Peak School

Parent Presentation - Maths

Year 5 and 6 - 26 September, 2012

Wendy Barrett, John Marwick and Bill Garnett

Introduction

Purpose

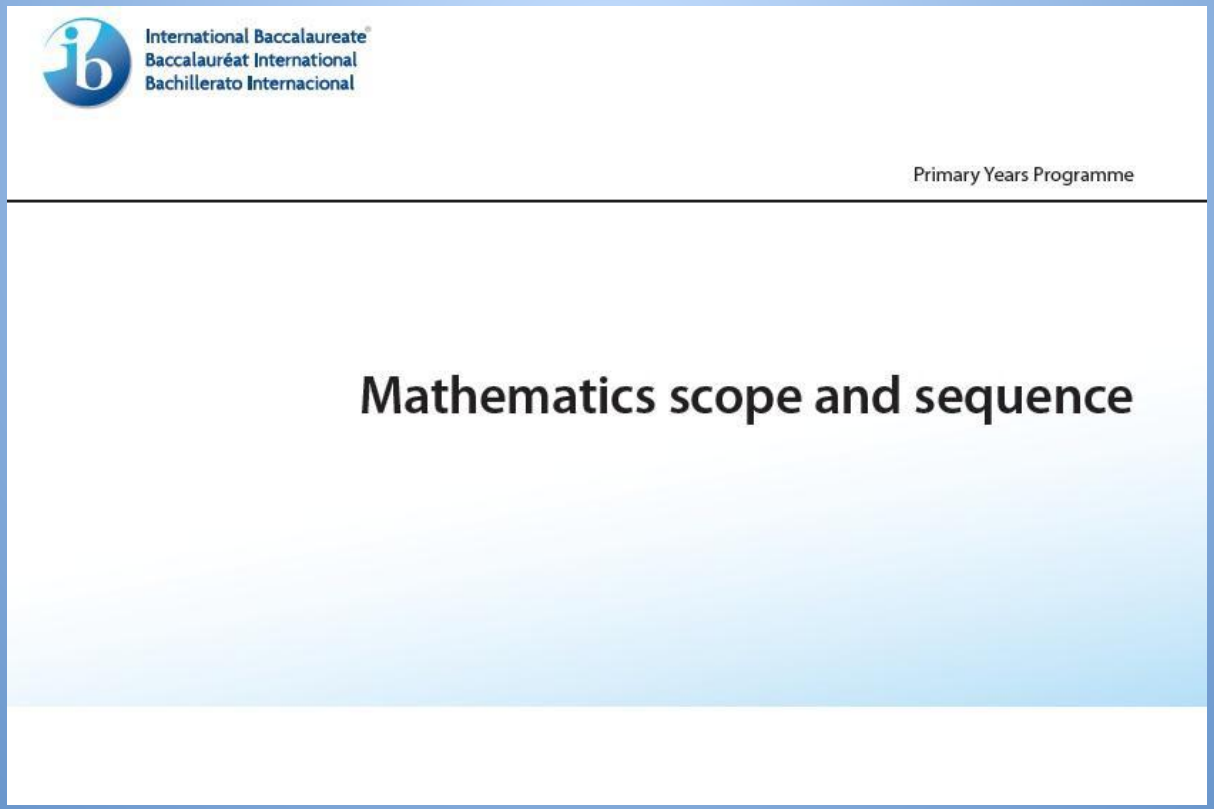
To share with parents the teaching and learning of Maths at Peak School

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.



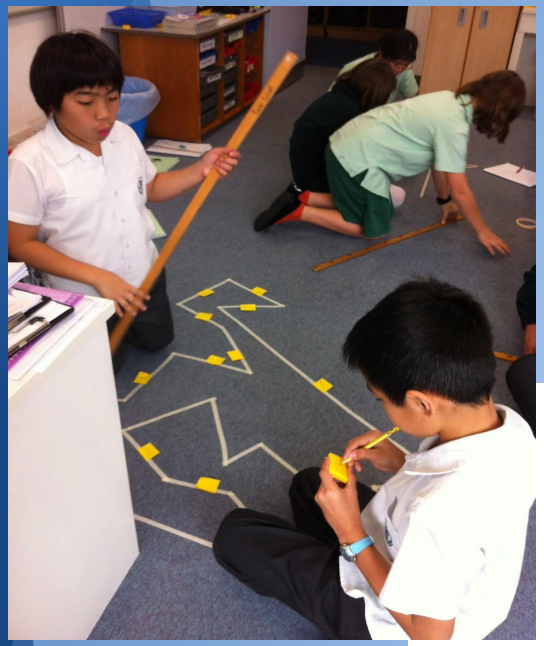
What the PYP believes about learning Mathematics

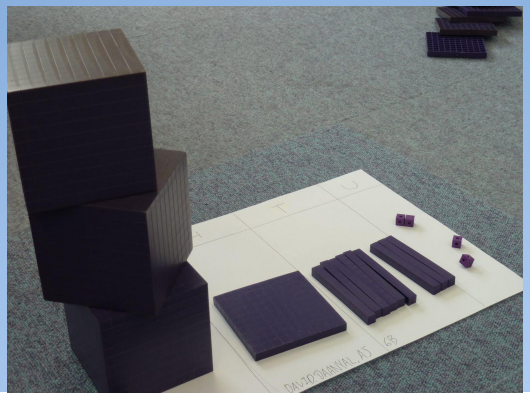
"The power of mathematics for describing and analysing the world around us is such that it has become a highly effective tool for solving problems..."

"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.





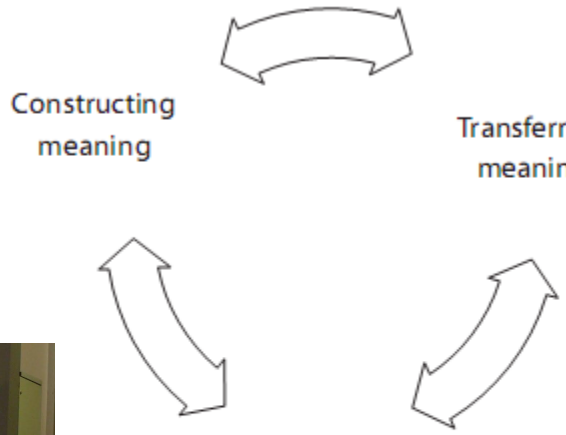
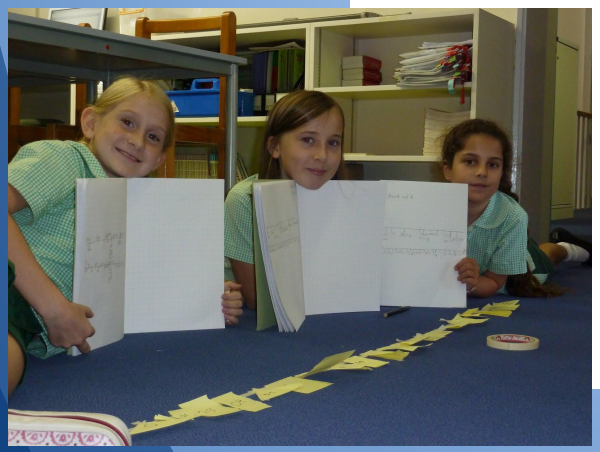
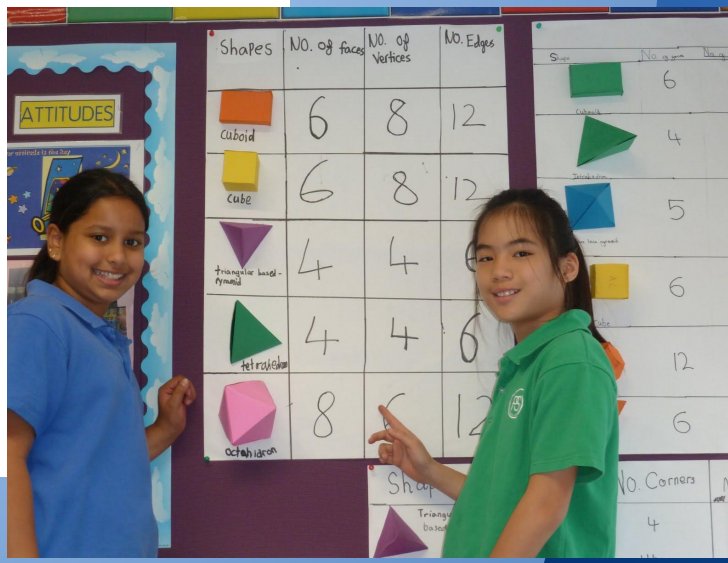


Figure 1
How children learn mathematics





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 Curriclum Y6

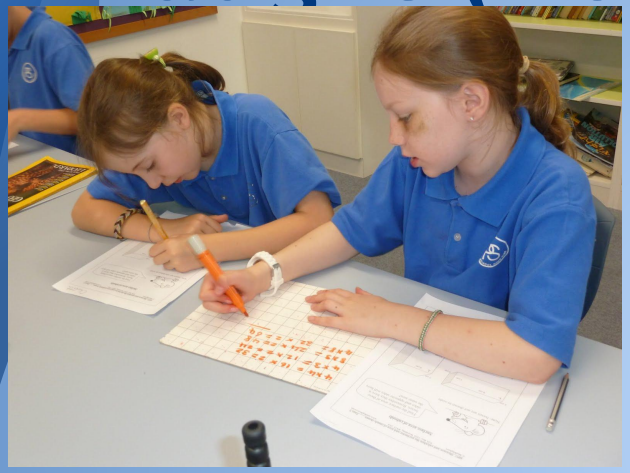
Y6 MATHS WEEKLY PLAN: Place Value 1

CENTRAL IDEA	**The base 10 place value system extends infinitely in two directions.**				
GROUP	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
STARTER		Using 5 or 6 digits make target numbers eg largest even number, a smallest number etc Practise saying numbers and what each digit represents	Play Traffic lights (See attached notes)	X Bingo	Model Calculate A Digit
CIRCLES	Preassement - written assessment	One grain of rice: Estimating how many grains in piles of rice as intro. Read story, but stop at relevant points and ask children to fill in their record grid. Can they see /explain what is happening? At end of story children thinsk about what that many grains of rice looks like – look at own intial pile. Children then choose a number from the grid to focus on. Wrote in words, identify the value of the digits, add 10, subtract 100.	(Rotate through games) Play Grab 15 mins Reflect on task	Play place value Squeeze - Ref: Dice games for place value, Paul Swan (Purple book) With support	Play Calculate A Digit (3 digits) Ref Card Capers, Paul Swan. With support
TRIANGLES			Play Traffic lights 15 mins Reflect on task	Play place value Squeeze	Play Calculate A Digit
SQUARES			Play Go Fish 15 mins Reflect on task	Play place value Squeeze - decimals	Play Calculate A Digit
ASSESSMENT FOCUS		Can children estimate and make approximations in real-life situations involving large numbers. Read, write, compare and order numbers up to millions and beyond that occur in real life.	Can apply place value knowledge of whole numbers and decimals	Can apply place value knowledge of whole numbers and decimals. Read, write, compare and order numbers up to millions and beyond.	Can apply place value knowledge of whole numbers and decimals.

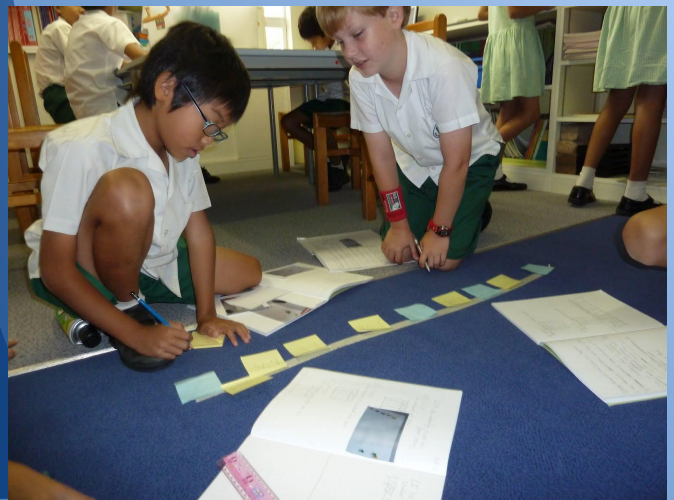
“I hear and I forget.
I see and I remember.
I do and I understand.”
Confucius

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

Taught (How)



Five and Six.



Solve mentally

728 – 98 =

Solve mentally

$5 \times 19 =$

Solve mentally

$$19.9 + 13.5 + 24.1 =$$

Solve mentally

$$119 \div 5 =$$

Mental Strategies

Addition and Subtraction.

Place value partitioning

Compensation

Inverse operations

Jump strategies

Mental Strategies

Multiplying and Dividing

Split into place value

Doubling and halving

Rounding and compensating

Using known facts and 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 (end of Yr 4).
- 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?

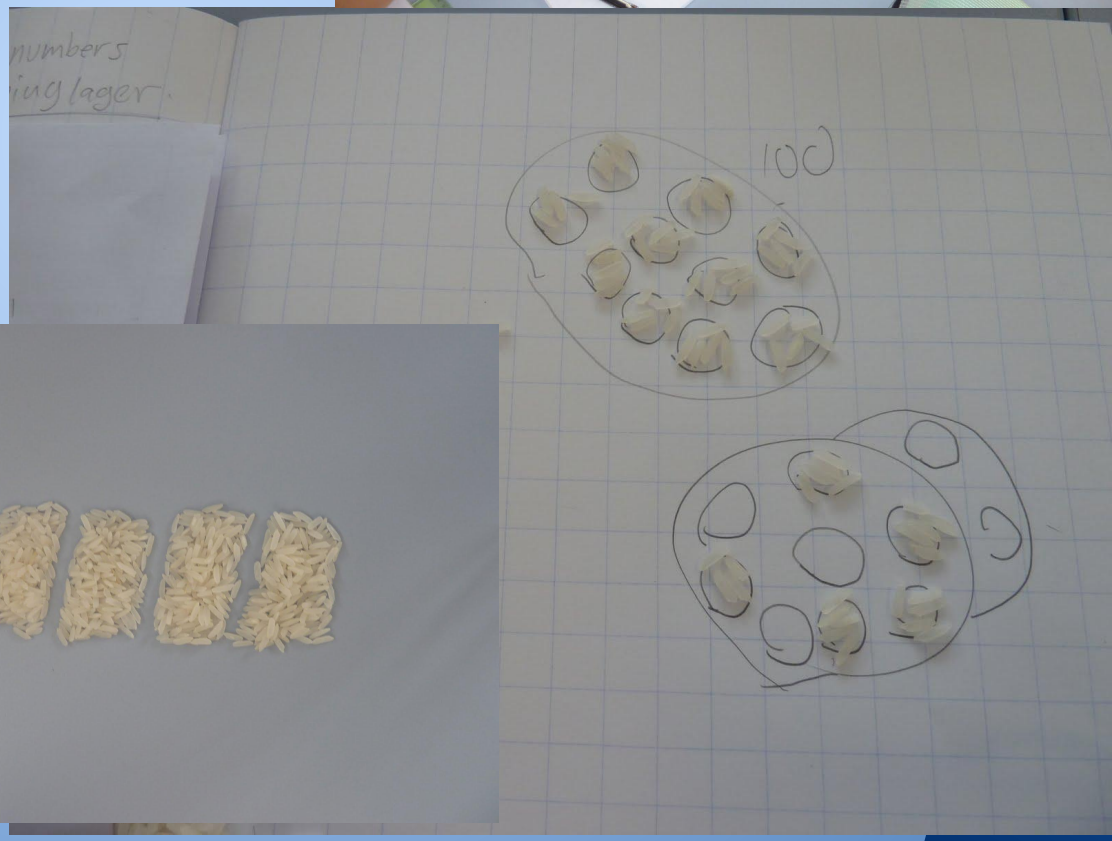
Mathematical Literacy

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?

iPad app video!


numbers
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100

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

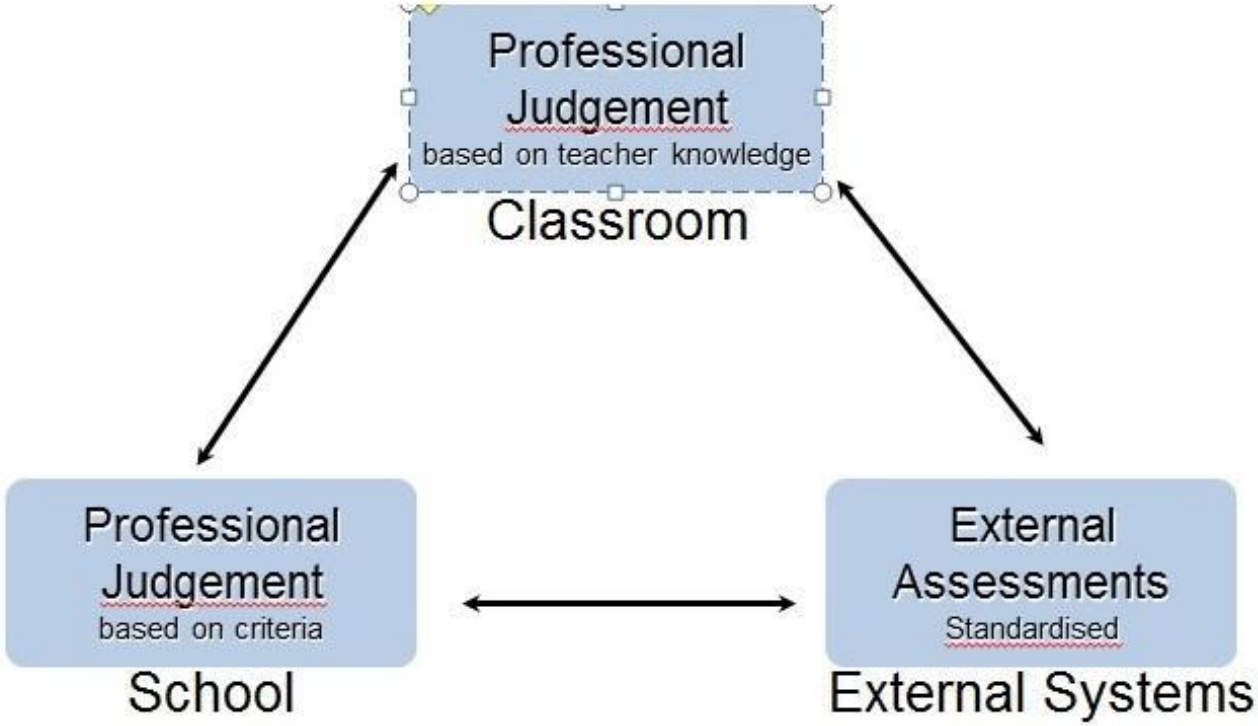
To find out how students learn (learning styles)

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.

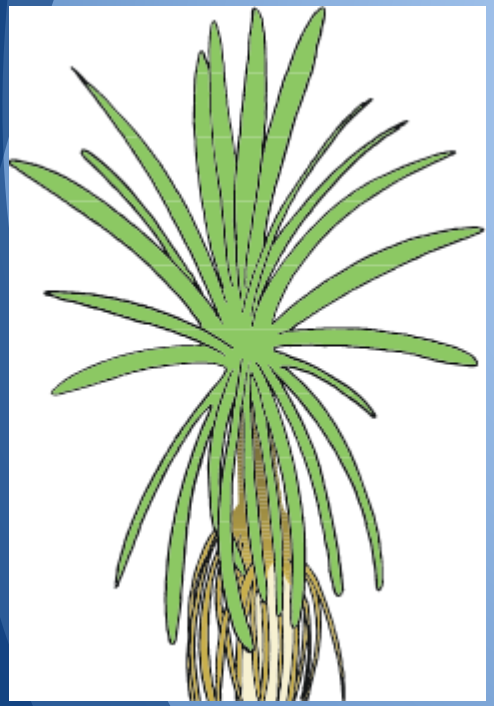
Formative assessment has the greatest impact on learning and achievement.

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.

Assessment - Add Y5 Rubric

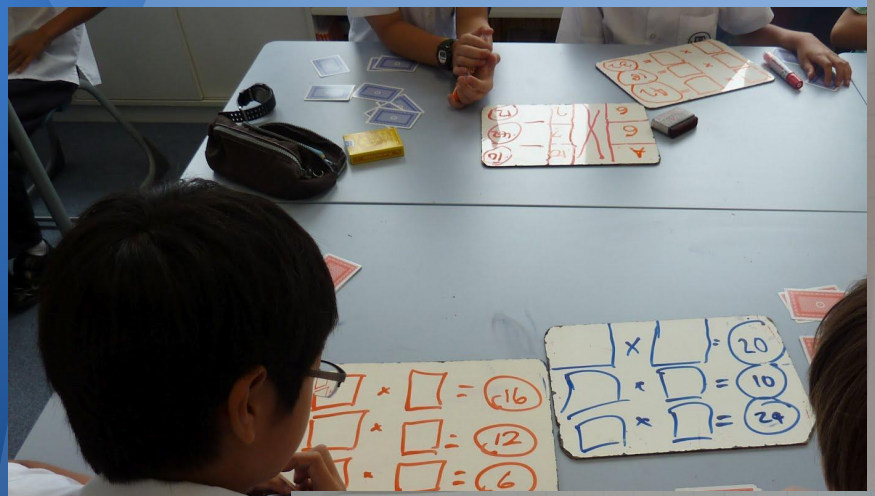
Year 5 Rubric: Place Value

	The base 10 place value system extends infinitely in two directions
Developing (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.
	.
	Year 5 Rubric: Place Value
	The base 10 place value system extends infinitely in two directions
Meets Expectations (Phase 3-4)	Model numbers to 100 thousands and beyond using the place value system. Read, write, compare and order numbers up to 100 thousands Estimates by rounding up to 6 digit numbers to nearest 10,100,1000. Model decimals fractions to hundredths Can read, write, compare and order decimals to hundredths Can explain how the Base 10 place value system applies to decimals Can apply place value knowledge of whole numbers and decimals in real life situation.
	Year 5 Rubric: Place Value
	The base 10 place value system extends infinitely in two directions
Exceeds Expectations (Phase 4)	Model numbers to millions and beyond using the place value system. Read, write, compare and order numbers up to millions Model decimals fractions to thousandths Can read, write, compare and order decimals to thousandths Can model exponents and square roots Can explain how the Base 10 place value system applies to decimals Can apply place value knowledge of whole numbers and decimals in real life situation. Estimate and make approximations in real-life situations involving large numbers and decimals.

Assessment - Add Y6 Rubric

Year 6 Rubric: Place Value

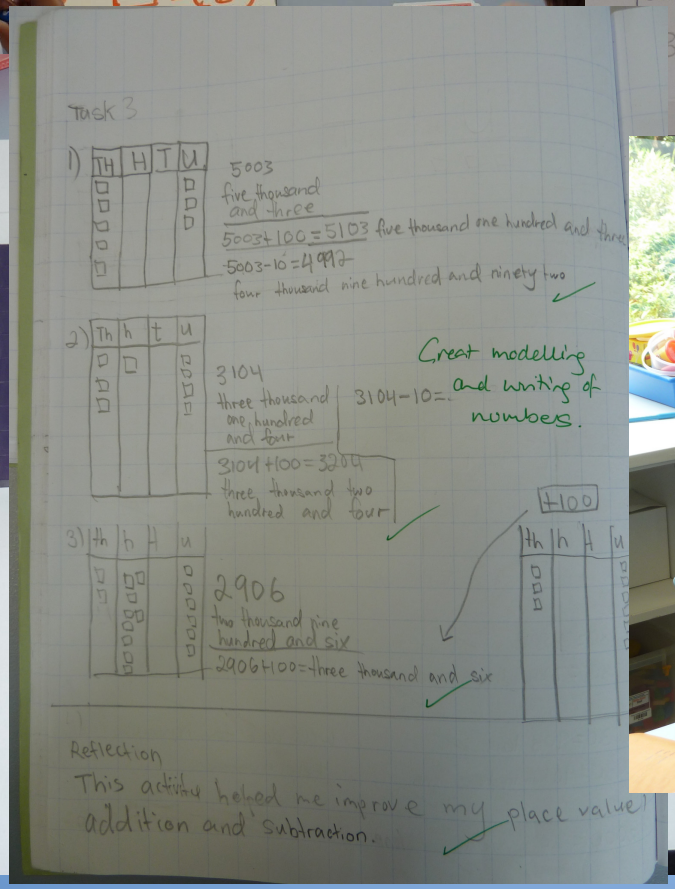
	The base 10 place value system extends infinitely in two directions
Developing (Phase 3-4)	Model numbers to millions and beyond using the place value system. Read, write, compare and order numbers up to millions Model decimals fractions to thousandths Can read, write, compare and order decimals to thousandths Can explain how the Base 10 place value system applies to decimals Can model exponents and square roots Can apply place value knowledge of whole numbers and decimals in real life situation. Estimate and make approximations in real-life situations involving large numbers and decimals.
	The base 10 place value system extends infinitely in two directions
Meets Expectations (Phase 4)	Model numbers to millions and beyond using the place value system. Read, write, compare and order numbers up to millions and beyond that occur in real life. Model decimals fractions to thousandths or beyond Can read, write, compare and order decimals to thousandths and beyond that occur in real life Can explain how the Base 10 place value system applies to decimals and converting measurements Can read and write exponents and square roots Can apply place value knowledge of whole numbers and decimals in real life situation. Estimate and make approximations in real-life situations involving large numbers and decimals. Model intergers in appropriate situations
	The base 10 place value system extends infinitely in two directions
Exceeds Expectations (Phase 4+)	Practical interpretations of explaining or represents extremely large and small numbers.



Term 1 PLACE VALUE Pre-Assessment. Name: 27/8/12

→ Decimals.

Write a number which is greater than 1 million.	Write a number which has 2 decimal places.	Write a number that comes between 5.6 and 5.68	Write a number that comes between 6.75 and 6.76?	
6000066 ✓	6.66 ✓	5.7	6.075	2
80 + 70000 + 6000 + 400 + 2 = 76482 ✓	6493 = 6 thousands, ... 400+90+3 ✓	256.8 = 2 hundreds, ... 50+6 + 1 tenths	543.67 = 500+40+3+0.67	2
What is the value of 3 in 234 568? 30,000 ✓	How many hundreds are in 50 000? 500	What is 300 more than 45 298? 45,598 ✓	What is 0.4 less than 45.67? 45.27 ✓	3



Task 3

1) TH H T U — 5003 — five thousand and three — 5003+100=5103 five thousand one hundred and three — 5003-10=4992 four thousand nine hundred and ninety two

2) Th h t u — 3104 — three thousand one hundred and four — 3104-10=... — 3104+100=3204 three thousand two hundred and four

Great modelling and writing of numbers.

3) th h t u — 2906 — two thousand nine hundred and six — 2906+100=three thousand and six — +100

Reflection

This activity helped me improve my place value addition and subtraction.

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?

Task: Students use website http://www.geohive.com/ (or similar) to research country statistics eg population and area of land.

Using this information and the criteria on the place value rubric each student will create a poster showing their understanding of the base 10 place value system.

Poster to include examples of:

- **Read, write and represent numbers in the millions in expanded, standard word and exponential forms.(e.g 1 000 as $1x10^3$)**
- **Estimate, model, compare and order numbers to millions**
- **Rounding numbers, eg to the nearest 1000**
- **Explain and model place value from thousandths to millions**

They will have a conceptual understanding of quantitative size of large numbers and be able to apply this to real-life situation.

Understanding (especially of decimals) will also be assessed using a written test.

Ongoing: Students will reflect on their learning through completing journal entries and also proving their learning to each other and their teacher. Students will write reflections on how they are applying their place value knowledge to games that they need to manipulate and strategise.

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?

Students will sit a pencil and paper assessment that gets them to name the value of digits and explain why that digit has that value. Questions will also include students expanding numbers. Numbers used will be up to a million and include decimals.

What are the possible ways of assessing student learning in the context of the lines of inquiry? What evidence will we look for?

Teachers look for student's ability to explain the conceptual reason for moving the decimal point when multiplying and dividing by multiples of 10, 100, 1000.

Have students open discussions about the thinking that students use while playing the games.

Students share their strategies for being effective when playing place value games. They order each other's strategies and rank them according to effectiveness.

Students reflect on their own design for a place value game. Students try out their prototype game with each other and identify the strategies that students need to use to be effective. Identify the maths in the game.

Evidence gathered through journaling and children responding to reflection prompts. Eg I used to think… Now I think…

Anecdotal notes made by teacher through observations and discussions.

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