity to measure, order and compare objects. They associate angle with measure of turn and compare angles in everyday situations. They tell the time in minutes and convert between units of time. They use simple grids in maps and identify symmetry. | **Students use scaled instruments with metric units to measure and compare length, mass, capacity and temperature. They compare shapes and objects using familiar metric units for area and volume**, and compare angles with respect to a right angle. Students use 'am' and 'pm' notations, and solve simple time problems, including conversions between units of time. They construct new shapes by combining or splitting common shapes, and create symmetric patterns, pictures and shapes with and without the use of technology. They interpret and use basic maps with simple scales, directions and legends. | Students choose and use suitable metric and other units for measurement of length, angle, area, volume, capacity and mass. They calculate the perimeter and area of rectangles, and construct specified angles using protractors and other relevant technologies. Students use 12 and 24 hour time systems, with measurements and conversions to seconds. They use grid reference systems to describe location and connect three-dimension objects with two-dimensional representations. They translate, reflect and rotate shapes with and without the use of technology, and identify point and line symmetries. They explore similarity of familiar shapes through enlargement. |

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| **Activities** | **Proficiencies** |
| * Identify and use different measuring instruments to compare the masses and capacities of various objects * Read and interpret, to the nearest graduation, the graduated scales on a range of measuring instruments * Explore the size of a grams and millilitres * Explore the size of a kilograms and litres * Order and compare objects using metric units of mass and capacity * Measure the temperature of various everyday objects, and environments, construct temperature scales for cooking. | * **Fluency** through choosing and using familiar metric units to order and compare the masses and capacities of various objects * **Understanding** by building on concepts already known about informal units of measuring mass, capacity and temperature, 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 masses, capacities and temperatures of different objects |

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| **Considering different levels** |
| Level 3  Students who are working at this level could:   * Measure, order and compare objects using familiar metric units of mass and capacity, and environments with respect to temperature.   Level 5  Students who are working at this level could:   * Choose appropriate units of measurement for length, area, volume, capacity, mass and temperature. |

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| **Assessment ideas** |
| Students:   * Use scaled instruments to measure and compare the masses and capacities of common objects found in the classroom and school * Investigate the temperature and rainfall of different regions around Australia across various times of the year. |

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| **Resources** |
| **FUSE**  [Formal Units for Measuring: Mathematics Continuum](http://fuse.education.vic.gov.au/?GWGBL2)  [AAA Math: Measurement](http://fuse.education.vic.gov.au/?7XD49H)  [Temperature](http://fuse.education.vic.gov.au/Search/Results?AssociatedPackageId=&QueryText=temperature&SearchScope=All)  **Primary Resources (UK)**  [Capacity](http://www.primaryresources.co.uk/maths/mathsE1.htm#capacity)  [Mass](http://www.primaryresources.co.uk/maths/mathsE1.htm#mass) |

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| Topic 4.2.4 Simple Fractions and Decimals – One and Beyond | | |
| Strand:  Number and Algebra | Sub-strand:  Fractions and Decimals | Recommended teaching time:  1 week |

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| **Mapping to F–10 curriculum in Victoria** | | |
| **Content descriptions** | | |
| * Investigate equivalent fractions used in contexts [(VCMNA157)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA157) * Count by quarters, halves and thirds, including with mixed numerals. Locate and represent these fractions on a number line [(VCMNA158)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA158) * Recognise that the place value system can be extended to tenths and hundredths. Make connections between fractions and decimal notation [(VCMNA159)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA159) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 3 | **Level 4** | Level 5 |
| Students recognise, model and order numbers to at least 10 000 and place four digit numbers on a number line with regard for scale. They partition and re-arrange to facilitate calculations involving addition and subtraction. Students have facility with single digit addition and related subtraction facts, and recall multiplication and related division facts for twos, threes, fives and tens. They formulate and solve simple multiplication and division problems, estimate answers and use technology to check calculations. Students group money to a specified value in several ways, and calculate change required in simple transactions. They model and represent multiples of unit fractions up to a whole, using arrays on a number line. They write simple rules for number patterns and generate those patterns. | Students model, represent and order numbers to tens of thousands, **and extend place value to tenths and hundredths.** They investigate odd and even numbers and explore number patterns based on multiples of 3, 4, 6, 7, 8 and 9. Students develop facility with multiplication facts up to 10 x 10 and related division facts. **They investigate simple equivalent fractions and count by halves, thirds and quarters, and locate corresponding elements on a number line.** Students use simple decimals to solve money problems including total cost and change. They solve simple number sentences and word problems involving all four operations. | Students use estimation and rounding for all four operations, with and without the use of technology for calculation. They solve multiple digit problems involving addition, subtraction, multiplication and division by single digit divisors with remainders. Students represent, compare and order unit fractions, and decimal fractions, and represent them on a number line. They construct simple budgets for familiar events and activities. They solve numbers sentences involving division, and create number patterns involving fractions and decimals. |

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| **Activities** | **Proficiencies** |
| * Count by quarters, halves, thirds and tenths, and mixed numerals * Count on fractions, e.g. ¼, ½, ¾ up to and on from 1 * Count on decimals, e.g. 0.25, 0.5, 0.75 up to and on from 1 * Establish equivalency between fractions and decimals up to and beyond 1 * explain how 0 is represented as a fraction or a decimal | * **Fluency** in counting on by fractions and decimals including quarters, halves, thirds and tenths * **Understanding** how to * **Problem solving** through making models of fraction equivalent lines * **Reasoning** includes explaining fractional equivalency with decimal notation up to and beyond 1 |

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| **Considering different levels** |
| Level 3  Students who are working at this level could:   * Model and represent unit fractions including 1/2, 1/4, 1/3, 1/5 and their multiples to a complete whole.   Level 5  Students who are working at this level could:   * Investigate strategies to solve problems involving addition and subtraction of fractions with the same denominator. |

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| **Assessment ideas** |
| Students:   * Explore the relationship between families of fractions (halves, quarters and eighths or thirds and sixths). |

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| **Resources** |
| **FUSE**  [Decimaster Collections: Match-up 1](http://fuse.education.vic.gov.au/?VQ4BRW)  [Wishball: hundredths](http://fuse.education.vic.gov.au/?225PL8) |

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| Topic 4.2.5 Chance and Probability | | |
| Strand:  Statistics and Probability | Sub-strand:  Chance | Recommended teaching time:  3 weeks |

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| **Mapping to F–10 curriculum in Victoria** | | |
| **Content descriptions** | | |
| * Identify events where the chance of one will not be affected by the occurrence of the other [(VCMSP177)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP177) * Identify everyday events where one cannot happen if the other happens [(VCMSP176)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP176) * Describe possible everyday events and order their chances of occurring [(VCMSP175)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMSP175) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 3 | **Level 4** | Level 5 |
| Students carry out investigations, collect and organise data into categories and use different methods with and without technology to display the data. They conduct experiments involving chance, describe possible outcomes and recognise variability in results. | Students select and trial different methods for collecting data, including surveys. They construct suitable data displays with and without the use of technology, where there is a many-to-one relationship between elements of graphs and data, and evaluate the effectiveness of different displays. **They identify relative likelihood of everyday events, and identify events that are mutually exclusive and events that are independent.** | Students pose questions to collect categorical and numerical data by observation and survey, and represent the data in a variety of ways with and without the use of technology. They describe and interpret data sets in context. Students recognise that probabilities are measured on a scale of 0 to 1 (inclusive), and represent the probability of events from simple experiments using fractions |

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| **Activities** | **Proficiencies** |
| * Order lists of every day events from ‘least likely’ to ‘most likely’ to occur * Identify everyday events where one cannot happen if the other happens, e.g. weather, which cannot be dry and wet at the same time * Identify events where the chance of one will not be affected by the occurrence of the other, e.g. explaining that the probability of a new baby being either a boy or a girl does not depend on the sex of the previous baby | * **Fluency** through identifying practical activities and everyday events that involve chance, and identifying and describing outcomes of chance experiments * **Understanding** outcomes as likely or unlikely and recognising variation in results * **Problem solving** by carrying out a chance investigation (e.g. stretch a snake and see where it breaks), including explaining results and, if there is variation, which outcomes, or types of outcomes, appear to be the more likely * **Reasoning** by being able to agree with, disagree with, and/or discuss various chance-related statements or questions, e.g. it is certain that a newborn baby will grow, a ball is likely to bounce when it is dropped, a cat is unlikely to chase a dog. |

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| **Considering different levels** |
| Level 3  Students who are working at this level could:   * Conduct repeated trials of chance experiments such as tossing a coin or drawing a ball from a bag and identifying the variations between trials.   Level 5  Students who are working at this level could:   * List outcomes of chance experiments involving equally likely outcomes and represent probabilities of those outcomes using fractions. |

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| **Assessment ideas** |
| Students:   * Create a game for other students that contains scenarios where either a) one cannot happen if the other happens or b) the chance of one will not be affected by the occurrence of the other; students play each other’s games. |

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| **Resources** |
| **FUSE**  [Chance: What is Fair; What is Likely?](http://fuse.education.vic.gov.au/?MH7GB4)  [Development of Chance Concepts and Skills (Teacher Resource)](http://fuse.education.vic.gov.au/?MH97HJ)  **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 4.2.6 Number Sentences | | |
| Strand:  Number and Algebra | Sub-strand:  Patterns and Algebra | Recommended teaching time:  2 weeks |

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| **Mapping to F–10 curriculum in Victoria** | | |
| **Content descriptions** | | |
| * Explore and describe number patterns resulting from performing multiplication [(VCMNA161)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA161) * Solve word problems by using number sentences involving multiplication or division where there is no remainder [(VCMNA162)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA162) * Use equivalent number sentences involving addition and subtraction to find unknown quantities [(VCMNA163)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA163) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 3 | **Level 4** | Level 5 |
| Students recognise, model and order numbers to at least 10 000 and place four digit numbers on a number line with regard for scale. They partition and re-arrange to facilitate calculations involving addition and subtraction. Students have facility with single digit addition and related subtraction facts, and recall multiplication and related division facts for twos, threes, fives and tens. They formulate and solve simple multiplication and division problems, estimate answers and use technology to check calculations. Students group money to a specified value in several ways, and calculate change required in simple transactions. They model and represent multiples of unit fractions up to a whole, using arrays on a number line. They write simple rules for number patterns and generate those patterns. | Students model, represent and order numbers to tens of thousands, and extend place value to tenths and hundredths. They investigate odd and even numbers and **explore number patterns based on multiples of 3, 4, 6, 7, 8 and 9.** Students develop facility with multiplication facts up to 10 x 10 and related division facts. They investigate simple equivalent fractions and count by halves, thirds and quarters, and locate corresponding elements on a number line. Students use simple decimals to solve money problems including total cost and change. **They solve simple number sentences and word problems involving all four operations.** | Students use estimation and rounding for all four operations, with and without the use of technology for calculation. They solve multiple digit problems involving addition, subtraction, multiplication and division by single digit divisors with remainders. Students represent, compare and order unit fractions, and decimal fractions, and represent them on a number line. They construct simple budgets for familiar events and activities. They solve numbers sentences involving division, and create number patterns involving fractions and decimals. |

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| **Activities** | **Proficiencies** |
| * Identifying examples of number patterns in everyday life * Represent a word problem as a number sentence * Write a word problem using a given number sentence * Write number sentences to represent and answer questions such as: ‘When a number is added to 23 the answer is the same as 57 minus 19. What is the number?’ * Using partitioning to find unknown quantities in number sentences | * **Understanding** through multiple representations of patterns, such as a description in words * **Fluency** in representing a word problem as a number sentence * **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 * **Reasoning** through describing, continuing and creating number patterns resulting from multiplication |

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| **Considering different levels** |
| Level 3  Students who are working at this level could:   * Use equivalent number sentences involving addition and subtraction to find unknown quantities.   Level 5  Students who are working at this level could:   * Describe, continue and create patterns with fractions, decimals and whole numbers resulting from addition and subtraction. |

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| **Assessment ideas** |
| Students:   * Use equivalent number sentences involving addition and subtraction to find unknown quantities. * Solve word problems by using number sentences involving multiplication or division where there is no remainder. |

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| **Resources** |
| **FUSE**  [Number Patterns (AITSL Illustration of Practice)](http://fuse.education.vic.gov.au/?YR2PB5)  [NLVM: Number Line Arithmetic](http://fuse.education.vic.gov.au/?S7FCN9)  **Primary Resources (UK)**  [Patterns and Number Sequences](http://www.primaryresources.co.uk/maths/mathsB3.htm) |

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| **Notes** | | |
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| Topic 4.2.7 Whole Numbers – Multiplication and Area | | | |
| Strand:  Number and Algebra | Sub-strand:  Using Units of Measurement | Recommended teaching time:  1 week | |

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| **Mapping to F–10 curriculum in Victoria** | | |
| **Content descriptions** | | |
| * Recall multiplication facts up to 10 × 10 and related division facts [(VCMNA155)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA155) * Develop efficient mental and written strategies and use appropriate digital technologies for multiplication and for division where there is no remainder [(VCMNA156)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA156) * Compare objects using familiar metric units of area and volume [(VCMMG166)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG166) * Explore and describe number patterns resulting from performing multiplication [(VCMNA161)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA161) * Define a simple class of problems and solve them using an effective algorithm that involves a short sequence of steps and decisions [(VCMNA164)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA164) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 3 | **Level 4** | Level 5 |
| Students recognise, model and order numbers to at least 10 000 and place four digit numbers on a number line with regard for scale. They partition and re-arrange to facilitate calculations involving addition and subtraction. Students have facility with single digit addition and related subtraction facts, and recall multiplication and related division facts for twos, threes, fives and tens. They formulate and solve simple multiplication and division problems, estimate answers and use technology to check calculations. Students group money to a specified value in several ways, and calculate change required in simple transactions. They model and represent multiples of unit fractions up to a whole, using arrays on a number line. They write simple rules for number patterns and generate those patterns. | Students model, represent and order numbers to tens of thousands, and extend place value to tenths and hundredths. They investigate odd and even numbers and explore number patterns based on multiples of 3, 4, 6, 7, 8 and 9. **Students develop facility with multiplication facts up to 10 x 10 and related division facts.** They investigate simple equivalent fractions and count by halves, thirds and quarters, and locate corresponding elements on a number line. Students use simple decimals to solve money problems including total cost and change. They solve simple number sentences and word problems involving all four operations. | Students use estimation and rounding for all four operations, with and without the use of technology for calculation. They solve multiple digit problems involving addition, subtraction, multiplication and division by single digit divisors with remainders. Students represent, compare and order unit fractions, and decimal fractions, and represent them on a number line. They construct simple budgets for familiar events and activities. They solve numbers sentences involving division, and create number patterns involving fractions and decimals. |

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| **Activities** | **Proficiencies** |
| * Recall multiplication facts up to 10 × 10 and related division facts * Use known multiplication facts to calculate related division facts * Use strategies to recall the multiplication facts * Use known facts and strategies, such as commutativity, doubling and halving for multiplication, and connecting division to multiplication when there is no remainder * Extend multiplication facts (for example 4 by 7 is 28 so 4 by 7 tens is 28 tens) * Compare areas using grid paper and recognise connection to multiplication * Identify examples of number patterns in everyday life related to multiplication * Construct and apply an algorithm for multiplication of two-digit numbers * Partition and order a set of Australian coins by denomination   *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** through recalling multiplication facts and related division facts * **Understanding** the relationship between multiplication and division facts and how to use multiplication facts to calculate related division facts * **Problem solving** through making appropriate choice of strategies to solve open ended problems involving whole numbers * **Reasoning** through explaining the patterns in arrays |

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| **Considering different levels** |
| Level 3  Students who are working at this level could:   * Represent and solve problems involving multiplication using efficient mental and written strategies and appropriate digital technologies.   Level 5  Students who are working at this level could:   * Choose between mental, written and a technology-based computation depending on the nature of the problems and the purpose for computation. |

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| **Assessment ideas** |
| Students:   * Compare areas using grid paper and annotated to illustrate connection to multiplication. |

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| **Resources** |
| **FUSE**  [Area Explorer](http://fuse.education.vic.gov.au/?X88P5G)  **Primary Resources (UK)**  [General Multiplication and Division](http://www.primaryresources.co.uk/maths/mathsC2.htm)  **Everyday Maths Online (US)**  [Multiplication and Division Fact Families](https://emccss.everydaymathonline.com/em-crosswalk/pdf/3/g3_tlg_lesson_4_6.pdf)  **University of Idaho**  [Assessing Students Levels of Understanding of Multiplication through Problem Solving and Problem Writing (Teacher Article)](http://www.webpages.uidaho.edu/cpiez/m235_sp10/assessing%20mult%20through%20problem%20writing.pdf) |

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| Topic 4.2.8 Space, Maps, Scales and Networks | | |
| 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** | | |
| * Use simple scales, legends and directions to interpret information contained in basic maps [(VCMMG172)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG172) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 3 | **Level 4** | Level 5 |
| Students use metric units of length, mass and capacity to measure, order and compare objects. They associate angle with measure of turn and compare angles in everyday situations. They tell the time in minutes and convert between units of time. They use simple grids in maps and identify symmetry. | Students use scaled instruments with metric units to measure and compare length, mass, capacity and temperature. They compare shapes and objects using familiar metric units for area and volume, and compare angles with respect to a right angle. Students use 'am' and 'pm' notations, and solve simple time problems, including conversions between units of time. They construct new shapes by combining or splitting common shapes, and create symmetric patterns, pictures and shapes with and without the use of technology. **They interpret and use basic maps with simple scales, directions and legends.** | Students choose and use suitable metric and other units for measurement of length, angle, area, volume, capacity and mass. They calculate the perimeter and area of rectangles, and construct specified angles using protractors and other relevant technologies. Students use 12 and 24 hour time systems, with measurements and conversions to seconds. They use grid reference systems to describe location and connect three-dimension objects with two-dimensional representations. They translate, reflect and rotate shapes with and without the use of technology, and identify point and line symmetries. They explore similarity of familiar shapes through enlargement. |

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| **Activities** | **Proficiencies** |
| 1. Recognise what a scale is, and why it is important (its purpose on a map) 2. Interpret information contained in a basic map including legends 3. Identify the scale used on maps of cities and rural areas in Australia and a city in Indonesia and describe the difference 4. Using directions to find features on a map | * **Fluency** through choosing language to communicate pathways on a map * **Understanding** the purpose of scales and legends * **Problem solving** is the ability 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 locate something on a map |

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| **Considering different levels** |
| Level 3  Students who are working at this level could:   * Create and interpret simple grid maps to show position and pathways.   Level 5  Students who are working at this level could:   * Use a grid reference system to describe locations. |

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| **Assessment ideas** |
| Students:   * Create their own simple Secret Island map, which includes landmarks and a legend. |

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| **Resources** |
| **FUSE**  [Rainforest: Use Signs and Symbols](http://fuse.education.vic.gov.au/?Y3NT6G)  [Location](http://fuse.education.vic.gov.au/?PP9SLH)  **Primary Resources (UK)**  [Position and Direction](http://www.primaryresources.co.uk/maths/mathsE6.htm) |

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| Topic 4.2.9 Time | | |
| 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** | | |
| * Convert between units of time [(VCMMG167)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG167) * Use am and pm notation and solve simple time problems [(VCMMG168)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG168) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 3 | **Level 4** | Level 5 |
| Students use metric units of length, mass and capacity to measure, order and compare objects. They associate angle with measure of turn and compare angles in everyday situations. They tell the time in minutes and convert between units of time. They use simple grids in maps and identify symmetry. | Students use scaled instruments with metric units to measure and compare length, mass, capacity and temperature. They compare shapes and objects using familiar metric units for area and volume, and compare angles with respect to a right angle. **Students use 'am' and 'pm' notations, and solve simple time problems, including conversions between units of time.** They construct new shapes by combining or splitting common shapes, and create symmetric patterns, pictures and shapes with and without the use of technology. They interpret and use basic maps with simple scales, directions and legends. | Students choose and use suitable metric and other units for measurement of length, angle, area, volume, capacity and mass. They calculate the perimeter and area of rectangles, and construct specified angles using protractors and other relevant technologies. Students use 12 and 24 hour time systems, with measurements and conversions to seconds. They use grid reference systems to describe location and connect three-dimension objects with two-dimensional representations. They translate, reflect and rotate shapes with and without the use of technology, and identify point and line symmetries. They explore similarity of familiar shapes through enlargement. |

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| **Activities** | **Proficiencies** |
| * Identify and use the correct operation for converting units of time * Calculate the time spent at school during a normal school day * Calculate the time required to travel between two locations * Determine arrival time given departure time * Using am and pm notation in solving simple time problems | * **Fluency** is describing and comparing time durations * **Understanding** is the ability to use appropriate language to communicate times * **Problem solving** by choosingappropriate and efficient strategies to solve problems in relation to time including calculation of time, e.g. time required to travel between two locations or determining arrival time and departure times * **Reasoning** by describing the relationships between units of time |

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| **Considering different levels** |
| Level 3  Students who are working at this level could:   * Tell time to the minute and investigate the relationship between units of time.   Level 5  Students who are working at this level could:   * Compare 12- and 24-hour time systems and convert between them. |

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| **Assessment ideas** |
| Students   * Work through the ‘Who Works the Most Hours’ problem, below; they create their own (similar) problems and solve each other’s problems. |

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| **Resources** |
| **FUSE**  [Various FUSE Resources and Activities](http://fuse.education.vic.gov.au/Search/Results?AssociatedPackageId=&QueryText=time+am+pm&SearchScope=All)  [Who Works the Most Hours?](http://fuse.education.vic.gov.au/?S5CWJQ)  **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 4.2.10 Fractions and Decimals to Hundredths | | |
| 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** | | |
| * Investigate equivalent fractions used in contexts [(VCMNA157)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA157) * Count by quarters, halves and thirds, including with mixed numerals. Locate and represent these fractions on a number line [(VCMNA158)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA158) * Recognise that the place value system can be extended to tenths and hundredths. Make connections between fractions and decimal notation [(VCMNA159)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMNA159) | | |
| **Achievement standard (excerpt in bold)** | | |
| Level 3 | **Level 4** | Level 5 |
| Students recognise, model and order numbers to at least 10 000 and place four digit numbers on a number line with regard for scale. They partition and re-arrange to facilitate calculations involving addition and subtraction. Students have facility with single digit addition and related subtraction facts, and recall multiplication and related division facts for twos, threes, fives and tens. They formulate and solve simple multiplication and division problems, estimate answers and use technology to check calculations. Students group money to a specified value in several ways, and calculate change required in simple transactions. They model and represent multiples of unit fractions up to a whole, using arrays on a number line. They write simple rules for number patterns and generate those patterns. | Students model, represent and order numbers to tens of thousands, and extend place value to tenths and hundredths. They investigate odd and even numbers and explore number patterns based on multiples of 3, 4, 6, 7, 8 and 9. Students develop facility with multiplication facts up to 10 x 10 and related division facts. **They investigate simple equivalent fractions and count by halves, thirds and quarters, and locate corresponding elements on a number line.** Students use simple decimals to solve money problems including total cost and change. They solve simple number sentences and word problems involving all four operations. | Students use estimation and rounding for all four operations, with and without the use of technology for calculation. They solve multiple digit problems involving addition, subtraction, multiplication and division by single digit divisors with remainders. Students represent, compare and order unit fractions, and decimal fractions, and represent them on a number line. They construct simple budgets for familiar events and activities. They solve numbers sentences involving division, and create number patterns involving fractions and decimals. |

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| **Activities** | **Proficiencies** |
| * Recognise that 1 whole unit can be split into 100 equal parts, where each part is one hundredth * Represent hundredths as fractions and as decimals (make up of tenths and hundredths) to two decimal places * Write decimal equivalents for hundredth fractions and mixed numbers, and visa versa * Order a list of decimals to two decimal-places * Exploring connection between hundredths and Australian currency   *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.*  *Whole numbers such as* 2 *also have fraction representations, such as*  *and decimal representations such as* 2 = 2.0 = 2.00. | * **Fluency** in writing hundredths as decimals (i.e. written to the right of the tenths column when writing numbers in figures) * **Understanding** that there are ten hundredths in one tenths and one hundred hundredths in one unit * **Problem solving** real world problems using hundredths, e.g. purchasing and giving change * **Reasoning** why some decimals are bigger than others even though the hundredths column is bigger than the tenths column |

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| **Considering different levels** |
| Level 3  Students who are working at this level could:   * Explore basic decimal notation (e.g. quarter, half, whole).   Level 5  Students who are working at this level could:   * Recognise that the place value system can be extended beyond hundredths. |

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| **Assessment ideas** |
| Students:   * Match equivalent fraction words, fraction figures, decimal figures and decimal words in a jumbled table. |

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| **Resources** |
| **FUSE**  [Scale Matters: Hundredths](http://fuse.education.vic.gov.au/?3224ZJ)  [Wishball: hundredths](http://fuse.education.vic.gov.au/?225PL8) |

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