MATHS PROGRAM : STAGE TWO

YEAR THREE

WEEKLY ROUTINE

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Terms 1-4</td></tr>
<tr><td colspan="3">Number & Algebra ⟶
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Terms 1-4 : Multiplication & Division 1
Terms 1 & 3: Patterns and Algebra 1
Terms 2 & 4: Fractions and Decimals 1</td><td></td><td></td></tr>
<tr><td></td><td></td><td>Statistics & Probability ⟶
Terms 1 & 3: Data 1
Terms 2 & 4: Chance 1</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td colspan="2">Measurement & Geometry ⟶
Term 1: Length 1 / Time 1 / 2D 1 / Position 1
Term 2: Mass 1 / 3D 1 / Angles 1
Term 3: Volume and Capacity 1 / Time 1 / 2D 1 / Position 1
Term 4: Area 1 / 3D1 / Angles 1</td></tr>
</table>

Sharon Tooney

K-6 MATHEMATICS SCOPE AND SEQUENCE

	NUMBER AND ALGEBRA					MEASUREMENT AND GEOMETRY									STATISTICS & PROBABILITY		TERM
	Whole Number	Addition & Subtraction	Multiplication & Division	Fractions & Decimals	Patterns & Algebra	Length	Area	Volume & Capacity	Mass	Time	3D	2D	Angles	Position	Data	Chance	
K	✓	✓			✓	✓				✓		✓					1
	✓		✓	✓	✓				✓		✓			✓	✓		2
	✓	✓			✓			✓		✓		✓					3
	✓		✓	✓	✓		✓				✓			✓	✓		4
Yr 1	✓	✓			✓	✓				✓		✓			✓		1
	✓		✓	✓					✓		✓			✓		✓	2
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	✓		✓	✓			✓				✓			✓		✓	4
Yr 2	✓	✓			✓	✓				✓		✓			✓		1
	✓		✓	✓					✓		✓			✓		✓	2
	✓	✓			✓			✓		✓		✓			✓		3
	✓		✓	✓			✓				✓			✓		✓	4
Yr 3	✓	✓	✓		✓	✓				✓		✓		✓	✓		1
	✓	✓	✓	✓					✓		✓		✓			✓	2
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	✓	✓	✓	✓			✓				✓		✓			✓	4
Yr 4	✓	✓	✓		✓	✓				✓		✓		✓	✓		1
	✓	✓	✓	✓					✓		✓		✓			✓	2
	✓	✓	✓		✓			✓		✓		✓		✓	✓		3
	✓	✓	✓	✓			✓				✓		✓			✓	4
Yr 5	✓	✓	✓		✓	✓				✓		✓		✓	✓		1
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Yr 6	✓	✓	✓		✓	✓				✓		✓		✓	✓		1
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	✓	✓	✓	✓			✓				✓		✓			✓	4

NB: Where a content strand has a level 1 & 2, the 1 refers to the lower grade within the stage, eg. Whole Number 1 in S1 is for Yr 1, Whole Number 2 is for Yr 2.

Sharon Tooney

MATHEMATICS PROGRAM PROFORMA

STAGE:				STRAND:	TERM:				WEEK:									
ES1	S1	**S2**	S3	NUMBER AND ALGEBRA	1	2	3	3	1	2	3	4	5	6	7	8	9	10

SUBSTRAND: Whole Number 1

OUTCOMES

A student:

› uses appropriate terminology to describe, and symbols to represent, mathematical ideas MA2-1WM

› selects and uses appropriate mental or written strategies, or technology, to solve problems MA2-2WM

› checks the accuracy of a statement and explains the reasoning used MA2-3WM

› applies place value to order, read and represent numbers of up to five digits MA2-4NA

Learning Across The Curriculum

Cross-curriculum priorities

☐ Aboriginal &Torres Strait Islander histories & cultures
☐ Asia & Australia's engagement with Asia
☐ Sustainability

General capabilities

☐ Critical & creative thinking
☐ Ethical understanding
☐ Information & communication technology capability
☐ Intercultural understanding
☐ Literacy
☐ Numeracy
☐ Personal & social capability

Other learning across the curriculum areas

☐ Civics & citizenship
☐ Difference & diversity
☐ Work & enterprise

KEY CONSIDERATIONS

Background Information

The place value of digits in various numerals should be investigated. Students should understand, for example, that the '5' in 35 represents 5 ones, but the '5' in 53 represents 50 or 5 tens.

Language

Students should be able to communicate using the following language: number before, number after, more than, **greater than**, less than, **largest number**, **smallest number**, **ascending order**, **descending order**, digit, zero, ones, groups of ten, tens, groups of one hundred, hundreds, **groups of one thousand**, **thousands**, **place value**, round to.

The word 'and' is used between the hundreds and the tens when reading and writing a number in words, but not in other places, eg 3568 is read as 'three thousand, five hundred and sixtyeight'.

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

OVERVIEW

Recognise, model, represent and order numbers to at least 10 000

• represent numbers of up to four digits using objects, words, numerals and digital displays

- make the largest and smallest number from four given digits

• identify the number before and after a given two-, three- or four-digit number

- describe the number before as 'one less than' and the number after as 'one more than' a given number

• count forwards and backwards by tens and hundreds on and off the decade, eg 1220, 1230, 1240, … (on the decade); 423, 323, 223, … (off the decade)

• arrange numbers of up to four digits in ascending and descending order

- use place value to compare and explain the relative size of four-digit numbers

• use the terms and symbols for 'is less than' and 'is greater than' to show the relationship between two numbers

Apply place value to partition, rearrange and regroup numbers to at least 10 000 to assist calculations and solve problems

• apply an understanding of place value and the role of zero to read, write and order numbers of up to four digits

- interpret four-digit numbers used in everyday contexts

• use place value to partition numbers of up to four digits, eg 3265 as 3 groups of one thousand, 2 groups of one hundred, 6 groups of ten and 5 ones

• state the 'place value' of digits in numbers of up to four digits, eg 'In the number 3426, the place value of the "4" is 400 or 4 hundreds'

• record numbers of up to four digits using place value, eg 5429 = 5000 + 400 + 20 + 9

• partition numbers of up to four digits in non-standard forms, eg 3265 as 32 hundreds and 65 ones

• round numbers to the nearest ten, hundred or thousand

Sharon Tooney

CONTENT	WEEK	TEACHING, LEARNING and ASSESSMENT	ADJUSTMENTS	RESOURCES
Recognise, model, represent and order numbers to at least 10 000 ***Apply place value to partition, rearrange and regroup numbers to at least 10 000 to assist calculations and solve problems***	**1-2**	**Counting Races** Students are divided into two groups. The teacher nominates a starting number eg 231. One group counts by tens, while the other counts by hundreds from the starting number. Both groups start counting and are asked to stop at the same time. Before commencing the activity, students discuss: - will both groups start/finish on the same number? Why? - which group will stop on the highest number? Why? - will both groups count number 281? Why?/Why not? - what are some of the numbers both groups will count? - what is a number only your group will count? *Variation:* Students play 'Buzz' counting by tens on and off the decade. They 'buzz' on the hundreds.	Use prompts as necessary	
	3-4	**Three- and Four-Digit Numbers** In small groups, students use a pack of playing cards with the tens and picture cards removed. The Aces are retained and count as 1 and the Jokers are retained and count as 0. Student A turns over the first 3 cards and each player makes a different three digit number. Student A records the numbers and puts the cards at the bottom of the pile. They each take a turn turning over three cards and recording the group's three-digit numbers. When each student has had a turn they sort and order their numbers. Students extend the game by making four-digit numbers. Possible questions include: - can you read each number aloud? - can you order the numbers in ascending and descending order? - can you state the place value of each numeral? - what is the largest/smallest number you can make using three cards/four cards? - what is the next largest/smallest number you can make using three cards/four cards? - can you identify the number before/after one of your three digit/four-digit numbers? - can you find a pattern? How can you describe your pattern? How can you continue the pattern? - how many different ways can you represent each number? (expanded notation, in words) - can you count forwards/backwards by tens/hundreds from one of your three-digit/four-digit numbers? - can you round one of your three-digit or four-digit numbers to the nearest hundred/thousand? *Variation:* Students could represent numbers using numeral expanders, Base 10 material, or expanded notation, to show place value.	Reduce/extend the number of digits	playing cards, numeral expanders, base 10 materials
	5	**Four-Digit Number Hunt** Students investigate examples of numbers up to 9999 seen in the environment, the media, on the internet, or on car number plates. Students make displays where possible. Students discuss the use of zero as a place holder and at the beginning of a number eg 8065, ARK – 082. Students discuss the place value of the numerals eg where all numbers are the same, as in 3333.	*Extension:* Students put numerals in ascending and descending order. Reduce/extend the number of digits	

	6	**Less Than and Greater Than, Ordering** **Part A** In pairs, students are given three different-coloured dice, representing hundreds, tens and ones. Students take turns to throw the dice, record their three-digit number and state the number before and after.	Reduce/extend the number of digits	coloured dice, paper and pencils
	7	**Less Than and Greater Than, Ordering** **Part B** In pairs, students are given three different-coloured dice, representing hundreds, tens and ones. Students take turns to throw the dice and record their three-digit number. Students nominate whether they are 'greater than' or 'less than.' They compare their numbers by showing the relationship between the two three-digit numbers they have made by using a < or > sign eg Student A rolls 431 and is 'greater than' and Student B rolls 146 and is 'less than'. Student B wins the point. The winner is the first to 20. This activity could be repeated using four dice.	Reduce/extend the number of digits	coloured dice, paper and pencils
	8	**Wipe-Out** Students are asked to enter a four-digit number into a calculator eg 2657. The teacher then asks the students to 'wipe out' one digit ie change it to a zero. In the example above, 'wiping out the 5' would require a student to change the number to 2607 by subtracting 50. Students could demonstrate this using Base 10 material.	Reduce/extend the number of digits	calculator, base 10 material
	9	**Revisit a Selection of Above Activities**		
	10	**Revision** **Assessment**		

ASSESSMENT OVERVIEW

MATHEMATICS PROGRAM PROFORMA

STAGE:				STRAND:	TERM:				WEEK:									
ES1	S1	S2	S3	NUMBER AND ALGEBRA	1	2	3	3	1	2	3	4	5	6	7	8	9	10

SUBSTRAND: Addition and Subtraction 1

OUTCOMES

A student:

› uses appropriate terminology to describe, and symbols to represent, mathematical ideas MA2-1WM

› selects and uses appropriate mental or written strategies, or technology, to solve problems MA2-2WM

› checks the accuracy of a statement and explains the reasoning used MA2-3WM

› uses mental and written strategies for addition and subtraction involving two-, three-, four and five-digit numbers MA2-5NA

Learning Across The Curriculum

Cross-curriculum priorities

☐ Aboriginal &Torres Strait Islander histories & cultures
☐ Asia & Australia's engagement with Asia
☐ Sustainability

General capabilities

☐ Critical & creative thinking
☐ Ethical understanding
☐ Information & communication technology capability
☐ Intercultural understanding
☐ Literacy
☐ Numeracy
☐ Personal & social capability

Other learning across the curriculum areas

☐ Civics & citizenship
☐ Difference & diversity
☐ Work & enterprise

KEY CONSIDERATIONS

Background Information

An inverse operation is an operation that reverses the effect of the original operation. Addition and subtraction are inverse operations; multiplication and division are inverse operations.

In Stage 2, it is important that students apply and extend their repertoire of mental strategies for addition and subtraction. The use of concrete materials to model the addition and subtraction of two or more numbers, with and without trading, is intended to provide a foundation for the introduction of the formal algorithm in Addition and Subtraction 2.

One-cent and two-cent coins were withdrawn by the Australian Government in 1990. Prices can still be expressed in one-cent increments, but the final bill is rounded to the nearest five cents (except for electronic transactions), eg
$5.36, $5.37 round to $5.35
$5.38, $5.39, $5.41, $5.42 round to $5.40
$5.43, $5.44 round to $5.45.

Language

Students should be able to communicate using the following language: plus, add, **addition**, minus, the difference between, **subtract**, **subtraction**, equals, is equal to, is the same as, number sentence, empty number line, strategy, **digit**, **estimate**, **round to**.

Students need to understand the different uses for the = sign, eg 4 + 1 = 5, where the = sign indicates that the right side of the number sentence contains 'the answer' and should be read to mean 'equals', compared to a statement of equality such as 4 + 1 = 3 + 2, where the = sign should be read to mean 'is the same as'.

OVERVIEW

Recall addition facts for single-digit numbers & related subtraction facts to develop increasingly efficient mental strategies for computation

• add 3 or more single-digit numbers
• model & apply the associative property of add to aid mental computation, eg 2 + 3 + 8 = 2 + 8 + 3 = 10 + 3 = 13
• apply known single-digit add & sub facts to mental strategies for add & sub of 2, 3 & 4 digit numbers, including:
- ➢ the jump strategy on an empty number line, eg 823 + 56: 823 + 50 = 873, 873 + 6 = 879
- ➢ the split strategy, eg 23 + 35: 20 + 30 + 3 + 5 = 58
- ➢ the compensation strategy, eg 63 + 29: 63 + 30 = 93, subtract 1 to obtain 92
- ➢ using patterns to extend number facts, eg 500 – 200: 5 – 2 = 3, so 500 – 200 = 300
- ➢ bridging the decades, eg 34 + 26: 34 + 6 = 40, 40 + 20 = 60
- ➢ changing the order of addends to form multiples of 10, eg 16 + 8 + 4: add 16 to 4 first
- ➢ using place value to partition numbers, eg 2500 + 670: 2500 + 600 + 70 = 3170
- ➢ partitioning numbers in non-standard forms, eg 500 + 670: 670 = 500 + 170, so 500 + 670 = 500 + 500 + 170, which is 1000 + 170 = 1170

- choose & apply efficient strategies for add & sub
- discuss & compare different methods of add & sub
• use concrete materials to model add & sub of 2 or more numbers, with & without trading, & record the method used
• select, use & record a variety of mental strategies to solve add & sub problems, including word problems, with numbers up to 4 digits
- give a reasonable estimate for a problem, explain how the estimate was obtained, & check the solution
• use the = sign to record equivalent number sentences involving add & sub & so to mean is the same as, rather than to mean to perform an operation, eg 32 – 13 = 30 – 11
- check given number sentences to determine if they are true/ false & explain why, eg 'Is 39 – 12 = 15 + 11 true? Why/not?'

Recognise & explain connection between addition & subtraction

• demonstrate how add & sub are inverse operations
• explain & check solutions to problems, including using inverse operation

Represent money values in multiple ways & count the change required for simple transactions to the nearest five cents

• calculate equivalent amounts of money using different denominations
• perform simple calculations with money, including finding change, & round to the nearest 5c
• calculate mentally to give change

Sharon Tooney

CONTENT	WEEK	TEACHING, LEARNING and ASSESSMENT	ADJUSTMENTS	RESOURCES
Recall addition facts for single-digit numbers & related subtraction facts to develop increasingly efficient mental strategies for computation ***Recognise & explain connection between addition & subtraction*** ***Represent money values in multiple ways & count the change required for simple transactions to the nearest five cents***	**1**	**Mental Strategies** Students are asked to calculate 34 + 17 in their heads. They are then asked to record the strategy they used. This process is repeated for other problems, such as: 73 – 25 162 – 69 63 + 29 188 – 89 Students discuss which methods are the most efficient. Possible questions include: - is there a better strategy? - what is the best method to find a solution to this problem?	*Extension:* Students are given increasingly more difficult problems to solve mentally. Students explain and discuss the strategies they use eg for '188 – 89 = ?' A student may say, 'I took away 88 and that was easy because it left 100 but I had to take away one more, because 88 + 1 = 89, so the answer is 99.' Students record the mental strategies they use.	paper and pencil
	2	**Recording on Empty Number Lines** Students are shown the number sentence 157 + 22 and an empty number line. The teacher marks the number 157 on the number line. Possible questions include: - what is the next multiple of ten after 157? - how many do you add on to get that number? Students record their answers on the number line. Possible questions include: - can you work it out with fewer steps? - can you visualise the number line in your head and do it? - can you write the numbers on paper to help you keep track?	Reduce or extend the number of digits in the numbers used.	number lines, pencils
	3	**Differences on Number Lines** In pairs, students draw an empty number line. Student A chooses two three-digit numbers and places them on the number line. Student B uses the number line to work out and record the difference between the two numbers. Students explain the mental strategies they used to find the answer. They reflect on their method, considering whether it can be improved.	Reduce or extend the number of digits in the numbers used.	number lines, pencils
	4	**Appropriate Calculations** Students are given a calculation such as 160 – 24 =136 and are asked to create a number of problems where this calculation would be needed. Students share and discuss responses.	Reduce or extend the number of digits in the numbers used.	paper and pencils
	9	**Revision**		
	10	**Assessment**		

ASSESSMENT OVERVIEW

MATHEMATICS PROGRAM PROFORMA

STAGE:				STRAND:	TERM:				WEEK:									
ES1	S1	S2	S3	NUMBER AND ALGEBRA	1	2	3	3	1	2	3	4	5	6	7	8	9	10

SUBSTRAND: Multiplication and Division 1

OUTCOMES

A student:

› uses appropriate terminology to describe, and symbols to represent, mathematical ideas MA2-1WM

› selects and uses appropriate mental or written strategies, or technology, to solve problems MA2-2WM

› checks the accuracy of a statement and explains the reasoning used MA2-3WM

› uses mental and informal written strategies for multiplication and division MA2-6NA

Learning Across The Curriculum

Cross-curriculum priorities

☐ Aboriginal &Torres Strait Islander histories & cultures
☐ Asia & Australia's engagement with Asia
☐ Sustainability

General capabilities

☐ Critical & creative thinking
☐ Ethical understanding
☐ Information & communication technology capability
☐ Intercultural understanding
☐ Literacy
☐ Numeracy
☐ Personal & social capability

Other learning across the curriculum areas

☐ Civics & citizenship
☐ Difference & diversity
☐ Work & enterprise

KEY CONSIDERATIONS

Background Information

In Stage 2, the emphasis in multiplication and division is on students developing mental strategies and using their own (informal) methods for recording their strategies. Comparing their own method of solution with the methods of other students will lead to the identification of efficient mental and written strategies. One problem may have several acceptable methods of solution.

Students could extend their recall of number facts beyond the multiplication facts to 10 × 10 by also memorising multiples of numbers such as 11, 12, 15, 20 and 25.

An inverse operation is an operation that reverses the effect of the original operation. Addition and subtraction are inverse operations; multiplication and division are inverse operations.

The use of digital technologies includes the use of calculators.

Language

Students should be able to communicate using the following language: group, row, column, **horizontal**, **vertical**, array, **multiply**, **multiplied by**, **multiplication**, **multiplication facts**, **double**, shared between, **divide**, **divided by**, **division**, **equals**, **strategy**, **digit**, number chart.

When beginning to build and read multiplication facts aloud, it is best to use a language pattern of words that relates back to concrete materials such as arrays. As students become more confident with recalling multiplication facts, they may use less language. For example, 'five rows (or groups) of three' becomes 'five threes' with the 'rows of' or 'groups of' implied. This then leads to 'one three is three', 'two threes are six', 'three threes are nine', and so on.

OVERVIEW

Recall multiplication facts of two, three, five and ten and related division facts

• count by 2s, 3s, 5s or 10s using skip counting

• use mental strategies to recall multiplication facts for multiples of 2, 3, 5 & 10

- relate 'doubling' to multiplication facts for multiples of 2, eg Double 3 is 6

• recognise & use the symbols for multiplied by (×), divided by (÷) & equals (=)

• link multiplication & division facts using groups / arrays, eg

- explain why a rectangular array can be read as a division in 2 ways by forming vertical or horizontal groups, eg 12 ÷ 3 = 4 or 12 ÷ 4 = 3

• model & apply the commutative property of multiplication, eg 5 × 8 = 8 × 5

Represent and solve problems involving multiplication using efficient mental and written strategies and appropriate digital technologies

• use mental strategies to multiply a 1-digit number by a multiple of 10, including:

- repeated addition, eg 3 × 20: 20 + 20 + 20 = 60
- using place value concepts,eg 3 × 20: 3 × 2 tens = 6 tens = 60
- factorising the multiple of 10, eg 3 × 20: 3 × 2 × 10 = 6 × 10 = 60

- apply the inverse relationship of multiplication & division to justify answers, eg 12 ÷ 3 is 4 because 4 × 3 = 12

• select, use & record a variety of mental strategies, & appropriate digital technologies, to solve simple multiplication problems

- pose multiplication problems & apply appropriate strategies to solve them

- explain how an answer was obtained & compare their own method of solution with the methods of other students

- explain problem-solving strategies using language, actions, materials & drawings

- describe methods used in solving multiplication problems

Sharon Tooney

<table>
<tr><th>CONTENT</th><th>WEEK</th><th>TEACHING, LEARNING and ASSESSMENT</th><th>ADJUSTMENTS</th><th>RESOURCES</th></tr>
<tr><td rowspan="4">Recall multiplication facts of two, three, five and ten and related division facts

Represent and solve problems involving multiplication using efficient mental and written strategies and appropriate digital technologies</td><td>5</td><td>Models of the Multiplication Facts
Part A
Students construct models of the multiplication facts using interlocking cubes. They build a staircase eg with 3 blocks in the first step, 6 in the second etc, to represent the multiplication facts for 3. Students use a 10 × 10 grid to record their answers.
Part B
Students model the multiplication facts using rectangular arrays and record the associated inverse relationships
eg • • • • $3 \times 4 = 12$ $12 \div 3 = 4$
• • • • and $4 \times 3 = 12$ $12 \div 4 = 3$
• • • •
Variation: Students are given a number (eg 12) and asked to represent all its factors using arrays.</td><td>Pictorial representations on how to create models may be needed</td><td>interlocking cubes, grid paper, paper and pencils</td></tr>
<tr><td>6</td><td>Multiplication Facts
Students write the multiplication facts on flash cards from 0 × 1 up to 10 × 10. In pairs, students test each other to find which facts they can immediately recall and put these into the ‘known’ pile. The others are put into the ‘unknown’ pile. Each day the students concentrate on learning from their ‘unknown’ facts. Students could repeat this activity with division facts.
Variation: Students play ‘Bingo’ using multiplication and division facts.</td><td>Reduce/extend the number of flash cards presented</td><td>flash cards, pencils</td></tr>
<tr><td>7</td><td>Tables Races
Students make up cards for particular multiplication facts for particular numbers, shuffle them and put them into an envelope eg
4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40
In groups, students are given an envelope of cards. Students race each other to put the cards into order, skip counting aloud. Students state which number has the multiplication facts their cards represent.
Variation: Students write numbers in descending order.</td><td>100s chart to assist skip counting may be required by some students.
Extend the number of cards used or remove a card so missing card has to be identified</td><td>cards, pencils, paper, envelopes</td></tr>
<tr><td>8</td><td>Multiplication Grid
Students keep a multiplication grid, as shown. When students are sure they have learnt particular multiplication facts, they fill in that section of the grid. Students are encouraged to recognise that if they know $3 \times 8 = 24$ they also know $8 \times 3 = 24$, and so they can fill in two squares on the grid.
<table>
<tr><th>x</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th></tr>
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<tr><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>7</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>8</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table></td><td>Use cards from the known pile in Multiplication Facts activity to assist recognition</td><td>multiplication grid, pencils</td></tr>
</table>

	9	**Revision**		
	10	**Assessment**		

ASSESSMENT OVERVIEW

MATHEMATICS PROGRAM PROFORMA

STAGE:				STRAND:	TERM:				WEEK:									
ES1	S1	**S2**	S3	NUMBER AND ALGEBRA	1	2	3	3	1	2	3	4	5	6	7	8	9	10

SUBSTRAND: Patterns and Algebra 1

OUTCOMES

A student:

› uses appropriate terminology to describe, and symbols to represent, mathematical ideas MA2-1WM

› selects and uses appropriate mental or written strategies, or technology, to solve problems MA2-2WM

› checks the accuracy of a statement and explains the reasoning used MA2-3WM

› generalises properties of odd and even numbers, generates number patterns, and completes simple number sentences by calculating missing values MA2-8NA

Learning Across The Curriculum

Cross-curriculum priorities

☐ Aboriginal &Torres Strait Islander histories & cultures
☐ Asia & Australia's engagement with Asia
☐ Sustainability

General capabilities

☐ Critical & creative thinking
☐ Ethical understanding
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☐ Personal & social capability

Other learning across the curriculum areas

☐ Civics & citizenship
☐ Difference & diversity
☐ Work & enterprise

KEY CONSIDERATIONS

Background Information

In Stage 2, number patterns include additive patterns that increase or decrease from any starting point.

Language

Students should be able to communicate using the following language: pattern, **goes up by**, **goes down by**, even, odd, **rows**, **digit**, **multiplication facts**.

OVERVIEW

Describe, continue and create number patterns resulting from performing addition or subtraction

• identify and describe patterns when counting forwards or backwards by threes, fours, sixes, sevens, eights and nines from any starting point

• model, describe and then record number patterns using diagrams, words or symbols

- ask questions about how number patterns have been created and how they can be continued

• create and continue a variety of number patterns that increase or decrease, and describe them in more than one way

Investigate the conditions required for a number to be even or odd and identify even and odd numbers

• model even and odd numbers of up to two digits using arrays with two rows

- compare and describe the difference between models of even numbers and models of odd numbers

- recognise the connection between even numbers and the multiplication facts for two

• describe and generalise the conditions for a number to be even or odd

- recognise the significance of the final digit of a whole number in determining whether a given number is even or odd

• identify even or odd numbers of up to four digits

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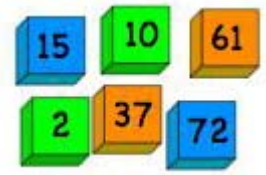
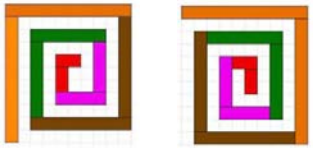
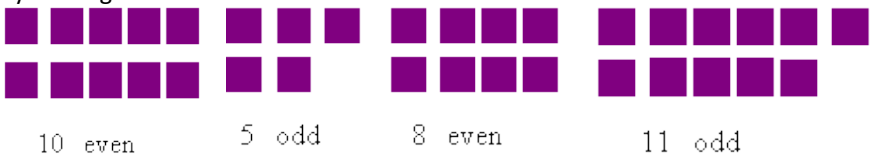
CONTENT	WEEK	TEACHING, LEARNING and ASSESSMENT	ADJUSTMENTS	RESOURCES
Describe, continue and create number patterns resulting from performing addition or subtraction ***Investigate the conditions required for a number to be even or odd and identify even and odd numbers***	**4**	**Number Sequences** Students identify and describe patterns when counting forwards or backwards by threes, fours, sixes, sevens, eights and nines from any starting point. Eg. Which number is missing from this sequence? 48, 39, 30, __, 12 ○ 18 ○ 23 ○ 21 ○ 15	100s chart to assist skip counting may be required by some students.	paper and pencils
	5	**Number Patterns** Students model, describe and then record number patterns using diagrams, words or symbols. Possible questions: - how was the number patterns created? - how can the number pattern be continued? Eg. That Number Square When you arrive in the classroom on Monday morning you discover all the numbers have fallen off the class number square and they are in a heap on the floor. All that is left on the wall is a blank grid!  There's five minutes to go before the lesson starts and you need the number square. Possible questions: - Before you start think - does your class number square start with 0 or 1 ? Or a different number? - Can you find a quick way of putting the numbers back in their right places on the grid? - Where will you start? - What different ideas are there about how to put the number tiles back as quickly as possible? - What do you think is a 'smart' way of putting the number square back together? - How quickly can you achieve this using your 'smart' strategy?	100s chart may be required by some students.	blank number grids, pencils
	6	**Even and Odd** Students investigate the properties of odd and even numbers by creating patterns to determine what happens when each unit is used individually and when combined with each other. Students record findings report back to the class on what they discovered.	Some students may require pictorial representations of possible spirals to one to one match on to get started	Cuisenaire rods, paper and pencils, computers

		Eg. Cuisenaire Spirals Here are two open spirals made from cuisenaire rods.  Only even numbered rods were used to create the spirals, investigate what other spirals can be made. Spirals can also be made online at the following website: http://nrich.maths.org/8293		
	7	**Modelling Odd and Even Numbers** Students model numbers that clearly shows the difference between odds and evens using arrays. Even numbers can be made into two-row arrays, but odd numbers cannot - there being always one item left over. The making of two rows highlights the fact that even numbers are always divisible by two. Eg.  10 even 5 odd 8 even 11 odd Introduce the characters ***Even Steven*** and ***Odd Todd.*** Provide students with a grid of different numbers. Ask them to identify which numbers are odd and which ones are even and explain why. Students should be encouraged to demonstrate this using arrays.	Recreate arrays by colouring grid paper to demonstrate odd and even	unifix cubes, number grids
	9	**Revision**		
	10	**Assessment**		

ASSESSMENT OVERVIEW

Sharon Tooney

The Number Square

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

100

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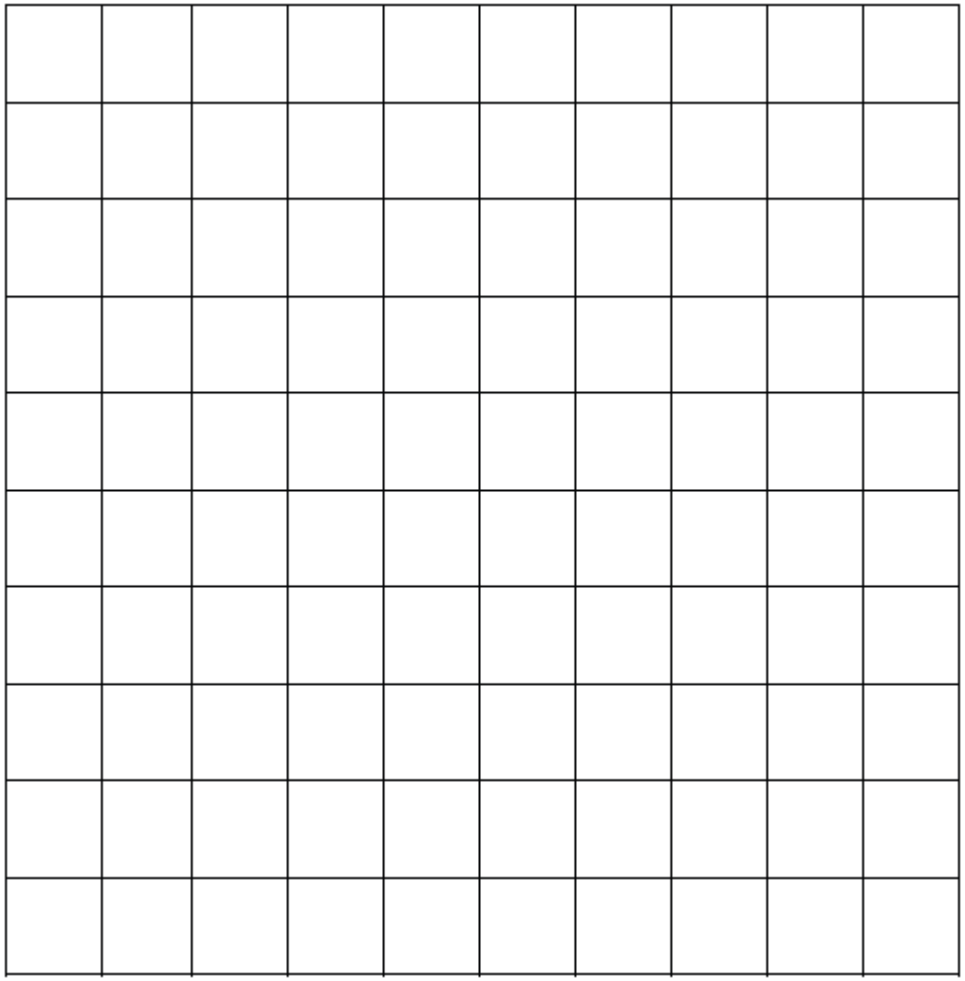
The Number Square



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MATHEMATICS PROGRAM PROFORMA

STAGE:				STRAND:	TERM:				WEEK:									
ES1	S1	S2	S3	MEASUREMENT AND GEOMETRY	1	2	3	3	1	2	3	4	5	6	7	8	9	10

SUBSTRAND: Length 1

OUTCOMES

A student:

› uses appropriate terminology to describe, and symbols to represent, mathematical ideas MA2-1WM

› selects and uses appropriate mental or written strategies, or technology, to solve problems MA2-2WM

› checks the accuracy of a statement and explains the reasoning used MA2-3WM

› measures, records, compares and estimates lengths, distances and perimeters in metres, centimetres and millimetres, and measures, compares and records temperatures MA2-9MG

Learning Across The Curriculum

Cross-curriculum priorities

☐ Aboriginal &Torres Strait Islander histories & cultures
☐ Asia & Australia's engagement with Asia
☐ Sustainability

General capabilities

☐ Critical & creative thinking
☐ Ethical understanding
☐ Information & communication technology capability
☐ Intercultural understanding
☐ Literacy
☐ Numeracy
☐ Personal & social capability

Other learning across the curriculum areas

☐ Civics & citizenship
☐ Difference & diversity
☐ Work & enterprise

KEY CONSIDERATIONS

Background Information

In Stage 2, measurement experiences enable students to develop an understanding of the size of the metre, centimetre and millimetre, to estimate and measure using these units, and to select the appropriate unit and measuring device.

When recording measurements, a space should be left between the number and the abbreviated unit, eg 3 cm, not 3cm.

Language

Students should be able to communicate using the following language: length, distance, metre, centimetre, **millimetre**, **ruler**, measure, estimate, hand span.

OVERVIEW

Measure, order and compare objects using familiar metric units of length

• measure lengths and distances using metres and centimetres

• record lengths and distances using metres and centimetres, eg 1 m 25 cm

• compare and order lengths and distances using metres and centimetres

• estimate lengths and distances using metres and centimetres and check by measuring

- explain strategies used to estimate lengths and distances, such as by referring to a known length, eg 'My hand span is 10 cm and my desk is 8 hand spans long, so my desk is about 80 cm long' (Communicating, Problem Solving)

• recognise the need for a formal unit smaller than the centimetre to measure length

• recognise that there are 10 millimetres in one centimetre, ie 10 millimetres = 1 centimetre

• use the millimetre as a unit to measure lengths to the nearest millimetre, using a ruler

- describe how a length or distance was measured

• record lengths using the abbreviation for millimetres (mm), eg 5 cm 3 mm or 53 mm

• estimate lengths to the nearest millimetre and check by measuring

Sharon Tooney

CONTENT	WEEK	TEACHING, LEARNING and ASSESSMENT	ADJUSTMENTS	RESOURCES
	1	**Concertina Metre** Groups of students make a metre strip using 10 centimetre strips which are taped together, end to end. Students check that their metre length is correct with a metre ruler. Group members fold the strip backwards and forwards into a concertina fashion at the 10 centimetre marks. Students record the estimate and then count how many 10 centimetre strips were needed and why.	Student one on one support where necessary	photocopy of 10cm strips, tape scissors, metre rulers
	2	**Towering Metres** Students work in small groups to build a tower that is 1 metre high. Students estimate when their tower has reached 1 metre, then measure to check. Students make adjustments to the height of the tower if necessary. The group reports back to the class on how close their estimate was to 1 metre. Individual students record how the estimate was made, and the measured result.	Peer tutoring strategy in group organisation	building objects or materials for tower, metre rulers, paper and pencils
	3	**The Human Tape Measure** Students each make a paper streamer 1 metre long. Students compare the length of their streamer with three other students to ensure an accurate length. *Additional whole-class activity:* students estimate, then measure, the distance of about 20m. Students stand in line, each holding an end of their own metre, end to end with the next student's streamer, until the total is 20 metres.	Student one on one support where necessary	paper streamers, metre rulers, scissors, pencils
	4	**Rolling Metres** Use a paint roller, brush or chalk to make a line or curve which measures approximately 1 metre. Check with a metre length (string or paper) to find if the estimate was more than, less than or exactly 1 metre. Discuss and record how the metre length was estimated, and the final measure recorded. **Ready Set Go!** Students work in small groups to estimate, then measure and record: - How long it takes to write a legible sentence 1 metre long? - How long it takes to make and measure a line of pens (paddle pop sticks, matchsticks) 1 metre long? - How long does it take to make and measure a playdough snake 1 metre long?	Students may suggest alternative activities to be measured	1 metre length, paint roller, chalk or brush, pencils and paper, watch, metre ruler, sticks, playdough
	5	**How to Use a Ruler** Begin the lesson with a whole class discussion of how to use a ruler to draw and measure lines which have a length of a whole number of centimetres. Students check their rulers to see where zero is marked, and practise drawing and measuring a line by starting at this point. Students work in pairs, student A and student B. Student A draws five lines for student B, each line to be an exact number of centimetres and a length of less than 30cm. Student B estimates the length of each line, records the estimate, then measures and labels each line. The roles are then reversed.	Student one on one support where necessary. Peer tutoring strategy in pairs organisation	30 cm rulers, paper and pencils
	6	**Any Three Items** Students work in pairs to find three items in the classroom which have a total of 25centimetres. Students record their findings by drawing the items, labelling with the measurement in centimetres, and showing how the three lengths were added to make a total of 25cm.	Peer tutoring strategy in pairs organisation	access to objects to measure, 30 cm rulers, paper and pencils

	7	**Draw It to Fit** Students choose a rectangular object and measure the edges of one face. Students draw the face, using the measured dimensions, and label with the measurements. Students superimpose the object on the drawing to see if the drawing is correct.	Cut out the drawing and match to the face of the object	rectangular objects to measure, 30 cm rulers, paper and pencils
	8	**Measure and Design** Pairs of students work with strips of materials such as streamers, ribbons, cardboard or wallpaper. Each student measures, cuts and labels six strips in lengths specified by the teacher. Lengths may include 12cm, 15cm, 20cm, 5cm, 3cm, 10cm, 26cm, etc. Students check that their lengths are correct by comparing each strip with their partner's corresponding strip, and measuring with a ruler if necessary. Students incorporate the strips into a design or picture.	Student one on one support where necessary	streamers, straws, ribbons, cardboard strips, 30 cm rulers, paper and pencils, scissors, paste
	9	**Revision**		
	10	**Assessment**		

ASSESSMENT OVERVIEW

MATHEMATICS PROGRAM PROFORMA

STAGE:				STRAND:	TERM:				WEEK:									
ES1	S1	S2	S3	MEASUREMENT AND GEOMETRY	1	2	3	3	1	2	3	4	5	6	7	8	9	10

SUBSTRAND: Time 1

OUTCOMES

A student:

› uses appropriate terminology to describe, and symbols to represent, mathematical ideas MA2-1WM

› reads and records time in one-minute intervals and converts between hours, minutes and seconds MA2-13MG

Learning Across The Curriculum

Cross-curriculum priorities

☐ Aboriginal &Torres Strait Islander histories & cultures
☐ Asia & Australia's engagement with Asia
☐ Sustainability

General capabilities

☐ Critical & creative thinking
☐ Ethical understanding
☐ Information & communication technology capability
☐ Intercultural understanding
☐ Literacy
☐ Numeracy
☐ Personal & social capability

Other learning across the curriculum areas

☐ Civics & citizenship
☐ Difference & diversity
☐ Work & enterprise

KEY CONSIDERATIONS

Background Information

The duration of a solar year is actually 365 days 5 hours 48 minutes and 45.7 seconds.

Language

Students should be able to communicate using the following language: time, clock, analog, digital, hour hand, minute hand, **second hand**, **revolution**, numeral, hour, minute, second, o'clock, **(minutes) past**, **(minutes) to**.

OVERVIEW

Tell time to the minute and investigate the relationship between units of time

• recognise the coordinated movements of the hands on an analog clock, including:
– the number of minutes it takes for the minute hand to move from one numeral to the next
– the number of minutes it takes for the minute hand to complete one revolution
– the number of minutes it takes for the hour hand to move from one numeral to the next
– the number of minutes it takes for the minute hand to move from the 12 to any other numeral
– the number of seconds it takes for the second hand to complete one revolution
• read analog and digital clocks to the minute, including using the terms 'past' and 'to', eg 7:35 is read as 'seven thirty-five' or 'twenty-five to eight'
• record in words various times shown on analog and digital clocks

Sharon Tooney

CONTENT	WEEK	TEACHING, LEARNING and ASSESSMENT	ADJUSTMENTS	RESOURCES
Tell time to the minute and investigate the relationship between units of time	**1**	**Construct a Clock** Students construct an analog clock, label its parts and include any markings they already know. Students then compare their clock with a real analog clock and describe how the clocks are alike and different. They are given the opportunity to include any additional features on their clock.	Student one on one support where necessary	paper and pencils, clock faces
	2	**Time Bingo** **Part A** Students are given a page of blank analog clocks. They record their own times on the clocks. The teacher calls out various times. A counter is placed on a clock with the matching time. When all clocks are covered the student calls out 'Bingo.' **Part B** Students are given a page of blank digital clocks. Students record their own times on the clocks. The teacher calls out various times. A counter is placed on a clock with the matching time. When all clocks are covered the student calls out 'Bingo.'	*Extension:* Students are given a page with both analog and digital clocks. They record various times in both forms. The teacher calls out a time eg a quarter past 12. Students place a counter on the corresponding time, analog or digital ie a quarter past 12 or 12:15.	blank analog clocks, pencils
	3	**Reading Analog Clocks** The teacher presents the following scenario: 'Madeline is very good at reading digital clocks. All of the clocks in her house are digital. For Madeline's birthday her grandparents bought her an analog wristwatch but she is having trouble reading the time.' Students are asked to write to Madeline, helping her to tell the time with her new watch. They are encouraged to use diagrams as part of their response.	Use diagrams to explain telling time	Paper and pencil
	4	**The Minute and Hour Hands** Students observe and discuss the position of the hour hand at half past, quarter past and quarter to the hour, and on the hour. Students construct an analog clock with an hour hand only. In pairs, students position the hour hand anywhere on their clock and swap clocks with their partner. Students are then asked to identify the time represented on their partner's clock and give reasons. Students are asked to display and name as many different times as possible using the minute and hour hands.	Peer tutoring strategy in pairs organisation	materials to create a clock, paper and pencils
	9	**Revision**		
	10	**Assessment**		

ASSESSMENT OVERVIEW

MATHEMATICS PROGRAM PROFORMA

STAGE:				STRAND:	TERM:				WEEK:									
ES1	S1	**S2**	S3	MEASUREMENT AND GEOMETRY	**1**	2	3	3	1	**2**	**3**	**4**	**5**	**6**	**7**	8	9	10

SUBSTRAND: 2D 1

OUTCOMES

A student:

› uses appropriate terminology to describe, and symbols to represent, mathematical ideas MA2-1WM

› checks the accuracy of a statement and explains the reasoning used MA2-3WM

› manipulates, identifies and sketches two-dimensional shapes, including special quadrilaterals, and describes their features MA2-15MG

Learning Across The Curriculum

Cross-curriculum priorities

☐ Aboriginal &Torres Strait Islander histories & cultures
☐ Asia & Australia's engagement with Asia
☐ Sustainability

General capabilities

☐ Critical & creative thinking
☐ Ethical understanding
☐ Information & communication technology capability
☐ Intercultural understanding
☐ Literacy
☐ Numeracy
☐ Personal & social capability

Other learning across the curriculum areas

☐ Civics & citizenship
☐ Difference & diversity
☐ Work & enterprise

KEY CONSIDERATIONS

Background Information

The special quadrilaterals are the parallelogram, rectangle, rhombus, square, trapezium and kite. Regular shapes have all sides equal and all angles equal. In Stage 2, students are expected to be able to distinguish between regular and irregular shapes and to describe a polygon as either regular or irregular, eg a regular pentagon has five equal sides and five equal angles.

It is important for students to have experiences with a variety of shapes in order to develop flexible mental images. Students need to be able to recognise shapes presented in different orientations.

When constructing polygons using materials such as straws of different lengths for sides, students should be guided to an understanding that:

› sometimes a triangle cannot be made from 3 straws
› a figure made from 3 lengths, ie a triangle, is always flat
› a figure made from 4 or more lengths need not be flat
› a unique triangle is formed, if a triangle can be formed, from 3 given lengths
› more than one two-dimensional shape can result if more than 3 lengths are used.

When using examples of Aboriginal rock carvings and other Aboriginal art, it is recommended that local examples be used wherever possible. Consult with local Aboriginal communities and education consultants for such examples.

Language

Students should be able to communicate using the following language: shape, two-dimensional shape (2D shape), circle, triangle, quadrilateral, **parallelogram**, rectangle, **rhombus**, square, **trapezium**, **kite**, pentagon, hexagon, octagon, **regular shape**, **irregular shape**, orientation, features, **properties**, side, parallel, **pair of parallel sides**, **opposite**, **length**, vertex (vertices), **angle**, **right angle**, symmetry, **line (axis) of symmetry**, **rigid**.

The term 'polygon' (derived from the Greek words meaning 'many angles') refers to closed shapes with three or more angles and sides. While the angles are the focus for the general naming system used for shapes, polygons are more usually understood in terms of their sides. Students are not expected to use the term 'polygon'. However, some students may explore other polygons and so benefit from being introduced to the collective term. Students could explore the language origins of the names of polygons.

The term diamond is often used in everyday contexts when describing quadrilaterals with four equal sides. However, diamond is not the correct geometrical term to name such quads; correct term is rhombus

OVERVIEW

Compare & describe features of 2D shapes, including the special quadrilaterals

• manipulate/compare/describe features of 2D shapes, including the special quadrilaterals: parallelograms, rectangles, rhombuses, squares, trapeziums & kites
- determine the number of pairs of parallel sides, if any, of each of the special quadrilaterals
• use measurement to establish & describe side properties of the special quadrilaterals
• identify & name the special quads presented in diff orientations
- explain why a particular quadrilateral has a given name
- name a shape, given a written or verbal description of its features
• recognise vertices of 2D shapes as vertices of angles that have the sides of the shape as their arms
• identify right angles in squares & rectangles
• group parallelograms, rectangles, rhombuses, squares, trapeziums & kites using 1 or more attributes
• identify & describe 2D shapes as either regular or irregular
- identify regular shapes in a group that includes irregular shapes, such as a regular pentagon in a group of pentagons,
- explain the difference between regular & irregular 2D shapes
- recognise that the name of a shape does not change if its size or orientation in space is changed
• draw representations of regular & irregular 2D shapes in different orientations
• construct regular & irregular 2D shapes from a variety of materials
- determine a triangle cannot be made from 3 straws if the sum of the lengths of the 2 shorter straws is < the length of the longest straw
• compare the rigidity of 2D frames of 3 sides with the rigidity of those of 4 or more sides
- construct & manipulate a 4-sided frame & explain how adding a brace can make a 4-sided frame rigid

Identify symmetry in the environment

• identify lines of symmetry in pictures, artefacts, designs & enviro
• identify & draw lines of symmetry on given shapes, including the special quadrilaterals & other regular & irregular shapes
- determine & explain whether a given line through a shape is a line of symmetry
- recognise & explain why any line through the centre of a circle is a line of symmetry

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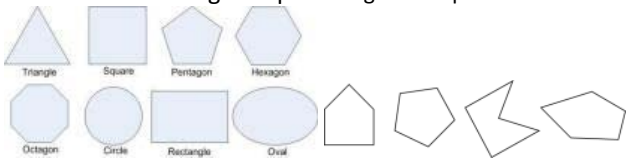
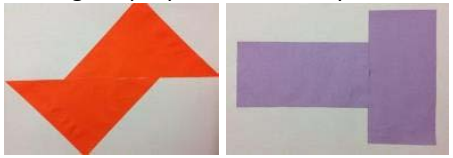
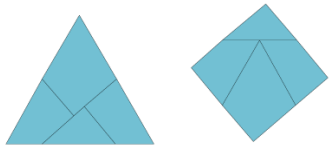
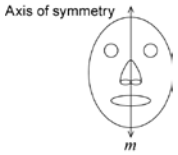
CONTENT	WEEK	TEACHING, LEARNING and ASSESSMENT	ADJUSTMENTS	RESOURCES
Compare & describe features of 2D shapes, including the special quadrilaterals ***Identify symmetry in the environment***	**2**	**Introductory Activity Process** Create a class definition of what '2D means' (two dimensional) in relation to shapes. Brainstorm and list as many 2D shapes the students can name or describe. Discuss the difference between a 'regular' shape and an 'irregular' shape. - Regular shape = Has all sides and all angles equal. Irregular shapes = Not all sides and angles are equal  Look around the classroom or take a walk around the school grounds to find other shapes that may have not been listed and find examples of regular and irregular shapes. Investigate and give reasons why a particular quadrilateral has a given name e.g. 'It is a parallelogram because it has four sides and the opposite sides are parallel. Identify regular and irregular shapes into groups. Revise the geometric properties of shapes and how we can classify them - sides, acute/obtuse/ right angles, lines of symmetry, parallel lines, straight/curved lines. Draw representations of regular and irregular two dimensional shapes in different orientations. Create a class poster of common 2D shapes and their geometric properties	Student one on one support where necessary	chart paper, pencils, textas
	3	**Creating Shapes** Give each student 2 squares of coloured paper. - Ask them to describe the properties of the square. What can they see? (regular polygon) Can this square represent anything else? - Ask the students to fold the square diagonally in half? What do they see? (2 triangles) Ask the students to fold the square in half vertically? What do they see? (2 rectangles). Instruct the students to cut along the folded lines of their squares and manipulate and glue the two pieces to create a new 2D shape. The students describe the properties of the new shapes and compare these properties to the original properties of the square  Students label their design as a square that has been reshaped. Ask students to consider if the new shape is larger in area or smaller? Is it still a polygon? What kind of polygon is it? (irregular)	Student one on one support where necessary	coloured paper, scissors, glue, paper and pencils
	4	**Creating More Shapes** Discuss that 2D shapes can be broken (split) up into other common shapes and can also be combined to create new shapes and design. Ask students to think of a 2D shapes which is not a polygon. Can they identify why they are not. Definition of a polygon: A 2D closed shape with straight lines. Give the students a copy of the triangle that they need to cut out and arrange/	Student one on one support where necessary	photocopy of triangle, scissors, glue, paper

		transform into a square (Turn a Triangle into a Square)  Refer to the following website: http://www.cutoutfoldup.com/109-turn-an-equilateral-triangle-into-a-square.php		
	5	**Tangrams** Explain and introduce 'Tangrams' (A Chinese geometric puzzle consisting of a square cut into pieces that can be arranged to make various other shapes). Print out the 'Tangram' templates - either in colour or black and white. Students cut out very carefully along the lines. Now use the seven pieces to make "pictures" - either inventing their own or using the examples from the website below *www.**activity**village.co.uk/**tangram puzzles**.htm*  Using a square piece of paper, students draw straight sided polygons to create their own tangram. Students cut out.	Student one on one support where necessary	tangram templates, scissors, glue, paper
	6	**Symmetry of 2D Shapes** Define symmetry: ***line symmetry*** A plane figure F has line symmetry in a line m if the image of F under the reflection in m is F itself. The line m is called the axis of symmetry  Examine shapes that have an axis of symmetry and those that do not. Ask the students: - What do you think the difference is between the shapes that show symmetry and the shapes that don't? Pose the question: What shape would have the most symmetry? Draw it and explain your answer. Visit the website below and complete the symmetry quiz questions: http://www.innovationslearning.co.uk/subjects/maths/activities/year3/symmetry/shape_game.asp	Student one on one support where necessary	
	7	**Reflection Grids** Have students explore symmetry in patterns using grid paper. Begin by providing examples of reflection grids for the students to complete. Encourage them to use a mirror to check the accuracy of their attempts. Using blank grid paper, have students fold the paper in half and create a pattern or half of a picture	Peer tutoring strategy in pairs organisation	grid paper, photocopy of reflection grid examples, pencils

		on the grid paper. When they have completed it, swap with a partner and using a different colour, complete the reflection grid. Partners assess and provide feedback as to the accuracy of the attempt.		
	10	**Revision** **Assessment**		

ASSESSMENT OVERVIEW

MATHEMATICS PROGRAM PROFORMA

STAGE:				STRAND:	TERM:				WEEK:									
ES1	S1	S2	S3	MEASUREMENT AND GEOMETRY	1	2	3	3	1	2	3	4	5	6	7	8	9	10

SUBSTRAND: Position 1

OUTCOMES

A student:

› uses appropriate terminology to describe, and symbols to represent, mathematical ideas MA2-1WM

› uses simple maps and grids to represent position and follow routes, including using compass directions MA2-17MG

Learning Across The Curriculum

Cross-curriculum priorities

- ☐ Aboriginal &Torres Strait Islander histories & cultures
- ☐ Asia & Australia's engagement with Asia
- ☐ Sustainability

General capabilities

- ☐ Critical & creative thinking
- ☐ Ethical understanding
- ☐ Information & communication technology capability
- ☐ Intercultural understanding
- ☐ Literacy
- ☐ Numeracy
- ☐ Personal & social capability

Other learning across the curriculum areas

- ☐ Civics & citizenship
- ☐ Difference & diversity
- ☐ Work & enterprise

KEY CONSIDERATIONS

Background Information

By convention when using grid-reference systems, such as those found on maps, the horizontal component of direction is named first, followed by the vertical component. This is a precursor to introducing coordinates on the Cartesian plane in Stage 3 Patterns and Algebra, where the horizontal coordinate is recorded first, followed by the vertical coordinate.

Aboriginal people use an Aboriginal land map to identify and explain the relationship of a particular Aboriginal Country to significant landmarks in the area. They use a standard map of New South Wales to identify nearby towns and their proximity to significant Aboriginal landmarks, demonstrating their unique relationship to land, Country and place.

Language

Students should be able to communicate using the following language: position, location, map, **plan**, path, **route**, **grid**, **grid reference**, **aerial view**, directions.

OVERVIEW

Create and interpret simple grid maps to show position and pathways

• describe the location of an object using more than one descriptor, eg 'The book is on the third shelf and second from the left'

• use given directions to follow routes on simple maps

- use and follow positional and directional language

• use grid references on maps to describe position, eg 'The lion cage is at B3'

- use grid references in games

• identify and mark particular locations on maps and plans, given their grid references

• draw and label a grid on a given map

- discuss the use of grids in real-world contexts, eg zoo map, map of shopping centre

• draw simple maps and plans from an aerial view, with and without labelling a grid, eg create a map of the classroom

- create simple maps and plans using digital technologies

- compare different methods of identifying locations in the environment, eg compare the reference system used in Aboriginal Country maps with standard grid-referenced maps

• draw and describe routes or paths on grid-referenced maps and plans

- use digital technologies involving maps, position and paths

• interpret and use simple maps found in factual texts and in the media

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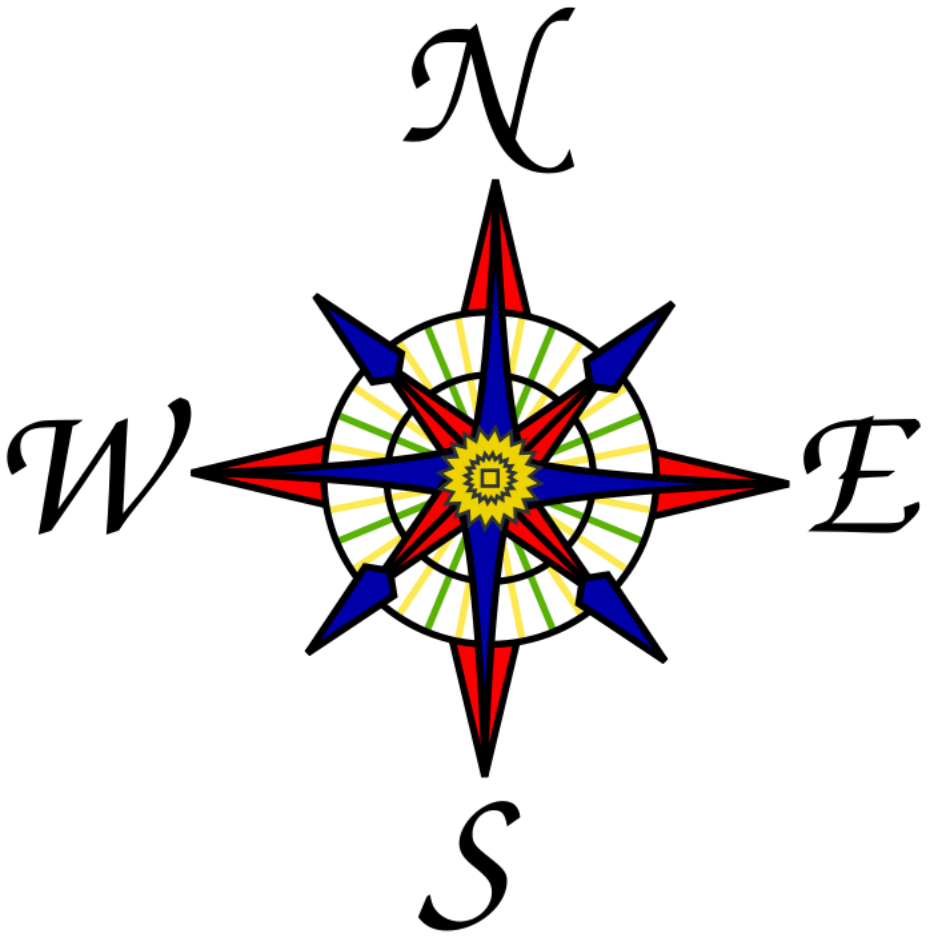
CONTENT	WEEK	TEACHING, LEARNING and ASSESSMENT	ADJUSTMENTS	RESOURCES
	5	**Ice-Cube Tray** In pairs, students are given an ice-cube tray. Students describe the position of a bead or counter to be placed in the ice-cube tray eg 'put the bead in the third square from the left in the top row'. Students find that position in their ice-cube tray and place a bead or counter there. Students check and discuss their results. Students repeat the activity in opposing pairs. Student A describes the location of the opposition's bead for student B to place a corresponding bead in the correct position. *Variation:* The activity could be played as a barrier game or Battleships.	Questioning techniques, partner selection	ice cube trays, beads, counters
	6	**Buried Treasure** The teacher hides mystery objects and gives simple compass directions and distances in paces from a starting point to enable students to find the objects. *Variation:* Students work in groups and carry out searches to find objects.	Provide concrete representations of compasses for those students experiencing difficulty	objects to hide
	7	**Mystery Location** Students are asked to describe the location of an object in the classroom eg 'My picture is fifth from the left and it's in the second row on the back wall'. Students write a description of the object using positional clues. The teacher collects the clues and reallocates them back to the students. Students read the descriptions and locate the object.	*Extension:* In pairs, Student A hides an object in the room while Student B turns away. A gives B directions to find the hidden object. B then has a turn at hiding the object.	objects to hide
	8	**Body Turns** The teacher marks the four major compass directions on the ground. Students face north. Students are asked to turn left or right in quarter turns and state in which direction they then face. Students are given north and are then asked to face particular compass directions. Students record on a compass rose. Students are then asked to face a place in the playground and name the direction they are facing.	*Extension:* NE, NW, SE and SW are introduced to enable students to describe places that lie between N, S, E and W.	chalk, compass rose photocopy masters
	9	**Revision**		
	10	**Assessment**		

ASSESSMENT OVERVIEW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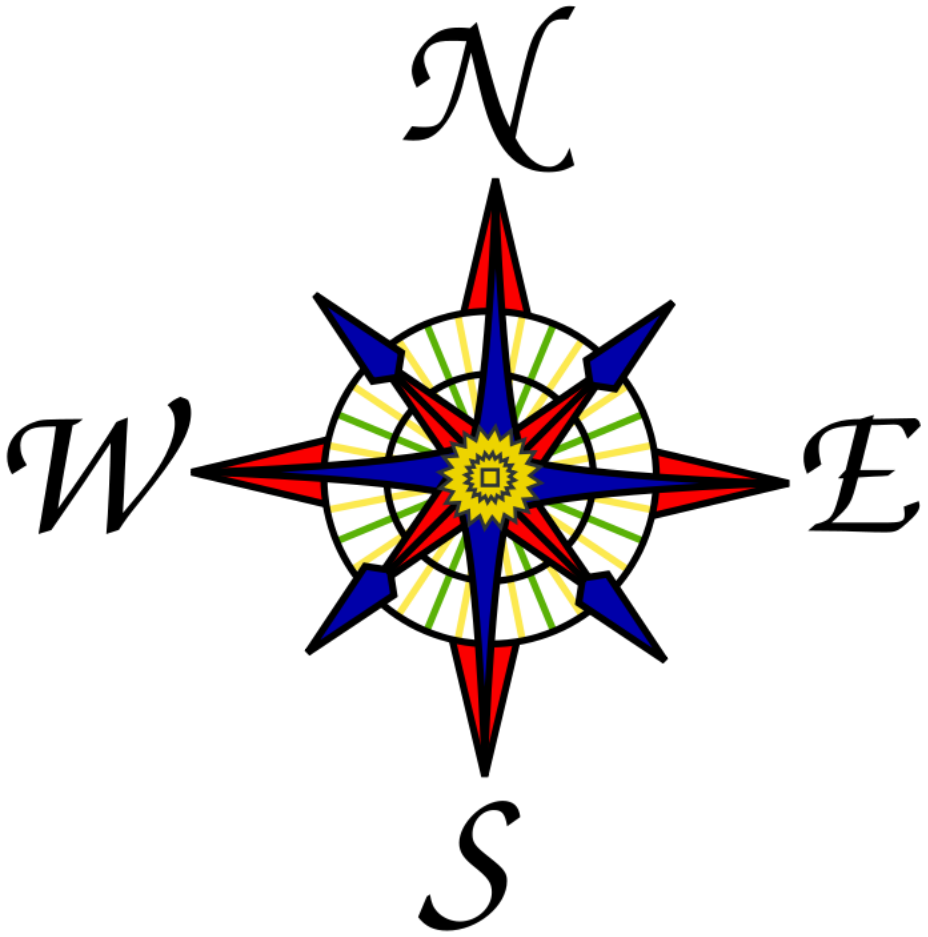
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MATHEMATICS PROGRAM PROFORMA

STAGE:				STRAND:	TERM:				WEEK:									
ES1	S1	**S2**	S3	STATISTICS AND PROBABILITY	**1**	2	3	3	1	**2**	**3**	**4**	**5**	6	7	8	9	10

SUBSTRAND: Data 1

OUTCOMES

A student:

› uses appropriate terminology to describe, and symbols to represent, mathematical ideas MA2-1WM

› selects and uses appropriate mental or written strategies, or technology, to solve problems MA2-2WM

› checks the accuracy of a statement and explains the reasoning used MA2-3WM

› selects appropriate methods to collect data, and constructs, compares, interprets and evaluates data displays, including tables, picture graphs and column graphs MA2-18SP

Learning Across The Curriculum

Cross-curriculum priorities

☐ Aboriginal &Torres Strait Islander histories & cultures
☐ Asia & Australia's engagement with Asia
☐ Sustainability

General capabilities

☐ Critical & creative thinking
☐ Ethical understanding
☐ Information & communication technology capability
☐ Intercultural understanding
☐ Literacy
☐ Numeracy
☐ Personal & social capability

Other learning across the curriculum areas

☐ Civics & citizenship
☐ Difference & diversity
☐ Work & enterprise

KEY CONSIDERATIONS

Background Information

Data could be collected from the internet, newspapers or magazines, as well as through students' surveys, votes and questionnaires.

In Stage 2, students should consider the use of graphs in real-world contexts. Graphs are frequently used to persuade and/or influence the reader, and are often biased.

One-to-one correspondence in a column graph means that one unit (eg 1 cm) on the vertical axis is used to represent one response/item.

Categorical data can be separated into distinct groups, eg colour, gender, blood type. Numerical data has variations that are expressed as numbers, eg the heights of students in a class, the number of children in families.

Language

Students should be able to communicate using the following language: information, data, collect, category, display, symbol, list, table, **column graph**, picture graph, **vertical columns**, **horizontal bars**, equal spacing, **title**, key, **vertical axis**, **horizontal axis**, **axes**, **spreadsheet**.

Column graphs consist of vertical columns or horizontal bars. However, the term 'bar graph' is reserved for divided bar graphs and should not be used for a column graph with horizontal bars.

OVERVIEW

Identify questions or issues for categorical variables; identify data sources and plan methods of data collection and recording

• recognise that data can be collected either by user /others
• identify possible sources of data collected by others
• pose questions about a matter of interest to obtain information that can be recorded in categories
• predict & create a list of categories for efficient data collection in relation to a matter of interest
- identify issues for data collection & refine investigations

Collect data, organise it into categories, and create displays using lists, tables, picture graphs and simple column graphs, with and without the use of digital technologies

• collect data & create a list or table to organise the data
- use computer software to create a table to organise collected data, eg a spreadsheet
• construct vertical & horizontal column graphs & picture graphs that represent data using 1-to-1 correspondence
- use grid paper to assist in constructing graphs that represent data using 1-to-1 correspondence
- use the terms horizontal axis, vertical axis & axes appropriately when referring to column graphs
- use graphing software to enter data & create column graphs that represent data
- mark equal spaces on axes, name & label axes, & choose appropriate titles for column graphs
- choose an appropriate picture or symbol for a picture graph & state the key used

Interpret and compare data displays

• describe & interpret information presented in simple tables, column graphs & picture graphs
- make conclusions about data in different data displays
• represent the same data set using more than 1 type of display & compare the displays
- discuss the advantages &/or disadvantages of different representations of the same data

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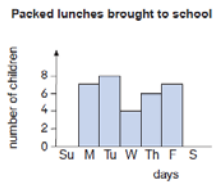
<table>
<tr><th>CONTENT</th><th>WEEK</th><th>TEACHING, LEARNING and ASSESSMENT</th><th>ADJUSTMENTS</th><th>RESOURCES</th></tr>
<tr><td rowspan="3">Identify questions or issues for categorical variables; identify data sources and plan methods of data collection and recording

Collect data, organise it into categories, and create displays using lists, tables, picture graphs and simple column graphs, with and without the use of digital technologies

Interpret and compare data displays</td><td>2</td><td>Solve a Problem
Solve a problem such as: What is our favourite… sport, comic, TV show, colour...?
Respond to questions such as:
- How can we find out?
- What information should we collect, and how?
- How shall we organise it?
Collect data quickly (for example, by voting in a show of hands) and make a simple frequency table.
<table><tr><td>Favourite Colours</td><td>Votes</td></tr><tr><td>Blue</td><td>6</td></tr><tr><td>Green</td><td>4</td></tr><tr><td>Pink</td><td>8</td></tr><tr><td>Red</td><td>7</td></tr></table>Discuss the outcomes. Respond to questions like:
- Which is the most/least popular?
- Who voted either for this or for this?
- Which colour had fewer than 5 votes?
- Would the table be the same if we asked Year 6?
- How might the table change if everyone had 2 votes?
- Who might find it useful to know what colours children like?</td><td>questioning techniques</td><td>white board and markers</td></tr>
<tr><td>3</td><td>Using Data
Use the data in a frequency table linked to a problem the class is trying to solve. Make – or use a computer to make – a simple bar chart, with the vertical axis labelled in ones, then twos. For example:
 
Discuss questions such as:
- Which day had most/least packed lunches?
- How many packed lunches in the whole week?
- Why do you think there are different numbers of packed lunches brought on different days?
- Would next week’s graph of packed lunches be the same or different? Why?</td><td>One on one support as needed</td><td>computers</td></tr>
<tr><td>4</td><td>Test a Hypothesis
Test a hypothesis such as: We think that most children in our class walk to school.
Decide what data is needed, collect it quickly then make – or use a computer to make – a simple pictogram, where the symbol represents 2 units.</td><td>One on one support as needed, questioning techniques</td><td>white board and markers</td></tr>
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		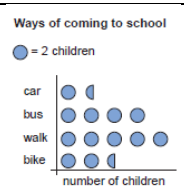 Discuss questions such as: - Do most children walk to school? - More children walk than come by bike. How many more? - How many children altogether in the class? - How would the graph be different: * if it were a wet day…? or December…? * if there were no buses…? * if we asked Year 6…?		
	5	**Computer Generated Graphs** Have students in small groups decide on an interest area and collect the relevant data needed. Use a computer with a simple graphing program to enter and display data. Encourage students to explore different ways of presenting the same data. Discuss how quickly the computer can do it and which chart, graph or table shows the information best. Give reasons.	Peer tutoring strategy in group organisation	computers, paper and pencils
	10	**Revision** **Assessment**		

ASSESSMENT OVERVIEW

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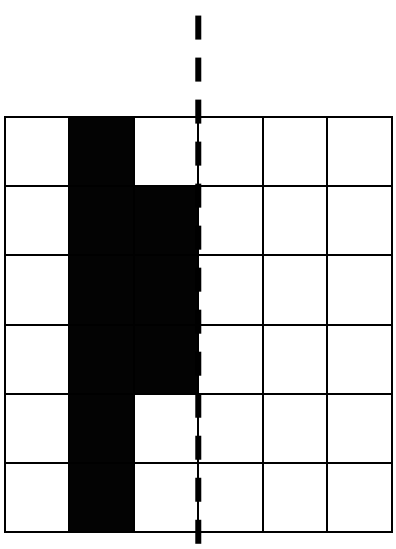
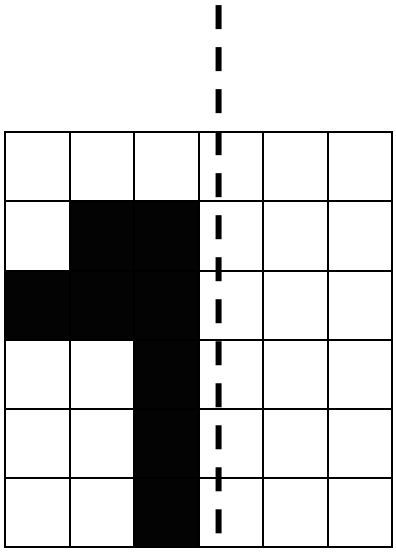
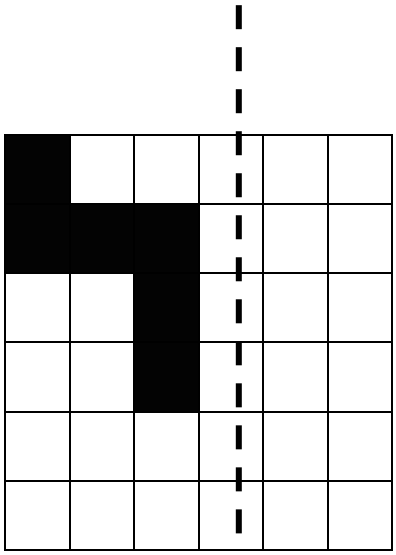
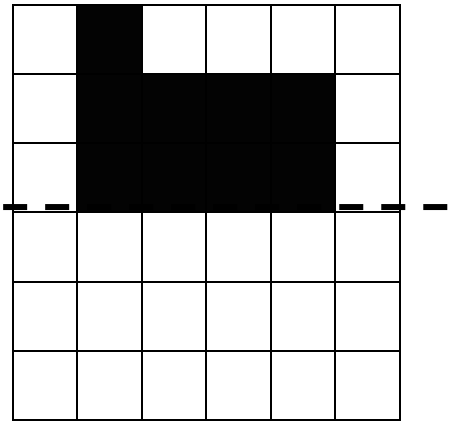
Name: _____ Date: _____

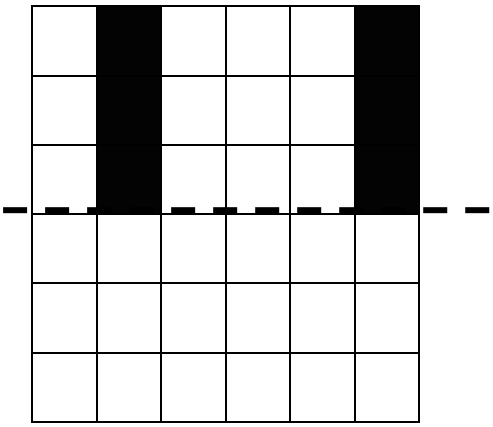
Shade the squares to create symmetrical patterns

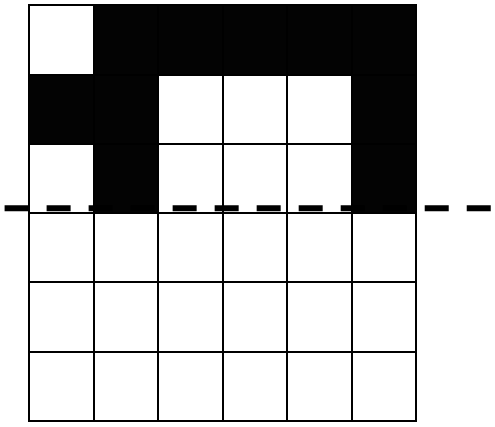


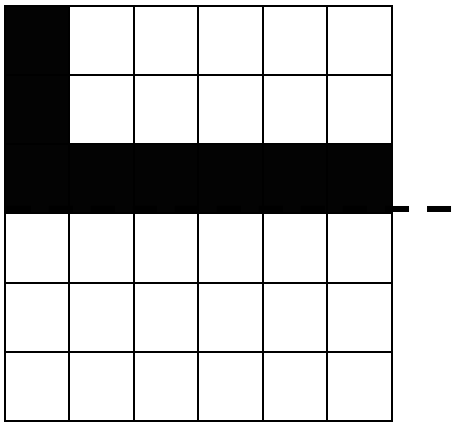


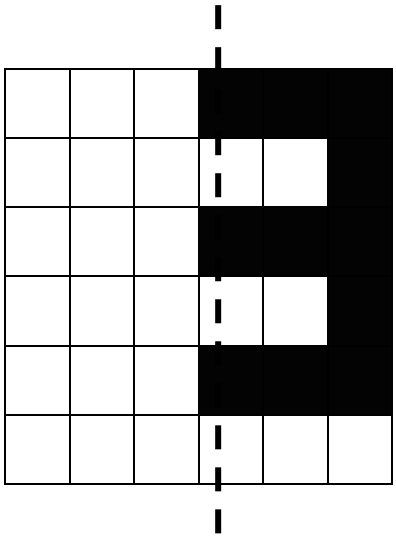


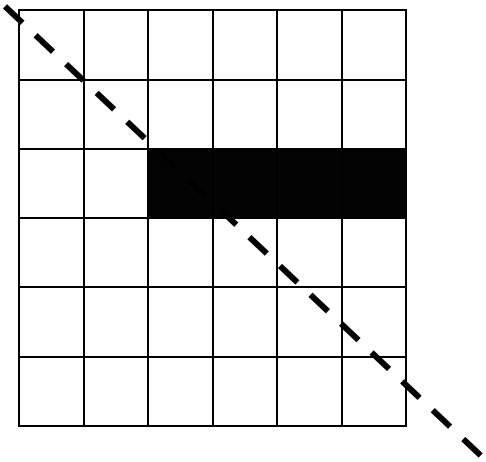












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