

## Copymaster: The “Number Devil” meets “Figure It Out”

Chapter	Mathematical Content	Investigation topic and Figure It Out Link	Other Activity Ideas
1 <sup>st</sup> Night	<ol style="list-style-type: none"> <li>1. The importance of 1.</li> <li>2. Fractions using 1</li> <li>3. Creating all the whole numbers using only 1 (11x11=121)</li> <li>4. Palindromes and other symmetrical patterns created (111x111=12321, 1111x1111=1234321).</li> </ol>	<p>Investigating palindromic numbers</p> <p>Level 4 Number Sense Book 2 <i>Reading by Numbers</i> p. 8</p>	<p>Explore finding half of a half (<math>\frac{1}{2} \times \frac{1}{2}</math>) and see how far you can get with various sized objects. Take a sticky note and cut it in half and then the half in half and so on. What fraction of the original can you get to? Repeat with an A4 piece of paper.</p>
2 <sup>nd</sup> Night	<ol style="list-style-type: none"> <li>1. Roman Numerals</li> <li>2. The importance of zero.</li> <li>3. Link to negative numbers.</li> <li>4. Squared numbers &amp; exponents (<i>Hopping</i>)</li> <li>5. Expanded notation</li> </ol>	<p>Investigating Roman Numerals</p> <p>Level 3 Theme: Time Travel <i>Into the Lion’s Den</i> p. 2-3</p>	<p>Imagine the world without zero. Write a scenario of what impact the loss of zero could have on our lives.</p> <p>Read the book <i>Nesta and the Missing Zero</i> to a younger class</p>
3 <sup>rd</sup> Night	<ol style="list-style-type: none"> <li>1. Division with zero?</li> <li>2. Prime numbers (<i>Prima donnas</i>).</li> <li>3. Patterns in primes – any even number larger than 2 is the sum of two prime numbers; any odd number larger than 5 is the sum of 3 prime numbers.</li> </ol>	<p>Investigating prime numbers</p> <p>Level 4 Number Book 4 <i>Prime Sites</i> p.6</p>	<p>Play Primates, a game in Basic Facts L3-4 p. 22</p>

4 <sup>th</sup> Night	<ol style="list-style-type: none"> <li>1. Square Roots (<i>Rutabagas</i>)</li> <li>2. Recurring decimals</li> </ol>	<p>Investigating recurring decimals</p> <p>Level 3-4 Number Sense and Algebraic Thinking Book Two <i>Non-stop Ninths</i> p. 12-13</p>	<p>Find out about irrational numbers. See how many digits of <math>\pi</math> you can memorise.</p> <p><a href="http://www.joyofpi.com/pi.html">http://www.joyofpi.com/pi.html</a></p>
5 <sup>th</sup> Night	<ol style="list-style-type: none"> <li>1. Triangular Numbers (<i>Coconuts</i>)</li> <li>1. Any number can be made by adding triangular numbers together.</li> <li>2. Adding consecutive triangular numbers always results in a squared number.</li> <li>3. Add consecutive numbers e.g. 1-12 the answer is the 12<sup>th</sup> triangular number.</li> </ol>	<p>Investigating triangular numbers</p> <p>Level 3-4 Algebra <i>Animal Antics</i> p.8</p>	<p>Challenge: Only two numbers between 1 and 100 hold the distinction of being both square numbers and triangle numbers. The first is the number 1. What is the other number that is both a triangle number and a square number? Create a model to demonstrate your answer.</p>
6 <sup>th</sup> Night	<p>Fibonacci numbers and sequences (<i>Bonacci</i>). 1,2,3,5,8,13,21...</p>	<p>Investigating sequential patterns</p> <p>Level 4 Algebra Book 2 <i>Number Crunching</i> p. 4-5</p>	<p>Explore the relationships between Fibonacci's numbers and nature or architecture or art</p> <p>Research the famous mathematician and conduct an "interview" where you take on the role of Fibonacci and a friend interviews you about your discoveries</p> <p>Read <i>The Rabbit Problem</i></p> <p><a href="http://nzmaths.co.nz/picture-books-level-4-algebra-content">http://nzmaths.co.nz/picture-books-level-4-algebra-content</a></p>

7 <sup>th</sup> Night	Pascal's Triangle Relates to triangular numbers $\begin{array}{c} 1 \\ 1\ 1 \\ 1\ 2\ 1 \\ 1\ 3\ 3\ 1 \end{array}$	Investigating patterns  Level 4 Number Book Six, <i>Pascal's Patterns</i> , p. 9	Create a tetrahedral number sequence by building a tetrahedron out of marbles and recording the numbers in each layer. Make a table with the headings Height (number of layers), Triangular Number (marbles in layer), and Tetrahedral Number (total marbles). What are your observations?
8 <sup>th</sup> Night	<ol style="list-style-type: none"> <li>1. Permutations and combinations</li> <li>2. Factorials</li> <li>3. Circle diagrams.</li> <li>4. Use of number pyramid for solving problems such as teams of 3, 4, 5 etc</li> </ol>	Investigating factorials  Level 4 Number Book 5 <i>Factorials</i> p. 4	Read <i>Anno's Mysterious Multiplying Jar</i> and the response activity available here: <a href="http://nzmaths.co.nz/resource/anno-s-mysterious-multiplying-jar?parent_node=">http://nzmaths.co.nz/resource/anno-s-mysterious-multiplying-jar?parent_node=</a>
9 <sup>th</sup> Night	<ol style="list-style-type: none"> <li>1. Number sequences             <ul style="list-style-type: none"> <li>• Cardinal</li> <li>• Odd</li> <li>• Prime</li> <li>• Fibonnaci</li> <li>• Triangular</li> <li>• Exponents</li> <li>• Factorial</li> </ul> </li> <li>2. Sum of fractions on a number line (<math>\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} \dots</math>never equalling 1)</li> </ol>	Investigating exponents  Level 4+ Number Book 6 <i>Alien Bacteria</i> p. 20	What do you know about infinity? Create a model that demonstrates the concept of infinity without words or numbers.

10 <sup>th</sup> Night	<ol style="list-style-type: none"> <li>Hexagons</li> <li>Fibonacci numbers ÷ them by their neighbours. Recurring decimals</li> <li>1.618 – the divine proportion</li> <li>Platonic Solids</li> </ol>	<p>Investigating platonic solids</p> <p>Level 4+ Geometry Book Two <i>Tricky Truncations</i> p. 8</p>	<p>Design and build a model housing project using matchsticks, plasticine and platonic solids</p>
11 <sup>th</sup> Night	<ol style="list-style-type: none"> <li>The protagonist wants to do more than play with numbers, he wants to know what's behind them i.e. the rule of the game. He has become a mathematician.</li> <li>Proof</li> </ol>	<p>Investigating proof</p> <p>Level 3-4 Geometry <i>Inside Out</i> p. 5</p>	<p>Proof Sequence</p> <ol style="list-style-type: none"> <li>Create a model</li> <li>Convince a friend</li> <li>Convince a skeptic</li> <li>Write a rule</li> </ol>
12 <sup>th</sup> Night	<ol style="list-style-type: none"> <li>Famous mathematicians, history of mathematics</li> <li>Pi</li> </ol>	<p>Investigating pi</p> <p>Level 4+ Measurement Book Two <i>Colossal Kiwifruit</i> p.14-15</p>	<p>Come up with your own 'mind numbing' problem (and logical solution) to share.</p>
Index	<p>Covers all of the imaginary words (<i>in italics</i>) as well as the correct mathematical terms.</p>	<p>For teachers:  <a href="http://www.nzmaths.co.nz/glossary">http://www.nzmaths.co.nz/glossary</a>  For students:  <a href="http://www.amathsdictionaryforkids.com/">http://www.amathsdictionaryforkids.com/</a></p>	<p>Create a class or individual maths dictionary, including real and imaginary words to describe key concepts</p>