Math curse
by Jon Scieszka + Lane Smith
**Overview:** The engaging narrative of this picture book provides a context for learning by presenting word problems that link mathematical ideas to everyday and imaginary situations through humour and visual representations. The ideas presented could be used as a springboard for developing conceptual understanding of the key ideas in many strands and substrands or embedded within specific activities in mathematics lessons. The content is best suited to Stages 2 & 3.

**Focus Areas:** Problem Solving, Visualisation, Representation, Student Recording

**Syllabus Strands:** Working Mathematically, Number & Algebra, Measurement & Geometry, Statistics & Probability

**Substrands:** Whole Numbers, Multiplication & Division, Fractions & Decimals, Patterns & Algebra, Length, Time, Data

**Using Math curse as a Learning/Teaching Tool:**

*Math curse* been ‘mapped out’ on the planning scaffolds provided in this package. Many pages in this picture book offer possibilities to work across strands or integrate learning experiences with other Key Learning Areas. Table 1, *Math curse* – Related Syllabus Outcomes and Key Ideas and Table 2 *Math curse* – Content and Language provide examples of documentation that could be included in a mathematics program for registration. Selecting an area of focus, planning the learning/teaching sequence and determining the purpose for each lesson is at the discretion of individual teachers based on the learning needs of their students. Refer to the *Mathematics K–10 syllabus* for background information and a complete learning/teaching sequence, in conjunction with a comprehensive list, and further explanation, of the language related to each strand and substrand. The sample lessons for Stage 2 and 3 focus on problem solving through visual representation and student recording of investigations. They aim to demonstrate a conceptual approach to learning and teaching within a whole class context that supports student learning through a paired structure. ‘Like ability’ pairings generally work well, except in lessons with high literacy content, when ‘more able with middle’ and ‘middle with less able’ is often more successful.

<table>
<thead>
<tr>
<th>Table 1: <em>Math curse</em> - Related Syllabus Outcomes and Key Ideas</th>
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<tbody>
<tr>
<td><strong>Stage 2</strong></td>
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<tr>
<td><strong>Working Mathematically</strong></td>
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<tr>
<td><strong>Communicating</strong></td>
</tr>
<tr>
<td>MA2-1WM uses appropriate terminology to describe, and symbols to represent, mathematical ideas</td>
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<tr>
<td><strong>Problem Solving</strong></td>
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<tr>
<td>MA2-2WM selects and uses appropriate mental or written strategies, or technology, to solve problems</td>
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<td><strong>Reasoning</strong></td>
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<td>MA2-3WM checks the accuracy of a statement and explains the reasoning used</td>
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<tr>
<td><strong>Number and Algebra</strong></td>
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<tr>
<td><strong>Whole Numbers</strong></td>
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<tr>
<td>MA2-4NA applies place value to order, read and represent numbers of up to five digits</td>
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<tr>
<td>• Counts forwards and backwards by tens from any starting point</td>
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<td>• State the place value of digits in numbers up to five digits</td>
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<tr>
<td>• Read, write and order numbers up to five digits</td>
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<tr>
<td><strong>Multiplication and Division</strong></td>
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<tr>
<td>MA2-6NA uses mental and informal written strategies for multiplication and division</td>
</tr>
<tr>
<td>• Recall multiplication facts for twos, threes, fives and tens</td>
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<tr>
<td>• Link multiplication and division using arrays</td>
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<tr>
<td>• Model and apply commutative property for multiplication</td>
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<tr>
<td>• Use and record mental strategies to multiply one-digit numbers by multiples of 10</td>
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<tr>
<td>• Recall multiplication facts up to 10 x 10 and related division facts</td>
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</tbody>
</table>
## Fractions and Decimals

**MA2-7NA** represents, models and compares commonly used fractions and decimals
- Model and represent fractions of denominators 2, 3, 4, 5 and 8
- Count by quarters, halves and thirds
- Represent fractions on a number line that extends beyond 1
- Model and find equivalence between fractions
- Apply the place value system to model tenths and hundredths as decimals
- Make connections between fraction and decimal notation
- Model, compare and represent decimals with up to two decimal places

## Patterns and Algebra

**MA2-8NA** generalises properties of odd and even numbers, generates number patterns and completes simple number sentences by calculating missing values
- Recognise, continue, create, describe, and record increasing and decreasing number patterns
- Identify odd and even numbers of up to four digits
- Recognise, continue and describe number patterns resulting from performing multiplication
- Find missing values in number sentences involving one operation from performing multiplication or division

## Length

**MA2-9MG** estimates, measures, compares and records lengths, distances and perimeters in metres, centimetres and millimetres, and measures, compares and records temperatures
- Uses metres, centimetres, and millimetres to measure, compare, order and estimate lengths
- Select and use appropriate scaled instruments and units to measure and compare lengths
- Convert between millimetres, centimetres and metres
- Record lengths using decimal notation to two decimal places

**MA2-13MG** reads and records time in one-minute intervals and converts between hours, minutes and seconds
- Tell time to the minute, using the language of ‘past’ and ‘to’
- Convert between seconds, minutes, hours and days
- Use and interpret am and pm notation
- Read and interpret simple timetables, timelines and calendars

## Time

**MA3-9MG** selects and uses the appropriate unit and device to measure lengths, distances and perimeters, and converts between units of length
- Use the kilometre to measure lengths and distances
- Select and use appropriate instruments and units to measure lengths
- Record distances using the abbreviation km
- Record lengths using decimal notation to three decimal places
- Convert between kilometres, metres, centimetres and millimetres
- Solve problems involving length and perimeter

## Data

**MA2-18SP** selects appropriate methods to collect data, and constructs, compares, interprets and evaluates data displays
- Plan methods for data collection
- Collect data, organise into categories and create displays using lists, tables, picture graphs and simple column graphs (one-to-one correspondence)
- Interpret and compare data displays
- Select and trial methods for data collection, including survey questions and recording sheets
- Construct data displays including tables, column graphs and picture graphs of many-to-one correspondence
- Evaluate the effectiveness of different displays

## Fractions, Decimals and Percentages

**MA3-7NA** compares, orders and calculates with fractions, decimals and simple percentages
- Compare and order unit fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12 and 100
- Apply the place value system to represent thousandths as decimals
- Compare, order and represent decimals with up to three decimal places
- Represent, compare and order unit fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12 and 100
- Determine, generate and record equivalent fractions
- Write fractions in their simplest form
- Find a simple fraction of a quantity
- Solve word problems involving fractions and decimals, including money
- Recognise percentages in everyday situations
- Make connections between percentages, fractions and decimals
- Use mental, written and calculator strategies to calculate 10%, 25% and 50% of quantities, including as discounts

## Patterns and Algebra

**MA3-8NA** analyses and creates geometric and number patterns, constructs and completes number sentences, and locates points on the Cartesian plane
- Recognise, continue, create and describe increasing and decreasing number patterns with fractions, decimals and whole numbers
- Create, record and describe geometric and number patterns in words
- Determine the rule for geometric and number patterns in words and use the rule to calculate missing values

## Length

**MA3-9MG** selects and uses the appropriate unit and device to measure lengths, distances and perimeters, and converts between units of length
- Use the kilometre to measure lengths and distances
- Select and use appropriate instruments and units to measure lengths
- Record distances using the abbreviation km
- Record lengths using decimal notation to three decimal places
- Convert between kilometres, metres, centimetres and millimetres
- Solve problems involving length and perimeter

## Time

**MA3-13MG** uses 24-hour time and am and pm notation in real-life situations, and constructs timelines
- Determine and compare duration of events
- Interpret and use timetables

## Data

**MA3-18SP** uses appropriate methods to collect data, constructs and interprets data displays, and analyses sets of data
- Poses and refines questions and collects categorical and numerical data
- Creates data displays, including tables, column graphs, line graphs and dot plots appropriate for data type
- Describe and interpret data presented in tables, column graphs, line graphs and dot plots
- Compare a range of data displays to determine the most appropriate display for the data type

## Additional Content
- Ancient Numeration Systems
- Binary Notation

**Note:** Only key ideas related to the mathematical content in “Math Curse” are listed in this table – refer to *Mathematics K–10 syllabus* for the complete sequence of key ideas in each strand/substrand.
<table>
<thead>
<tr>
<th>Strand/Substrand</th>
<th>Page Reference</th>
<th>Language Stage 2</th>
<th>Language Stage 3</th>
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</thead>
<tbody>
<tr>
<td>Whole Numbers</td>
<td>Where page 1 begins “On Monday in…”</td>
<td>number before, number after, more than, greater than, less than, largest number,</td>
<td>Ascending order, descending order, zero, ones, tens, hundreds, thousands, tens of thousands, millions, digit, place value, expanded notation, round to, whole number, factor, integer, prime number, composite number,</td>
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<tr>
<td>Whole number concepts are embedded in the content of most pages. They can be used as a basis for warm up activities at the beginning of a lesson or as the central idea.</td>
<td></td>
<td>ascending order, descending order, digit, zero, ones, groups of ten, tens, groups of one hundred, hundreds, groups of one thousand, thousands, tens of thousands place value.</td>
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<tr>
<td>Multiplication &amp; Division</td>
<td>p7 “I try to…”</td>
<td>group, row, column, horizontal, vertical, array, multiply, divided by, multiplication,</td>
<td>Multiply, multiplied by, product, multiplication, multiplication facts, area, thousands, hundreds, tens, ones, double, multiple, factor, divide, divided by, quotient, division, halve, remainder, fraction, decimal, equals, strategy, digit, estimate, operations</td>
</tr>
<tr>
<td>Particular focus on arrays and division with remainders</td>
<td>p10 “The whole morning…”</td>
<td>multiplication facts, double, shared between, divide, divided by, division, product, tens, ones, multiple, factor, strategy, digit.</td>
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</tr>
<tr>
<td>Fractions &amp; Decimals</td>
<td>p11 “Unfortunately for me…”</td>
<td>whole, part, equal parts, half, quarter, eighth, third, fifth, one-third, one-fifth, fraction, denominator, numerator, mixed numeral, whole number, fractional part, number line. Whole, part, equal parts, half, quarter, eighth, third, sixth, fifth, tenth, hundredth, one-sixth, one-tenth, one-hundredth, is equal to, equivalent fractions, decimal, decimal point, digit, place value, round to, decimal places, dollars, cents.</td>
<td>Whole, equal parts, half, quarter, eighth, third, sixth, twelfth, fifth, tenth, hundredth, thousandth, one-thousandth, fraction, numerator, denominator, whole number, number line, decimal, decimal point, digit, place value, decimal places, round to, equivalent, ascending order, descending order, simplest form, dollars, cents, best buy, percent, percentage, discount, sale price.</td>
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<td>In particular, collections of objects and area model</td>
<td>p13 “English is a…”</td>
<td>whole, part, equal parts, half, quarter, eighth, third, sixth, fifth, tenth, hundredth, one-sixth, one-tenth, one-hundredth, is equal to, equivalent fractions, decimal, decimal point, digit, place value, round to, decimal places, dollars, cents.</td>
<td>Whole, equal parts, half, quarter, eighth, third, sixth, twelfth, fifth, tenth, hundredth, thousandth, one-thousandth, fraction, numerator, denominator, whole number, number line, decimal, decimal point, digit, place value, decimal places, round to, equivalent, ascending order, descending order, simplest form, dollars, cents, best buy, percent, percentage, discount, sale price.</td>
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<tr>
<td>Patterns &amp; Algebra</td>
<td>p14 “English is a…”</td>
<td>pattern, goes up by, goes down by, even, odd, rows, digit, multiplication facts, term, missing number, is the same as, equals.</td>
<td>Pattern, increase, decrease, missing number, number sentence, number line, value, table of values, rule, position in pattern, value of term</td>
</tr>
<tr>
<td>Number relationships</td>
<td>p15 “Math is just…”</td>
<td>whole, part, equal parts, half, quarter, eighth, third, sixth, fifth, tenth, hundredth, one-sixth, one-tenth, one-hundredth, is equal to, equivalent fractions, decimal, decimal point, digit, place value, round to, decimal places, dollars, cents.</td>
<td>whole, part, equal parts, half, quarter, eighth, third, sixth, twelfth, fifth, tenth, hundredth, thousandth, one-thousandth, fraction, numerator, denominator, whole number, number line, decimal, decimal point, digit, place value, decimal places, round to, equivalent, ascending order, descending order, simplest form, dollars, cents, best buy, percent, percentage, discount, sale price.</td>
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<tr>
<td>Fibonacci &amp; other number sequences</td>
<td>p16 “I pull out…”</td>
<td>whole, part, equal parts, half, quarter, eighth, third, sixth, twelfth, fifth, tenth, hundredth, thousandth, one-thousandth, fraction, numerator, denominator, whole number, number line, decimal, decimal point, digit, place value, decimal places, round to, equivalent, ascending order, descending order, simplest form, dollars, cents, best buy, percent, percentage, discount, sale price.</td>
<td>whole, part, equal parts, half, quarter, eighth, third, sixth, twelfth, fifth, tenth, hundredth, thousandth, one-thousandth, fraction, numerator, denominator, whole number, number line, decimal, decimal point, digit, place value, decimal places, round to, equivalent, ascending order, descending order, simplest form, dollars, cents, best buy, percent, percentage, discount, sale price.</td>
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<tr>
<td>Length</td>
<td>p12 “In the afternoon…”</td>
<td>length, distance, metre, centimetre, millimetre, ruler, measure, estimate.</td>
<td>length, distance, kilometre, metre, centimetre, millimetre, measure, measuring device, ruler, estimate</td>
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<tr>
<td>Estimation</td>
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<tr>
<td>Centimetres, metres, kilometres</td>
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<tr>
<td>Time</td>
<td>p3, 4 “I wake up….”</td>
<td>time, clock, analog, digital, hour hand, minute hand, second hand, revolution, numeral, hour, minute, second, o’clock, (minutes past), (minutes to), timetable, timeline, midday, noon, midnight, am (notation), pm (notation).</td>
<td>12-hour time, hour, minute, second, am (notation), pm (notation).</td>
</tr>
<tr>
<td>Timetables and duration of events</td>
<td>p27, 28 “I wake up…”</td>
<td>time, clock, analog, digital, hour hand, minute hand, second hand, revolution, numeral, hour, minute, second, o’clock, (minutes past), (minutes to), timetable, timeline, midday, noon, midnight, am (notation), pm (notation).</td>
<td>12-hour time, hour, minute, second, am (notation), pm (notation).</td>
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<tr>
<td>Data</td>
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<td>Incidental information</td>
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<td>Column graphs</td>
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<td>p7, 8 “Mrs Fibonacci has…”</td>
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<td>Data, survey, category, display, symbol, list, table, column graph, picture graph, vertical columns, horizontal bars, equal spacing, title, scale, vertical axis, horizontal axis, axis, axes</td>
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<tr>
<td>Additional Content</td>
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<tr>
<td>Ancient Numeration Systems</td>
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<tr>
<td>Binary Notation</td>
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<tr>
<td>p14, “In art we…”</td>
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<td>p16, “And on the…”</td>
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<tr>
<td>Table 2: <strong>Math curse – Content and Language</strong></td>
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</tbody>
</table>

**Notes**

- Table 2: Math curse – Content and Language

- Whole Numbers
  - Whole number concepts are embedded in the content of most pages. They can be used as a basis for warm up activities at the beginning of a lesson or as the central idea.

- Multiplication & Division
  - Particular focus on arrays and division with remainders
  - p7 “I try to...”
  - p10 “The whole morning...”
  - p17, 18 “We are just...”
  - p21, 22 “I am now...”

- Fractions & Decimals
  - In particular, collections of objects and area model
  - p11, “Unfortunately for me...”
  - p13 “English is a...”
  - p19 “I stagger out...”
  - p23 – 26 “I dream I’m...”

- Patterns & Algebra
  - Number relationships
  - p7 “I try to...”
  - p9 “The whole morning...”
  - p13 “English is a...”
  - p15 “Math is just...”
  - p19, 20 “I pull out...”

- Length
  - Estimation
  - Centimetres, metres, kilometres
  - p12 “In the afternoon...”

- Time
  - Timetables and duration of events
  - p3, 4 “I wake up...”
  - p27, 28 “I wake up...”

- Data
  - Incidental information
  - p7, 8 “Mrs Fibonacci has...”

- Additional Content
  - Ancient Numeration Systems
  - Binary Notation
  - p14, “In art we...”
  - p16, “And on the...”
## Lesson Plan: Math curse

**Stage:** 2  
**Strand/s:** Working Mathematically  
**Number & Algebra Substrand:** Multiplication & Division

### Purpose
1. To provide a context for solving word problems by engaging students in the narrative of the picture book “Math Curse” by Jon Scieszka + Lane Smith.  
2. To represent word problems visually by forming arrays using concrete materials to demonstrate multiplication and division patterns and relationships.

### Quality Teaching Framework

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<thead>
<tr>
<th>Quality Teaching Framework</th>
<th>Intellectual Quality</th>
<th>Quality Learning Environment</th>
<th>Significance</th>
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<tr>
<td></td>
<td>Deep Understanding</td>
<td>Engagement</td>
<td>Narrative</td>
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<td></td>
<td>Substantive Communication</td>
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</tbody>
</table>

### Outcomes

| Communication | MA2-1WM uses appropriate terminology to describe, and symbols to represent, mathematical ideas  
| Problem Solving | MA2-2WM selects and uses appropriate mental or written strategies, or technology, to solve problems  
| Reasoning | MA2-3WM checks the accuracy of a statement and explains the reasoning used |

### Key Ideas
- **Multiplication & Division**  
  - Link multiplication and division using arrays  
  - Model and apply to commutative property for multiplication  
  - Determine multiples and factors of numbers  
  - Use the equals sign to record equivalent number sentences

### Introduction
1. Introduce “Maths Curse” by Jon Scieszka + Lane Smith. Provide an orientation to the text as you would in a literacy lesson. Be sure students understand the meaning of the word ‘curse’. Ask students to make predictions about the story.
2. Read “Math Curse” to introduce the concept of word problems within a picture book. Provide opportunities for students to discuss and suggest possible solutions for some of the numeracy problems presented in the book up to page 9. Focus on the language linked to the key ideas for this lesson and ‘build’ a language wall as the lesson progresses.

### Concept Development

#### 1. Read up to the end of page 9 which begins “The whole morning is one problem after another.”

1. **“Show Me”** (This is the cue for whiteboards to be held for the teacher to see. It provides a quick visual as to which students have grasped concepts being presented). Invite students to share their representations and descriptions. If a student has named this arrangement correctly, add the word ‘array’ to the vocabulary wall.
2. Repeat this process for Mrs Fibonacci’s classroom arrangement for 6 rows. Again, invite students to share their representations and descriptions. Through questioning, lead students to an understanding of the commutative properties of these two arrangements and model the equivalent number sentence $4 \times 6 = 6 \times 4$. Explain that the first digit indicates the ‘number of groups’ and the second ‘the number in each group’. (Introduce the term array at this point if it has not yet been suggested)
3. Ask: “Can we describe and label these arrays another way?” Through questioning, lead students to label and describe arrays as models of division. Discuss this relationship – partner/whole class. Through effective feedback, highlight explanations that reflect the link between multiplication and division.

#### 2. Present the word problem, “The whole morning is one problem after another. There are 24 kids in my class. I just know someone is going to bring in cupcakes to share. We sit in 4 rows with 6 desks in each row. What if Mrs Fibonacci rearranges the desks to make 6 rows? 8 rows? 3 rows? 2 rows?”

1. Ask: “How could we represent this problem using concrete materials, pictures or diagrams?”
2. Provide pairs of students with 24 counters, a mini-whiteboard and marker (only one set of materials). Ask each pair to arrange the counters to represent the students sitting in four rows. Ask students to describe this arrangement to their partner. Ask students to represent this arrangement on their whiteboard and label it with numbers, symbols and words.
3. “Show Me” (This is the cue for whiteboards to be held for the teacher to see. It provides a quick visual as to which students have grasped concepts being presented). Invite students to share their representations and descriptions. If a student has named this arrangement correctly, add the word ‘array’ to the vocabulary wall.
4. Repeat this process for Mrs Fibonacci’s classroom arrangement for 6 rows. Again, invite students to share their representations and descriptions. Through questioning, lead students to an understanding of the commutative properties of these two arrangements and model the equivalent number sentence $4 \times 6 = 6 \times 4$. Explain that the first digit indicates the ‘number of groups’ and the second ‘the number in each group’. (Introduce the term array at this point if it has not yet been suggested)
5. Ask: “Can we describe and label these arrays another way?” Through questioning, lead students to label and describe arrays as models of division. Discuss this relationship – partner/whole class. Through effective feedback, highlight explanations that reflect the link between multiplication and division.

### Strengthening the concept

1. Working with their numeracy partner, ask students to investigate the other desk formations in Mrs Fibonacci’s class.  
2. Ask students to represent these arrangements using counters, then draw and label with numbers, symbols and words on their whiteboards. Move around the class and make notes on student observation grid (attached) whilst students are investigating “look and listen for understanding of key ideas”.

### Reflection 2

1. “Think/Pair/Share”  
   - Ask questions that lead discussion to deepen understanding of the link between multiplication and division. Encourage students to model the vocabulary used throughout the lesson.
   - Ask: “How would you describe an array?”  
   - Each pair of students writes their definition on a ‘post-it’ note/piece of card, includes their names and ‘posts’ it on the board.  
   - Share some of the definitions with the class to conclude the lesson.
   - Finish reading the story, save it for another part of the day or to explore a new concept in the next maths lesson.

### Notes

1. If working with students for whom this is an introduction to arrays, the lesson could be rewritten to focus only on the structure of arrays linked to multiplication. Adjust purpose and key ideas accordingly. Alternately, if the purpose is to ‘strengthen concepts’, tasks could be completed on an individual basis in student learning logs.
2. In the next lesson, students could independently investigate a similar problem for the numbers 36 or 48 and record all their work in their student learning log. This work sample would then provide an assessment opportunity to inform the next step in the teaching/learning cycle.
3. Materials: Mini whiteboards and markers, ‘post-it’ notes, large whiteboard or butcher’s paper, student observation grid (attached)

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Programming format adapted from The Maths Unit, DEC 2012

Targeted for assessment
<table>
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<tr>
<th>Name:</th>
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Early Stage 3 Work Samples: Independent Tasks to determine conceptual understanding of inverse relationships

Multiplication and Division

24 x 1 = 24 or 24 ÷ 2 = 12

12 x 2 = 24 or 24 ÷ 12 = 2

6 x 4 = 24 or 24 ÷ 6 = 4

3 x 8 = 24 or 24 ÷ 3 = 8

8 x 3 = 24

24 ÷ 8 = 3

Reflection

An array is a formal pattern made up of dots. They represent either a square or rectangular number. They can show multiplication (the number of dots in a column x the number of dots in a row = the total) or division (the total ÷ the number of dots in a column = the number of dots in a row).

You clearly have a conceptual understanding of these concepts, Tisha.

Congratulations!
## Lesson Plan: Math curse

**Stage:** 2/3  
**Strand/s:** Working Mathematically  
**Number & Algebra**  
**Substrand:** Multiplication & Division

### Purpose
1. To provide a context for solving word problems by engaging students in the narrative of the picture book "Math Curse" by Jon Scieszka + Lane Smith  
2. To present word problems at a simple level in order to focus on visual representation and a step-by-step approach to problem solving

### Quality Teaching Framework

<table>
<thead>
<tr>
<th>Intellectual Quality</th>
<th>Quality Learning Environment</th>
<th>Significance</th>
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<tbody>
<tr>
<td>Problematic Knowledge</td>
<td>Substantive Communication</td>
<td>Engagement</td>
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### Outcomes

- **Communicating**  
  - 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

- **Problem Solving**  
  - MA3-4NA orders, reads and represents integers of any size and describes properties  
  - MA3-5NA selects and applies appropriate strategies for multiplication and division, and applies the order of operations to calculations involving more than one operation

### Key Ideas

- **Whole Numbers**  
- **Multiplication & Division**  
- **Reasoning**  
- **Communicating**

### Introduction

1. Introduce Math curse by Jon Scieszka + Lane Smith. Provide an orientation to the text as you would in a literacy lesson.
2. Read Math curse to introduce the concept of word problems within a picture book. Provide opportunities for students to discuss and suggest possible solutions for some of the numeracy problems presented in the book up to page 9. Focus on the language linked to the key ideas for this lesson and 'build' a language wall as the lesson progresses.

### Concept Development

1. Read up to the end of page 9 which begins, "The whole morning is one problem after another".
2. Present the word problem, "Casey pulls Eric’s ear. How many ears are in our class?"
3. Ask: "How could we represent this problem using pictures or diagrams and solve it without using an algorithm?"
4. Provide each pair of students with a mini-whiteboard and marker. Ask each pair to draw a picture or diagram to represent the problem. Encourage students to write a number sentence that identifies the 'missing element' and then solve the problem using mental computation. Ask students to record all steps on their whiteboards. Provide individual hundreds charts and/or Base 10 materials for students needing learning support.
5. Students share pictures/diagrams, strategies and solutions with the pair opposite.
6. Invite pairs of students to share their pictures/diagrams, number sentences and strategies with the whole class. Through effective feedback, highlight knowledge and skills that reflect an understanding of place value in explaining the strategies used for mental computation.
7. Reflection 1: Think/Pair/Share  
   - Ask: "What are the most important things to know when solving a word problem?" (Encourage students to model the vocabulary used throughout the lesson.) In pairs, students record responses on post-it notes. "Post" on a board/sheet of butcher’s paper and reflect on responses as a whole class before presenting the next problem.

### Strengthening the concept

1. Present the word problem, "Jack scratches his paper with one finger. How many fingers are in our class?"
2. Repeat the steps 3 – 6 above. Encourage students to use the most efficient strategy they can. (Move around the class and make notes on student observation chart whilst students are investigating – "look and listen")

### Reflection 2

- **Using the writing style of Jon Scieszka, work with your partner to write a multiplication word problem about the children in our class.**

### Notes

1. Adaptations of this lesson working with Newman’s Prompts to scaffold learning could include:
   - keep to the structure of the lesson as planned and introduce the 5 prompts at the beginning of the next lesson  
   - guide the learning using Newman’s Prompts in this lesson  
   - ask students to identify each step of Newman’s Prompts as they solve problems in this lesson if they are already familiar with the process  
2. Materials: Mini whiteboards and markers, 'post-it' notes, large whiteboard or butcher’s paper, hundreds charts, Base 10 materials,
3. Additional resources (attached): ‘Newman’s Prompts Problem Solving Scaffold’ adapted from The Counting On Project, Maths Unit, NSW DEC Student Observation Grid

*Programming format adapted from The Maths Unit, DEC 2012  
*Targeted for assessment*
## A Problem Solving Approach using Newman’s Prompts

<table>
<thead>
<tr>
<th>Read the problem. What is it about? (In my own words)</th>
<th>What is the question asking me to do? (In my own words)</th>
<th>How am I going to find the answer?</th>
<th>Do the calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Important facts</strong></td>
<td><strong>A drawing or diagram may help</strong></td>
<td><strong>Write the answer to the question</strong></td>
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Adapted from The Maths Unit, DEC 2012
### Stage 2 Work Sample based on ‘Time’ word problems in *Math curse*: Earlier version of Newman’s Scaffold

<table>
<thead>
<tr>
<th>Read the Problem. What is it about?</th>
<th>What is the question asking you to do?</th>
<th>Important facts</th>
<th>How are you going to find the answer?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Getting ready in the morning. ✓</td>
<td>To say what time he will be ready at ✓</td>
<td>Wakes up at 7:15 am, 10 minutes to get dressed, 15 minutes to have breakfast, 1 minute to clean teeth, Bus leaves at 8:00.</td>
<td>Add all the minutes together and add it to 7:15 ✓</td>
</tr>
</tbody>
</table>

A drawing or diagram may help.

![Diagram](image)

<table>
<thead>
<tr>
<th>Do the calculation/s.</th>
<th>Write the answer to the question.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 + 15 + 1 = 26 ✓</td>
<td>He will be ready at 7:41 ✓</td>
</tr>
<tr>
<td>26 + 7:15 = 41</td>
<td></td>
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</tbody>
</table>

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I wake up at 7:00. I get to dance at 8:25. I stay at dance for 1 hour. Then I go to swimming for two hours. When did I finish swimming? ✓ I like two-part problems.

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Excellent use of model

![Star](image)

22/6/11

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Problem solving