Welcome
Hello, and welcome to the first edition of our newsletter! This newsletter aims to support teachers implementing the new K-10 mathematics syllabus in NSW, specifically in Stages 3 and 4 where most of the changes have occurred. We want to bridge the gap between primary and secondary through providing information on current pedagogical research, new content and teaching ideas to assist in the classroom. We hope you find this a helpful resource. We would appreciate any feedback and welcome suggestions for upcoming issues.

Nagla Jebeile and Katherin Cartwright, Mathematics Advisors, Australian curriculum

Focus on the new mathematics curriculum
Role of the continuum of learning in effective teaching and successful learning:
Secondary mathematics teachers across NSW will be implementing the NSW Mathematics 7-10 Syllabus for the Australian Curriculum from Term 1 2014 for years 7 and 9. In 2015, primary schools will follow by implementing the curriculum for K-6 and secondary schools will implement the years 8 and 10 mathematics curriculum.

During the early stages of implementation we want all our students to achieve the learning goals set while recognising that students enter the learning pathway at various points. To achieve this, the continuum of learning is essential in gaining an understanding of prior learning, continuation of learning and future learning. When programming it is necessary for teachers to determine outcomes students have achieved in previous stages before teaching to ensure the continuation of learning without gaps in knowledge.

Good planning and sequencing of lessons combined with explicit teaching of skills leads to success in improving student outcomes. To be effective teachers we require a thorough understanding of the continuum which provides us with the sequence of learning for concepts in mathematics. The continuum links content taught in primary maths with secondary maths concepts and shows the prior learning required for successful teaching of particular concepts as well as indicating pathways for further learning.

The continuum of key ideas for both K-6 and 7-10 can be downloaded from NSW Board of Studies Additional Support Materials. Building an understanding of the continuum will enhance programming and lesson sequencing. Gathering data about student prior learning will provide teachers with the base on which students are building their knowledge. Each stage builds upon knowledge and skills from previous stages with all these factors considered, lesson sequences will ensure the smooth transition across stages of learning. In this issue we will take a closer look at the continuum of key ideas for Number and Algebra with teaching ideas.

Embedding general capabilities:
Reading the new syllabus you will also discover that there is more there than the understanding of mathematical concepts, manipulation of facts and figures. There is clearly an approach for embedding skills which we require in our daily lives into the learning process to build student capabilities for success in life.

One of the major driving forces for the new syllabus was the need to design a curriculum with explicit inclusion of skills such as critical and creative thinking, ethical behaviour, personal and social competence or intercultural understanding, which prepare students for life and work in a complex technological driven world.

At work we often operate in teams making informed and responsible decisions based on the information...
we gather, we make ethical decisions and transfer intercultural understanding across our work. We use critical and creative thinking in so many aspects of life. Our syllabus also encourages the application of critical and creative thinking, promoting ethical understanding, as well as developing students’ personal and social competence.

Our students have grown up in an era where technology is in their pocket and provides instant access to information current, past and future within seconds. If students need to conduct research, they have concise facts, a multitude of images and the latest data on any event across the globe. It is a convenient way to access information.

Preparing our teaching and learning activities for the new syllabus can also use the convenience of technology for students to access information instantaneously. Personal and social competence refers to students working effectively in teams and making responsible decisions. Think about all the opportunities we have to create such learning environments with the tasks we design for students.

Creating financial plans is new content for Stage 3, it includes creating a budget, recording data using spreadsheets and prioritising items in a budget. Financial mathematics is also new content to Stage 4 it includes performing calculations involving GST, calculating discounts and ‘best buys’ and solving problems involving profit and loss. Many activities can be designed for students to learn about financial mathematics while allowing flexible access to technology such as the use of mobile phones, laptops or iPads to access internet apps during class and at home. We can design activities to develop students’ personal and social competence through working in teams and making responsible decisions with peers. In this issue we will take a closer look at some examples. The following videos show strategies for teaching algebra through teams. Ms Warburton and Ms Jones work collaboratively to develop algebra lessons and show how they teach students to work in teams.

Teacher collaboration: (25 min) https://www.teachingchannel.org/videos/algebra-team-teacher-collaboration
Student team work: (7 min) https://www.teachingchannel.org/videos/teaching-with-group-work

Modelling the concept- it’s not just for kindergarten!
When we think of concrete materials, the first thing that comes to our mind is five year olds with counters or paddle-pop sticks. This is true, much of the foundational teaching we do with young students, uses concrete materials. However, when starting to teach a new concept, using hands-on materials and visuals provides students with a clear picture of how the concept works. It also provides a scaffold to assist them in developing an understanding of concept, not just the procedure to find the answer.

Take fractions for example. By Stage 3 we often assume students know unit fractions, how to find equivalent fractions and how to add and subtract fractions with like denominators. If they can work out these problems we might jump to the conclusion that they understand fractions as a concept. However, we know that many of our students have trouble understanding many aspects of fractions, for example, how the parts relate to the whole and how to divide the whole without halving first. When in Stage 3, we don’t want to go straight to a quick fix way of teaching multiplying fractions e.g. 2/6 x 4 ‘just multiply the top number by the 4 and put it over the six to work out your answer’. This is not providing the students with conceptual understanding. You might, for example, ask the students, ‘how could we represent 2/6?’ We then need to take suggestions; students may draw a circle, divide it into 6 equal parts and shade 2.

We need to now multiply the 2/6 by 4, ‘this means we need 4 lots of 2/6, how might we do this?’ again take suggestions. At this point you may have some students suggest drawing the same image another three times then using repeated addition to find the answer.

Some may start shading in a second and third set of 2/6 on the one circle, see they need another circle, and then continue.

Either of these methods is correct and provides information to the teacher on where students are at and what strategy they are using. Eventually students will no longer need the visual scaffold on paper but being able to recreate that visual in your head is fundamental to developing a deep understanding of how fractions work and how to perform operations with fractions.
Continuum of learning Mathematics K-10
Number and Algebra Strand, Stages 3 and 4

Stage 3

A student orders, reads and represents integers of any size and describes properties of whole numbers MA3-4NA

Whole Numbers Part 1
Read, write and order numbers of any size. State the place value of digits in numbers of any size. Record numbers of any size using expanded notation. Determine factors and multiples of whole numbers.

Whole Number Part 2
Recognise the location of negative numbers in relation to zero on a number line. Identify and describe prime and composite numbers. Model and describe square and triangular numbers.

Stage 4

A student compares, orders and calculates with integers, applying a range of strategies to aid computation MA4-4NA

A student selects and applies appropriate strategies for addition and subtraction with counting numbers of any size MA3-5NA

Addition and Subtraction Part 1
Select and apply efficient mental, written and calculator strategies for addition and subtraction of numbers of any size. Use estimation to check answers to calculations. Solve word problems and record the strategy used, including problems involving money. Create a simple budget.

Addition and Subtraction Part 2
Select and apply efficient mental, written and calculator strategies to solve word problems and record the strategy used.

Computation with Integers
Apply associative, commutative and distributive laws to aid mental computation. Apply the four operations with integers. Apply the order of operations.

A student selects and applies appropriate strategies for multiplication and division, and applies the order of operations to calculations involving more than one operation MA3—6NA

Multiplication and Division Part 1
Use and record a range of mental and written strategies to multiply by one- and two-digit operators. Use the formal algorithm for multiplication by one- and two-digit operators. Use and record a range of mental and written strategies to divide numbers with three or more digits by a one-digit operator, including problems that result in a remainder. Solve word problems and record the strategy used. Interpret remainders in division problems. Use estimation to check answers to calculations.

Multiplication and Division Part 2
Select and apply efficient mental, written and calculator strategies to solve word problems and record the strategy used. Recognise and use grouping symbols. Apply the order of operations in calculations.

Indices
Use index notation for positive integral indices. Express a whole number as a product of its prime factors. Apply the order of operations to evaluate numerical expressions involving indices. Determine and apply tests of divisibility. Find square roots and cube roots. Determine and apply the index laws for numerical expressions with positive-integer indices. Determine and apply the meaning of the zero index.
This issue of *The Mathematical Bridge* deals with the following four topics from Stage 4 and Stage 3 precursor topics, there are example activities for both stages.
Stage 3 Strategies in Multiplication and Division

**Syllabus Content**

**Strand:** Number and Algebra  
**Substrand:** Whole Numbers and Multiplication & Division

**Outcomes:** A student,  

**Whole Numbers 1**  
MA3-4NA orders, reads and represents integers of any size and describes properties of whole numbers  

**Multiplication and Division 2**  
MA3-6NA selects and applies appropriate strategies for multiplication and division, and applies the order of operations to calculations involving more than one operation  
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

**Prior Knowledge:**  
**Stage 2 Key ideas**  
Model and apply to commutative property for multiplication  
Use and record a range of mental strategies for multiplication of two single-digit numbers  
Recall and use multiplication facts up to 10 × 10 with automaticity  
Relate multiplication facts to their inverse division facts  
Determine multiples and factors of whole numbers

**Teaching content:** students apply their knowledge of multiplication and division strategies to solve problems that involve multiplying, dividing, using inverse operations, looking for highest common factors and lowest common multiples.

These activities come from *Red Dragonfly Mathematics Challenge*, Yasuhiro Hosomizu. There is also an extension book that links further activities to those in the first book *Companion Mathematics Challenge* that is available to purchase through State Office, contact Katherin.cartwright@det.nsw.edu.au for how to order it.

You can use these activities as a lesson starter or can develop them into full lessons.

‘Developing students’ reasoning  
- Reflecting on your own strategies and reasoning to solve the problem  
- Ensuring all students understand the question  
- Knowing how to begin the lesson  
- Asking the right questions to promote logical pathways for reasoning  
- Anticipating responses  
- Moving student strategies beyond “guess and check”  
- Managing differing ability levels’

*Peter Gould, Leader Numeracy LNAP, Early Learning and Primary Education*
Rolling three dice resulted in three different numbers, and their product was 48. Which numbers were they?
What number is divisible by all of the numbers 1, 2, 3, 4, 5, and 6?

÷ 1  ÷ 2
÷ 3  ÷ 5
÷ 6
Stage 4 Tests of Divisibility

Syllabus Content
Strand: Number and Algebra
Substrand: Indices

Outcomes: A student,
MA4-9NA operates with positive integers and zero indices of numerical bases
MA4-1WM communicates & connects mathematical ideas using appropriate terminology, diagrams & symbols
MA4-2WM applies mathematical techniques to solve problems
MA4-3WM recognises and explains mathematical relationships using reasoning

Prior Knowledge: students can select and apply efficient mental and written strategies for multiplication and division

Teaching content: students determine and apply tests of divisibility for 2, 3, 4, 5, 6 and 10, verify the test of divisibility using a calculator, apply tests of divisibility mentally as an aid to calculation
(Candy Shop is based on Licorice factory by Lovitt.C and Clarke.D, MCTP Activity Bank vol 2 p441ff)

Student Activity: Candy Shop

Lesson opener introduction to Divisibility tests using a work place problem, YouTube clip (12:46 min)
http://www.youtube.com/watch?v=M_SpFL_oyoA

Fun clip for remembering rules for divisibility YouTube Clip (3:28 min)
http://www.youtube.com/watch?v=RlRRJ88rASE

<table>
<thead>
<tr>
<th>Divisible by</th>
<th>Divisibility Test</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>If the digit ends in 0, 2, 4, 6 or 8</td>
<td>10024</td>
</tr>
<tr>
<td>3</td>
<td>If the sum of the digits is divisible by 3</td>
<td>135</td>
</tr>
<tr>
<td>4</td>
<td>If the last two digits form a number divisible by 4</td>
<td>636</td>
</tr>
<tr>
<td>5</td>
<td>If the last digit is a 0 or 5</td>
<td>205</td>
</tr>
<tr>
<td>6</td>
<td>If the digit is divisible by 2 and 3</td>
<td>654</td>
</tr>
<tr>
<td>9</td>
<td>If the sum of the digits is divisible by 9</td>
<td>216</td>
</tr>
<tr>
<td>10</td>
<td>If the last digit is 0</td>
<td>3780</td>
</tr>
</tbody>
</table>

The Candy Shop

This is the musk stick cutter that cuts up the musk sticks at the local candy shop. The shop produces musk sticks of different lengths. Customers order musk sticks of any length and use the machine to cut it into an equal number of parts. For example, if a customer wants to cut a length of musk stick into 22 equal parts, the customer places the musk stick in the machine, presses the button for 22, and the machine cuts up the length of musk sticks into 22 equal parts.

Example: To cut 5 pieces, place the musk stick into the machine and press the number 5. The musk stick is cut into 5 equal pieces.

One day, a customer wanted the musk stick cut into 45 pieces, but the 45 button would not work. Fortunately, an employee had an idea about how the machine could still be used to do this. She placed the
musk stick in the machine and pressed the number 9 button. She then took the nine pieces of musk sticks and placed them in the machine and pressed the number 5 button. Then the customer had 45 pieces as requested. Later on the 66 button stopped working……

THINK PAIR SHARE - In pairs, think about the situation and use the divisibility tests to solve the problems below. Share your solutions with another team of students:

1. What would happen if the number 66 button stopped working? How would we cut the musk stick into 66 pieces?

2. Is there another way of cutting the musk stick into 66 pieces?

3. What would happen if the 135 button stopped working, how would we make 135 pieces?

4. What would happen if the 305 button stopped working, how would we make 305 pieces?

5. What would happen if the 132 button stopped working, how would we make 132 pieces?

6. If the machine below contains the buttons 1 to 120, which buttons are required to cut the musk sticks into the number of pieces requested by any customer? That is, which buttons can be discarded once they seize to work without stopping production? Cross out the buttons no longer required, justify your answer.

<table>
<thead>
<tr>
<th>Musk stick cutter buttons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  2  3  4  5  6  7  8  9  10</td>
</tr>
<tr>
<td><img src="image1.png" alt="Buttons 1-10" /></td>
</tr>
<tr>
<td>11 12 13 14 15 16 17 18 19 20</td>
</tr>
<tr>
<td><img src="image2.png" alt="Buttons 11-20" /></td>
</tr>
<tr>
<td>21 22 23 24 25 26 27 28 29 30</td>
</tr>
<tr>
<td><img src="image3.png" alt="Buttons 21-30" /></td>
</tr>
<tr>
<td>31 32 33 34 35 36 37 38 39 40</td>
</tr>
<tr>
<td><img src="image4.png" alt="Buttons 31-40" /></td>
</tr>
<tr>
<td>41 42 43 44 45 46 47 48 49 50</td>
</tr>
<tr>
<td><img src="image5.png" alt="Buttons 41-50" /></td>
</tr>
<tr>
<td>51 52 53 54 55 56 57 58 59 60</td>
</tr>
<tr>
<td><img src="image6.png" alt="Buttons 51-60" /></td>
</tr>
<tr>
<td>61 62 63 64 65 66 67 68 69 70</td>
</tr>
<tr>
<td><img src="image7.png" alt="Buttons 61-70" /></td>
</tr>
<tr>
<td>71 72 73 74 75 76 77 78 79 80</td>
</tr>
<tr>
<td><img src="image8.png" alt="Buttons 71-80" /></td>
</tr>
<tr>
<td>81 82 83 84 85 86 87 88 89 90</td>
</tr>
<tr>
<td><img src="image9.png" alt="Buttons 81-90" /></td>
</tr>
<tr>
<td>91 92 93 94 95 96 97 98 99 100</td>
</tr>
<tr>
<td><img src="image10.png" alt="Buttons 91-100" /></td>
</tr>
<tr>
<td>101 102 103 104 105 106 107 108 109 110</td>
</tr>
<tr>
<td><img src="image11.png" alt="Buttons 101-110" /></td>
</tr>
<tr>
<td>111 112 113 114 115 116 117 118 119 120</td>
</tr>
<tr>
<td><img src="image12.png" alt="Buttons 111-120" /></td>
</tr>
</tbody>
</table>
Stage 3 Activities for financial mathematics

Syllabus Content
Strand: Number and Algebra
Substrand: Addition and Subtraction

Outcomes: A student,
Addition and Subtraction 1 and 2
MA3-5NA selects and applies appropriate strategies for addition and subtraction with counting numbers of any size
MA3-1WM describes and represents mathematical situations in a variety of ways using mathematical terminology and some conventions
MA3-2WM selects and applies appropriate strategies for addition and subtraction with counting numbers of any size

Key Ideas:
Solve word problems and record the strategy used, including problems involving money
Create a simple budget
Select and apply efficient mental, written and calculator strategies to solve word problems and record the strategy used

Prior Knowledge:
Stage 2 Key Ideas
Use and record a range of mental strategies for addition and subtraction of two-, three- and four-digit numbers
Perform calculations with money, including calculating equivalent amounts using different denominations
Solve word problems, including those involving money

Teaching content: students,
- use knowledge of addition and subtraction facts to create a financial plan, such as a budget, eg organise a class celebration on a budget of $60 for all expenses
- record numerical data in a simple spreadsheet (Communicating)
- give reasons for selecting, prioritising and deleting items when creating a budget (Communicating, Reasoning)

- solve addition and subtraction word problems involving whole numbers of any size, including problems that require more than one operation, eg 'I have saved $40 000 to buy a new car. The basic model costs $36 118 and I add tinted windows for $860 and Bluetooth connectivity for $1376. How much money will I have left over?'

Student Activities

These teaching lessons come from www.makingcents.com.au from this website you can download valuable programs for years 2, 4 and 6 around financial literacy. The outcomes relate to our current syllabus, but the lessons still dovetail nicely with our new outcomes and content, particularly in Stage 3. There is also another great website http://teaching.moneysmart.gov.au and has lessons that link directly to the Australian curriculum.
Stage 4 Teaching ideas for Financial Mathematics

Strand: Number and Algebra

Substrand: Financial mathematics

Outcomes: A student

MA4-6NA solves financial problems involving purchasing goods
MA4-1WM communicates & connects mathematical ideas using appropriate terminology, diagrams & symbols
MA4-2WM applies mathematical techniques to solve problems
MA4-3WM recognises and explains mathematical relationships using reasoning

Prior Knowledge: students can compare order and calculate with fractions, decimal and percentages

Teaching content: students,

- calculate GST & GST-inclusive prices for goods purchased in Australia, given the pre-GST price
- interpret GST information contained on receipts (Communicating)
- investigate efficient methods of computing the GST and GST-inclusive prices (Problem Solving)
- explain why the value of the GST itself is not equivalent to 10% of the GST-inclusive price (Communicating, Reasoning)
- determine the pre-GST prices for goods, given the GST-inclusive price
- explain why the pre-GST price is not equivalent to 10% off the GST-inclusive price (Communicating, Reasoning)

What is GST?

Goods and Services Tax (GST)

“The Goods and Services Tax (GST) in Australia is a value-added tax on the supply of goods and services. It was introduced by the Australian Government and took effect from 1 July 2000. Prior to the GST, Australia operated a wholesale sales tax implemented in the 1930s, when its economy was dominated by the production and sale of goods. In Australia, the GST is levied at a flat rate of 10% on most goods and services, apart from GST-exempt items which include basic necessities such as milk and bread.” (NSW Mathematics 7-10 syllabus, page 54)

- Most basic food for human consumption is GST free. This includes food and beverages such as:
  - fruit and vegetables
  - meat
  - eggs
  - bread
  - cheese
  - soup
  - milk, tea, coffee, fruit & vegetable juices (with 90% minimum by volume of juice)
  - breakfast cereals, flour
  - infant formula
  - sugar

The Australian Taxation Office Website is a great source for students to investigate information about goods and services tax for class discussion.

List of GST free products

<table>
<thead>
<tr>
<th>Category</th>
<th>Beverages GST Free</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk products</td>
<td>milk, skim milk or buttermilk (whether liquid, powdered, concentrated or condensed) casein , whey, whey powder or whey paste</td>
</tr>
<tr>
<td></td>
<td>Beverages consisting of products referred above or a combination, to the extent of at least 95 per cent but not including flavoured beverages</td>
</tr>
<tr>
<td>Lactose</td>
<td></td>
</tr>
<tr>
<td>Soy &amp; rice milk</td>
<td>Beverages consisting principally of soy milk or rice milk, but not including flavoured beverages</td>
</tr>
<tr>
<td>Tea, coffee (not ready-to-drink form)</td>
<td>Tea (including herbal tea, fruit tea, ginseng tea and other similar beverage preparations), coffee and coffee essence, chicory and chicory essence, and malt</td>
</tr>
<tr>
<td>Fruit and vegetable juices</td>
<td>Concentrates for making non-alcoholic beverages &amp; carbonated beverages, if the concentrates consist of at least 90% by volume of juices of fruits</td>
</tr>
<tr>
<td>Beverages for infants or invalids</td>
<td>Beverages, and ingredients for beverages, of a kind marketed principally as food for infants or invalids</td>
</tr>
<tr>
<td>Water</td>
<td>Natural water, non-carbonated and without any other additives</td>
</tr>
</tbody>
</table>


Internet research task – What is GST?

Your task is to investigate GST, research the internet to gather information about GST. Your presentation must include answers to the questions below. Presentation style is your choice e.g. PowerPoint, Prezi, a poem, a narrative, a speech or a short video clip (maximum of 3 minutes).

1. What is GST?
2. When was it introduced?
3. Which items have the GST added?
4. What items are exempt from GST?
5. Collect two receipts from a supermarket purchase which show how much GST was charged for items purchased. List the items you see with no GST charged and the items with GST charged. Explain how the receipt indicates that GST has been charged.
6. Give an example of another country which has a goods and services tax and the amount of tax charged?
Activity in pairs - Interpreting GST information on receipts

1. Which items were taxed?
2. How do we know?
3. How much was the total bill?
4. Does this figure include GST?
5. How much GST was charged?
6. If the customer purchased another packet of Choco mix, what would be the new bill? How much GST would be charged?
7. Create your own receipt for goods purchased at the local store. Make sure you include GST and GST free items in your purchase.

Think, pair, share – Finding GST

Complete this activity in pairs.

1. To calculate GST we find 10% of the price.
   Write a question for finding GST on a product; write the worked solution on another page. Take your question to another team to answer. Check if their answer is correct.

2. To calculate GST, included in a price divide the price by 11.
   Check if the statement above is true. Write a question where this fact can be used, on another page write the worked solution. Take your question to another team to answer. Check if their answer is correct.

3. Why is the GST price not equivalent to 10% off the GST- inclusive price?
   In pairs discuss this statement above, turn around and share your ideas with the team behind you.

4. Why do we divide by 11?
   Think about this statement and discuss your answer; report back to the whole class about your findings.
Stage 4 - ‘Best Buys’

Outcomes:

MA4 – 6NA solves financial problems involving purchasing goods
MA4-1WM communicates & connects mathematical ideas using appropriate terminology, diagrams & symbols
MA4-2WM applies mathematical techniques to solve problems
MA4-3WM recognises and explains mathematical relationships using reasoning

Teaching content:
Investigate and calculate 'best buys', with and without the use of digital technologies (ACMNA174)

Students:
- solve problems involving discounts, including calculating the percentage discount
- evaluate special offers, such as percentage discounts, 'buy-two-get-one-free', 'buy-one-get-another-at-half-price', etc., to determine how much is saved (Communicating, Problem Solving, Personal and social capability)
- calculate 'best buys' by comparing price per unit, or quantity per monetary unit, e.g. 500 grams for $4.50 compared with 300 grams for $2.75
- investigate 'unit pricing' used by retailers and use this to determine the best buy (Problem Solving, Personal and social capability)
- recognise that in practical situations there are considerations other than just the 'best buy', e.g. the amount required, waste due to spoilage (Reasoning)
- use price comparison websites to make informed decisions related to purchases under given conditions (Problem Solving, Critical and creative thinking)
- evaluate special offers, such as percentage discounts, 'buy-two-get-one-free', 'buy-one-get-another-at-half-price', to determine how much is saved (Communicating, Problem solving)
- Calculate 'best buys' by comparing price per unit, or quantity per monetary unit, e.g. 500 grams for $4.50 compared with 300 grams for $2.75 Investigate 'unit pricing' used by retailers and use this to determine the best buy (Problem Solving).

Quick Quiz – solve without using a calculator

Prior knowledge - Pre-assess student skills in calculating percentages using mental computation.

Ask students to find the following and explain the thinking strategy they used when calculating each percentage:

1. Find 10% of $100
2. Find 20% of $150
3. Find 25% of $200
4. Find 50% of $400
5. Find 75% of $80
6. The price of a $120 jacket is discounted by 10%, what is the new discounted price?
7. The selling price of a pair of shoes is $60, if the price is increased by 25%, what is the new price for the shoes?
### Brainstorm – Finding Percentages

Brainstorm equivalent fractions and percentages. Find the equivalent fraction and percentage for each of the following:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>1/2</td>
</tr>
<tr>
<td>25%</td>
<td>3/4</td>
</tr>
<tr>
<td>20%</td>
<td>10/100</td>
</tr>
<tr>
<td>80%</td>
<td>120</td>
</tr>
<tr>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>150%</td>
<td></td>
</tr>
</tbody>
</table>

Brainstorm percentage values of the same amount, using thinking strategies. Find the following percentages of $200:

<table>
<thead>
<tr>
<th>Find the following percentages of $200</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
</tr>
<tr>
<td>50%</td>
</tr>
<tr>
<td>25%</td>
</tr>
<tr>
<td>75%</td>
</tr>
<tr>
<td>20%</td>
</tr>
<tr>
<td>10%</td>
</tr>
<tr>
<td>80%</td>
</tr>
<tr>
<td>60%</td>
</tr>
<tr>
<td>40%</td>
</tr>
<tr>
<td>15%</td>
</tr>
</tbody>
</table>
Think, pair, share - Building knowledge of vocabulary and language

Read the following list and think about the meanings of these words and phrases.
In pairs write sentences using these words and then share your understandings with the class.
If you are unsure of a meaning look it up on the internet.

- Sale price
- Percentage increase
- Special offer
- Mark up, Mark down
- Percentage discount
- Increase, Decrease
- Cost price, Selling price
- GST, Discount, 10% off
- Buy one get one free
- Buy one get one half price
- Buy two get one free
- Take a further 25% off
- Up to 70% off
- Already reduced prices as marked

Student investigation – Special offers

Part 1:
Your task is to find three offers online for the same item and work out how much money can be saved by taking the deal, and if there are any other considerations. Look at the examples below:

Examples:

- **T-Shirts $50**
  - On sale take 20% off and a further 25% off the sale price

- **Bike $300**
  - On sale take 10% off
  - And a further 25% Off the sale price

Part 2:
Use the Comparison website to make informed decisions related to purchase
http://www.shopbot.com.au/. Your task is to research 3 items you wish to purchase and compare their prices from 4 different stores. The website does this for you; in your assignment create a table showing each item, the price comparison from different suppliers and a product image. Write a report about the product you have chosen where you will be purchasing the product and why this is the best place to shop include mathematical facts and reasoning to support your argument.

shopbot.com.au
Where Australians Compare Prices
Best Buys – Calculate the unit price to discover the best buy

Which is the best buy? Are there any other considerations when selecting the item to purchase such as size, value for money or used by date.

- **Task 1:** Provide students with a set of 6 cards or a PowerPoint presentation, showing 2 equivalent items of different brand and quantity. Students calculate the unit price to work out the best buy.

- **Task 2:** Students investigate unit pricing in online supermarket catalogues and present findings. Ask students to select 3 items to purchase from the supermarket, students investigate brands of the same product from different stores using online catalogues. Students create a report showing pictures of the items they wish to compare, their unit price, their advertised price and which brand is the best buy explaining the mathematically why there choice is the best value for money.

Clever Shopping teaching resources on Scootle


Which bag of Easter eggs is the better value?

- The purple packet costs $9.98 for 475g or $22.59 per kg
- The red packet costs $3.48 for 180 g or $20.78 per kg

A 375 ml can of soft drink is priced at $1.40. Calculate the price per litre.

- Two cans of drink contain $2 \times 375 \text{ ml} = 750 \text{ ml}$.
- Three cans contain $3 \times 375 \text{ ml} = 1125 \text{ ml}$
- Two and a bit cans hold 1000 ml or 1 litre.
- Two cans is not enough and three cans is too many.
- Exactly how many cans do I need?
Stage 3 Whole Numbers - The introduction of integers

**Strand:** Number and Algebra  
**Substrand:** Whole Numbers

**Outcomes:**
MA3-4NA orders, reads and represents integers of any size and describes properties of whole numbers  
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

**Key ideas:** Recognise the location of negative numbers in relation to zero on a number line

**Teaching content Whole Numbers 2**

**Students:**
Investigate everyday situations that use integers; locate and represent these numbers on a number line (ACMNA124)

- recognise the location of negative whole numbers in relation to zero and place them on a number line
- use the term 'integers' to describe positive and negative whole numbers and zero
- interpret integers in everyday contexts, e.g. temperature
- investigate negative whole numbers and the number patterns created when counting backwards on a calculator
- recognise that negative whole numbers can result from subtraction (Reasoning)
- ask 'What if' questions, e.g. 'What happens if we subtract a larger number from a smaller number on a calculator?' (Communicating)

**Prior knowledge**
Stage 2 Key Ideas
Whole Number
Read, write and order numbers of up to five digits
Length
Use a scaled instrument to measure and compare temperatures
Record temperatures using the symbol for degrees (°)

**Teaching Activities**
The use of the term integer is new for primary teachers and now appears in part 2 of Whole Numbers for Stage 3. This is an introduction to the use of the term to present numbers that are both positive and negative. As students gain an understanding of what integers are in Stage 3, they are then further explored in Stage 4, where students learn to perform operations with integers.

Some of the lessons below for Stage 4 Integers are also appropriate for Stage 3 students, specifically the activities around what integers are and the use of the number line to assist in understanding.

**Student activities**
These lesson activity ideas come from the [http://nrich.maths.org](http://nrich.maths.org) website. These are problems for students to find solutions; you can use them as part of a lesson introduction, consolidation of the concept or an extension.

- **Consecutive Negative Numbers** (Stage 4)
- **Tug Harder!** (Stage 3)
- **Making Sense of Positive and Negative Numbers** (Stage 3)
- **Adding and Subtracting Positive and Negative Numbers** (Stages 3-4)
- **Up, Down, Flying Around** (Stage 3)
- **First Connect Three** (Stage 3)
- **Negative Numbers** - This is an article that gives a brief history of negative numbers.
Stage 4 – Integers

**Strand:** Number and Algebra  
**Substrand:** Computing with Integers

**Outcomes:**  
MA4-4NA compares orders and calculates with integers applying a range of strategies to aid computation  
MA4-1WM communicates & connects mathematical ideas using appropriate terminology, diagrams & symbols  
MA4-2WM applies mathematical techniques to solve problems  
MA4-3WM recognises and explains mathematical relationships using reasoning

**Key ideas:** Integers on the number line, comparing integers, adding and subtracting integers

**Teaching content**

- Compare, order, add and subtract integers (ACMNA280)
- Recognise and describe the ‘direction’ and ‘magnitude’ of integers
- Construct a directed number sentence to represent a real-life situation (Communicating)
- Recognise and place integers on a number line
- Compare the relative value of integers, including recording the comparison by using the symbols < and >
- Order integers
- Interpret different meanings (direction or operation) for the + and – signs, depending on the context
- Add and subtract integers using mental and written strategies
- Determine, by developing patterns or using a calculator, that subtracting a negative number is the same as adding a positive number (Reasoning)
- Apply integers to problems involving money and temperature (Problem Solving)

**What is an integer?**

Integers are positive and negative numbers and zero. Example: …-3, -2, -1, 0, 1, 2, 3 …

A number line shows the order of numbers. As we move left along the number line, numbers become smaller. As we move right along the number line, numbers become larger.

![Number line diagram](image)

The arrows on either side of the number line indicate that numbers go on indefinitely to infinity and negative infinity. Two integers the same distance from zero on opposite sides of the number line are called opposites e.g. -5 and 5 are opposites

**Lesson Opener: What are negative numbers?**  
[http://www.youtube.com/watch?v=fyQ6lfynsZc](http://www.youtube.com/watch?v=fyQ6lfynsZc)
Activity 1: Construct an integer number line and locate numbers

Students construct a number line using a ruler, label the scale and locate the following numbers:

a) -5, 0, 5
b) -9, 0, 9
c) 7, -4, 11, -13, 3, -7

Class Discussion: Ask students which integers on a number line are larger and which are smaller

Comparing integers: Using a number line, students locate two integers on a number line and write a statement using an inequality sign < or > to show which integer is larger.

How to order numbers using inequality signs [link](http://www.youtube.com/watch?v=5jnkJ57rJc)
Comparing integers

< means less than

-5 < 4

-8 < 3

-6 < 0

Student Activity in pairs: Comparing integers
State whether the following is true or false, check your answer by using a number line
a) 8 < -10
b) 14 > -11
c) 8 > 12
d) -5 < 15
e) -10 < 9
f) 0 < -6
g) 17 < -32

Activity 2: Where do we use Integers?
Let students offer suggestions on various situations where we use negative numbers.
Negative numbers are used on thermometers they are also used to represent locations below sea level. We use positive and negative numbers to describe the motion of an object to describe magnitude and direction.

Think Pair Share
• Think about where we use negative numbers in the world around us
• In pairs discuss your thought and write a list
• Share your ideas with the class
Activity 3: Reading the temperature on a thermometer

On a thermometer we measure temperature using a scale of positive integers, negative integers and zero.

Brainstorm whether the following temperatures indicate hot, warm or cold weather
-100°C, 250°C, 300°C, -50°C

On a warm day, sunny day the temperature might be 230°C. We say the temperature is 230°C above zero, this can be written as +230°C. We do not always put in the (+) plus sign, when it is left out we understand that this is a positive number.

In the snow the temperature might be -100°C. We say the temperature is 100°C below zero, this can be written as -100°C. Unlike positive numbers, we never leave the (-) minus sign off negative numbers.

Discuss what the weather will be when the temperature drops by 5°C in the two cities.

What will the temperature be in the Sahara desert, London, Antarctica, Australia, Malaysia, Africa and China? Which is colder the North Pole or the South Pole, what could the reason be? Find the coldest recorded temperature for each.

Arrange the countries in descending order according to temperature place the countries on a number line showing a comparison of temperatures.

Use wolfram alpha to find temperatures in different cities or a mobile app for weather forecast
http://www.wolframalpha.com/widgets/view.jsp?id=520115043d9ba527a787577bd75930c8

Activity 4:

Geographically we represent altitude using integers, sea levels in negative integers and mountain heights above sea level are represented by positive integers. Example a location given as -300m means the location is 300m below sea level.

1. Find the height of the tallest mountain in the world?
2. Find the depth of the deepest sea?
3. Create a diagram comparing the following in ascending order show each height above or below sea level as a negative or positive number:
   - the heights of Mount Everest, Mount Kilimanjaro, Mount Fuji, Mount Kosciusko, and Uluru with the average depth of the Pacific Ocean, Atlantic Ocean, Indian Ocean and Arctic Ocean.
Negative and positive integers in motion are used to represent direction of movement, negative integers represent movement to the left and positive integers represent movement to the right.

Adding and subtracting negative numbers

http://www.youtube.com/watch?v=9mT1T6n0Rko

5. Adding and subtracting more complicated number sentences involving several integers

http://www.youtube.com/watch?v=YCg57KXR4GA

Activity: Learning Object for finding the difference between temperatures

http://tlf.dlr.det.nsw.edu.au/learningobjects/Content/L6544/object/asset1.html
## Stage 4 Integers, Student learning intentions

### Student Self-Assessment

<table>
<thead>
<tr>
<th>Student Self-Assessment</th>
<th>Confidently</th>
<th>Need more practise</th>
<th>Experiencing difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td>I know what an integer is and I can order integers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I recognise and describe direction and magnitude of integers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I place integers on a number line</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I compare integers and place the signs &lt; and &gt; to compare relative values</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I interpret different meanings for the + and – signs, depending on context</td>
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<td></td>
</tr>
<tr>
<td>I add and subtract integers using mental and written strategies</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>I apply integers to problems involving money and temperature</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I multiply and divide integers using mental and written strategies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I use grouping symbols as an operator with integers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can apply order of operation to evaluate expressions involving integers</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Terminology

<table>
<thead>
<tr>
<th><strong>Terminology</strong></th>
<th><strong>Write an example to show your understanding of each term.</strong></th>
<th><strong>Meaning</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Descending order</td>
<td>Writing numbers from largest to smallest</td>
<td></td>
</tr>
<tr>
<td>Integer</td>
<td>Positive or negative whole numbers or zero. Example: ...-3, -2, -1, 0, 1, 2, 3 ...</td>
<td></td>
</tr>
<tr>
<td>Ascending order</td>
<td>Writing numbers from smallest to largest</td>
<td></td>
</tr>
<tr>
<td>Magnitude</td>
<td>Size of a number</td>
<td></td>
</tr>
<tr>
<td>Order of operation</td>
<td>The order in which we carry out mathematical operations</td>
<td></td>
</tr>
<tr>
<td>Directed number</td>
<td>Numbers shown using a + or – sign.</td>
<td></td>
</tr>
<tr>
<td>Number line</td>
<td>A line where numbers are represented as points along it, the line goes to infinity in both directions</td>
<td></td>
</tr>
</tbody>
</table>

**Extension terminology**

- **Absolute value** - is the distance a number is from zero on a number line
- **Additive inverse** - the opposite of an integer, the sum of an integer and its additive inverse is zero, e.g. -8 + 8 = 0
Using the empty number line to compute with integers

Student Activity - Use the empty number line to find the answer to each question, use arrows to show how you move along the line when you add and subtract integers on the number line. Remember when you subtract a negative number it becomes a positive: $4 - (-8) = 4 + 8 = 12$

a) $5 - 10 + 3 =$

b) $-4 - 3 + 5 =$

c) $-6 + 4 - (-2) =$

d) $-5 - 7 + 4 =$

e) $-7 + 7 - 8 =$

f) $-10 - (-3) + 5 =$

g) $-20 + 15 - (-6) =$

h) $-15 + 8 - 3 =$

i) $-3 - (-8) + 4 =$

j) $18 - (-6) =$

k) $-13 + 5 - 4 =$
Fractions Stage 3 and Stage 4

Reviewing and building knowledge about Fractions

These Building Capacity resources for the have been developed to build teachers' capacity to understand aspects of the Mathematics syllabus that are new or may be challenging. They are intended to be downloaded and used for professional learning and to complement familiarisation with the new syllabuses. You can access these and more resources by visiting the NSW DEC intranet home page and clicking the link on the right hand side NSW syllabuses for the Australian Curriculum.

The following clips may be used as fractions home viewing in preparation for lessons i.e. ‘flipping the classroom’, or as lesson openers for discussion.

Representations of fractions and decimal place value
http://www.youtube.com/watch?v=Mst8iZlpFE (9:15 min)

Percentages and equivalent fractions (8:37 min)
http://www.youtube.com/watch?v=kmVfZ9o-2gg&list=SPUPEBWbAHUswc_ZkzMMTWbtx6ofZmVLfO

Adding and subtracting fractions
http://www.youtube.com/watch?v=5juto2ze8Lg (4:22 min)

Adding and subtracting fractions with different denominators
http://www.youtube.com/watch?v=N-Y0Kvcnw8g (5:07 min)

Finding a percentage of a number
http://www.youtube.com/watch?v=rR95Cbcjzus (7:32 min)

Multiplying fractions
http://www.youtube.com/watch?v=qmfXyR7Z6Lk (5:42 min)
Stage 3- Fractions

Fractions and Decimals is one of the substrands in the new syllabus that has been ‘beefed-up’ the most. There are 18 key ideas across Fractions & Decimals 1 and Fractions & Decimals 2 in Stage 3 in the new syllabus. This is due to percentages being moved up from Stage 2 and some decimal key ideas being moved down from Stage 4. The fractions section has some new content but the main focus is on modelling. As mentioned in the article in the beginning of this bulletin, starting with concrete models assists students in forming a deeper, clearer understanding of how fractions work and how to manipulate, compare and reform the whole.

Our Fractions: pikelets and lamingtons resource book that was written to support our current syllabus is still a vital resource to support the teaching of fractions. Make sure you explore your teacher resource section of your school library to find it!

Some of the activities are available online through the mathematics programming support website that is still accessible. It is yet to be updated to include new outcomes, however many aspects of new content are covered in these activities.

Stage 3 Fractions activities follow this link for other fraction activities.

One great activity is the Building the fraction bridge: 1 lesson. There is also a follow up lesson in the book which we highly recommend.

Building the fraction bridge: 1

Students build a fraction bridge using paper streamers.

Have students work in pairs and give each pair three paper streamers or strips of light card, each 60cm long and of equal widths. Write the following fractions on the board:

1/2, 1/3, 1/4, 1/5, 1/6, 1/7, 1/8, 1/9, 1/10, 1/11, 1/12.

Which three fractions could you make from one streamer and how could you do it?
Which other three fractions from the list could be done in a similar way?
If this is one-third of a steamer, how could I make one-ninth of a streamer?
(for the development of the activity, refer to Building the fraction bridge, pp. 48 – 51 in Fractions: pikelets and lamingtons)
Stage 4 - Rates and Ratios
Communicating, Reasoning, Critical and Creative Thinking

Outcomes: a student,
MA4-1WM communicates and connects mathematical ideas using appropriate terminology, diagrams and symbols
MA4-2WM applies appropriate mathematical techniques to solve problems
MA4-3WM recognises and explains mathematical relationships using reasoning
MA4-7NA operates with ratios and rates, and explores their graphical representation

Teaching content: students,
- Investigate, interpret and analyse graphs from authentic data (ACMNA180)
- interpret distance/time graphs (travel graphs) made up of straight-line segments
- write or tell a story that matches a given distance/time graph (Communicating)
- match a distance/time graph to a description of a particular journey and explain the reasons for the choice (Communicating, Reasoning)
- compare distance/time graphs of the same situation, decide which one is the most appropriate, and explain why (Communicating, Reasoning)
- recognise concepts such as change of speed and direction in distance/time graphs
- describe the meaning of straight-line segments with different gradients in the graph of a particular journey (Communicating)
- calculate speeds for straight-line segments of given distance/time graphs (Problem Solving)
- recognise the significance of horizontal line segments in distance/time graphs
- determine which variable should be placed on the horizontal axis in distance/time graphs
- draw distance/time graphs made up of straight-line segments
- sketch informal graphs to model familiar events, e.g. noise level during a lesson
- record the distance of a moving object from a fixed point at equal time intervals and draw a graph to represent the situation, e.g. move along a measuring tape for 30 seconds using a variety of activities that involve a constant rate, such as walking forwards or backwards slowly, and walking or stopping for 10-second increments (Problem Solving)
- use the relative positions of two points on a line graph, rather than a detailed scale, to interpret information

Rates and Ratios – Distance/Time Graphs – Tell me a story Activity

Literacy Continuum Connections

Cluster 12:

1. Vocabulary knowledge – uses technical language to explain a complex concept. Selects appropriate vocabulary in response to context, purpose and audience.
2. Aspects of writing – creates well-structured and sequenced texts for informative and persuasive purposes. Creates and develops ideas to explore a concept. Uses paragraphing to structure information and partition events and ideas.
3. Aspects of speaking – Expresses opinions to others with increasing confidence, uses talk to explore understandings of new concepts, ideas and issues.
Discussion 1: Distance/time graphs, consider the different scenarios

![Distance-time graph with four scenarios: A, B, C, and D.]

Discussion 2:

a) Which car is the slowest? How do you know?

b) Which car is the fastest? How do you know?
Discussion 3: Look at the graph below to answer the questions, provide reasons for your response.

a) What distance did John travel between 6am and 8am?
b) Do you think John drove faster or slower at 7am? How do you know?
c) When was John travelling the fastest? At what speed was he travelling?
d) When was John travelling the slowest?
e) When did John stop and rest?
f) Between which times did John travel the longest distance with constant speed?

Writing Activity 1: Write a story that matched the distance/time graph below.
Writing Activity 2: Write a story to match the distance/time graph below.

![Distance/Time Graph](image)

Writing Activity 3: Draw your own distance/time graph and write a story to match.

![Graph](image)
Formative Assessment Lesson Materials – Interpreting distance/time graphs

From the University of Nottingham & UC Berkeley

Follow this link to download a teaching unit for assessing students understanding of distance/time graphs. Lesson plans and activities with resources are all available.

http://opi.mt.gov/pdf/CCSSO/InterpTimeDistance.pdf

Some of the activities included in the package are shown below.

Activity: Matching a graph to a Story, involves students matching the most appropriate story with the given graph, students are required to use mathematical reasoning and communicate mathematically about their selection justifying their response.

- A. Tom took his dog for a walk to the park. He set off slowly and then increased his pace. At the park Tom turned around and walked slowly back home.

- B. Tom rode his bike east from his home up a steep hill. After a while the slope eased off. At the top he raced down the other side.

- C. Tom went for a jog. At the end of his road he bumped into a friend and his pace slowed. When Tom left his friend he walked quickly back home.

Activity: This activity contains cards for students to match the graph, with the story, with a table of values. The resource contains 3 sets of cards for students to match in teams and compare their results with other students. Each group is required to justify their response and communicate their ideas.

<table>
<thead>
<tr>
<th>Time</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>
Syllabus PLUS Maths K-6
Session outline and links to recordings

Syllabus PLUS K-6 Maths Adobe Connect Professional Development series highlights changes within the NSW Mathematics K-6 syllabus and provides teaching ideas. Each session will explore different aspects of the syllabus for teachers to deepen their knowledge of new content and pedagogy for teaching primary students. The presentations and resources can be downloaded from the file pod on the final screen of each recorded session. When trying to download any of the GeoGebra files, you will first need to download the GeoGebra software.

Syllabus PLUS K-6 Maths: Understanding the new syllabus

Session 1: Understanding the new syllabus
- Overview of syllabus structure
  The thinking and doing of mathematics: understanding working mathematically
- Exploring the five interrelated components
  Designing learning experiences that develop proficiency in relation to the components of working mathematically

Syllabus PLUS K-6 Math: Embedding learning across the curriculum areas

Session 2: Maths in context: embedding the learning across the curriculum areas
- Providing a mathematical context to assist students to understand real-world issues
- Developing knowledge and skills to assist students as 21 century learners (real world contexts)

Syllabus PLUS K-6 Maths What’s new: Number and Algebra

Session 3: What’s new: Number and Algebra
- New syllabus content
- Programming implications

Syllabus PLUS K-6 Maths What’s new: Measurement and Geometry

Session 4: What’s new: Measurement and Geometry
- New syllabus content
- Programming implications

Syllabus PLUS K-6 Maths What’s new: Statistics and Probability

Session 5: What’s new: Statistics and Probability
- New syllabus content
- Programming implications
Session 1: Stage 4 Number and Algebra

- Financial Mathematics calculating GST & Best Buys, developing the general capability personal and social competence
- Linear Relationships including transformations, translations, reflection, rotation, developing ICT general capability
- Rates and Ratios, distance/time graphs, developing the general capability critical & creative thinking and literacy.

Session 2: Stage 4 Statistics and Probability

- Identifying variables as categorical and numerical data
- Investigating data collection from Primary and secondary sources, developing intercultural and ethical understanding
- Single variable data representation and effect of outliers, Venn diagrams and Two way Tables, critical and creative thinking.

Session 3: Stage 5 Measurement

- Sub-strands of Measurement, numbers of any magnitude including investigating measurements for digital storage. Prefixes such as nano, tera, giga and related prefixes, their meaning and application
- Understanding limits of accuracy and developing critical and creative thinking capability through teaching measurement.

Session 4: Stage 5 Statistics and Probability

- Single variable data analysis, identifying skewed data, comparing data sets and statistical reports in the media, developing critical and creative thinking
- Bivariate data analysis investigations, relationships between two statistical variables and their relationship overtime. Developing ethical understanding, critical and creative thinking and mathematical reasoning.
Series 2
Syllabus PLUS Mathematics 7-10
Session outline and links to recordings

Session 1: Differentiating the curriculum, EAL/D learners and the new Mathematics Syllabus

- Designing learning pathways for Stage 4 Students
- Curriculum differentiation, catering for the diverse learning needs of students with considerations for EAL/D learners and aboriginal education

Session 2: Implications and considerations for teaching Stage 5 Mathematics

- Designing flexible pathways of learning for Stage 5 students
- Supporting teachers in curriculum differentiation and considerations for adjustments for students with special learning needs
- Teaching ideas and strategies using GeoGebra

Session 3: Integrating digital technology in Stage 4 Mathematics

- Exploring strategies for using digital technology within units of learning for developing a deeper understanding of Stage 4 concepts in Number and Algebra as well as Measurement and Geometry

Session 4: Integrating digital technology in Stage 5 Mathematics

- Exploring strategies for using digital technology within units of learning for developing a deeper understanding of Stage 5 concepts in Measurement and Geometry, Number and Algebra as well as Statistics and Probability
Professional Learning Coming up…

Webinars Syllabus PLUS 7-10 Mathematics Series 3, 2014

To register for all four webinars follow the enrolment link below, you may view the live sessions or the recorded session in your own time. The webinars address new syllabus content, teaching ideas and resources for stage 4 and 5. The dates for the four webinars in 2014 are listed below:

Wednesday 26 March 3:30 - 4pm  
Monday 10 March 3:30 - 4pm  
Monday 24 March 3:30 - 4pm  
Thursday 3 April 3:30 - 4pm

Click here to enrol in four webinars For mathematics 7-10  

Syllabus PLUS K-6 Maths Series 2

Tuesday 11 February 3:30- 4pm  
Tuesday 25 February 3:30- 4pm  
Tuesday 11 March 3:30- 4pm  
Tuesday 25 March 3:30- 4pm  
Tuesday 8 April 3:30- 4pm

Search in MyPL@Edu for ‘Syllabus Plus K-6 Maths’ to find these sessions. A contact person from each school will need to enrol and then schedule events for their staff to enrol in.

Implementing the new curriculum courses

A process for programming a unit of learning: Mathematics K-10

Resources

Scoutle

GeoGebra Institute, Geogebra applets and teaching ideas

Teaching programs, scope and sequence and resources, go to Sydney Schools Network

Professional Learning Association

MANSW

Subscription link

DEC Mathematics Curriculum network

Further information

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