Peak School

Parent Presentation - Maths

Year 3 & 4 - 25 September, 2012

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Introduction

Purpose

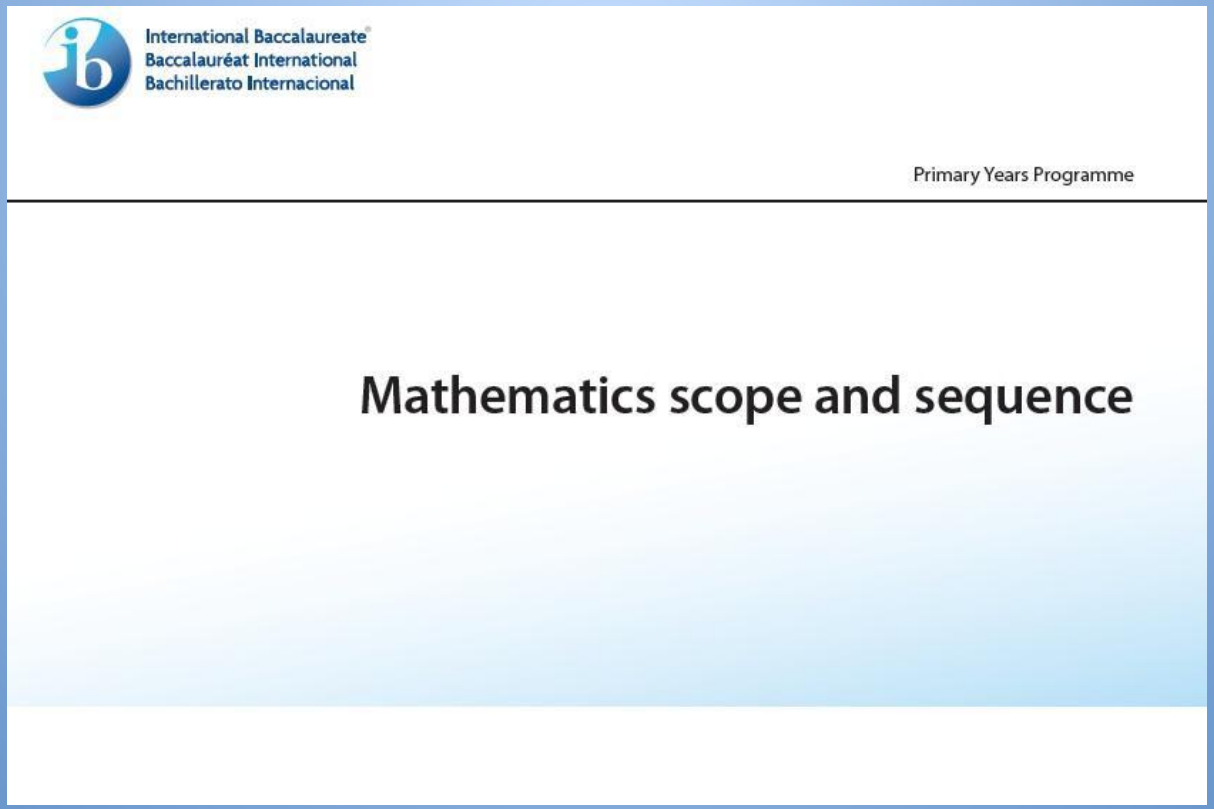
To share with parents the teaching and learning of Maths at Peak School

Success Criteria

- Parents will have a deeper understanding of how number is planned, taught and assessed
- To have the opportunity to experience a differentiated classroom environment

Written Curriculum - What we teach

The starting point is the IB Maths scope and sequence document.



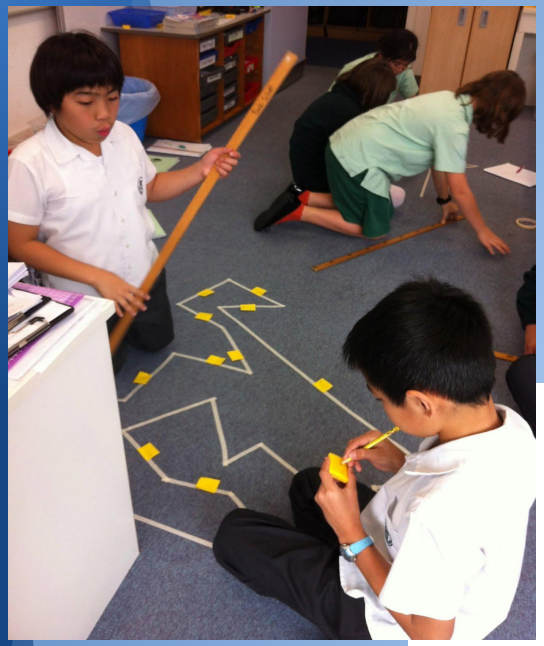
What the PYP believes about learning Mathematics

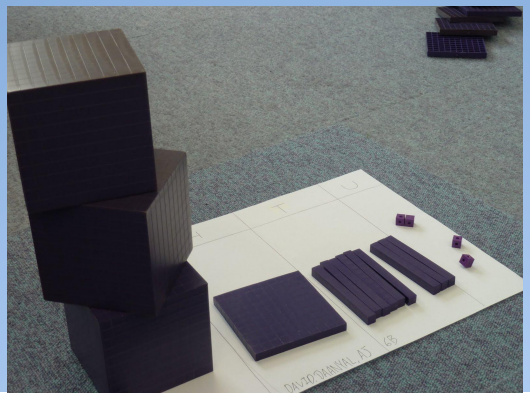
"The power of mathematics for describing and analysing the world around us is such that it has become a highly effective tool for solving problems..."

"In the PYP mathematics is also viewed as vehicle to support inquiry, providing a global language through which we make sense of the world around us.

IB Mathematics scope and sequence.

How children learn mathematics.





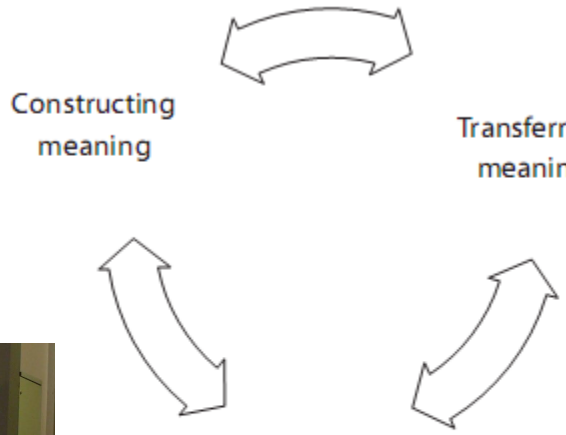
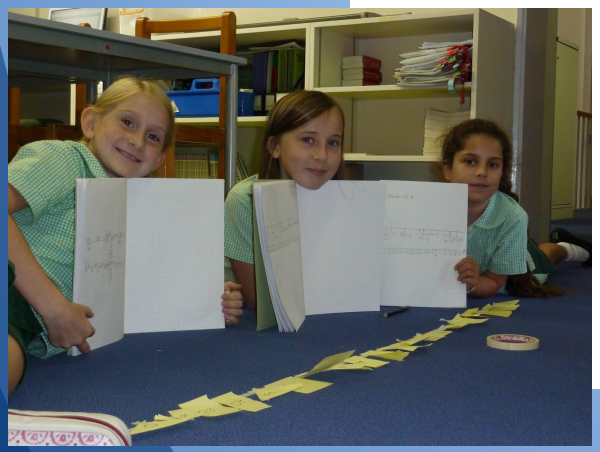
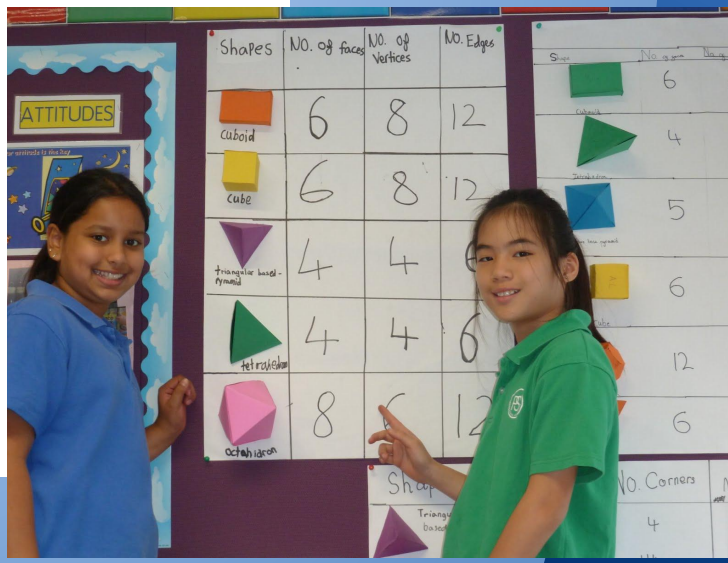


Figure 1
How children learn mathematics





Mathematics in a transdiciplinary programme.

Where there are strong links to a unit of inquiry maths is taught through relevant, realistic context.

-Data handling in a *How we organise ourselves unit*.

With some units the mathematics is taught as a standalone and then applied within a unit of inquiry.

-measurement in a *How the world works unit*.

Mathematics in a transdiciplinary programme.

Number is taught as a standalone unit

- place value
- four operations
- fractions, decimals and percentages.

Number flows through all mathematics and students will still apply strategies in units of work when they are needed,

How are mathematics practices changing?	
Increased emphasis on:	**Decreased emphasis on:**
connecting mathematical concepts and applications to learning	treating mathematics as isolated concepts and facts
manipulatives, to make mathematics understandable to students	rote learning, memorization and symbol manipulation
real-life problem solving using mathematics	word problems as problem solving
instruction built on what students know, what they want to know, and how they best might find out	instruction focused on what students do not know
a variety of strategies for possible multiple solutions—emphasis on process	one answer, one method, emphasis on answer
students being encouraged to speculate and pursue hunches	the teacher as the sole authority for right answers
a broad range of topics regardless of computational skills	computational mastery before moving on to other topics
mathematics as a means to an end	teaching mathematics disconnected from other learning
the use of calculators and computers for appropriate purposes	a primary emphasis on pencil and paper computations
programme of inquiry as the context for learning	textbook as the context for learning
students investigating, questioning, discussing, justifying and journalling their mathematics	the use of worksheets
students and teachers engaged in mathematical discourse.	teacher telling about mathematics.

Inquiry Indicators - Standalone

1. exploring, wondering and questioning;
2. experimenting and playing with possibilities;
3. making connections between previous learning and their current thinking;
4. making predictions and acting purposefully to see what happens;
5. collecting data and reporting findings;
6. Clarifying existing ideas and reappraising perceptions of events;
7. deepening understanding through the application of a concept;
8. making and testing theories;
9. researching and seeking information;
10. taking and defending a position;
11. solving problems in a variety of ways;
12. reflecting on their learning.

Five Strands

- Number
- Pattern and Function
- Data Handling
- Measurement
- Shape and Space

Phase 3		
Conceptual understandings The base 10 place value system can be extended to represent magnitude. Fractions and decimals are ways of representing whole-part relationships. The operations of addition, subtraction, multiplication and division are related to each other and are used to process information to solve problems. Even complex operations can be modelled in a variety of ways, for example, an algorithm is a way to represent an operation.	• model addition and subtraction of fractions with related denominators*** • model addition and subtraction of decimals.	
Learning outcomes When **constructing meaning** learners: • model numbers to thousands or beyond using the base 10 place value system • model equivalent fractions • use the language of fractions, for example, numerator, denominator • model decimal fractions to hundredths or beyond • model multiplication and division of whole numbers • use the language of multiplication and division, for example, factor, multiple, product, quotient, prime numbers, composite number	When **transferring meaning into symbols** learners: • read, write, compare and order whole numbers up to thousands or beyond • develop strategies for memorizing addition, subtraction, multiplication and division number facts • read, write, compare and order fractions • read and write equivalent fractions • read, write, compare and order fractions to hundredths or beyond • describe mental and written strategies for multiplication and division.	• use decimal fractions in real-life situations • use mental and written strategies for multiplication and division in real-life situations • select an efficient method for solving a problem, for example, mental estimation, mental or written strategies, or by using a calculator • use strategies to evaluate the reasonableness of answers • add and subtract fractions with related denominators in real-life situations • add and subtract decimals in real-life situations, including money • estimate sum, difference, product and quotient in real-life situations, including fractions and decimals.
	When **applying with understanding** learners: • use whole numbers up to thousands or beyond in real-life situations • use fast recall of multiplication and division number facts in real-life situations	

Written Curriculum

What has happened at Peak School?

Teachers have worked collaboratively using their knowledge and experience on "breaking the document down" into further detailed outcomes in line with the IB maths scope and sequence documents.

Contributed to ESF wide documentation

PD attended - workshops - international community (IB, MLATS etc)

Written to taught Curriculum: Y4

Planning the inquiry

1. What is our purpose?

1a) To inquire into the following:

Place Value

Central Idea

The base 10 place value system can be extended to represent magnitude.

Enduring understandings we want the children to have:

The position of the digit in a number represents its value.

The value of a digit is connected the base 10 value system.

Class/grade: Year 4 Age group: 8-9

School: Peak School

Title: Unit 1

Teacher: N MacLennan and L Fay

Date: August/September 2012 (and on-going throughout the year)

Proposed duration: 4-6 weeks intensive, revisiting often

1b) Summative assessment task(s):

What are the possible ways of assessing students' understanding of the central idea? What evidence, including student-initiated actions, will we look for?

Task: Students design a game that involves place value. They can use equipment to help model. They can base the game on some of the dice games they have experienced through the unit.

Evidence: Teachers/Students look for evidence of their achievement based on the following 'I can' statements.

- I can read and write numbers to 1000 and beyond.
- I can model numbers to 1000 and beyond
- I can compare and order numbers to 1000 and beyond.
- I can expand numbers up to 1000 and beyond
- I can successfully play a game that uses place value to solve.

Ongoing: Students will reflect on their learning by recording the different ways they represent numbers. They will also give personal feedback on how they feel they went with the place value games. Starting with smiley faces and sentences starters.
As a result of the summative assessment task it is anticipated that the children will draw on their ability to explain a strategy that they have used to play a game.

2. What do we want to learn?

What are the key concepts (form, function, causation, change, connection, perspective, responsibility, reflection) to be emphasized within this inquiry?

Key concepts

Function – How does the base 10 system work?

Change– How does a digit's value change when it moves to a different column?

Reflection – Is my math game a fair game?

What lines of inquiry will define the scope of the inquiry into the central idea?

An inquiry into

- The base 10 number system.
- Math games that involve place value.

What teacher questions/provocations will drive these inquiries?

What are the patterns of the base ten system?

How do we read large numbers?

How far is it to the moon?

Read: Is a blue whale the biggest thing there is? by Robert E. Wells

How big is a million? by Anna Milbourne

Written to taught Curriculum: Y4

Planning the inquiry

1. What is our purpose?	Class/grade: Year 4 Age group: 8-9

Maths Carousel Activities
August 27-31, 2011

Day/Group	Monday	Tuesday	Wednesday	Thursday	Friday
Whales	Teacher guided	EA guided	Think Tanks Orange	ICT	Place value exploration
Polar Bears	Place value exploration	Teacher guided	EA guided	Think Tanks Orange	ICT
Seals	ICT	Place value exploration	Teacher guided	EA guided	Think Tanks Orange
Beavers	Think Tanks Yellow	ICT	Place value exploration	Teacher guided	EA guided
Moose	EA guided	Think Tanks Yellow	ICT	Place value exploration	Teacher guided

T= teacher EA= educational assistant PS= parent support

Teacher guided- working with the children using the base ten blocks, modelling, combining and partitioning numbers up to 10,000. Warm up with interactive base ten program. Provide chn with examples of numbers to both partition and to combine. Demonstrate how to record using numbers, pictures and number sentences. Draw examples in their books. Pages 18 and 19 Paul Swann 'Developing Maths with Base 10"

EA guided- using the place value grids, 'Point it Out' follow lesson (attached), take anecdotal notes where appropriate

Think Tanks- independently children will choose think tank cards and complete on whiteboards

ICT-children to explore place value games set on Koalas-math carousel-woodlands jr-place value

Place Value- Tropical fish sheet exploring value of units (colour 2s in ten spots, etc.)

Ongoing: Students will reflect on their learning by recording the different ways they represent numbers. They will also give personal feedback on how they feel they went with the place value games. Starting with smiley faces and sentences starters.
As a result of the summative assessment task it is anticipated that the children will draw on their ability to explain a strategy that they have used to play a game.

- Math games that involve place value.

What teacher questions/provocations will drive these inquiries?

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Written to taught Curriculum: Y4

Maths Planning

September 3rd-7th, 2012

	Tuesday	Wednesday	Thursday	Friday	Monday
Starter	Numbers up to 10,000. Using 0-9 cards make 4 digit numbers. Make 4 numbers using the digit 5 in a different position. What is the value of the 5 each time? Make a number with no hundreds. Make a number closest to 5000 without going over.	Display lower page 10 Abacus Evolve Book 1. Use number clues to match to different numbers. Model how to play 'Guess my Number' using similar questions to the clues given ie: is it even? Is it between 20 and 40?	Model for children how to collect information during Lugard Rd. Walk	Teach chn how to manage the data that was gathered on the walk. Model how to complete bar graphs.	Using a number line have chn order numbers biggest to smallest; find a number between two others; place a number on a line.
Main	Abacus Evolve Textbook 1 for practice work. BA- p3/7 A- 4/5 AA- 6/8	Paul Swan Dice Games for Place Value Knockout Pg 12/13 See attached.	Split into three groups chn will collect information regarding flora and fauna on the Peak walk. They will use tally charts, sketches, bullet points and photographs. All information will be used in later maths and UoI lessons.	Chn will use their gathered data to create their own bar graph.	Pg 27 Make my number. Students roll dice and make that number using base ten, write numbers, pictures and words, partitioned. BA- 3 dice A-4 dice AA-5 dice

ability to explain a strategy that they have used to play a game.

How do we read large numbers?

How far is it to the moon?

Read: Is a blue whale the biggest thing there is? by Robert E. Wells

How big is a million? by Anna Milbourne

Written to taught Curriculum: Y4

Maths Planning

Place Value knockout

AA

- Use 6 digit numbers (Roll a dice 6 times and decide where the digits go)
- Add the numbers created (can check with a dice)
- The winner is the player with the highest total after 5 rounds.
- Cannot reuse a cell by placing a counter on an existing counter.
-

A

- 4 digit numbers (Roll a dice 4 times)
- Decide second round the order of the digits.
- Try adding the numbers together. (Use a calculator)
- Cannot reuse a cell by placing a counter on an existing counter.
-

BA

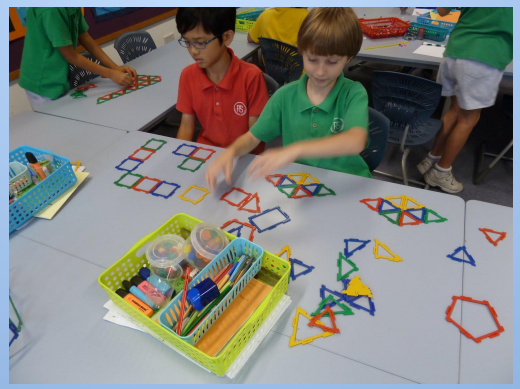
- Roll 4 dice to create 4 digit number
- The winner is the player with the most counters on the board after 5 goes.
- Cannot reuse a cell by placing a counter on an existing counter.

“I hear and I forget.
I see and I remember.
I do and I understand.”
Confucius

“Mathematical learning occurs when there is activity with dialogue.”
George Booker

Taught (How)

Year Three and Four.



Solve mentally

234 + 98 =

Answer?

Solve mentally

53 – 38 =

Answer?

Solve mentally

$$12 + 9 + 8 + 1 + 5 =$$

Answer?

Mental Strategies

Working from doubles
Place Value Partitioning
Compensating
If I know then I know…. (known facts)*
Number line
Bridging Strategy
Inverse operations

Key Number Knowledge

Times Tables.

- students learn 2,5, and 10's first and then use strategies to support solving other times tables.
- there comes a point that students should have instant recall of times tables.
- this will support the development of mental and written strategies for solving multiplication and division problems.

Written Strategies

Students will start with informally recording their working and thinking.
eg using number lines

Student will then start with an expanded form which reinforces place value concepts.

Students are expected to explain the process clearly as they work.

Teachers take the time to work on these expanded forms to develop understanding.

Written Strategies

Once students demonstrate an understanding they introduced to a shorter more efficient method.

This is taught as an inquiry into effective written methods.

- What are the different methods?
- What methods do your parents use?
- What method works for you?

Mathematical Literacy

Students need to be able to explain their thinking using the correct mathematical language.

Students need to be able to identify the math within a problem.

What operations does the problem want me to use and what is the most effective strategy to use to solve the problem?

ANNO'S MYSTERIOUS MULTIPLYING JAR

Masaichiro and Mitsumasa Anno

ASSESSMENT AND DIFFERENTIATION

Why Assess?

To establish prior knowledge

To inform and differentiate future teaching and learning

To find out how children are feeling about their learning

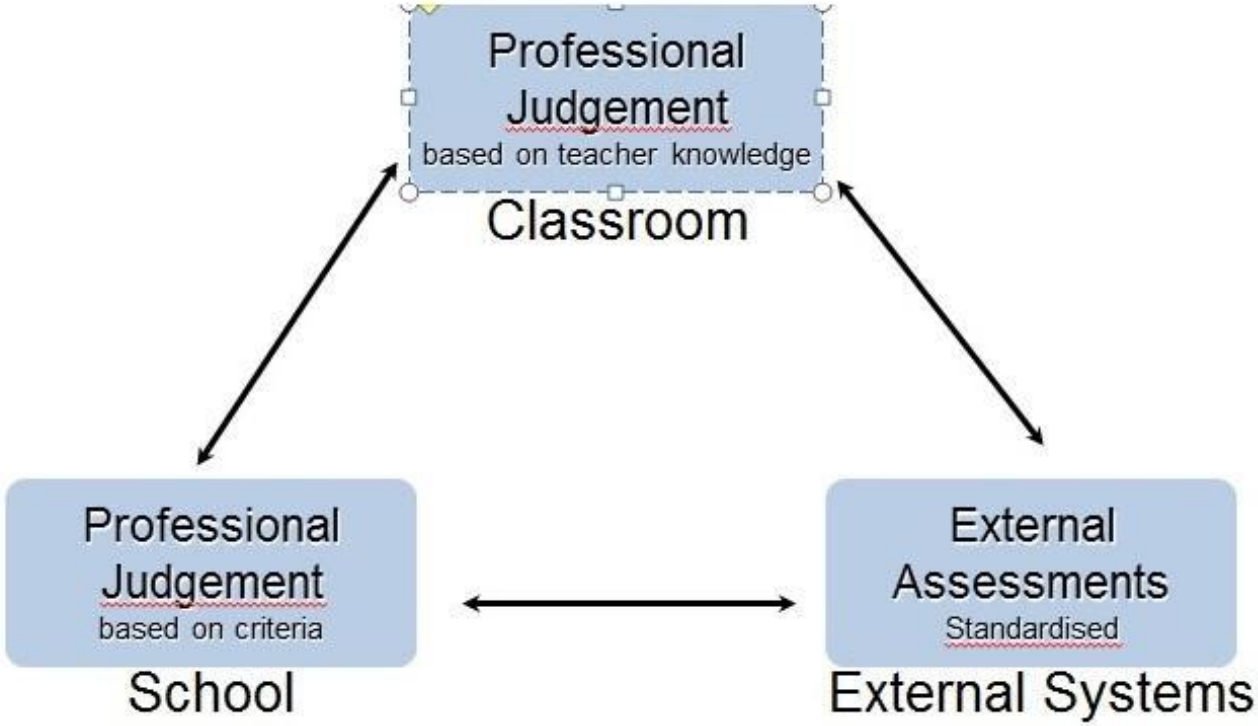
To find out how students learn (learning styles)

To provide feedback to students/parents/stakeholders

To set goals for future learning

To tell us if our teaching is effective

Assessing - How do we discover what students know and have learned?



Three forms of Assessment

Diagnostic- pre assessment of students to see what they know before teaching the unit.

Formative- assessing students' strengths and weaknesses, and providing feedback during the unit.

Summative- Testing the student's knowledge at the end of teaching a unit .

Formative and Summative Assessment

Formative and summative assessment are interactive. They support one another and should be used together.

Most formative assessment is informal. The feedback and response involves both teacher and student.

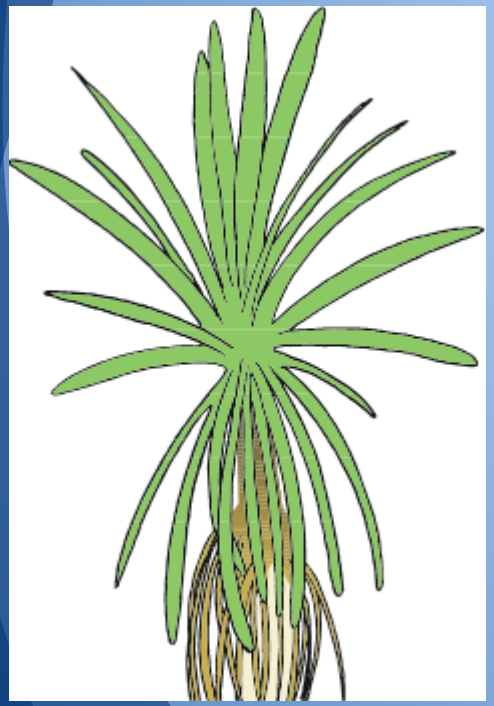
Formative assessment has the greatest impact on learning and achievement.

The garden analogy: Diagnostic

Takes place prior to the growing. You can diagnose the plants strengths and weaknesses.

You can identify what it needs to be bigger and stronger.

The garden analogy: Formative



Formative assessment is the ongoing analysis of a plant's needs - we must recognize when it needs to be fed, watered, and provided with sunlight in order for it to grow.

The garden analogy: Summative

Summative assessment of the measuring is the plants growth at a point.

The measurement tells us how much the plants have grown.

It does not affect the growth of the plants.

Year 3 Rubric: Place Value

Developing (Phase 2+)	Understanding base 10 place value system allows us to communicate, numbers and number relationships
	• Models numbers up to three digits • Can read and write three digit numbers • Can compare and order three digit numbers • Can identify the value of a digit within a three digit number. • Can expand out a three digit number • Estimate by rounding up or down to the nearest 10 • Can apply place knowledge to solve problems in real life situations.
	Year 3 Rubric: Place Value
	Understanding base 10 place value system allows us to communicate, numbers and number relationships
Meets Expectations (Phase 2-3)	• Models numbers up to four digits • Can read and write four digit numbers • Can compare and order four digit numbers • Can identify the value of a digit within a four digit number. • Can expand out a four digit number • Estimate by rounding up or down to the nearest 100 Can apply place knowledge to solve problems in real life situations.
	Year 3 Rubric: Place Value
Exceeds Expectations (Phase 3)	Understanding base 10 place value system allows us to communicate, numbers and number relationships
	• Models numbers up to four digits and beyond • Can read and write four digit numbers and beyond • Can compare and order four digit numbers and beyond • Can identify the value of a digit within a four digit number or beyond • Can expand out a four digit number and beyond • Estimate by rounding up or down to the nearest 1000 Can apply place knowledge to solve problems in real life situations.

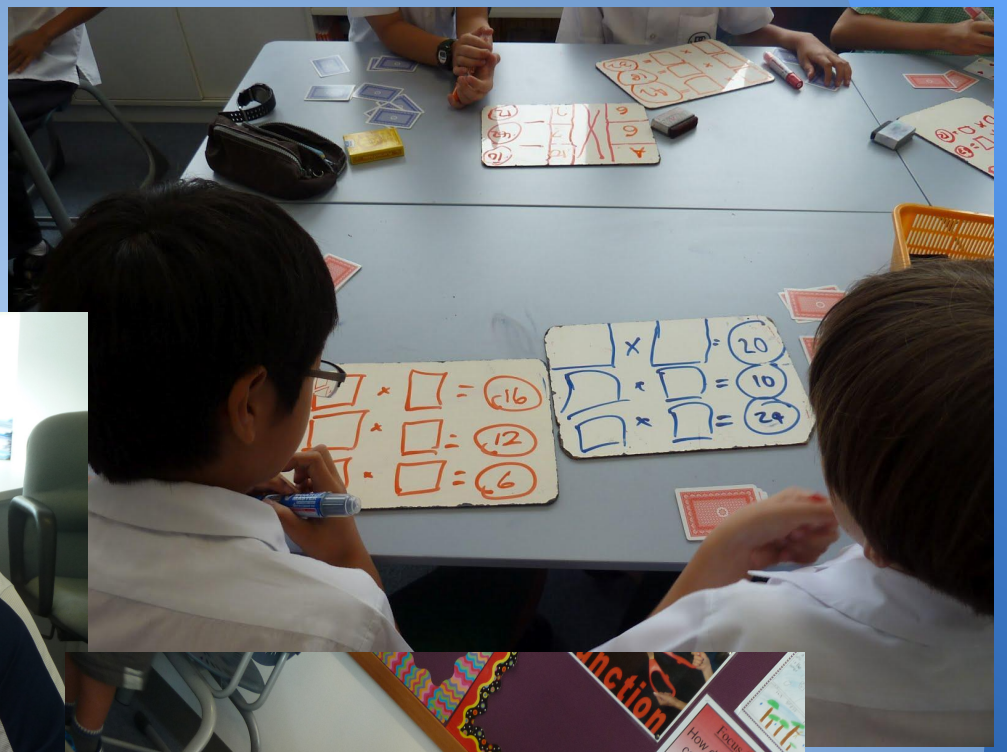
Year 4 Rubric: Place Value

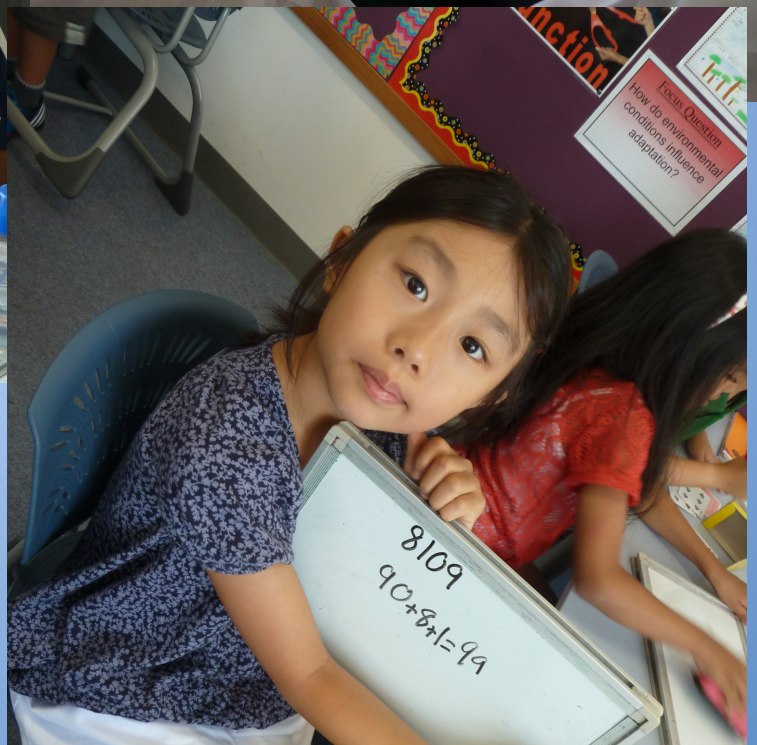
Developing (Phase 3)	**Understanding base 10 place value system allows us to communicate, numbers and number relationships**			
	• Models numbers up to four digits and beyond • Can read and write four digit numbers and beyond • Can compare and order four digit numbers and beyond • Can identify the value of a digit within a four digit number or beyond • Can expand out a four digit number and beyond • Estimate by rounding up or down to the nearest 1000 Can apply place knowledge to solve problems in real life situations.			
	Year 4 Rubric: Place Value			
	Understanding base 10 place value system allows us to communicate, numbers and number relationships			
Meets Expectations (Phase 3)	Models numbers up to four digits and beyond Can read and write (words and numerical) four digit numbers and beyond Partition numbers up to four digits and beyond Can order numbers up to four digits and beyond Can identify the value of a digit and the place value within a four digit number or beyond Estimates by rounding up to 4 digit numbers to nearest 10,100 Can apply place knowledge to solve problems in real life situations.(through games)			
	Year 4 Rubric: Place Value			
	The base 10 place value system extends infinitely in two directions			
Exceeds Expectations (Phase 3+)	Model numbers to 10 thousands using the place value system. Read and write numbers up to 10 thousands Partition numbers up to 10 thousand. Can order whole numbers to 10 thousands Estimates by rounding up to 4 digit numbers to nearest 10,100,1000. Model decimal fractions to tenths Can explain how the Base 10 place value system works Can apply place value knowledge to 10 thousands in real life situation.			

Assessing - Tools to evaluate strategies used.

Assessment strategies and tools					
Assessment tools / Assessment strategies	Rubrics	Exemplars	Checklists	Anecdotal records	Continuums
Observations	✓		✓	✓	✓
Performance assessments	✓	✓		✓	✓
Process-focused assessments	✓		✓	✓	✓
Selected responses		✓	✓		✓
Open-ended tasks	✓	✓		✓	✓


Report




Focus Question
How do environmental conditions influence adaptation?
8109
90+8+1=99

Gathering evidence:

Summative assessment task(s):

What are the possible ways of assessing students' understanding of the central idea? What evidence, including student-initiated actions, will we look for?

Summative Task: Students demonstrate their understanding by representing a number using flash cards and objects. (Teacher led discussion in small groups)

Summative Task: Students demonstrate their understanding by counting a group of objects and represent that number though words, pictures and symbols. (Teacher led discussion in small groups)

SENA test at the end of the year.

3. How might we know what we have learned?

This column should be used in conjunction with "How best might we learn?"

What are the possible **ways** of assessing students' **prior knowledge and skills**? What evidence will we look for?

PIP's – pre assessment
SENA assessment

What are the possible **ways** of assessing student learning in the context of the **three lines of inquiry**?

Photos, drawings, recording quantities, models
Observations
Number stories
Teacher notes
Student action

What evidence will we look for?

Evidence refer to Rubric.
(I can statements)

- I can keep track when counting objects
- I know how many objects there is in a set
- I know what comes after a number
- I know what comes before a number
- I know different way to make numbers to 10
- Recognise groups of zero to 5 objects without counting
- I can use and understand number words and numerals to represent quantities in real life situations

Assessment and Reporting to Parents

- Portfolio
- Gateway report x 3
- Targets set by teacher/student
- Standardised assessment data (ISA)
- 3 Way Conferences
- Student Led Conference
- Learning Journey