What is a syllabus?

• A document that describes, for a specific learning area, what students are expected to learn.

• Contains an aim, objectives, outcomes, content, and assessment requirements.

• Provides teachers with an outline of what students are to be taught at particular Stages. There is a syllabus for each of the six key learning areas (KLAs) in primary school.

• Consistent Teacher Judgement >> Assessment
Mathematics K-6

What is the aim of this syllabus?
The aim of Mathematics K–6 (and Mathematics Years 7–10) is to develop students’:
• mathematical thinking;
• understanding, competence and confidence in the application of mathematics;
• their creativity, enjoyment and appreciation of the subject; and
• their engagement in lifelong learning.

Welcome to mathematics K-6
What are outcomes and content?

Outcomes:
- specify the intended student learning that will result from the teaching of the syllabus.
- milestones of achievement towards which students will work.
- are organised by Stages. Except for Early Stage 1, each Stage covers two years of schooling.

It is expected that most students will demonstrate:
- Early Stage One outcomes by the end of Kindergarten
- Stage 1 outcomes by the end of Year 2
- Stage 2 outcomes by the end of Year 4
- Stage 3 outcomes by the end of Year 6
- Stage 4 outcomes by the end of Year 8.

Achievement of outcomes and links to grading
## Outcomes

### Working Mathematically Outcomes

<table>
<thead>
<tr>
<th>Process</th>
<th>EARLY STAGE 1</th>
<th>STAGE 1</th>
<th>STAGE 2</th>
<th>STAGE 3</th>
<th>STAGE 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questioning</td>
<td>WMES1.1</td>
<td>WMS1.1</td>
<td>WMS2.1</td>
<td>WMS3.1</td>
<td>WMS4.1</td>
</tr>
<tr>
<td>Students ask questions in relation to mathematical situations and their mathematical experiences</td>
<td>Asks questions that could be explored using mathematics in relation to Early Stage 1 content</td>
<td>Asks questions that could be explored using mathematics in relation to Stage 1 content</td>
<td>Asks questions that could be explored using mathematics in relation to Stage 2 content</td>
<td>Asks questions that could be explored using mathematics in relation to Stage 3 content</td>
<td>Asks questions that could be explored using mathematics in relation to Stage 4 content</td>
</tr>
<tr>
<td>Substrand</td>
<td>EARLY STAGE 1</td>
<td>STAGE 1</td>
<td>STAGE 2</td>
<td>STAGE 3</td>
<td>STAGE 4</td>
</tr>
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</tr>
<tr>
<td>Whole Numbers</td>
<td>NES1.1 Counts to 30, and orders, reads and</td>
<td>NS1.1 Counts, orders, reads and represents</td>
<td>NS2.1 Counts, orders, reads and records</td>
<td>NS3.1 Orders, reads and writes numbers of</td>
<td>Operations with Whole Numbers</td>
</tr>
<tr>
<td></td>
<td>represents numbers in the range 0 to 20</td>
<td>two- and three-digit numbers</td>
<td>numbers up to four digits</td>
<td>any size</td>
<td>NS4.1 Recognises the properties of special</td>
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<td></td>
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<td></td>
<td></td>
<td>groups of whole numbers and applies a range</td>
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<td></td>
<td></td>
<td></td>
<td>of strategies to aid computation</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Addition and Subtraction</td>
<td>NES1.2 Combines, separates and compares</td>
<td>NS1.2 Uses a range of mental strategies and</td>
<td>NS2.2 Uses mental and written strategies for</td>
<td>NS3.2 Selects and applies appropriate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>collections of objects, describes</td>
<td>informal recording methods for addition and</td>
<td>addition and subtraction involving two-,</td>
<td>strategies for addition and subtraction with</td>
<td></td>
</tr>
<tr>
<td></td>
<td>language and records using informal methods</td>
<td>subtraction involving one- and two-digit</td>
<td>three- and four-digit numbers</td>
<td>counting numbers of any size</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>numbers</td>
<td></td>
<td></td>
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<td></td>
<td>Integers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NS4.2 Compares, orders and calculates with</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>integers</td>
</tr>
</tbody>
</table>
### Mathematics K-6

#### Scope and Continuum of Key Ideas: Number

<table>
<thead>
<tr>
<th>Early Stage 1</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Whole Numbers</strong></td>
<td>Count forwards to 30, from a given number</td>
<td>Count forwards and backwards by ones, twos and fives</td>
<td>Count forwards and backwards by tens or hundreds, on and off the decade</td>
</tr>
<tr>
<td></td>
<td>Count backwards from a given number, in the range 0 to 20</td>
<td>Count forwards and backwards by tens, on and off the decade</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Compare, order, read and represent numbers to at least 20</td>
<td>Read, order and represent two- and three-digit numbers</td>
<td>Use place value to read, represent and order numbers up to four digits</td>
</tr>
<tr>
<td></td>
<td>Read and use the ordinal names to at least ‘tenth’</td>
<td>Read and use the ordinal names to at least ‘thirty-first’</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use the language of money</td>
<td>Sort, order and count money using face value</td>
<td>Record numbers in expanded notation</td>
</tr>
<tr>
<td><strong>Addition and Subtraction</strong></td>
<td>Combine groups to model addition</td>
<td>Model addition and subtraction using concrete materials</td>
<td>Use a range of mental strategies for addition and subtraction involving two-, three- and four-digit numbers</td>
</tr>
<tr>
<td></td>
<td>Take part of a group away to model subtraction</td>
<td>Develop a range of mental strategies and informal recording methods for addition and subtraction</td>
<td>Explain and record methods for adding and subtracting</td>
</tr>
<tr>
<td></td>
<td>Compare groups to determine ‘how many more’</td>
<td>Record number sentences using drawings, numerals, symbols and words</td>
<td>Use a formal written algorithm for addition and subtraction</td>
</tr>
</tbody>
</table>
Content

- describes the knowledge, skills and understanding to be developed by students over a Stage.
- organised under the headings of Knowledge and Skills (students learn about) and Working Mathematically (students learn to).
- assist teachers in planning what and how they will teach, and in assessing what each student knows and can do.
<table>
<thead>
<tr>
<th>Stage</th>
<th>Substrand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome Code</td>
<td>Key Ideas</td>
</tr>
<tr>
<td>A Statement of the outcome.</td>
<td>A list of the key ideas to be addressed that summarise the content statements listed below in both the left and right columns. These are also listed on the Scope and Continuum.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge and Skills</th>
<th>Working Mathematically</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students learn about</td>
<td>Students learn to</td>
</tr>
<tr>
<td>A set of statements related to the knowledge and skills students need to understand and apply in order to achieve the outcome.</td>
<td>A sample set of statements that incorporate Working Mathematically processes into the knowledge and skills listed in the left hand column.</td>
</tr>
<tr>
<td>These are generally presented as a hierarchy of concept development; however, separate statements would typically be grouped and addressed together when planning teaching and learning experiences.</td>
<td>Teachers are encouraged to extend this list of statements by creating their own Working Mathematically experiences for students to engage with each of the five processes (Questioning, Applying Strategies, Communicating, Reasoning and Reflecting).</td>
</tr>
<tr>
<td>The content is written for a whole Stage that would typically span two years of schooling.</td>
<td></td>
</tr>
</tbody>
</table>

**Understanding** is encompassed in the development of concepts and processes in both of these columns.

<table>
<thead>
<tr>
<th>Background Information</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information that provides background knowledge for teachers to assist with planning programs of study for students.</td>
<td>Advice about language and literacy that may assist student engagement and understanding of the content in the unit.</td>
</tr>
<tr>
<td>Some links with other substrands and strands have been included. Others are incorporated in the Teaching and Learning Units.</td>
<td>A list of recommended terminology is included in the Teaching and Learning Units that are not part of the syllabus.</td>
</tr>
</tbody>
</table>
### Stage 2

#### Whole Numbers

<table>
<thead>
<tr>
<th>NS2.1</th>
<th>Key Ideas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counts, orders, reads and records numbers up to four digits</td>
<td>Use place value to read, represent and order numbers up to four digits</td>
</tr>
<tr>
<td>Count forwards and backwards by tens or hundreds, on and off the decade</td>
<td></td>
</tr>
</tbody>
</table>

#### Knowledge and Skills

**Students learn about**

- representing numbers up to four digits using numerals, words, objects and digital displays
- identifying the number before and after a given two-, three- or four-digit number
- applying an understanding of place value and the role of zero to read, write and order numbers up to four digits
- stating the place value of digits in two-, three- or four-digit numbers eg ‘in the number 3426, the 3 represents 3000 or 3 thousands’
- ordering a set of four-digit numbers in ascending or descending order
- using the symbols for ‘is less than’ (<) and ‘is greater than’ (>) to show the relationship between two numbers
- counting forwards and backwards by tens or hundreds, on and off the decade
  - eg 1220, 1230, 1240 (on the decade);
  - 423, 323, 223 (off the decade)
- recording numbers up to four digits using expanded notation eg 5429 = 5000 + 400 + 20 + 9
- rounding numbers to the nearest ten, hundred or thousand when estimating

**Working Mathematically**

**Students learn to**

- pose problems involving four-digit numbers *(Questioning)*
- identify some of the ways numbers are used in our lives *(Reflecting)*
- interpret four-digit numbers used in everyday contexts *(Communicating)*
- compare and explain the relative size of four-digit numbers *(Applying Strategies, Communicating)*
- make the largest and smallest number given any four digits *(Applying Strategies)*
- solve a variety of problems using problem-solving strategies, including:
  - trial and error
  - drawing a diagram
  - working backwards
  - looking for patterns
  - using a table *(Applying Strategies, Communicating)*
Background Information

Students should be encouraged to develop different counting strategies eg if they are counting a large number of shells they can count out groups of ten and then count the groups.

The place value of digits in various numerals is investigated. Students should understand, for example, that the five in 35 represents five ones but the 5 in 53 represents five tens.

The convention for writing numbers of more than four digits requires that they have a space [and not a comma] to the left of each group of three digits, when counting from the Units column.

Language

The word ‘and’ is used between the hundreds and the tens when reading a number, but not between other places eg three thousand, six hundred and sixty-three.

The word ‘round’ has different meanings in different contexts eg the plate is round, round 23 to the nearest ten.

The word ‘place’ has different meanings in everyday language to those used in a mathematical context.
Features of the Sample Units of Work

The following sample page has been constructed to highlight the features included in the units of work:

### Learning Experiences and Assessment Opportunities

#### Timetables

- **Students access timetables on the Internet or the teacher provides students with a variety of timetables e.g. bus, plane, train, ferry, plane, parks, movies. Students describe any visible patterns e.g. buses leave every 15 minutes on weekday mornings. Students calculate the duration of different journeys or events using start and finish times. They develop an itinerary for a given time frame e.g. 4 hours. Students plan their 'ultimate' 24-hour itinerary. Students record their itinerary in 12-hour time using am and pm notation, and 24-hour time. Students discuss which timetables use 24-hour time and why it is important.**

#### Stopwatches

- **Students read digital stopwatch displays showing time from 00:00 to 59 minutes, seconds and hundredths of a second.**

- **Graphic: a bar chart of students' times. Times range from 0:34:26 to 0:35:59.**

- **Example: A Day In My Life**

  **Students list at least eight things they do in a particular day of the week with the time they do each activity.**

  **They then record these times on a sheet of clock faces.**

  **Students convert the times to 24-hour time.**

  **They use the 24-hour times and activities to draw a timeline using an appropriate scale.**

  **Possible questions include: What time did you get up? What time did you have breakfast? What time did you do your homework?**

#### Assessment

- **Assessment for learning activities are integrated into the teaching/learning sequence.**

### Resources

- **Units of Work: Use of time/units of measure.**

### Links

- **Units of Work: Use of time/units of measure.**

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**Units of Work**
"Count Me In Too" uses a team-based approach to professional development with a focus on practice in the classroom.

The learning framework provides a basis for designing purposeful learning experiences.

The framework outlines how students move from using naive strategies to increasingly sophisticated strategies in order to solve number problems. It can be used to sequence instruction.

Count Us In Games
Newman's prompts

Finding out why students make mistakes
The Australian educator Anne Newman (1977) suggested five significant prompts to help determine where errors may occur in students attempts to solve written problems. She asked students the following questions as they attempted problems.

1. **Reading:**
ReRead the question quietly to yourself and let me know if you want help with any word.

2. **Comprehension:**
Can you tell me what the question is asking you to find out?

3. **Transformation:**
What could you do to get the answer?

4. **Process Skills:**
Try doing it and as you are doing it, tell me what you are thinking.

5. **Encoding:**
Now write down your answer.
Progress

Students progress at different rates.

- some students will not demonstrate the outcomes identified with their stage of schooling by the time they complete that Stage.
- some students will demonstrate the outcomes before the end of their stage of schooling.