

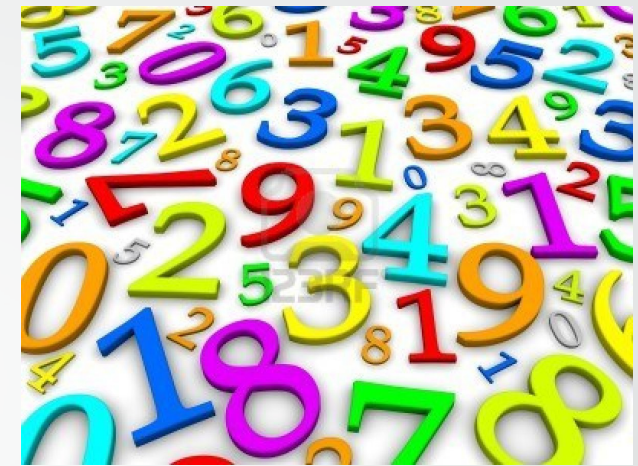


2020 Kindergarten Orientation

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Instructional Leader - Numeracy

Early Stage 1 – Stage 3



- Mathematics is mandatory for all students K–10.
- The [Mathematics K–10 syllabus](#) is divided into the strands of:
- Number and Algebra
- Measurement and Geometry
- Statistics and Probability



Mathematics and Numeracy

What is the difference?

Mathematics

- Mathematics is abstract - such as 5 dimensional shapes which can't be drawn but can be represented mathematically.
- The mathematical ideas used by engineers and mathematicians could be considered the 'numeracy' of those professions
- Mathematics is about overarching principles and concepts
- Mathematics provides the foundations for being numerate

Numeracy

- Numeracy is applied
- Numeracy uses and applies mathematical ideas to solve problems in everyday or applied concepts
- Numeracy is flexible and relates to the context which it is being applied
- Numeracy is connected to other areas of mathematical concepts and to everyday concepts.



Working Mathematically

- The working mathematically components of communicating, problem solving, reasoning, understanding and fluency are integrated within the strands.
- Students who feel confident about working mathematically feel confident about themselves as learners of mathematics.



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Kindergarten – Early Stage 1

- count aloud to 30 and recognise numbers 0 to 20
- manipulate objects, such as counters to help add and subtract numbers
- use the language of money in everyday situations, eg coins, notes, dollars
- count forwards by one to add and backwards by one to subtract
- name the days of the week and tell the time to the hour, eg four o'clock
- identify and name simple shapes, eg circles, squares
- use position terms, eg between, behind, right, left
- recognise that halves are equal parts.



Helping your children feel good about Mathematics

- **Have a positive attitude towards maths**
- Many parents are scared of maths or think they just can't do it, but it's the worst thing you can tell your child.
- Parents are just so crucial as role models.
- When parents tell their children that they themselves can't do it, it means they're communicating messages that it's OK not to be good at maths, which can carry all the way through high school.



Talk to your child about Mathematics

- cooking in the kitchen (measurement)
- operating a microwave oven (numbers and counting backwards)
- stacking containers in the cupboard (shapes)
- finding a certain house number down the street (counting by twos).



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Play games to show you're interested in Mathematics

- Ask your child to tell you the number of dots on a die each time they throw one during a board game. Eventually they will be able to do this without having to count them. These kinds of activities form the basis of working out number problems in their head. Research shows that children who can do these things mentally have a deeper understanding of the maths involved.
- When your child is adding the dots of two dice together ask them to start counting from the biggest number, eg if the dice rolled were five and two, start with the number five and then count on two more. This helps your child learn to be efficient in their number strategies.

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Ask your child to explain how they work things out

- When your child works out a maths problem, such as adding the total when two dice have been rolled, ask them how they did it.
- Young children have quite sophisticated thinking strategies for solving maths problems. We need to communicate to them that their ways of thinking are just as important as finding out the answer.
- You could ask your child, 'How did you get that?' they may at first say, 'I don't know', but if they realise there is an expectation that they will need to explain the way they do maths, they will start thinking about it. The more they think about how they did something, the more it might make sense to them – it really contributes to that meaning-making process.



Have your child work things out in their head

- Children are encouraged to work things out in their mind in the early years of school rather than using pen and pencil to work out number problems, because it leads to a deeper understanding of the maths involved.
- Maths is about building upon foundations. The more complex maths children learn is made easier if they've got solid foundations in those early years
- It is crucial for children in younger grades to understand those foundational concepts of maths: **addition, subtraction, multiplication and division.**



Look at patterns with your child

- Asking your child to identify patterns – whether it's a pattern in a sequence of numbers, the beads in a necklace or the way bricks are arranged in a pathway – is helpful because through patterns, children identify structure.
- When we get to more advanced levels of maths, such as algebra, it's all about identifying and dealing with patterns, so if we can get children at a very young age to start looking at them, no matter how simple they are, they're developing a mindset that they are important.



How children learn numbers

- Children learn counting as a pattern of words, just like a nursery rhyme.
- Children learn the pattern of counting by repeating the numbers.
- To count, children need to match saying the number words with the correct number of things.
- Children should be given lots of opportunities to practise and explore counting groups of things.
- Children also need to recognise and name numbers.



How do children learn to count and use numbers?

- Children learn the pattern of counting by repeating the numbers. At the beginning, this pattern may have gaps where your child may leave out a number in the sequence, or they may invent numbers. It's common to hear students say "20-10" after counting to 29.
- Remembering the words for each number in the correct order such as '1, 2, 3' is only part of counting. To count, children need to match saying the number words with the correct number of things ie, saying the number "three" for three cars. Children should be given lots of opportunities to practise and explore counting groups of things as well as making groups. Children also need to recognise and name numbers.



Counting with your child at home

- Count with your child the number of buttons as you do up a cardigan or shirt.
- Encourage your child to count the number of pegs used to hang out the washing.
- Count the number of steps from the front door to the letterbox.
- Count the number of eggs in a carton, and again after some have been removed.
- Read and talk about stories and rhymes that use numbers.
- Sing songs and nursery rhymes that include numbers, such as *Five Little Ducks* and *Baa Baa Black Sheep*.
- Have your child count as far as they are able to go and then encourage them to join you while you continue counting.



75 Numeracy Picture Books – TOP TEN resources

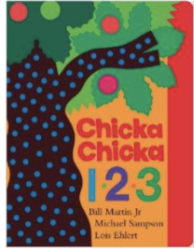




Numeracy Picture Book Library

CATALOGUE BY GRADE LEVEL

CLICK ON FRONT COVERS TO OPEN LINKED LESSONS

Foundation / Kindergarten

<p>Chicka Chicka 1 2 3 Martin B.</p>  <p>Count to 3 and subitise</p>	<p>The Very Hungry Caterpillar, Carle E.</p>  <p>Count to 5, connect to digits, partition, create and solve patterns, models $\frac{1}{2}$, measure and graphing</p>	<p>Uno's Counting Book, Base G.</p>  <p>Count to 10 and match digits to number names and quantities</p>
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Numeracy Picture Book Library

CATALOGUE BY CONCEPT

CLICK ON FRONT COVERS TO OPEN LINKED LESSONS

Place Value Picture Books

<p>Chicka Chicka 1 2 3 Martin B.</p>  <p>Lessons for F/K – Count to 3 and subitise</p>	<p>The Very Hungry Caterpillar, Carle E.</p>  <p>Lessons for F/K – Count to 5, connect to digits, partition, create and solve patterns</p>	<p>Uno's Counting Book, Base G.</p>  <p>Lessons for F/K – Count to 10</p>
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By grade and by concept. All come with lesson plans.

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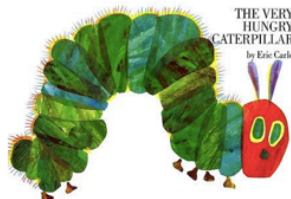
The Very Hungry Caterpillar

The Very Hungry Caterpillar Carle E.

Storyline: A caterpillar eats 1 piece of fruit on Monday, 2 on Tuesday and so on until it transforms into a colourful butterfly.

Best features: Simple but classic.

Foundation Place Value: Count to 5



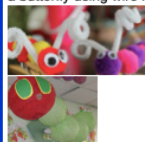
MY HUNGRY CATERPILLAR

Read one page each day from the start of the week.

Using pompoms and a popsicle stick as their base, students add a piece to their caterpillar each day as you read one page of the book, tracking the caterpillar's growth by counting from 1 to 5. Model your own version using the materials or using balloons connected by string on the floor and/or even lanterns as a hanging class display (see visuals).
Materials: 5 green pompoms and 1 red pompom for each student. Popsicle sticks. Craft glue. Optional: Googly eyes.



On the final day, students can transform their caterpillars into a butterfly using wire like so:



Support: Set up a caterpillar with large balloons on a tree to create some class excitement, but also which you can use for some extra counting practice with support students just before you bring the class in from recess and lunch. These quick 15-second opportunities for extra practice every day are a great way to consolidate counting with these students.



Extension: Add pompoms for each piece of fruit the caterpillar eats to allow them to count well past 10 and make a longer caterpillar using 2 or more popsicle sticks.

COMBINATIONS CATERPILLARS

Read in full.

Students create hungry caterpillars using red and green paper chains.

Materials: Pre-sliced thin strips of green and red paper.

Sticky tape to construct the paper chains.

Modelling and questioning: Model how to create a paper chain.

Allocate each student a needs-based number. E.g. 7. That student then creates all the ways to make 7 using the colours of the caterpillar, e.g. their first chain could be 1 red and 6 green, their next chain could then be 3 red and 4 green, etc.

Students record the combinations they find in a T-chart in their maths book:

All the ways to make a 7 caterpillar

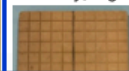
2	5
3	4

Once they have created all combinations possible for that number, including turn-arounds, allow the student to choose another caterpillar number. Focus students on mastering all the numbers between 5 and 10; being able to partition these is a critical developmental stepping stone).



Support: Start with a number like 5 and remove the recording element from the task for their first few numbers so that they can just work with the materials.

Extension: Use higher numbers (e.g. all the ways to make 25) and use counters instead of paper chains, moving these around an A4 page folded in $\frac{1}{2}$ to represent the two partitioned parts. Very advanced students could figure out all the ways to make 100 by drawing in pencil over a hundred block, recording each combination in their maths book, then erasing their pencil marks and marking a new way, e.g. 54 and 56:



Foundation Patterns & Algebra: Sort and classify familiar objects and explain the basis for these classifications, and copy, continue and create patterns with objects and drawings

COLOURFUL CATERPILLARS

Read in full.

Students use pompoms or circular counters to practise their patterning skills. Then students ask their partner to solve and continue their pattern.

You may also wish to read *Teddy Bear*

Patterns that is also linked to this concept and well-aligned to this lesson.

Materials: Pompoms or circular counters.

Modelling and questioning: Set up students with mini-blackboards or black A4 paper in front of them - this makes the colours of their pattern more visually prominent. Ask students to start with a two-colour pattern. Students then combine in like-ability pairs and challenge their partner to orally solve their pattern, e.g. "Is it blue yellow blue yellow?" This may seem very basic to adults but pattern creation and recognition is a fundamental stepping stone for more advanced skills including skip-counting, efficient strategies for the times tables and input-output tables in later algebra. Emphasise that a pattern must be 'crackable', i.e. it must repeat at least once (or partially) so that someone else can figure it out without having to ask you what it is.

What is a pattern:



What is not a pattern:



Student work samples:

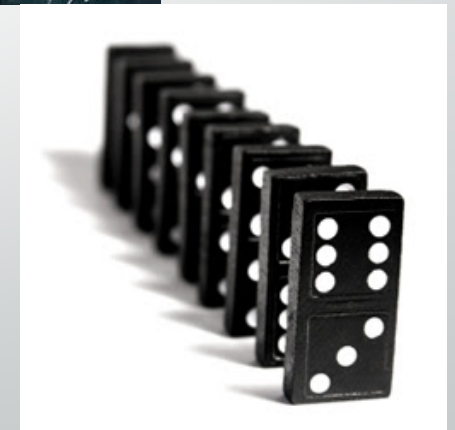
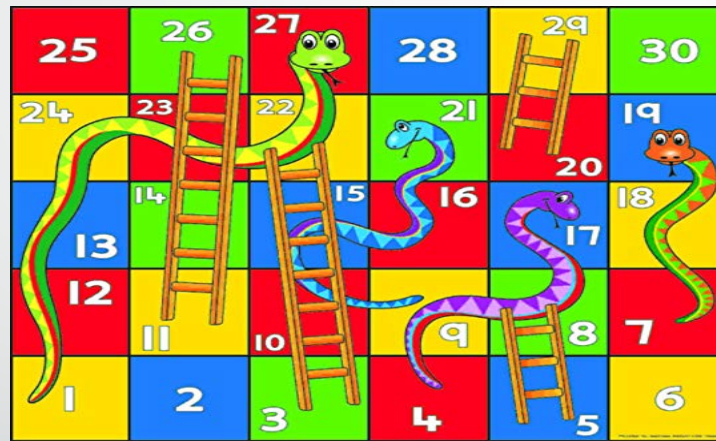
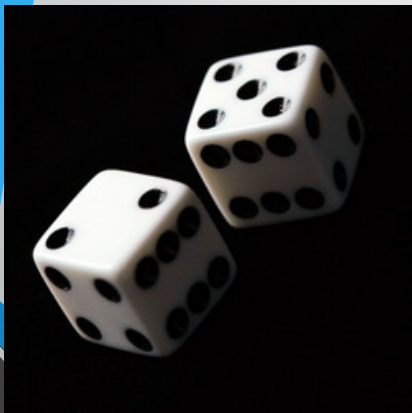
Support: Start with just one colour and being able to articulate that their pattern is 'red, red, red.' Then progress to 2 colours, e.g. 'blue, red, blue, red.'

Extension: These students can work in like-ability pairs creating more challenging patterns for each other, such as by using 3 or more colours and not just 1-by-1.

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Games to play at home



Card games

- Use the cards 1 (Ace) to 10
- **Kindergarten - Year 2**
- **Snap** – Recognising numbers. numbers before and after a given number, combinations to 10,
- Divide the cards amongst the players. Snap the cards that are the same.
- **Variations:**
- Snap the cards that come after the one played.
- Snap the cards that come before the one played.
- Snap the cards that add up to 10.



- **Fish** – Recognising numbers

Deal out seven cards to each player.

Each player finds pairs of numbers from their hand and places them down in front of them. Player 1 asks the player sitting to their left if they have a card that matches one of theirs so that they can make a pair. If they do have the card, they give it to player 1. If they do not have the card they say “fish” and player 1 picks a card from the pack. Play continues in this way. After all the deck has been used, players count the number of pairs they made. The winner is the one with the most number of pairs.



Place in order – Numeral recognition, numbers before and numbers after a given number

Place all the cards 1(ace) -10 face down in rows of ten so that there are four rows with ten cards in each row.

The aim of the game is to have the cards in order in each row. (cards places 1 – 10).

Player 1 turns over the first card and tries to work out where it should be in the row and places the card down. The next player picks up the card where player 1 placed their card and then works out where to put that card. Play continues in this until all the rows are from 1 – 10.



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Make 10 – Addition

A pack of cards 1-10

One player deals out ten cards and places them face up in a row. The first player then looks across the row of cards for combinations that add up to 10 (any number of cards is fine). Only one combination can be removed. The aim of the game is to collect as many cards as possible, so combinations that require more cards are favoured. Once a combination of cards has been removed the cards are replaced with new ones from the pack. Play continues until there are no more cards or combinations to 10. The winner is the player with the most cards.

Variation

Choose a different target number for the combinations.



Domino games

- **Game 1** – In pairs each person takes a domino. Count the number of dots to determine the total. Say or write the number that comes before and after.
- **Game 2 – Which is missing?**
- Take two dominoes. Announce the total number of dots and then show the child one of the dominoes. Ask how many dots must be on the other domino. Then let the child have a turn asking you which number must be on the missing dominoes. If you can keep it casual enough you can challenge the child to figure out what possible combinations of dots there are that would make up the missing number.



Dice games


- **Game 1:** Roll the dice to make the highest number possible. You can use 2 dice to start with but as the student gets older you add more dice.
- **Game 2:** To play this game you will need:
 - a regular dice for each student (the dice used for this game can be varied according to the needs of the students)
 - counters
 - Players roll their dice and the player with the higher number showing score a counter; if both throw the same number they both score a counter. The first player to collect 10 counters is the winner.



Useful websites

- Learning Potential Australian Government to support learning at home – Includes resources activities and online games: <https://www.learningpotential.edu.au/>
- NSW Department of Education: Practical Help for Parents: Formerly <http://www.schoolatoz.nsw.edu.au>
- <https://education.nsw.gov.au/public-schools/practical-help-for-parents-and-carers/maths/maths-a-to-z>





The only way
to learn
mathematics
is to do
mathematics.

PAUL HALMOS