**FRACTIONS AND DECIMALS 1 – STAGE 3**

**OUTCOMES**

A student:

* MA3-1WM - describes and represents mathematical situations in a variety of ways using mathematical terminology and some conventions
* MA3-2WM - selects and applies appropriate problem-solving strategies, including the use of digital technologies, in undertaking investigations
* MA3-3WM - gives a valid reason for supporting one possible solution over another
* MA3-7NA - compares, orders and calculates with fractions, decimals and percentages

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| **CONTENT** | **plan** |
| **Compare and order common [unit fractions](http://syllabus.bos.nsw.edu.au/glossary/mat/unit-fraction/?ajax" \t "_blank" \o "Click for more information about 'unit fractions') and locate and represent them on a [number line](http://syllabus.bos.nsw.edu.au/glossary/mat/number-line/?ajax" \t "_blank" \o "Click for more information about 'number line') (ACMNA102)** |  |
| place [fractions](http://syllabus.bos.nsw.edu.au/glossary/mat/fraction/?ajax" \t "_blank" \o "Click for more information about 'fractions') with [denominators](http://syllabus.bos.nsw.edu.au/glossary/mat/denominator/?ajax" \t "_blank" \o "Click for more information about 'denominators') of 2, 3, 4, 5, 6, 8, 10 and 12 on a number line between 0 and 1, eg | 1 |
| compare and order unit fractions with denominators of 2, 3, 4, 5, 6, 8, 10, 12 and 100 CT | 1 |
| compare the relative value of unit fractions by placing them on a number line between 0 and 1 (Communicating, Reasoning) | 1 |
| investigate and explain the relationship between the value of a unit fraction and its denominator (Communicating, Reasoning) CT | 1 |
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| **Investigate strategies to solve problems involving addition and subtraction of fractions with the same denominator(ACMNA103)** |  |
| identify and describe 'proper fractions' as fractions in which the [numerator](http://syllabus.bos.nsw.edu.au/glossary/mat/numerator/?ajax" \t "_blank" \o "Click for more information about 'numerator') is less than the denominator http://syllabus.bos.nsw.edu.au/wsimages/cca/l.png | 2 |
| identify and describe 'improper fractions' as fractions in which the numerator is greater than the denominator http://syllabus.bos.nsw.edu.au/wsimages/cca/l.png | 2 |
| express mixed [numerals](http://syllabus.bos.nsw.edu.au/glossary/mat/numeral/?ajax" \t "_blank" \o "Click for more information about 'numerals') as improper fractions and vice versa, through the use of diagrams and number lines, leading to a mental strategy http://syllabus.bos.nsw.edu.au/wsimages/cca/l.png | 3 |
| model and represent strategies, including using diagrams, to add proper fractions with the same denominator, where the result may be a mixed numeral, | 2 |
| model and represent a [whole number](http://syllabus.bos.nsw.edu.au/glossary/mat/whole-number/?ajax" \t "_blank" \o "Click for more information about 'whole number') added to a proper fraction, | 3 |
| subtract a proper fraction from another proper fraction with the same denominator | 2 |
| model and represent strategies, including using diagrams, to add mixed numerals with the same denominator, eg | 2 |
| use diagrams, and mental and written strategies, to subtract a unit fraction from any whole number including 1, eg | 3 |
| solve word problems that involve addition and subtraction of fractions with the same denominator | 2 |
| use estimation to verify that an answer is reasonable (Problem Solving, Reasoning) CT | 3 |
| **Recognise that the [place value](http://syllabus.bos.nsw.edu.au/glossary/mat/place-value/?ajax" \t "_blank" \o "Click for more information about 'place value') system can be extended beyond hundredths (ACMNA104)** |  |
| express thousandths as [decimals](http://syllabus.bos.nsw.edu.au/glossary/mat/decimal/?ajax" \t "_blank" \o "Click for more information about 'decimals') | 4 |
| interpret decimal notation for thousandths | 4 |
| state the place value of digits in decimal numbers of up to three decimal places | 4 |
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| **Compare, order and represent decimals (ACMNA105)** |  |
| compare and order decimal numbers of up to three decimal places, eg 0.5, 0.125, 0.25 http://syllabus.bos.nsw.edu.au/wsimages/cca/l.png | 5 |
| interpret zero digit(s) at the end of a decimal, eg 0.170 has the same value as 0.17 | 5 |
| place decimal numbers of up to three decimal places on a number line between 0 and 1 | 5 |

**FRACTIONS AND DECIMALS 2 – STAGE 3**

**OUTCOMES**

A student:

* MA3-1WM - describes and represents mathematical situations in a variety of ways using mathematical terminology and some conventions
* MA3-2WM - selects and applies appropriate problem-solving strategies, including the use of digital technologies, in undertaking investigations
* MA3-3WM - gives a valid reason for supporting one possible solution over another
* MA3-7NA - compares, orders and calculates with fractions, decimals and percentages

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| **CONTENT** | **plan** |
| **Compare [fractions](http://syllabus.bos.nsw.edu.au/glossary/mat/fraction/?ajax" \t "_blank" \o "Click for more information about 'fractions') with [related denominators](http://syllabus.bos.nsw.edu.au/glossary/mat/related-denominators/?ajax" \t "_blank" \o "Click for more information about 'related denominators') and locate and represent them on a [number line](http://syllabus.bos.nsw.edu.au/glossary/mat/number-line/?ajax" \t "_blank" \o "Click for more information about 'number line') (ACMNA125)** |  |
| model, compare and represent fractions with [denominator](http://syllabus.bos.nsw.edu.au/glossary/mat/denominator/?ajax" \t "_blank" \o "Click for more information about 'denominator') of 2, 3, 4, 5, 6, 8, 10, 12 and 100 of a whole object, a whole shape and a collection of objects | 6 |
| compare the relative size of fractions drawn on the same diagram, eg (Reasoning) CT | 6 |
| compare and order simple fractions with related denominators using strategies such as diagrams, the number line, or [equivalent fractions](http://syllabus.bos.nsw.edu.au/glossary/mat/equivalent-fractions/?ajax" \t "_blank" \o "Click for more information about 'equivalent fractions') | 6 |
| find equivalent fractions by re-dividing the whole, using diagrams and number lines, eg | 7 |
| record equivalent fractions using diagrams and [numerals](http://syllabus.bos.nsw.edu.au/glossary/mat/numeral/?ajax" \t "_blank" \o "Click for more information about 'numerals') | 7 |
| develop mental strategies for generating equivalent fractions, such as [multiplying](http://syllabus.bos.nsw.edu.au/glossary/mat/multiplication/?ajax" \t "_blank" \o "Click for more information about 'multiplying') or dividing the [numerator](http://syllabus.bos.nsw.edu.au/glossary/mat/numerator/?ajax" \t "_blank" \o "Click for more information about 'numerator') and the [denominator](http://syllabus.bos.nsw.edu.au/glossary/mat/denominator/?ajax" \t "_blank" \o "Click for more information about 'denominator') by the same number | 7 |
| explain or demonstrate why two fractions are or are not equivalent (Communicating, Reasoning) CT | 8 |
| write fractions in their 'simplest form' by dividing the numerator and the denominator by a [common factor](http://syllabus.bos.nsw.edu.au/glossary/mat/common-factor/?ajax" \t "_blank" \o "Click for more information about 'common factor') | 10 |
| recognise that a fraction in its simplest form represents the same value as the original fraction (Reasoning) | 10 |
| apply knowledge of equivalent fractions to convert between units of time (Problem Solving) | 9 |
| **Solve problems involving addition and subtraction of fractions with the same or related denominators (ACMNA126)** |  |
| add and subtract fractions, including mixed numerals, where one denominator is the same as, or a [multiple](http://syllabus.bos.nsw.edu.au/glossary/mat/multiple/?ajax" \t "_blank" \o "Click for more information about 'multiple') of, the other | 11 |
| convert an answer that is an improper fraction to a mixed numeral (Communicating) | 12 |
| use knowledge of equivalence to simplify answers when adding and subtracting fractions (Communicating, Reasoning) | Missing |
| recognise that improper fractions may sometimes make calculations involving mixed numerals easier (Communicating) | 12 |
| solve word problems involving the addition and subtraction of fractions where one denominator is the same as, or a multiple of, the other | 11 |
| multiply simple fractions by [whole numbers](http://syllabus.bos.nsw.edu.au/glossary/mat/whole-number/?ajax" \t "_blank" \o "Click for more information about 'whole numbers') using repeated addition, leading to a rule | 11 |
| **Find a simple fraction of a quantity where the result is a whole number, with and without the use of digital technologies(ACMNA127)** |  |
| calculate [unit fractions](http://syllabus.bos.nsw.edu.au/glossary/mat/unit-fraction/?ajax" \t "_blank" \o "Click for more information about 'unit fractions') of collections, with and without the use of digital technologies | 20 |
| describe the connection between finding a unit fraction of a collection and the [operation](http://syllabus.bos.nsw.edu.au/glossary/mat/operation/?ajax" \t "_blank" \o "Click for more information about 'operation') of division (Communicating, Problem Solving) CT | 20 |
| calculate a simple fraction of a collection/quantity, with and without the use of digital technologies | 21 |
| explain how unit fractions can be used in the calculation of simple fractions of collections/quantities | 21 |
| solve word problems involving a fraction of a collection/quantity http://syllabus.bos.nsw.edu.au/wsimages/cca/l.png | 20 & 21 |
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| **Add and subtract [decimals](http://syllabus.bos.nsw.edu.au/glossary/mat/decimal/?ajax" \t "_blank" \o "Click for more information about 'decimals'), with and without the use of digital technologies, and use estimation and [rounding](http://syllabus.bos.nsw.edu.au/glossary/mat/rounding/?ajax" \t "_blank" \o "Click for more information about 'rounding') to check the reasonableness of answers (ACMNA128)** |  |
| add and subtract decimals with the same number of decimal places, with and without the use of digital technologies CT | 13 |
| add and subtract decimals with a different number of decimal places, with and without the use of digital technologies CT | 13 |
| relate decimals to fractions to aid mental strategies (Communicating) | 13 |
| round a number of up to three decimal places to the nearest whole number | 13 |
| use estimation and rounding to check the reasonableness of answers when adding and subtracting decimals CT | 13 |
| describe situations where the estimation of calculations with decimals may be useful, eg to check the total cost of multiple items when shopping (Communicating, Problem Solving) | 13 |
| solve word problems involving the addition and subtraction of decimals, with and without the use of digital technologies, including those involving money SCE | 13 |
| use selected words to describe each step of the solution process (Communicating, Problem Solving) http://syllabus.bos.nsw.edu.au/wsimages/cca/l.png | 13 |
| interpret a calculator display in the context of the problem, eg 2.6 means $2.60 (Communicating) | 13 |

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| **Multiply decimals by whole numbers and perform divisions by non-zero whole numbers where the results are [terminating decimals](http://syllabus.bos.nsw.edu.au/glossary/mat/terminating-decimal/?ajax" \t "_blank" \o "Click for more information about 'terminating decimals'), with and without the use of digital technologies (ACMNA129)** |  |
| use mental strategies to multiply simple decimals by single-digit numbers, eg 3.5 × 2 | 14 & 15 |
| multiply decimals of up to three decimal places by whole numbers of up to two digits, with and without the use of digital technologies, eg 'I measured three desks. Each desk was 1.25 m in length, so the total length is 3 × 1.25 = 3.75 m' CT | 14 & 15 |
| divide decimals by a one-digit whole number where the result is a terminating decimal, eg 5.25 ÷ 5 = 1.05 | 14 & 15 |
| solve word problems involving the multiplication and division of decimals, including those involving money, eg determine the 'best buy' for different-sized cartons of cans of soft drink SCECT | 14 & 15 |
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| **Multiply and divide decimals by powers of 10 (ACMNA130)** |  |
| recognise the number patterns formed when decimals are multiplied and divided by 10, 100 and 1000 CT | 16 |
| multiply and divide decimals by 10, 100 and 1000 | 16 |
| use a calculator to explore the effect of multiplying and dividing decimals by multiples of 10 (Reasoning) | 16 |
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| **Make connections between equivalent fractions, decimals and [percentages](http://syllabus.bos.nsw.edu.au/glossary/mat/percentage/?ajax" \t "_blank" \o "Click for more information about 'percentages') (ACMNA131)** |  |
| recognise that the symbol % means 'percent' http://syllabus.bos.nsw.edu.au/wsimages/cca/l.png | **17 - 19** |
| represent common percentages as fractions and decimals | **17 - 19** |
| recognise fractions, decimals and percentages as different representations of the same value (Communicating) | **17 - 19** |
| recall commonly used equivalent percentages, decimals and fractions | **17 - 19** |
| represent simple fractions as decimals and as percentages | **17 - 19** |
| interpret and explain the use of fractions, decimals and percentages in everyday contexts | **17 - 19** |
| represent decimals as fractions and percentages | **17 - 19** |

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| **Investigate and calculate percentage discounts of 10%, 25% and 50% on sale items, with and without the use of digital technologies (ACMNA132)** |  |
| Equate 10% to one tenth, 25% to one quarter and 50% to one half | 22 |
| calculate common percentages (10%, 25%, 50%) of quantities, with and without the use of digital technologiesCTE | 22 |
| choose the most appropriate equivalent form of a percentage to aid calculation | 22 & 23 |
| use mental strategies to estimate discounts of 10%, 25% and 50%, eg '50% off the price of $122.70: 50% is the same as one half so the discount is about $60' SCECT | 23 |
| calculate the sale price of an item after a discount of 10%, 25% and 50%, with and without the use of digital technologies, recording the strategy and result CTCT | 23 |

**MISSING PLANS**