

## BRAINtastic Maths – NSW Curriculum Correlation

The table for each BRAINtastic Maths product indicates which outcomes in the NSW Mathematics K-6 syllabus are met by the activities in that product.



Approximate age range – 4 to 6 years  
Approximate syllabus level – NSW Early Stage 1



Approximate age range – 6 to 8 years  
Approximate syllabus level – NSW Stage 1



Approximate age range – 8 to 10 years  
Approximate syllabus level – NSW Stage 2



Approximate age range – 10 to 12 years  
Approximate syllabus level – NSW Stage 3



Approximate age range – 12 to 15 years  
Approximate syllabus level – NSW Stage 4+

# BRAINtastic Maths P – K ⇔ NSW Early Stage 1



## Whole Numbers

### – BRAINtastic Category 1 (Numeration)

<p><b>NES1.1</b></p> <p>Counts to 30, and orders, reads and represents numbers in the range 0 to 20</p>	<p><b>Key Ideas</b></p> <p>Count forwards to 30, from a given number Count backwards from a given number, in the range 0 to 20 Compare, order, read and represent numbers to at least 20 Read and use ordinal names to at least ‘tenth’ Use the language of money</p>
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"><li>• counting forwards to 30, from a given number</li><li>• counting backwards from a given number, in the range 0 to 20</li><li>• identifying the number before and after a given number</li><li>• counting with one-to-one correspondence</li><li>• reading and writing numbers to at least 20, including zero</li><li>• comparing and ordering numbers or groups of objects</li><li>• recognising different visual arrangements for the same number</li><li>• using 5 as a reference in forming numbers from 6 to 10</li><li>• using 10 as a reference in forming numbers from 11 to 20</li><li>• reading and using the ordinal names to at least ‘tenth’</li><li>• using the language of money in everyday contexts</li></ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"><li>• apply counting strategies to solve simple everyday problems</li><li>• exchange money for goods in a play situation</li></ul>

## Addition and Subtraction

### – BRAINtastic Category 2 (Addition & Subtraction)

#### NES1.2

Combines, separates and compares collections of objects, using everyday language

#### Key Ideas

Combine groups to model addition  
Take part of a group away to model subtraction  
Compare groups to determine 'how many more'

#### Knowledge and Skills

##### Students learn about

- combining two or more groups of objects to model addition
- separating and taking part of a group away to model subtraction
- comparing two groups of objects to determine 'how many more'
- creating combinations for numbers to at least 10 eg 'How many more make ten?'
- describing the action of combining, separating or comparing using everyday language eg *makes, join, and, get, take away, how many more, altogether*
- counting forwards by ones to add and backwards by ones to subtract

#### Working Mathematically

##### Students learn to

- use concrete materials to model and solve simple addition and subtraction problems
- solve simple everyday problems using problem-solving strategies

## Multiplication and Division

### – BRAINtastic Category 2 (Multiplication & Division)

<b>NES1.3</b>  Groups, shares and counts collections of objects using everyday language	<b>Key Ideas</b>  Model equal groups or rows Group and share collections of objects equally
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <b>Students learn about</b> <ul style="list-style-type: none"><li>• using the term 'group' to describe a collection of objects</li><li>• using the term 'sharing' to describe the distribution of a collection of objects</li><li>• grouping and sharing using concrete materials</li><li>• modelling equal groups or equal rows</li><li>• recognising unequal groups or unequal rows</li></ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <b>Students learn to</b> <ul style="list-style-type: none"><li>• describe grouping and sharing using everyday language</li></ul>

## Fractions and Decimals

### – BRAINtastic Category 4 (Fractions & Decimals)

<b>NES1.4</b> Describes halves, encountered in everyday contexts, as two equal parts of an object	<b>Key Ideas</b> Divide an object into two equal parts Recognise and describe halves
<b>Knowledge and Skills</b> <b>Students learn about</b> <ul style="list-style-type: none"><li>• sharing an object by dividing it into two equal parts eg cutting a piece of fruit into halves</li><li>• recognising that halves are two equal parts</li><li>• recognising when two parts are not halves of the one whole</li><li>• using the term ‘half’ in everyday situations</li></ul>	<b>Working Mathematically</b> <b>Students learn to</b> <ul style="list-style-type: none"><li>• use fraction language in everyday situations</li></ul>

## Patterns and Algebra

### – BRAINtastic Category 6 (Patterns & Algebra)

#### PAES1.1

Recognises, describes, creates and continues repeating patterns and number patterns that increase or decrease

#### Key Ideas

Recognise, describe, create and continue repeating patterns  
Continue simple number patterns that increase or decrease  
Use the term 'is the same as' to describe equality of groups

#### Knowledge and Skills

##### Students learn about

##### *Repeating Patterns and Number Patterns*

- recognising, copying, continuing and creating repeating patterns using shapes, objects or pictures
- describing a repeating pattern in terms of a 'number' pattern
- recognising, copying and continuing simple number patterns that increase or decrease

##### *Number Relationships*

- using the term 'is the same as' to express equality of groups

#### Working Mathematically

##### Students learn to

- answer questions about how repeating patterns are made and how they can be copied or continued
- create repeating patterns with the same 'number' pattern eg **A, B, B, A, B, B,...** is a 'three' pattern and so is ♣, ♣, ♦, ♣, ♣, ♦
- recognise when an error occurs in a pattern
- determine whether two groups have the same number of objects and describe the equality

## Data

### – BRAINtastic Category 7 (Data)

#### DES1.1

Represents and interprets data displays made from objects and pictures

#### Key Ideas

Organise pictures of objects into a data display  
Interpret data displays made from objects and pictures

#### Knowledge and Skills

##### Students learn about

- sorting objects into groups according to characteristics
- comparing groups by counting
- using a picture of an object to represent the object in a data display
- interpreting information presented in a data display to answer questions

#### Working Mathematically

##### Students learn to

- interpret data displays

## Length

### – BRAINtastic Category 8 (Measurement)

#### MES1.1

Describes length and distance using everyday language and compares lengths using direct comparison

#### Key Ideas

Identify and describe the attribute of length  
Compare lengths directly by placing objects side-by-side and aligning the ends

#### Knowledge and Skills

##### Students learn about

- identifying the attribute of length as the measure of an object from end to end
- using everyday language to describe length eg *long, short, high, tall, low, the same*
- using comparative language to describe length eg *longer, higher, taller than, shorter than, lower than, the same as*
- describing distance using terms such as *near, far, nearer, further, close*
- comparing lengths directly by placing objects side-by-side

#### Working Mathematically

##### Students learn to

- identify an object that is longer or shorter than another object
- solve simple everyday problems using problem-solving strategies



## Area

### – BRAINtastic Category 8 (Measurement)

#### MES1.2

Describes area using everyday language and compares areas using direct comparison

#### Key Ideas

Identify and describe the attribute of area  
Estimate the larger of two areas

#### Knowledge and Skills

##### Students learn about

- identifying the attribute of area as the measure of the amount of surface
- covering surfaces completely with smaller shapes
- using everyday language to describe area eg *surface, inside, outside*
- using comparative language to describe area eg *bigger than, smaller than, the same as*
- estimating the larger of two areas and comparing by direct comparison

#### Working Mathematically

##### Students learn to

- answer questions about area in everyday situations eg 'Which book cover is bigger?'
- solve simple everyday problems using problem-solving strategies

## Volume and Capacity

### – BRAINtastic Category 8 (Measurement)

#### MES1.3

Compares the capacities of containers and the volumes of objects or substances

#### Key Ideas

Identify and describe the attributes of volume and capacity  
Compare the capacities of two containers  
Compare the volumes of two objects by direct observation

#### Knowledge and Skills

##### Students learn about

- sharing an object by dividing it into two equal parts eg cutting a piece of fruit into halves
- recognising that halves are two equal parts
- recognising when two parts are not halves of the one whole
- using the term 'half' in everyday situations

#### Working Mathematically

##### Students learn to

- recognise when a container is nearly full, half-full or empty
- predict whether an object or collection of objects will fit inside a defined space such as a box or cupboard
- solve simple everyday problems using problem-solving strategies
- predict which container has the greater capacity

## Mass

### – BRAINtastic Category 8 (Measurement)

#### MES1.4

Compares the masses of two objects and describes mass using everyday language

#### Key Ideas

Identify and describe the attribute of mass

#### Knowledge and Skills

##### Students learn about

- identifying the attribute of mass as the amount of matter in an object
- describing objects in terms of their mass eg *heavy, light, hard to push, hard to pull*
- using comparative language to describe mass eg *heavier, lighter, heaviest, lightest*
- sorting objects on the basis of their mass

#### Working Mathematically

##### Students learn to

- predict which object would be heavier than, lighter than or have about the same mass as another object

## Time

### – BRAINtastic Category 8 (Measurement)

#### MES1.5

Sequences events and uses everyday language to describe the duration of activities

#### Key Ideas

Describe the duration of events using everyday language  
Sequence events in time  
Name the days of the week and seasons  
Tell time on the hour on digital and analog clocks

#### Knowledge and Skills

##### Students learn about

- using and understanding terms such as *daytime, night-time, yesterday, today, tomorrow, before, after, next, morning, afternoon*
- sequencing events in time
- comparing the duration of two events using informal methods eg 'It takes me longer to eat my lunch than it does to clean my teeth.'
- recalling that there are seven days in a week
- naming and ordering the days of the week
- naming the seasons
- classifying weekdays and weekend days
- reading hour time on a digital and an analog clock
- using the term 'o'clock'

#### Working Mathematically

##### Students learn to

- describe events that take 'a long time' and events that take 'a short time'
- describe the position of the hands on an analog clock when reading hour time

### Three-dimensional Space

#### – BRAINtastic Category 9 (Space & Geometry)

##### SGES1.1

Manipulates, sorts and represents three-dimensional objects and describes them using everyday language

##### Key Ideas

Sort three-dimensional objects  
Describe features of three-dimensional objects using everyday language  
Use informal names for three-dimensional objects

### Two-dimensional Space

#### – BRAINtastic Category 9 (Space & Geometry)

##### SGES1.2

Manipulates, sorts and describes representations of two-dimensional shapes using everyday language

##### Key Ideas

Manipulate, sort and describe two-dimensional shapes  
Identify and name circles, squares, triangles and rectangles in pictures and the environment, and presented in different orientations  
Identify straight and curved lines

#### Knowledge and Skills

##### Students learn about

- identifying straight and curved lines
- comparing closed shapes and open lines
- describing features of circles, squares, triangles and rectangles using everyday language
- sorting two-dimensional shapes according to features, including size and shape
- identifying and naming circles, squares, triangles and

#### Working Mathematically

##### Students learn to

- respond to questions that identify a particular shapes
- recognise how a group of two-dimensional shapes have been sorted
- make pictures and designs using a selection of shapes

rectangles presented in different orientations <ul style="list-style-type: none"> <li>• identifying circles, squares, triangles and rectangles in pictures</li> </ul>	
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**Position**  
**– BRAINtastic Category 9 (Space & Geometry)**

<b>SGES1.3</b> Use everyday language to describe position and give and follow simple directions	<b>Key Ideas</b> Give and follow simple directions use everyday language to describe position
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<b>Knowledge and Skills</b>  <b>Students learn about</b> <ul style="list-style-type: none"> <li>• following simple directions to position an object</li> <li>• using everyday language to describe position</li> </ul>	<b>Working Mathematically</b>  <b>Students learn to</b> <ul style="list-style-type: none"> <li>• follow directions to a point or place</li> </ul>
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## BRAINtastic Maths Lower Primary ⇔ NSW Stage 1



### Whole Numbers

#### – BRAINtastic Category 1 (Numeration)

<p><b>NS1.1</b></p> <p>Counts, orders, reads and represents two- and three-digit numbers</p>	<p><b>Key Ideas</b></p> <p>Count forwards and backwards by ones, twos and fives Count forwards and backwards by tens, on and off the decade Read, order and represent two-digit numbers</p>
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"><li>• counting forwards or backwards by ones, from a given two-digit number</li><li>• identifying the number before and after a given two-digit number</li><li>• representing two-digit numbers using numerals, words, objects and pictures</li><li>• combining materials into tens to model two-digit numbers</li><li>• applying an understanding of place value and the role of zero to read, write and order two-digit numbers</li><li>• stating the place value of digits in two-digit numbers</li><li>• using the terms 'more than' and 'less than' to compare numbers</li><li>• using a number line or hundreds chart to assist with counting and ordering</li><li>• counting forwards and backwards by twos, fives and tens</li><li>• counting forwards and backwards by ten, on and off the</li></ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"><li>• interpret numerical information from texts and in other contexts</li><li>• use number patterns to assist with counting</li><li>• solve simple, everyday problems using problem-solving strategies</li></ul>

decade <ul style="list-style-type: none"> <li>• rounding numbers to the nearest ten or hundred</li> <li>• using the symbols for dollars and cents</li> </ul>	
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**Addition and Subtraction**  
**– BRAINtastic Category 2 (Addition & Subtraction)**

<b>NS1.2</b> Uses a range of mental strategies for addition and subtraction involving one- and two-digit numbers	<b>Key Ideas</b> Develop a range of mental strategies for addition and subtraction
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<b>Knowledge and Skills</b>	<b>Working Mathematically</b>
<b>Students learn about</b> <ul style="list-style-type: none"> <li>• representing subtraction as the difference between two numbers</li> <li>• using the terms <i>add, plus, equals, is equal to, take away, minus and the difference between</i></li> <li>• recognising and using the symbols +, - and =</li> <li>• using a range of mental strategies for addition and subtraction, including             <ul style="list-style-type: none"> <li>- counting on from the larger number to find the total of two numbers</li> <li>- counting back from a number to find the number remaining</li> <li>- counting on or back to find the difference between two numbers</li> <li>- using doubles and near doubles</li> <li>- combining numbers that add to 10</li> <li>- bridging to ten</li> </ul> </li> <li>• using related addition and subtraction number facts to at least 20</li> </ul>	<b>Students learn to</b> <ul style="list-style-type: none"> <li>• recall addition and subtraction facts for numbers to at least 20</li> <li>• select and use a variety of strategies to solve addition and subtraction problems</li> <li>• calculate mentally to give change</li> </ul>



<ul style="list-style-type: none"> <li>• using concrete materials to model addition and subtraction problems involving one- and two-digit numbers</li> <li>• performing simple calculations with money including finding change</li> </ul>	
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**Multiplication and Division**  
**– BRAINTastic Category 3 (Multiplication & Division)**

<p><b>NS1.3</b></p> <p>Uses a range of mental strategies and concrete materials for multiplication and division</p>	<p><b>Key Ideas</b></p> <p>Skip-count by ones, twos, fives and tens          Use strategies for multiplication including arrays, equal groups and repeated addition          Use strategies for division including sharing, arrays and repeated subtraction</p>
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<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• counting by ones, twos, fives and tens using skip counting</li> <li>• describing collections of objects as ‘rows of’ and ‘groups of’</li> <li>• modelling multiplication as equal groups or as an array of equal rows eg two groups of three</li> <li>• finding the total number of objects using repeated addition</li> <li>• modelling division by sharing a collection of objects into equal groups or as equal rows in an array eg six objects shared between two friends</li> <li>• modelling division as repeated subtraction</li> <li>• recognising the symbols <math>\times</math>, <math>\div</math> and <math>=</math></li> </ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• answer mathematical problems using objects, diagrams, imagery, actions or trial-and-error</li> <li>• use a number line or hundreds chart to solve multiplication and division problems</li> </ul>
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## Fractions and Decimals

### – BRAINTastic Category 4 (Fractions & Decimals)

<b>NS1.4</b> Describes and models halves and quarters, of objects and collections, occurring in everyday situations	<b>Key Ideas</b> Model and describe a half or a quarter of a whole object Model and describe a half or a quarter of a collection of objects Use the fraction notation $\frac{1}{2}$ and $\frac{1}{4}$
<b>Knowledge and Skills</b> <b>Students learn about</b> <ul style="list-style-type: none"><li>• modelling a half or a quarter of a whole object</li><li>• modelling a half or a quarter of a collection of objects</li><li>• describing equal parts of a whole object or collection of objects</li><li>• describing parts of an object or collection of objects as ‘about a half’, ‘more than a half’ or ‘less than a half’</li><li>• using fraction notation for half (<math>\frac{1}{2}</math>) and a quarter (<math>\frac{1}{4}</math>)</li></ul>	<b>Working Mathematically</b> <b>Students learn to</b> <ul style="list-style-type: none"><li>• question of parts of a whole object, or collection of objects, are equal</li><li>• use fraction language in a variety of everyday contexts eg the half-hour, one-quarter of the class</li><li>• recognise the use of fractions in everyday contexts</li></ul>

## Patterns and Algebra

### – BRAINtastic Category 6 (Patterns & Algebra)

#### PAS1.1

Creates, represents and continues a variety of number patterns, supplies missing elements in a pattern and builds number relationships

#### Key Ideas

Create represent and continue a variety of number patterns and supply missing elements  
Use the equals sign to record equivalent number relationships  
Build number relationships by relating addition and subtraction facts to at least 20  
Make generalisations about number relationships

#### Knowledge and Skills

##### Students learn about

##### *Number Patterns*

- identifying and describing patterns when counting forwards or backwards by ones, twos, fives or tens
- continuing, creating and describing number patterns that increase or decrease
- determining a missing element in a number pattern

##### *Number Relationships*

- using the equals sign to record equivalent number relationships and to mean 'is the same as' rather than as an indication to perform an operation eg  $5 + 2 = 4 + 3$
- building addition facts to at least 20 by recognising patterns or by applying the commutative property
- relating addition and subtraction facts for numbers to at least 20

#### Working Mathematically

##### Students learn to

- solve problems based on number patterns
- identify how number patterns are made and how they can be copied or continued
- describe how the missing element in a number pattern was determined
- represent number patterns using diagrams, words or symbols
- check number patterns to determine whether they are true or false eg is  $7 + 5 = 8 + 5$  true?

## Data

### – BRAINTastic Category 7 (Data)

#### DS1.1

Displays data using columns and picture graphs, and interprets the results.

#### Key Ideas

Display data using pictorial representations  
Use objects or pictures as symbols to represent other objects, using one-to-one correspondence  
Interpret information presented in picture graphs and column graphs

#### Knowledge and Skills

##### Students learn about

- displaying data using concrete materials and pictorial representations
- using pictures as symbols to represent data using one-to-one correspondence eg using a block to represent each car
- interpreting information presented in picture graphs or column graphs

#### Working Mathematically

##### Students learn to

- interpret data displayed in simple picture graphs and column graphs

## Length

### – BRAINtastic Category 8 (Measurement)

<b>MS1.1</b> Estimates, measures, compares and records lengths and distances using informal units, metres and centimetres	<b>Key Ideas</b> Use informal units to measure and estimate length and distance by placing informal units end-to-end without gaps or overlaps Record measurements by referring to the number and type of formal or informal units used
<b>Knowledge and Skills</b> <b>Students learn about</b> <ul style="list-style-type: none"><li>• using informal units to measure lengths or distances, placing the units end-to-end without gaps or overlaps</li><li>• counting informal units to measure lengths or distances</li><li>• comparing and ordering two or more lengths or distances using informal units</li></ul>	<b>Working Mathematically</b> <b>Students learn to</b> <ul style="list-style-type: none"><li>• use informal units to compare the lengths of two objects that cannot be moved or aligned</li></ul>

## Area

### – BRAINtastic Category 8 (Measurement)

<b>MS1.2</b> Estimates, measures, compares and records areas using informal units	<b>Key Ideas</b> Use appropriate informal units to estimate and measure area Compare and order two or more areas Record measurements by referring to the number and type of informal units used
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<b>Knowledge and Skills</b>	<b>Working Mathematically</b>
<p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• comparing the areas of two surfaces that cannot be moved or superimposed</li> <li>• measuring area by placing identical informal units in rows or columns without gaps or overlaps</li> <li>• estimating, comparing and ordering two or more areas using informal units</li> <li>• recording area by referring to the number and type of units used eg the area of this surface is 20 tiles</li> </ul>	<p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• select and use appropriate informal units to measure area</li> </ul>

**Volume and Capacity**  
**– BRAINTastic Category 8 (Measurement)**

<p><b>MS1.3</b></p> <p>Estimates, measures, compares and records volumes and capacities using informal units</p>	<p><b>Key Ideas</b></p> <p>Use appropriate informal units to estimate and measure volume and capacity</p> <p>Compare and order the capacities of two or more containers and the volumes of two or more models or objects</p> <p>Record measurements by referring to the number and type of informal units used</p>
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<b>Knowledge and Skills</b>	<b>Working Mathematically</b>
<p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• comparing and ordering the capacities of two or more containers by comparing the number of informal units needed to fill each container</li> <li>• comparing and ordering the volumes of two or more models by counting the number of blocks used in each model</li> </ul>	<p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• use an appropriate informal unit to compare the capacities of two containers</li> <li>• recognise that containers of different shapes may have the same capacity</li> <li>• recognise that models with different appearances may have the same volume</li> </ul>

## Mass

### – BRAINtastic Category 8 (Measurement)

<b>MS1.4</b> Estimates, measures, compares and records the masses of two or more objects using informal units	<b>Key Ideas</b> Compare and order two or more objects according to mass Record measurements by referring to the number and type of informal units used
<b>Knowledge and Skills</b> <b>Students learn about</b> <ul style="list-style-type: none"><li>• describing the mass of an object by counting the number of informal units needed to balance the object</li><li>• recording mass by referring to the number and type of informal units used</li><li>• comparing and ordering the masses of two or more objects using informal units</li><li>• recognising that two collections of objects with equal mass will balance on an equal arm balance</li><li>• calculating difference in mass by measuring and comparing eg 'The pencil has a mass equal to three blocks and a pair of plastic scissors has a mass of six blocks, so the scissors are three blocks heavier than the pencil.'</li></ul>	<b>Working Mathematically</b> <b>Students learn to</b> <ul style="list-style-type: none"><li>• solve a variety of problems using problem-solving strategies</li></ul>

## Time

### – BRAINtastic Category 8 (Measurement)

<b>MS1.5</b> Compares the duration of events using informal methods and reads clocks on the half-hour	<b>Key Ideas</b> Use informal units to measure and compare the duration of events
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	Name and order the months and seasons of the year Identify the day and date on the calendar Tell time on the hour and half-hour on digital and analog clocks
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• naming and ordering the months of the year</li> <li>• recalling the number of days in each month</li> <li>• ordering the seasons and naming the months for each season</li> <li>• using the terms 'hour', 'minute' and 'second'</li> <li>• using the terms 'o'clock' and 'half'-past'</li> <li>• reading and recording hour and half-hour time on digital and analog clocks</li> </ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• discuss activities that take one hour, less than an hour, more than an hour</li> <li>• solve simple everyday problems using problem-solving strategies</li> <li>• describe the position of the hands on a clock for the half-hour</li> </ul>
<p><b>Three-dimensional Space</b>  <b>– BRAINtastic Category 9 (Space &amp; Geometry)</b></p>	
<p><b>SGS1.1</b></p> <p>Sorts, describes and represents three-dimensional objects including cones, cubes, cylinders, spheres and prisms, and recognises them in pictures</p>	<p><b>Key Ideas</b></p> <p>Name, describe, sort and model cones, cubes, cylinders, spheres and prisms          Recognise three-dimensional objects in pictures and presented in different orientations          Recognise that three-dimensional objects look different from different views</p>
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• describing common three-dimensional objects including cones, cylinders, spheres and prisms</li> <li>• identifying and naming three-dimensional objects including cones, cubes, cylinders, spheres and prisms from a</li> </ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• sort objects according to a single attribute or multiple attributes</li> <li>• select an item from a description of its features eg find an object with six square faces</li> </ul>



<p>collection of everyday objects</p> <ul style="list-style-type: none"> <li>• identifying cones, cubes, cylinders, spheres and prisms presented in different orientations</li> <li>• recognising three-dimensional objects from pictures</li> <li>• use the terms 'faces', 'edges' and 'corners' to describe three-dimensional objects</li> </ul>	
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**Two-dimensional Space**  
**– BRAINtastic Category 9 (Space & Geometry)**

<p><b>SGS1.2</b></p> <p>Manipulates, sorts and describes representations of two-dimensional shapes using everyday language</p>	<p><b>Key Ideas</b></p> <p>Manipulate, sort and describe two-dimensional shapes</p> <p>Identify and name circles, squares, triangles and rectangles in pictures and the environment, and presented in different orientations</p> <p>Identify straight and curved lines</p>
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<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• identifying straight and curved lines</li> <li>• comparing closed shapes and open lines</li> <li>• describing features of circles, squares, triangles and rectangles using everyday language</li> <li>• sorting two-dimensional shapes according to features, including size and shape</li> <li>• identifying and naming circles, squares, triangles and rectangles presented in different orientations</li> <li>• identifying circles, squares, triangles and rectangles in pictures</li> </ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• respond to questions that identify a particular shapes</li> <li>• recognise how a group of two-dimensional shapes have been sorted</li> <li>• make pictures and designs using a selection of shapes</li> </ul>
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## Position

### – BRAINTastic Category 9 (Space & Geometry)

#### SGS1.3

Represents the position of objects and describes using everyday language

#### Key Ideas

Represent the position of objects using models and drawings  
Describe the position of objects using everyday language, including 'left' and 'right'

#### Knowledge and Skills

##### Students learn about

- making simple models form descriptions
- using the terms 'left' and 'right' to describe the position of objects in relation to themselves
- describing the path from one location to another on a drawing
- using drawings to represent the position of objects along a path

#### Working Mathematically

##### Students learn to

- follow instructions to position objects in models and drawings
- follow simple directions using a diagram or description

## BRAINtastic Maths Middle Primary ⇨ NSW Stage 2



### Whole Numbers

#### – BRAINtastic Category 1 (Numeration)

<p><b>NS2.1</b></p> <p>Counts, orders, reads and records numbers up to four digits</p>	<p><b>Key Ideas</b></p> <p>Use place value to read, represent and order numbers up to four digits Count forwards and backwards by tens or hundreds, on and off the decade</p>
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"><li>• representing numbers up to four digits using numerals and words</li><li>• identifying the number before and after a given two-, three- or four-digit number</li><li>• applying an understanding of place value and the role of zero to read, write and order numbers up to four digits</li><li>• stating the place value of digits in two-, three- or four-digit numbers</li><li>• ordering a set of four-digit numbers in ascending or descending order</li><li>• using the symbols for 'is less than' (&lt;) and 'is greater than' (&gt;) to show the relationship between two numbers</li><li>• counting forwards and backwards by tens or hundreds, on and off the decade</li><li>• recording numbers up to four digits using expanded notation</li><li>• rounding numbers to the nearest ten, hundred or thousand</li></ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"><li>• interpret four-digit numbers used in everyday contexts</li><li>• compare the relative size of four-digit numbers</li><li>• make the largest and smallest number given any four digits</li><li>• solve a variety of problems using problem-solving strategies</li></ul>

## Addition and Subtraction

### – BRAINtastic Category 2 (Addition & Subtraction)

<b>NS2.2</b> Uses mental and written strategies for addition and subtraction involving two-, three- and four-digit numbers	<b>Key Ideas</b> Use a range of mental strategies for addition and subtraction involving two-, three- and four-digit numbers Use a formal algorithm for addition and subtraction
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <b>Students learn about</b> <ul style="list-style-type: none"><li>• using mental strategies for addition and subtraction involving two-, three- and four-digit numbers, including<ul style="list-style-type: none"><li>- the jump strategy</li><li>- the split strategy</li><li>- the compensation strategy</li><li>- using patterns to extend number facts</li><li>- bridging the decades</li><li>- changing the order of addends to form multiples of 10</li></ul></li><li>• using a formal algorithm and applying place value to solve addition and subtraction problems, involving two-, three- and four-digit numbers</li></ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <b>Students learn to</b> <ul style="list-style-type: none"><li>• solve a variety of problems involving addition and subtraction, including those involving money, using problem-solving strategies</li><li>• use estimation to arrive at solutions</li><li>• apply inverse operations to addition and subtraction problems</li></ul>

## Multiplication and Division

### – BRAINtastic Category 3 (Multiplication & Division)

<b>NS2.3 – Unit 1</b> <b>(multiplication and division facts)</b> Uses mental strategies for multiplication and division	<b>Key Ideas</b> Develop mental facility for number facts up to $10 \times 10$ Find multiples and squares of numbers
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<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• counting by threes, fours, sixes, sevens, eights or nines using skip counting</li> <li>• linking multiplication and division facts using groups or arrays</li> <li>• using mental strategies to recall multiplication facts up to 10 x 10 including <ul style="list-style-type: none"> <li>- the commutative property of multiplication</li> <li>- using known facts to work out unknown facts</li> <li>- the relationship between multiplication facts eg 'the multiplication facts for 6 are double the multiplication facts for 3'</li> </ul> </li> <li>• recognising and using <math>\div</math> to indicate division</li> <li>• using mental strategies to divide by a one-digit number, including <ul style="list-style-type: none"> <li>- the inverse relationship of multiplication and division</li> <li>- recalling known division facts</li> <li>- relating to known division facts eg <math>36 \div 4</math>; halve 36 and halve again</li> </ul> </li> <li>• listing multiples for a given number</li> </ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• recall multiplication facts for up to 10 x 10, including zero facts</li> <li>• solve a variety of problems using problem-solving strategies</li> <li>• use multiplication and division facts in board, card and computer games</li> <li>• apply the inverse relationship of multiplication and division to check answers</li> </ul>
<p><b>NS2.3 – Unit 2</b> <b>(multiplication and division facts)</b></p> <p>Uses mental and informal written strategies for multiplication and division</p>	<p><b>Key Ideas</b></p> <p>Uses mental and informal written strategies for multiplying or dividing a two-digit number by a one-digit operator  Interpret remainders in division problems  Determine factors for a given number</p>

<b>Knowledge and Skills</b>	<b>Working Mathematically</b>
<p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• using mental strategies to multiply a one-digit number by a multiple of 10</li> <li>• using mental strategies to multiply a two-digit number by a one-digit number</li> <li>• using mental strategies to divide by a one-digit number, in problems for which the answer may include a remainder</li> <li>• recording remainders to division problems</li> <li>• interpreting the remainder in the context of a word problem</li> <li>• describing multiplication as the product of two or more numbers</li> <li>• determining factors for a given number</li> </ul>	<p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• solve multiplication and division problems</li> <li>• select and use mental, written and calculator strategies to solve multiplication and division problems</li> <li>• solve a variety of problems using problem-solving strategies</li> <li>• identify the operation/s required to solve a problem</li> <li>• apply the inverse relationship of multiplication and division to check answers</li> <li>• apply factorisation or a number to aid mental computation</li> </ul>

**Fractions and Decimals – Unit 1**  
**– BRAINtastic Category 4 (Fractions & Decimals)**

<p><b>NS2.4</b></p> <p>Models, compares and represents commonly used fractions and decimals, adds and subtracts decimals to two decimal places, and interprets everyday percentages</p>	<p><b>Key Ideas</b></p> <p>Model, compare and represent fractions with denominators 2, 4 and 8, followed by fractions with denominators of 5, 10 and 100</p> <p>Model, compare and represent decimals to 2 decimal places</p> <p>Add and subtract decimals with the same number of decimal places (to 2 decimal places)</p> <p>Perform calculations with money</p>
<b>Knowledge and Skills</b>	<b>Working Mathematically</b>
<p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• modelling, comparing and representing fractions with denominators 2, 4 and 8 by</li> </ul>	<p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• pose questions about a collection of items</li> <li>• understand why <math>\frac{1}{8}</math> is less than <math>\frac{1}{4}</math></li> </ul>

<ul style="list-style-type: none"><li>- modelling halves, quarters and eighths of a whole object or collections of objects</li><li>- modelling a half or a quarter of a collection of objects</li><li>- naming fractions with denominators of two, four and eight up to one whole</li><li>- comparing and ordering fractions with the same denominator</li><li>- interpreting the denominator as the number of equal parts a whole has been divided into</li><li>- interpreting the numerator as the number of equal fractional parts</li><li>- comparing unit fractions by referring to the denominator</li><li>- renaming <math>\frac{2}{2}</math>, <math>\frac{4}{4}</math>, <math>\frac{8}{8}</math> as 1</li><li>• modelling, comparing and representing fractions with denominators 5, 10 and 100 by extending the knowledge and skills covered above to fifths, tenths and hundredths</li><li>• modelling, comparing and representing decimals to two decimal places</li><li>• applying a knowledge of place value to express whole numbers, tenths and hundredths as decimals</li><li>• interpreting decimal notation for tenths and hundredths</li><li>• adding and subtracting decimals with the same number of decimal places (to 2 decimal places)</li></ul>	<ul style="list-style-type: none"><li>• interpret the everyday use of fractions and decimals</li><li>• apply decimal knowledge to record measurements</li><li>• explain the relationship between fractions and decimals</li><li>• perform calculations with money</li></ul>
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## Fractions and Decimals – Unit 2

### – BRAINtastic Category 4 (Fractions & Decimals)

<p><b>NS2.4</b></p> <p>Models, compares and represents commonly used fractions and decimals, adds and subtracts decimals to two decimal places, and interprets everyday percentages</p>	<p><b>Key Ideas</b></p> <p>Find equivalence between halves, quarters and eighths; fifths and tenths, tenths and hundredths Recognise percentages in everyday situations Relate a common percentage to a fraction or decimal</p>
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"><li>• modelling, comparing and representing fractions with denominators 2, 4 and 8 by<ul style="list-style-type: none"><li>- finding equivalence between halves, quarters and eighths using concrete materials and diagrams</li><li>- modelling mixed numerals</li></ul></li><li>• rounding a number with one or two decimal places to the nearest whole number</li><li>• recognising the number patterns formed when decimal numbers are multiplied or divided by 10 or 100</li><li>• recognise that the symbol % means 'percent'</li><li>• relating a common percentage to a fraction or decimal eg '25% means 25 out of 100 or 0.25'</li><li>• equating 10% to <math>\frac{1}{10}</math>, 25% to <math>\frac{1}{4}</math> and 50% to <math>\frac{1}{2}</math></li></ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"><li>• pose questions about a collection of items</li><li>• understand why <math>\frac{1}{8}</math> is less than <math>\frac{1}{4}</math></li><li>• interpret the everyday use of fractions, decimals and percentages</li><li>• apply decimal knowledge to record measurements</li><li>• explain the relationship between fractions and decimals</li><li>• perform calculations with money</li></ul>



## Chance

### – BRAINtastic Category 5 (Chance)

<b>NS2.5</b> Describes and compares chance events in social and experimental contexts	<b>Key Ideas</b> Explores all possible outcomes in a simple chance situation
<b>Knowledge and Skills</b> <b>Students learn about</b> <ul style="list-style-type: none"><li>• listing all the possible outcomes in a simple chance situation eg 'heads', tails', if a coin is used</li><li>• distinguishing between certain and uncertain events</li><li>• predicting and recording all possible outcomes in a simple chance experiment</li><li>• predicting and recording all possible combinations</li></ul>	<b>Working Mathematically</b> <b>Students learn to</b> <ul style="list-style-type: none"><li>• apply an understanding of equally likely outcomes in a simple chance experiment eg from a collection of 27 red, 10 blue and 13 yellow marbles, name red as being the colour most likely to be drawn out</li><li>• acknowledge 'randomness' in a situation eg 'the spinner could stop on any colour'</li></ul>

## Patterns and Algebra

### – BRAINtastic Category 6 (Patterns & Algebra)

<b>PAS2.1</b> Generates, describes and records number patterns using a variety of strategies and completes simple number sentences by calculating missing values	<b>Key Ideas</b> Generate, describe and record number patterns using a variety of strategies Build number relationships by relating multiplication and division facts to at least 10 x 10 Complete simple number sentences by calculating the value of a missing number
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## Knowledge and Skills

### Students learn about

#### ***Number Patterns***

- finding a higher term in a number pattern given the first five terms eg determine the 10<sup>th</sup> term given a number pattern beginning 4, 8, 12, 16, 20
- describing a simple number pattern in words

#### ***Number Relationships***

- using the equals sign to record equivalent number relationships and to mean 'is the same as' rather than as an indication to perform an operation eg  $6 \times 4 = 4 \times 6$
- forming arrays to demonstrate multiplication patterns and relationships
- relating multiplication and division facts for numbers to at least 20
- applying the associative property of addition and multiplication to aid mental computation
- completing number sentences involving one operation by calculating missing values eg  $5 + \square = 13$

## Working Mathematically

### Students learn to

- solve problems based on number patterns
- identify how number patterns have been created and how they can be continued
- play 'guess my rule' games
- represent number patterns using diagrams, words or symbols
- check number sentences to determine if they are true or false
- use inverse operations to complete number sentences
- describe strategies for completing simple number sentences

## Data

### – BRAINtastic Category 7 (Data)

#### DS2.1

Displays data using tables and graphs, and interprets the results.

#### Key Ideas

Classify and organise data using tables  
Construct vertical and horizontal column graphs and picture graphs  
Interpret data presented in tables, column graphs and picture graphs

#### Knowledge and Skills

##### Students learn about

- creating simple tables to organise data
- interpreting information presented in simple tables
- constructing vertical and horizontal column graphs on a grid with one-to-one correspondence
- interpreting information presented in column graphs and picture graphs
- create a two-way table to organise data
- interpret information presented in two-way tables

#### Working Mathematically

##### Students learn to

- interpret data displayed in tables, column graphs and picture graphs

## Length

### – BRAINtastic Category 8 (Measurement)

#### MS2.1

Estimates, measures, compares and records lengths and distances and perimeters in metres, centimetres and millimetres

#### Key Ideas

Estimate, measure, compare and record lengths and distances using metres, centimetres and/or millimetres  
Convert between metres and centimetres, and centimetres and millimetres  
Record lengths and distances using decimal notation to two places

#### Knowledge and Skills

##### Students learn about

- describing one centimetre as one-hundredth of a metre
- comparing lengths or distances using millimetres
- recognising that ten millimetres equal one centimetre and describing one millimetre as one-tenth of a centimetre
- using the abbreviation for millimetre (mm)
- converting between metres and centimetres, and centimetres and millimetres
- recording lengths or distances using decimal notation to two decimal places eg 1.25 m
- using the term 'perimeter' to describe the total distance around a shape

#### Working Mathematically

##### Students learn to

## Area

### – BRAINtastic Category 8 (Measurement)

<b>MS2.2</b> Estimates, measures, compares and records the areas of surfaces in square centimetres and square metres	<b>Key Ideas</b> Compare and record areas in square centimetres and square metres
<b>Knowledge and Skills</b> <b>Students learn about</b> <ul style="list-style-type: none"><li>• comparing areas in square centimetres</li><li>• measuring surfaces using a square centimetre grid overlay</li><li>• recording area in square centimetres</li><li>• comparing areas in square metres</li><li>• recording area in square metres</li><li>• using the abbreviation for square metre (m<sup>2</sup>) and square centimetre (cm<sup>2</sup>)</li></ul>	<b>Working Mathematically</b> <b>Students learn to</b> <ul style="list-style-type: none"><li>• explain where square metres are used for measuring in everyday situations eg floor coverings</li><li>• recognise areas that are 'smaller than', 'about the same as' and 'bigger than' a square metre</li></ul>

## Volume and Capacity

### – BRAINtastic Category 8 (Measurement)

<b>MS2.3 – Unit 1 (litres and cubic centimetres)</b> Estimates, measures, compares and records volumes and capacities using litres, millilitres and cubic centimetres	<b>Key Ideas</b> Estimate, measure, compare and record volumes and capacities using litres Measure the volume of models in cubic centimetres
<b>Knowledge and Skills</b> <b>Students learn about</b> <ul style="list-style-type: none"><li>• comparing volumes to the nearest litre</li><li>• using the abbreviation for litre (L)</li></ul>	<b>Working Mathematically</b> <b>Students learn to</b> <ul style="list-style-type: none"><li>• recognise the litre as a standard unit for measuring the volume of liquids and the capacity of containers</li></ul>

<ul style="list-style-type: none"> <li>• using the cubic centimetre as a formal unit for measuring volume</li> <li>• using the abbreviation for cubic centimetre</li> <li>• counting cubic centimetre blocks to determine volume</li> </ul>	<ul style="list-style-type: none"> <li>• recognise that one-litre containers can be a variety of shapes</li> <li>• distinguish between mass and volume eg ‘This stone is heavier than the ball but it takes up less room.’</li> </ul>
<p><b>MS2.3 – Unit 2 (millilitres and displacement)</b></p> <p>Estimates, measures, compares and records volumes and capacities using litres, millilitres and cubic centimetres</p>	<p><b>Key Ideas</b></p> <p>Estimate, measure, compare and record volumes and capacities using litres and millilitres Convert between litres and millilitres</p>
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• comparing volumes and capacities using millilitres</li> <li>• reading measuring devices calibrated in millilitres</li> <li>• using the abbreviation for millilitres (mL)</li> <li>• recognising that 1000 millilitres equal one litre</li> <li>• converting between millilitres and litres</li> </ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• measure quantities to the nearest 100 mL and/or the nearest 10 mL</li> <li>• interpret information about capacity and volume on commercial packaging</li> <li>• relate the millilitre to familiar everyday containers and familiar informal units eg 1 teaspoon is approximately 5 mL, a small fruit juice drink is about 250 mL, etc</li> </ul>
<p><b>Mass</b></p> <p><b>– BRAINtastic Category 8 (Measurement)</b></p>	
<p><b>MS2.4</b></p> <p>Estimates, measures, compares and records masses using kilograms and grams</p>	<p><b>Key Ideas</b></p> <p>Compare and record masses using kilograms and grams</p>
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• identifying objects that are ‘more than’, ‘less than’ and ‘about the same as’ one kilogram</li> <li>• using the abbreviation for kilogram (kg)</li> </ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• recognise that objects with a mass of one kilogram can be a variety of shapes and sizes</li> <li>• solve problems including those involving commonly used</li> </ul>

<ul style="list-style-type: none"> <li>• using the abbreviation for grams (g)</li> <li>• recognising that 1000 grams equal one kilogram</li> <li>• interpreting commonly used fractions of a kilogram including <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, <math>\frac{3}{4}</math> and relating these to the number of grams</li> </ul>	fractions of a kilogram
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**Time**  
**– BRAINtastic Category 8 (Measurement)**

<p><b>MS2.5</b>  Reads and record time in one-minute intervals and makes comparisons between time units</p>	<p><b>Key Ideas</b>  Read and record time using digital and analog notation  Convert between units of time  Read and interpret simple timetables, timelines and calendars</p>
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<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• recognising the co-ordinated movements of the hands on an analog clock, including <ul style="list-style-type: none"> <li>- how many minutes it takes for the minute hand to move from one numeral to the next</li> <li>- how many minutes it takes for the minute hand to complete one revolution</li> <li>- how many minutes it takes for the hour hand to move from one numeral to the next</li> <li>- how many seconds it takes for the second hand to complete one revolution</li> </ul> </li> <li>• associating the numerals 3, 6 and 9 with 15, 30 and 45 minutes, and using the terms ‘quarter-past’ and ‘quarter-to’</li> <li>• identifying which hour has just passed when the hour hand is not pointing to a numeral</li> <li>• reading analog and digital clocks to the minute eg 7:35 is read as ‘seven thirty-five’</li> <li>• recording digital time using the correct notation eg 9:15</li> </ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• recall time facts eg 24 hours in a day</li> <li>• solve a variety of problems using problem-solving strategies</li> <li>• record in words various times as shown on analog and digital clocks</li> </ul>
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<ul style="list-style-type: none"> <li>• relating analog notation to digital notation eg ten to nine is the same as 8:50</li> <li>• converting between units of time eg 60 seconds = 1 minute 60 minutes = 1 hour 24 hours = 1 day</li> <li>• reading and interpreting simple timetables, timelines and calendars</li> </ul>	
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**Three-dimensional Space**  
**– BRAINTastic Category 9 (Space & Geometry)**

<p><b>SGS2.1</b>          Compares, describes and names three-dimensional objects including pyramids</p>	<p><b>Key Ideas</b>          Name, describe and sort prisms, pyramids, cylinders, cones and spheres</p>
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• comparing and describing features of prisms, pyramids, cylinders, cones and spheres</li> <li>• identifying and naming three-dimensional objects as prisms, pyramids, cylinders, cones and spheres</li> <li>• identifying three-dimensional objects in the environment from drawings or descriptions</li> </ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• describe three-dimensional objects using everyday language and mathematical terminology</li> <li>• explore the variety of nets that can be used to create particular three-dimensional objects</li> </ul>



## Two-dimensional Space

### – BRAINtastic Category 9 (Space & Geometry)

#### SGS2.2a

Compares and names two-dimensional shapes and describes their features

#### Key Ideas

Identify and name pentagons, octagons and parallelograms presented in different orientations  
Compare and describe special groups of quadrilaterals  
Find all lines of symmetry for a two-dimensional shape

#### Knowledge and Skills

##### Students learn about

- manipulating, comparing and describing features of two-dimensional shapes, including pentagons, octagons and parallelograms
- identifying and naming pentagons, octagons, trapeziums and parallelograms presented in different orientations
- comparing and describing the features of special groups of quadrilaterals
- using measurement to describe features of two-dimensional shapes eg the opposite sides of a parallelogram are the same length
- grouping two-dimensional shapes using multiple attributes eg those with parallel sides and right angles
- finding lines of symmetry for a given shape

#### Working Mathematically

##### Students learn to

- select a shape from a description of its features
- explain why a particular two-dimensional shape has a given name eg 'It has four sides, and the opposite sides are parallel.'
- describe designs in terms of reflecting, translating and rotating

## Position

### – BRAINtastic Category 9 (Space & Geometry)

#### SGS2.3

Uses simple maps and grids to represent position and follow routes

#### Key Ideas

Use simple maps and grids to represent position and follow routes

Determine the directions N, S, E and W; NE, NW, SE and SW, given one of the directions

Describe the location of an object on a simple map using co-ordinates or directions

#### Knowledge and Skills

##### Students learn about

- describing the location of an object using more than one descriptor
- using a key or legend to locate specific objects
- using given directions to follow a route on a simple map
- describing a path or route on a simple map or plan
- using co-ordinates on simple maps to describe position eg 'The lion's cage is at B3.'
- plotting points at given co-ordinates
- using N, S, E and W to describe the location of an object on a simple map, given an arrow that represents North eg 'The treasure is east of the cave.'
- using a compass rose to indicate each of the key directions
- determining the directions NE, NW, SE and SW, given one of the directions
- using NE, NW, SE, and SW to describe the location of an object on a simple map, given a compass rose eg 'The treasure is north-east of the cave.'

#### Working Mathematically

##### Students learn to

- use and follow positional and directional language
- use simple co-ordinates in games
- interpret and use simple maps

## BRAINtastic Maths Upper Primary ⇔ NSW Stage 3



### Whole Numbers

#### – BRAINtastic Category 1 (Numeration)

<p><b>NS3.1</b></p> <p>Orders, reads and writes numbers of any size</p>	<p><b>Key Ideas</b></p> <p>Read, write and order numbers of any size using place value Record numbers in expanded notation Identify differences between Roman and Hindu-Arabic counting systems</p>
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"><li>• applying an understanding of place value and the role of zero to read, write and order numbers of any size</li><li>• stating the place value of any digit in large numbers</li><li>• ordering numbers of any size in ascending or descending order</li><li>• recoding large numbers using expanded notation eg <math>59\ 675 = 50\ 000 + 9000 + 600 + 70 + 5</math></li><li>• rounding numbers when estimating</li><li>• recognising, reading and converting Roman numerals</li><li>• identifying differences between the Roman and Hindu-Arabic systems of recording numbers</li></ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"><li>• use large numbers in real-life situations eg. population, money applications</li><li>• link negative numbers with subtraction</li><li>• interpret negative whole numbers in everyday contexts eg temperature</li><li>• apply strategies to estimate large quantities</li></ul>

## Addition and Subtraction

### – BRAINtastic Category 2 (Addition & Subtraction)

<b>NS3.2</b> Selects and applies appropriate strategies for addition and subtraction of counting numbers of any size	<b>Key Ideas</b> Select and apply appropriate mental, written or calculator strategies for addition and subtraction of counting numbers of any size
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <b>Students learn about</b> <ul style="list-style-type: none"><li>• selecting and applying appropriate mental, written or calculator strategies to solve addition and subtraction problems</li><li>• using a formal written algorithm and applying place value concepts to solve addition and subtraction problems, involving counting numbers of any size</li><li>• using estimation to check solutions to addition and subtraction problems</li></ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <b>Students learn to</b> <ul style="list-style-type: none"><li>• use a number of strategies to solve unfamiliar problems</li><li>• check solutions by using the inverse operation</li><li>• reflect on how a solution can be obtained for a problem</li></ul>

## Multiplication and Division

### – BRAINtastic Category 3 (Multiplication & Division)

<p><b>NS3.3</b></p> <p>Selects and applies appropriate strategies for multiplication and division</p>	<p><b>Key Ideas</b></p> <p>Select and apply appropriate mental, written or calculator strategies for multiplication and division Use formal written algorithms for multiplication (limit operators to two-digit numbers) and division (limit operators to single digits)</p>
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"><li>• applying appropriate mental, written or calculator strategies to solve multiplication and division problems</li><li>• recording remainders as decimals</li><li>• multiplying three- and four-digit numbers by one-digit numbers using mental or written strategies</li><li>• dividing a number with three or more digits by a single-digit divisor using mental or written strategies</li><li>• using mental strategies to multiply or divide a number by 100 or a multiple of 10</li><li>• finding solutions to questions involving mixed operations</li></ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"><li>• select an appropriate strategy for the solution of multiplication and division problems</li><li>• using a number of strategies to solve unfamiliar problems</li><li>• use the appropriate operation in solving problems in real-life situations</li><li>• use and interpret remainders in answers to division problems eg realising the answer needs to be rounded up if the problem involves finding the number of cars needed to take 48 people to an event</li><li>• question the meaning of packaging statements when determining the best buy eg 4 toilet rolls for \$2.95 or 6 toilet rolls for \$3.95</li><li>• calculate averages in everyday contexts eg temperature, sport scores</li></ul>

## Fractions and Decimals – Unit 1

### – BRAINTastic Category 4 (Fractions & Decimals)

#### NS3.4

Compares, orders and calculates with decimals, simple fractions and simple percentages

#### Key Ideas

Model, compare and represent commonly used fractions (those with denominators 2, 3, 4, 5, 6, 8, 10, 12 and 100)

Find equivalence between thirds, sixths and twelfths  
Express a mixed numeral as an improper fraction and vice versa

Multiply and divide decimals by whole numbers in everyday contexts

Add and subtract decimals to three decimal places

#### Knowledge and Skills

##### Students learn about

- modelling thirds, sixths and twelfths of a whole object or collection of objects
- expressing mixed numerals as improper fractions, and vice versa
- using mental strategies to subtract a unit fraction from 1
- adding and subtracting fractions with the same denominator
- expressing thousandths as decimals
- interpreting decimal notation for thousandths
- comparing and ordering decimal numbers with three decimal places
- adding and subtracting decimal numbers with a different number of decimal places
- multiplying and dividing decimal numbers by single digit numbers and by 10, 100 and 1000

#### Working Mathematically

##### Students learn to

- pose and solve problems involving simple proportions eg 'If a recipe for 8 people requires three cups of sugar, how many cups would be needed for 4 people?'
- interpret and explain the use of fractions, decimals and percentages in everyday contexts eg  $\frac{3}{4}$  hour = 45 min
- apply the four operations to money problems

## Fractions and Decimals – Unit 2

### – BRAINTastic Category 4 (Fractions & Decimals)

<p><b>NS3.4</b></p> <p>Compares, orders and calculates with decimals, simple fractions and simple percentages</p>	<p><b>Key Ideas</b></p> <p>Multiply simple fractions by whole numbers Calculate unit fractions of a number Calculate simple percentages of quantities Apply the four operations to money in real-life situations</p>
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"><li>• finding equivalent fractions using diagrams</li><li>• developing a mental strategy for finding equivalent fractions eg multiply or divide the numerator and denominator by the same number</li><li>• reducing a fraction to its lowest equivalent form by dividing the numerator and denominator by a common factor</li><li>• calculating unit fractions of a collection eg calculate <math>\frac{1}{5}</math> of 30</li><li>• representing simple fractions as a decimal and as a percentage</li><li>• calculating simple percentages (10%, 20%, 25%, 50%) of quantities eg 10% of \$200 = <math>\frac{1}{10}</math> of \$200 = \$20</li></ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"><li>• pose and solve problems involving simple proportions eg 'If a recipe for 8 people requires three cups of sugar, how many cups would be needed for 4 people?'</li><li>• interpret and explain the use of fractions, decimals and percentages in everyday contexts eg <math>\frac{3}{4}</math> hour = 45 min</li><li>• recall commonly used equivalent fractions eg 75%, 0.75, <math>\frac{3}{4}</math></li><li>• apply the four operations to money problems</li><li>• use mental strategies to convert between percentages and fractions to estimate discounts</li><li>• calculate prices involving percentage discounts eg a 10% discount</li><li>• understand how 50% of one amount could be less than 10% of another amount</li></ul>

## Patterns and Algebra

### – BRAINtastic Category 6 (Patterns & Algebra)

#### PAS3.1a

Records, analyses and describes geometric and number patterns that involve one operation using tables and words

#### Key Ideas

Build simple geometric patterns involving multiples  
Complete a table of values for geometric and number patterns  
Describe a pattern in words in more than one way

#### Knowledge and Skills

##### Students learn about

- working through a process of building a simple geometric pattern involving multiples, completing a table of values, and describing the pattern in words. This process includes the following steps:
  - building a simple geometric pattern using materials  
eg  $\diamond$ ,  $\diamond\diamond$ ,  $\diamond\diamond\diamond$ ,  $\diamond\diamond\diamond\diamond$ , ...
  - completing a table of values for the geometric pattern
  - determining a rule to describe the pattern from the table
  - using the rule to calculate the corresponding value for a larger number
- working through a process of identifying a simple number pattern involving only one operation, completing a table of values, and describing the pattern in words. This process includes the following steps:
  - completing a table of values for a number pattern involving one operation (including patterns that decrease)
  - determining a rule to describe the pattern from the table using the rule to calculate the corresponding value for a larger (or smaller) number

#### Working Mathematically

##### Students learn to

- ask questions about how number patterns have been created and how they can be continued
- interpret sentences written by peers and teachers that accurately describe geometric and number patterns
- use a number of strategies to solve unfamiliar problems
- play 'guess my rule' games



<p><b>PAS3.1b</b> Constructs, verifies and completes number sentences involving the four operations with a variety of numbers</p>	<p><b>Key Ideas</b> Construct, verify and complete number sentences involving the four operations with a variety of numbers</p>
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• completing number sentences that involve more than one operation by calculating missing values eg Find <math>\square</math> so that <math>5 + \square = 12 - 4</math></li> <li>• completing number sentences involving fractions or decimals eg Find <math>\square</math> so that <math>7 \times \square = 7.7</math></li> <li>• constructing a number sentence to match a problem that is presented in words and requires finding an unknown eg 'I am thinking of a number so that when I double it and add five, the answer is 13. What is the number?'</li> <li>• identifying and using inverse operations to assist with the solution of number sentences eg Find <math>\square</math> so that <math>125 \div 5 = \square</math> becomes find <math>\square</math> so that <math>\square \times 5 = 125</math></li> </ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• describe strategies for completing simple number sentences</li> <li>• use inverse operations to solve a number sentence</li> </ul>
<p><b>Data</b> – BRAINtastic Category 7 (Data)</p>	
<p><b>DS2.1</b> Displays and interprets data in graphs with scales of many-to-one correspondence</p>	<p><b>Key Ideas</b> Determine the mean (average) for a small set of data Read and interpret sector (pie) graphs Read and interpret graphs with scales of many-to-one correspondence</p>

<b>Knowledge and Skills</b>	<b>Working Mathematically</b>
<p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• using the term 'mean' for average</li> <li>• finding the mean for a small set of data</li> <li>• interpreting picture or column graphs using the key or scale</li> <li>• interpreting line graphs using the scales on the axes</li> <li>• interpreting divided bar graphs</li> <li>• interpreting sector (pie) graphs</li> </ul>	<p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• interpret data displayed in tables, column graphs and picture graphs</li> </ul>

## Length

### – BRAINtastic Category 8 (Measurement)

<p><b>MS2.1</b></p> <p>Selects and uses the appropriate unit and device to measure lengths, distances and perimeters</p>	<p><b>Key Ideas</b></p> <p>Select and use the appropriate unit and device to measure lengths, distances and perimeters</p> <p>Convert between metres and kilometres; millimetres, centimetres and metres</p> <p>Record lengths and distances using decimal notation to three places</p> <p>Calculate and compare perimeters of squares, rectangles and equilateral and isosceles triangles</p>
<b>Knowledge and Skills</b>	<b>Working Mathematically</b>
<p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• recognising that one thousand metres equal one kilometre and describing one metre as one thousandth of a kilometre</li> <li>• using the abbreviation for kilometre (km)</li> <li>• converting between metres and kilometres, describing one millimetre as one-tenth of a centimetre</li> <li>• converting between millimetres, centimetres and metres to</li> </ul>	<p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• interpret scales on maps and diagrams to calculate distances</li> <li>• solve problems involving different units of length eg Find the total length of three items measuring 5mm, 20 cm and 1.2 m</li> <li>• understand that the perimeters of squares, rectangles and triangles can be found by finding the sum of the side lengths</li> </ul>

<ul style="list-style-type: none"> <li>compare lengths or distances</li> <li>recording lengths or distances using decimal notation to three decimal places</li> <li>interpreting symbols used to record speed in kilometres per hour</li> <li>calculating and comparing perimeters of squares, rectangles and triangles</li> <li>finding the relationship between the lengths of the sides and the perimeter for squares, rectangles and equilateral and isosceles triangles</li> </ul>	<ul style="list-style-type: none"> <li>solve simple problems involving speed eg How long would it take to make a journey of 600 km if the average speed for the trip is 75 km/h?</li> </ul>
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**Area**

**– BRAINTastic Category 8 (Measurement)**

<p><b>MS3.2</b></p> <p>Selects and uses the appropriate units to calculate area, including the area of squares, rectangles and triangles</p>	<p><b>Key Ideas</b></p> <p>Select and use the appropriate unit to calculate area Develop formulae for finding area of squares, rectangles and triangles</p>
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>identifying situations where square kilometres are used for measuring area eg a suburb</li> <li>using the abbreviation for square kilometre (km<sup>2</sup>) and hectare (ha)</li> <li>recognising that one hectare is equal to 10 000 square metres</li> <li>finding the relationship between length, breadth and area of squares and rectangles</li> <li>finding the relationship between the base, perpendicular height and area of triangles</li> <li>reading and interpreting scales on maps and simple scale</li> </ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>extend mathematical tasks by asking questions eg 'If I change the dimensions of a rectangle but keep the perimeter the same, will the area change?'</li> <li>interpret measurements on simple plans</li> <li>investigate the areas of rectangles that have the same perimeter</li> <li>understand that the area of rectangles can be found by multiplying the length by the breadth</li> <li>understand that the area of squares can be found by squaring the side length</li> <li>equate 1 hectare to the area of a square with side 100 m</li> </ul>

<p>drawings to calculate an area</p> <ul style="list-style-type: none"> <li>• finding the surface area of rectangular prisms by using a square centimetre grid overlay or by counting unit squares</li> </ul>	
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**Volume and Capacity**  
**– BRAINtastic Category 8 (Measurement)**

<p><b>MS3.3 – Unit 1 (litres and cubic centimetres)</b></p> <p>Selects and uses the appropriate unit to estimate and measure volume and capacity, including the volume of rectangular prisms</p>	<p><b>Key Ideas</b></p> <p>Determine the relationship between cubic centimetres and millilitres  Record volume and capacity using decimal notation to three decimal places</p>
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<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• constructing rectangular prisms using cubic centimetre blocks and counting to determine volume</li> <li>• using the cubic metre as a formal unit for measuring larger volumes</li> <li>• using the cubic centimetre as a formal unit for measuring volume</li> <li>• using the abbreviation for cubic metre (m<sup>3</sup>)</li> <li>• selecting the appropriate unit to measure volume and capacity</li> <li>• finding the relationship between the length, breadth, height and volume of rectangular prisms</li> <li>• equating 1 cubic centimetre to 1 millilitre and 1000 cubic centimetres to 1 litre</li> <li>• recording volume and capacity using decimal notation to three decimal places eg 1.275 L</li> </ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• understand that objects with the same volume may have different shapes</li> <li>• recognising different rectangular prisms that have the same volume</li> <li>•</li> </ul>
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## Mass

### – BRAINTastic Category 8 (Measurement)

<b>MS3.4</b> Selects and uses the appropriate unit to find the mass of objects	<b>Key Ideas</b> Convert between kilograms and grams and between kilograms and tonnes Select and use the appropriate unit to measure mass Record mass using decimal notation to three decimal places
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <b>Students learn about</b> <ul style="list-style-type: none"><li>• using the tonne to record large masses</li><li>• using the abbreviation for tonne (t)</li><li>• converting between kilograms and grams and between kilograms and tonnes</li><li>• selecting and using the appropriate unit to measure mass</li><li>• recording mass using decimal notation to three decimal places eg 1.325 kg</li><li>• relating the mass of one litre of water to one kilogram</li></ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <b>Students learn to</b> <ul style="list-style-type: none"><li>• solve problems involving different units of mass</li><li>• associate gram measures with familiar objects</li><li>• find the approximate mass of a small object by establishing the mass of a number of that object eg 'The stated weight of a box of chocolates is 250 g. If there are 20 chocolates in the box, what does each chocolate weigh?'</li></ul>

## Time

### – BRAINtastic Category 8 (Measurement)

#### MS3.5

Uses twenty-four hour time and am and pm notation in real-life situations

#### Key Ideas

Convert between am and pm notation and 24-hour time  
Compare various time zones in Australia, including during daylight saving  
Use timetables involving 24-hour time

#### Knowledge and Skills

##### Students learn about

- using am and pm notation
- telling the time accurately using 24-hour time eg '2330 is the same as 11:30pm'
- converting between 24-hour time and am or pm notation
- determining the duration of events using starting and finishing times to calculate elapsed time
- comparing various time zones in Australia, including during daylight saving
- reading, interpreting and using timetables from real-life situations, including those involving 24-hour time

#### Working Mathematically

##### Students learn to

- select the appropriate unit to measure time and order a series of events according to the time taken to complete them
- determine the local times in various time zones in Australia
- use bus, train ferry and airline timetables
- use a number of strategies to solve unfamiliar problems

## Three-dimensional Space

### – BRAINtastic Category 9 (Space & Geometry)

<b>SGS3.1</b> Identifies three-dimensional objects, including particular prisms and pyramids, on the basis of their properties	<b>Key Ideas</b> Identify three-dimensional objects, including particular prisms and pyramids, on the basis of their properties
<b>Knowledge and Skills</b> <b>Students learn about</b> <ul style="list-style-type: none"><li>• recognising similarities and differences between pyramids or prisms eg between a triangular prism and a hexagonal prism</li><li>• naming prisms or pyramids according to the shape of their base eg rectangular prism, hexagonal prism</li><li>• identifying and listing the properties of three-dimensional objects</li><li>• visualising three-dimensional objects from different points of view</li><li>• visualising nets for three-dimensional objects</li></ul>	<b>Working Mathematically</b> <b>Students learn to</b> <ul style="list-style-type: none"><li>• ask questions about shape properties when identifying them</li></ul>

## Two-dimensional Space

### – BRAINtastic Category 9 (Space & Geometry)

<b>SGS3.2a</b> Classifies two-dimensional shapes and describes side and angle properties	<b>Key Ideas</b> Identify right-angled, isosceles, equilateral and scalene triangles Identify regular and irregular two-dimensional shapes Identify and name parts of a circle Identify shapes that have rotational symmetry
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<b>Knowledge and Skills</b>	<b>Working Mathematically</b>
<p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• identifying and naming right-angled triangles</li> <li>• identifying and naming isosceles, equilateral and scalene triangles</li> <li>• identifying regular and irregular two-dimensional shapes from descriptions of their side and angle properties</li> <li>• identifying diagonals on two-dimensional shapes</li> <li>• identifying and naming parts of a circle, including the centre, radius, diameter, circumference, sector, semi-circle and quadrant</li> <li>• identifying shapes that have rotational symmetry</li> </ul>	<p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• select a shape from a description of its features</li> <li>• describe side and angle properties of two-dimensional shapes</li> <li>• classify two-dimensional shapes understand the difference between regular and irregular shapes</li> </ul>

**Position**  
**– BRAINtastic Category 9 (Space & Geometry)**

<p><b>SGS2.3</b></p> <p>Uses a variety of mapping skills</p>	<p><b>Key Ideas</b></p> <p>Interpret scales on maps and plans          Makes simple calculations using scale</p>
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<b>Knowledge and Skills</b>	<b>Working Mathematically</b>
<p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• finding a place on a map or in a directory, given its co-ordinates</li> <li>• using scale to calculate the distance between two points on a map</li> </ul> <p>locating a place on a map which is a given direction from a town or landmark eg locating a town that is north-east of Broken Hill</p>	<p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• interpret scales on maps and plans</li> <li>• use street directories to find the route to a given place</li> <li>• describe the direction of one place relative to another eg Perth is west of Sydney</li> </ul>



## BRAINtastic Maths Lower Secondary $\Rightarrow$ NSW Stage 4



### Operations with Whole Numbers

– BRAINtastic Category 1 (Numeration) Category 2 (Addition & Subtraction) Category 3 (Multiplication & Division)

<p><b>NS4.1</b></p> <p>Recognises the properties of special groups of whole numbers and applies a range of strategies to aid computation</p>	<p><b>Key Ideas</b></p> <p>Investigate groups of positive whole numbers          Determine and apply tests of divisibility          Find squares/related square roots; cubes/related cube roots          Use index notation for positive integral indices          Apply mental strategies to aid computation</p>
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• using index notation to express powers of numbers (positive indices only) eg <math>8 = 2^4</math></li> <li>• using the notation for square root (<math>\sqrt{\quad}</math>) and cube root (<math>\sqrt[3]{\quad}</math>)</li> <li>• recognising the link between squares and square roots and cubes and cube roots eg <math>2^3 = 8</math> and <math>\sqrt[3]{8} = 2</math></li> <li>• identifying special groups of numbers including palindromic numbers and Fibonacci numbers</li> <li>• comparing the Hindu-Arabic number system with number systems from different societies past and present</li> <li>• determining and applying tests of divisibility</li> <li>• applying a range of mental strategies to aid computation, for example             <ul style="list-style-type: none"> <li>- a practical understanding of associativity and commutativity eg <math>2 \times 7 \times 5 = 7 \times (2 \times 5) = 7 \times 10 = 70</math></li> <li>- to multiply a number by 12, first multiply by 6 then double the result</li> </ul> </li> </ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• apply tests of divisibility mentally as an aid to calculation</li> <li>• verify the various tests of divisibility</li> </ul>

- to multiply a number by 13, first multiply by 10, then add 3 times the number
- to divide by 20, first halve the number than divide by 10
- a practical understanding of the distributive law eg to multiply any number by 9 first multiply by 10, then subtract the number

## Integers

– BRAINTastic Category 2 (Addition & Subtraction) Category 4 (Multiplication & Division)

### NS4.2

Compares, orders and calculates with integers

### Key Ideas

Perform operations with directed numbers  
Simplify expressions involving grouping symbols and apply order of operations

### Knowledge and Skills

#### Students learn about

- recognise the directions and magnitude of an integer
- ordering directed numbers
- interpreting different meanings (direction or operation) for the + and – signs depending on the context
- adding and subtracting directed numbers
- using grouping symbols as an operator
- applying order of operations to simplify expressions

### Working Mathematically

#### Students learn to

- interpret the use of directed numbers in a real-world context eg the rise and fall of temperature
- apply directed numbers to calculations involving money and temperature

## Fractions, Decimals and Percentages

### – BRAINtastic Category 4 (Fractions & Decimals)

<p><b>NS4.3</b></p> <p>Operates with fractions, decimals, percentages, ratios and rates</p>	<p><b>Key Ideas</b></p> <p>Perform operations with fractions, decimals and mixed numerals Use ratios and rates to solve problems</p>
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b> <i>Fractions, Decimals and Percentages</i></p> <ul style="list-style-type: none"><li>• finding highest common factors and lowest common multiples</li><li>• finding equivalent fractions</li><li>• reducing a fraction to its lowest equivalent form</li><li>• expressing improper fractions as mixed numerals and vice versa</li><li>• adding, subtracting, multiplying and dividing decimals</li><li>• determining the effect of multiplying or dividing by a number less than one</li><li>• rounding decimals to a given number of places</li><li>• converting fractions to decimals and percentages</li><li>• converting percentages to fractions and decimals</li><li>• calculating fractions, decimals and percentages of quantities</li><li>• increasing and decreasing a quantity by a given percentage</li><li>• interpreting and calculating percentages greater than 100% eg an increase from 6 to 18 is an increase of 200%; 150% of \$2 is \$3</li><li>• expressing profit and/or loss as a percentage of cost price or</li></ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"><li>• choose the appropriate form for mental computation eg 10% of \$40 is 1/10 of \$40</li><li>• recognise equivalences when calculating</li><li>• solve a variety of real-life problems involving fractions, decimals and percentages</li><li>• use a number of strategies to solve unfamiliar problems</li><li>• evaluate best buys and special offers</li></ul>

<p>selling price</p> <ul style="list-style-type: none"> <li>• ordering fractions, decimals and percentages</li> <li>• expressing one quantity as a fraction or a percentage of another eg 15 minutes as <math>\frac{1}{4}</math> or 25% of an hour</li> </ul> <p><b>Ratio and Rates</b></p> <ul style="list-style-type: none"> <li>• using ratio to compare quantities of the same type</li> <li>• writing ratios in various forms</li> <li>• simplify ratios</li> <li>• apply the unitary method to ratio problems</li> <li>• dividing a quantity in a given ratio</li> <li>• interpreting and calculating ratios that involve more than two numbers</li> <li>• calculating speed given distance and time</li> <li>• calculating rates from given information eg 150 kilometres travelled in 2 hours</li> </ul>	<ul style="list-style-type: none"> <li>• interpret descriptions of products that involve fractions, decimals, percentages or ratios eg on labels of packages</li> <li>• solve a variety of real-life problems involving ratios eg scales on maps, mixes for fuels or concrete, gear ratios</li> <li>• solve a variety of real-life problems involving rates eg batting and bowling strike rates, telephone rates, speed, fuel consumption</li> </ul>
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**Chance**  
**– BRAINtastic Category 5 (Chance)**

<p><b>NS2.5</b></p> <p>Solve probability problems involving simple events</p>	<p><b>Key Ideas</b></p> <p>Determine the probability of simple events  Solve simple probability problems  Recognise complementary events</p>
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<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• listing all possible outcomes of a simple event</li> <li>• assigning probabilities to simple events by reasoning about equally likely outcomes eg the probability of a 5 resulting from the throw of a fair die is <math>\frac{1}{6}</math></li> <li>• expressing the probability of a particular outcome as a</li> </ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• solve simple probability problems arising in games</li> <li>• use language associated with chance events appropriately</li> <li>• interpret and use probabilities expressed as percentages or decimals</li> </ul>
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<p>fraction between 0 and 1</p> <ul style="list-style-type: none"> <li>• assigning a probability of zero to events that are impossible and a probability of one to events that are certain</li> <li>• recognising that the sum of the probabilities of all possible outcomes of a simple event is 1</li> <li>• finding the probability of a complementary event</li> </ul>	
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**Algebraic Techniques**  
**– BRAINTastic Category 6 (Patterns & Algebra)**

<p><b>PAS4.1</b></p> <p>Uses letters to represent numbers and translates between words and algebraic symbols</p>	<p><b>Key Ideas</b></p> <p>Use letters to represent numbers          Translate between words and algebraic symbols and between algebraic symbols and words          Recognise and use simple equivalent algebraic expressions</p>
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<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• using letters (pronumerals) to represent numbers and developing the notion that a letter is used to represent a variable</li> <li>• recognising and using equivalent algebraic expressions              eg <math>y + y + y + y = 4y</math>  <math>w \times w = w^2</math>  <math>a \times b = ab</math>  <math>a \div b = \frac{a}{b}</math></li> <li>• translating between words and algebraic symbols and between algebraic symbols and words</li> </ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• generate a variety of equivalent expressions that represent a particular situation or problem</li> <li>• link algebra with generalised arithmetic eg for the commutative property, determine that <math>a + b = b + a</math></li> <li>• determine equivalence of algebraic expressions by substituting a given number for the letter</li> </ul>
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## Number Patterns

### – BRAINTastic Category 6 (Patterns & Algebra)

#### PAS4.2

Creates, records, analyses and generalises number patterns using words and algebraic symbols in a variety of ways

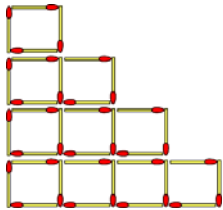
#### Key Ideas

Create, record and describe number patterns using words  
Use algebraic symbols to translate descriptions of number patterns  
Represent number pattern relationships as points on a grid

#### Knowledge and Skills

##### Students learn about

- using a process that consists of building a geometric pattern, completing a table of values, describing the pattern of words and algebraic symbols and representing the relationship on a graph:
  - modelling geometric patterns using materials such as matchsticks to form squares eg



- describing the pattern in a variety of ways that relate to the different methods of building the squares
- forming and completing a table of values for the geometric pattern
- determining a rule in words to describe the pattern from the table
- using algebraic symbols to create an equation that describes the pattern

#### Working Mathematically

##### Students learn to

- ask questions about how number patterns have been created and how they can be continued
- record number patterns using words and algebraic symbols
- check pattern descriptions by substituting further values
- describe the pattern formed by plotting points from a table and suggest another set of points that might form the same pattern
- play 'guess my rule' games, describing the rule in words and algebraic symbols where appropriate
- represent and apply patterns and relationships in algebraic forms

<ul style="list-style-type: none"> <li>- using the rule to calculate the corresponding value for a larger number</li> <li>• using a process that consists of identifying a number pattern (including decreasing patterns), completing a table of values, describing the pattern in words and algebraic symbols, and representing the relationship on a graph</li> </ul>	
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**Algebraic Techniques**  
**– BRAINtastic Category 6 (Patterns & Algebra)**

<p><b>PAS4.3</b>          Uses the algebraic symbol system to simplify, expand and factorise simple algebraic expressions</p>	<p><b>Key Ideas</b>          Use the algebraic symbol system to simplify, expand and factorise simple algebraic expressions          Substitute into algebraic expressions</p>
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<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>• recognising like terms and adding and subtracting like terms to simplify algebraic expressions eg <math>2n + 4m + n = 4m + 3n</math></li> <li>• recognising the role of grouping symbols and the different meanings of expressions, such as <math>2a + 1</math> and <math>2(a + 1)</math></li> <li>• simplifying algebraic expressions that involve multiplication and division eg <math>12a + 3</math>  <math>4x \times 3</math>  <math>2ab \times 3a</math></li> <li>• simplifying expressions that involve simple algebraic fractions eg <math>\frac{a}{2} + \frac{a}{3}</math> and <math>\frac{2x}{5} - \frac{x}{3}</math></li> <li>• expanding algebraic expressions by removing grouping symbols (the distributive property)            eg <math>3(a + 2) = 3a + 6</math></li> </ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• generate a variety of equivalent expressions that represent a particular situation or problem</li> <li>• determine whether a simplified expression is correct by substituting numbers for letters</li> <li>• determine whether a particular pattern can be described using algebraic symbols</li> </ul>
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<p> <math>-5(x + 2) = -5x - 10</math>  <math>a(a + b) = a^2 + ab</math> </p> <ul style="list-style-type: none"> <li>factorising algebraic expressions by finding a common factor  eg <math>6a + 12 = 6(a + 2)</math>  <math>x^2 + 5x = x(x + 5)</math>  <math>5ab + 10a = 5a(b + 10)</math>  <math>-4t - 12 = -4(t + 3)</math> </li> <li>substituting into algebraic expressions</li> <li>generating a number pattern from an algebraic expression</li> <li>replacing written statements describing patterns with equations written in algebraic symbols eg 'you add five to the first number to get the second number' could be replaced with <math>y = x + 5</math></li> <li>translating from everyday language to algebraic language and from algebraic language into everyday language</li> </ul>	
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**Algebraic Techniques**  
**– BRAINTastic Category 6 (Patterns & Algebra)**

<p><b>PAS4.4</b>  Uses algebraic techniques to solve linear equations</p>	<p><b>Key Ideas</b>  Solve linear equations and word problems using algebra</p>
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"> <li>solving linear equations using strategies such as guess and check and improve, and backtracking (reverse flow charts)</li> <li>solving equations using algebraic methods that involve up to and including three steps in the solution process and have solutions that are not necessarily whole numbers</li> <li>translating a word problem into an equation, solving the equation and translating the solution into an answer to the problem</li> </ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>create equations to solve a variety of problems</li> <li>use algebraic techniques as a tool for problem-solving</li> <li>construct formulae for finding areas of common geometric figures eg area of a triangle</li> <li>substitute into formulae used in other strands of the syllabus or in other key learning areas and interpret the solutions</li> </ul>



- solving equations arising from substitution into formulae eg given  $P = 2l + 2b$  and  $P = 20, l = 6$ , solve for  $b$

## Linear Relationships

### – BRAINTastic Category 6 (Patterns & Algebra)

#### PAS4.4

Graphs and interprets linear relationships on the number plane

#### Key Ideas

Interpret the number plane and locate ordered pairs  
Graph and interpret linear relationships created from simple number patterns and equations

#### Knowledge and Skills

##### Students learn about

- interpreting the number plane formed from the intersection of a horizontal  $x$ -axis and vertical  $y$ -axis and recognising similarities and differences between points located in each of the four quadrants
- identifying the point of intersection of the two axes as the origin, having the co-ordinates  $(0,0)$
- reading, plotting and naming ordered pairs on the number plane including those with values that are not whole numbers
- graphing points on the number plane from a table of values, using an appropriate scale
- graphing more than one line on the same set of axes and comparing the graphs to determine similarities and differences eg parallel, passing through the same point
- graphing two intersecting lines on the same set of axes and reading off the point of intersection

#### Working Mathematically

##### Students learn to

- relate the location of points on a number plane to maps, plans, street directories and theatre seating and note the different recording conventions
- compare similarities and differences between sets of linear relationships
- understand the significance to the point of intersection of two lines in relation to its being the solution of each equation
- describe which term affects the slope of a graph, making it increasing or decreasing

## Data Representation

### – BRAINTastic Category 7 (Data)

<b>DS4.1</b> Reads and interprets graphs, tables and charts with statistical information	<b>Key Ideas</b> Interpret graphs (line, sector, travel, step, conversion, divided bar, dot plots and stem-and-leaf plots), tables and charts Construct frequency tables
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"><li>• interpreting graphs of the following types:<ul style="list-style-type: none"><li>- sector graphs</li><li>- conversion graphs</li><li>- divided bar graphs</li><li>- line graphs</li><li>- step graphs</li></ul></li><li>• interpreting travel graphs, recognising concepts such as change of speed and change of direction</li><li>• using line graphs for continuous data only</li><li>• reading and interpreting tables, charts and graphs</li><li>• using a tally to organise data into a frequency distribution table</li><li>• drawing and using dot plots</li><li>• drawing and using stem-and-leaf plots</li></ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"><li>• write a story which matches a given travel graph</li><li>• read and comprehend a variety of data displays used in the media and in other school subject areas</li><li>• interpret the findings displayed in a graph eg the graph shows that the heights of all the children in the class are between 140 cm and 175 cm and that most are in the group 151 – 155 cm</li></ul>

**Data Analysis and Evaluation**  
**– BRAINtastic Category 7 (Data)**

<b>DS4.2</b> Analyses data using measures of location and range	<b>Key Ideas</b> Analyse data using mean, mode, median and range
<b>Knowledge and Skills</b> <b>Students learn about</b> <ul style="list-style-type: none"><li>• finding measure so location (mean, mode, median) for small sets of data</li><li>• using measures of location (mean, mode, median) and the range to analyse data that is displayed in a frequency distribution table, stem-and-leaf plot, or dot plot</li><li>• analysing categorical data eg a survey of car colours</li></ul>	<b>Working Mathematically</b> <b>Students learn to</b> <ul style="list-style-type: none"><li>• draw conclusions based on the analysis of data (eg a survey of the school canteen food) using the mean, mode and/or median and range</li></ul>

## Perimeter and Area

### – BRAINtastic Category 8 (Measurement)

<p><b>MS4.1</b></p> <p>Uses formulae and Pythagoras's theorem in calculating perimeter and area of circles and figures composed of rectangle and triangles</p>	<p><b>Key Ideas</b></p> <p>Develop formulae and use to find the area and perimeter of triangles, rectangles and parallelograms Find the areas of simple composite figures Apply Pythagoras's theorem Investigate and find the area and circumference of circles Convert between metric units of length and area</p>
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <p><b><i>Length and Perimeter</i></b></p> <ul style="list-style-type: none"><li>• interpreting the meaning of the prefixes 'milli', 'centi' and 'kilo'</li><li>• converting between metric units of length</li><li>• finding the perimeter of simple composite figures</li></ul> <p><b><i>Pythagoras's Theorem</i></b></p> <ul style="list-style-type: none"><li>• identifying the hypotenuse as the longest side in any right-angled triangle and also as the side opposite the right angle</li><li>• using Pythagoras's theorem to find the length of the sides in right-angles triangles</li><li>• identifying a Pythagorean triad as a set of three numbers such that the sum of the squares of the first two equals the square of the third</li><li>• using the converse of Pythagoras's theorem to establish whether a triangle has a right angle</li></ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"><li>• describe the relationships between the sides of a right-angled triangle</li><li>• use Pythagoras's Theorem to solve problems involving perimeter and area</li><li>• identify the perpendicular height of triangles and parallelograms in different orientations</li><li>• find the dimensions of a square given its perimeter, and of a rectangle given its perimeter and one side length</li><li>• solve problems related to perimeter, area and circumference</li><li>• compare rectangles with the same area and answer questions related to their perimeter such as whether they have the same perimeter</li><li>• compare various shapes with the same perimeter and answer questions related to their area such as whether they have the same area</li><li>• use mental strategies to estimate the circumference of a</li></ul>

<p><b>Areas of Squares, Rectangles, Triangles and Parallelograms</b></p> <ul style="list-style-type: none"> <li>• developing and using formulae for the area of a square and rectangle</li> <li>• developing (by forming a rectangle) and using the formula for the area of a triangle</li> <li>• finding the areas of simple composite figures that may be dissected into rectangles and triangles</li> <li>• convert between metric units of area  <math>1 \text{ cm}^2 = 100 \text{ mm}^2</math>, <math>1 \text{ m}^2 = 1\,000\,000 \text{ mm}^2</math>,  <math>1 \text{ ha} = 10\,000 \text{ m}^2</math>, <math>1 \text{ km}^2 = 1\,000\,000 \text{ m}^2 = 100 \text{ ha}</math></li> </ul> <p>Circumferences and Areas of Circles</p> <ul style="list-style-type: none"> <li>• developing formulae to calculate the circumference of circles in terms of radius <math>r</math> or diameter <math>d</math>  <math>C = \pi d</math> or <math>C = 2\pi r</math></li> </ul>	<ul style="list-style-type: none"> <li>• circle, using an approximate value of <math>\pi</math>, eg <math>\pi = 3</math></li> <li>• find radii of circles given their circumference or area</li> <li>• solve problems involving <math>\pi</math></li> </ul>
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**Surface Area and Volume**  
– BRAINtastic Category 8 (Measurement)

<p><b>MS4.2</b></p> <p>Calculates surface area of rectangular and triangular prisms and volume of right prisms and cylinders</p>	<p><b>Key Ideas</b></p> <p>Find the surface area of rectangular and triangular prisms  Find the volume of right prisms and cylinders  Convert between metric units of volume</p>
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b>  <b>Surface Area of Prisms</b></p> <ul style="list-style-type: none"> <li>• identifying the surface area of rectangular and triangular prisms</li> </ul> <p>Volume of Prisms</p> <ul style="list-style-type: none"> <li>• converting between units of volume</li> </ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• solve problems involving surface area of rectangular and triangular prisms</li> <li>• solve problems involving volume and capacity of right prisms and cylinders</li> </ul>

1 cm<sup>3</sup> = 1000 mm<sup>3</sup>, 1 L = 1000 mL = 1000 cm<sup>3</sup>  
1 m<sup>3</sup> = 1000 L = 1 kL

- using the kilolitre as a unit in measuring large volumes
- identifying the cross-section of a prism
- developing the formula for volume of prisms by considering the number and volume of layers of identical shape

$$\text{Volume} = \text{base area} \times \text{height}$$

- calculating the volume of a prism given its perpendicular height and the area of its cross-section
- calculating the volume of prisms with cross-sections that are rectangular and triangular

Volume of Cylinders

- developing and using the formula to find the volume of cylinders (r is the length of the radius of the base and h is the perpendicular height)

$$V = \pi r^2 h$$

## Time

### – BRAINtastic Category 8 (Measurement)

<b>MS4.3</b> Performs calculations of time that involve mixed units	<b>Key Ideas</b> Perform operations involving time units Use international time zones to compare times Interpret a variety of tables and charts related to time
<b>Knowledge and Skills</b> <b>Students learn about</b> <ul style="list-style-type: none"><li>• adding and subtracting time mentally using bridging strategies</li><li>• comparing times and calculating time differences between major cities of the world eg 'Given that London is 10 hours behind Sydney, what time is it in London when it is 6:00 pm in Sydney?'</li><li>• interpreting and using tables relating to time eg tide charts, sunrise/sunset tables, bus, train and airline timetables, standard time zones</li></ul>	<b>Working Mathematically</b> <b>Students learn to</b> <ul style="list-style-type: none"><li>• solve problems involving calculations with mixed time units eg 'How old is a person today if he/she was born on 30/6/1989?'</li></ul>

## Properties of Solids

### – BRAINtastic Category 9 (Space & Geometry)

<b>SGS2.1</b> Describes three-dimensional solids including polyhedra, and classifies them in terms of their properties	<b>Key Ideas</b> Determine properties of three-dimensional objects Investigate Platonic solids Investigate Euler’s relationship for convex polyhedra
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <ul style="list-style-type: none"><li>describing solids in terms of their geometric properties<ul style="list-style-type: none"><li><i>number of faces</i></li><li><i>shape of faces</i></li><li><i>number and type of congruent faces</i></li><li><i>number of vertices</i></li><li><i>number of edges</i></li><li><i>convex or non-convex</i></li></ul></li><li>classifying solids on the basis of their properties<ul style="list-style-type: none"><li><i>A polyhedron is a solid whose faces are all flat.</i></li><li><i>A prism has a uniform polygonal cross-section.</i></li><li><i>A cylinder has a uniform circular cross-section.</i></li><li><i>All points on the surface of a sphere are a fixed distance from its centre.</i></li></ul></li><li>using Euler’s formula <math>F + V = E + 2</math> relating the number of faces (<math>F</math>), the number of vertices (<math>V</math>) and the number of edges (<math>E</math>)</li></ul> <p>exploring the history of Platonic solids</p>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"><li>recognise solids with uniform and non-uniform cross-sections</li><li>visualise and name a common solid given its net</li><li>recognise whether a diagram is the net of a solid</li><li>identify parallel and perpendicular lines in the environment</li></ul>



## Angles

### – BRAINtastic Category 9 (Space & Geometry)

#### SGS4.2

Identifies and names angles formed by the intersection of straight lines, including those related to transversals on sets of parallel lines, and makes use of the relationships between them

#### Key Ideas

Classify angles and determine angle relationships  
Identify parallel and perpendicular lines and determine associated angle properties  
Complete simple numerical exercises based on geometrical properties

#### Knowledge and Skills

##### Students learn about

##### *Angles at a Point*

- labelling and naming points, lines and intervals using capital letters
- labelling the vertex and arms of an angle using capital letters
- labelling and naming angles using the  $\angle A$  and  $\angle XYZ$  notation
- using the common conventions to indicate right angles and equal angles on diagrams
- identifying adjacent angles, vertically opposite angles, straight angles and angles of complete revolution, embedded in a diagram
- using the words 'complementary' and 'supplementary' for angles adding to  $90^\circ$  and  $180^\circ$  respectively
- using the equality of vertically opposite angles

##### *Angles Associated with Transversals*

- identifying and naming a pair of parallel lines and a transversal
- using common symbols for 'is parallel to' ( $\parallel$ ) and 'is perpendicular to' ( $\perp$ )

#### Working Mathematically

##### Students learn to

- recognise that adjacent angles adding to  $90^\circ$  form a right angle
- recognise that adjacent angles adding to  $180^\circ$  form a straight line
- recognise that adjacent angles adding to  $360^\circ$  form a complete revolution
- find the unknown angle in a diagram using angle results
- apply angle and parallel line results to determine properties of two-dimensional shapes such as the square, rectangle, parallelogram, rhombus and trapezium
- identify parallel and perpendicular lines in the environment

<ul style="list-style-type: none"> <li>• recognising the common conventions to indicate parallel lines on diagrams</li> <li>• identifying the alternate angle pairs, the corresponding angle pairs and the co-interior angle pairs for two lines cut by a transversal</li> <li>• recognising the equal and supplementary angles formed when a pair of parallel lines are cut by a transversal</li> <li>• using angle properties to identify parallel lines</li> <li>• using angle relationships to find unknown angles in diagrams</li> </ul>	
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**Properties of Geometrical Figures**  
**– BRAINtastic Category 9 (Space & Geometry)**

<p><b>SGS4.3</b>  Classifies and determines that properties of triangles and quadrilaterals</p>	<p><b>Key Ideas</b>  Classify and determine properties of triangles and quadrilaterals  Complete simple numerical exercises based on geometrical properties</p>
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<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b></p> <p><b>Notation</b></p> <ul style="list-style-type: none"> <li>• labelling and naming triangles (eg ABC) and quadrilaterals (eg ABCD) in text and on diagrams</li> <li>• using the common conventions to mark equal intervals on diagrams</li> </ul> <p><b>Triangles</b></p> <ul style="list-style-type: none"> <li>• recognising and classifying types of triangles on the basis of their properties</li> </ul> <p>Quadrilaterals</p> <ul style="list-style-type: none"> <li>• investigating the properties of special quadrilaterals</li> </ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• label triangles and quadrilaterals from a given verbal description</li> <li>• recognise that a given triangle may belong to more than one class</li> <li>• recognise that the longest side of a triangle is always opposite the largest angle</li> <li>• recognise special types of triangles and quadrilaterals embedded in composite figures</li> <li>• determine if particular triangles and quadrilaterals have line symmetry</li> </ul>
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<p>(trapeziums, kites, parallelograms, rectangles, squares and rhombuses) by applying geometrical reasoning. Properties to be considered include:</p> <p><i>opposite sides parallel</i>  <i>opposites equal</i>  <i>adjacent sides perpendicular</i>  <i>opposite sides equal</i>  <i>diagonals equal in length</i>  <i>diagonals bisect each other</i>  <i>diagonals bisect each other at right angles</i>  <i>diagonals bisect the angles of the quadrilateral</i></p> <ul style="list-style-type: none"> <li>• investigate the line symmetries of the special quadrilaterals</li> <li>• classifying special quadrilaterals on the basis of their properties</li> </ul> <p><b>Circles</b></p> <ul style="list-style-type: none"> <li>• identifying and naming parts of the circle and related lines, including arc, tangent and chord</li> <li>• investigating the line symmetries of circles and of diagrams involving circles, such as a sector and a circle with a chord or tangent</li> </ul>	<ul style="list-style-type: none"> <li>• apply geometrical facts, properties and relationships to solve numerical problems such as finding unknown sides and angles in diagrams</li> </ul>
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**Properties of Geometrical Figures**  
**– BRAINTastic Category 9 (Space & Geometry)**

<p><b>SGS4.4</b>  Identifies congruent and similar two-dimensional figures stating the relevant conditions</p>	<p><b>Key Ideas</b>  Identify congruent figures</p>
<p style="text-align: center;"><b>Knowledge and Skills</b></p> <p><b>Students learn about</b>  <b>Similarity</b></p> <ul style="list-style-type: none"> <li>• using the term ‘similar’ for any two figures that have the same shape but not necessarily the same size</li> </ul>	<p style="text-align: center;"><b>Working Mathematically</b></p> <p><b>Students learn to</b></p> <ul style="list-style-type: none"> <li>• apply geometrical facts, properties and relationships to solve problems such as finding unknown sides and angles in diagrams</li> </ul>

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|--|--|
|  | <ul style="list-style-type: none"><li>• recognise that area, length of matching sides and angle sizes are preserved in congruent figures</li></ul> |
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