

Learning Difficulties Australia

Learning Difficulties Australia is an association of teachers and other professionals dedicated to assisting students with learning difficulties through effective teaching practices based on scientific research.



www.lداustralia.org



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Dr Ange Rogers

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Primary School Classroom Teacher/ Numeracy Leader
EMU Intervention Trained
Lecturer at RMIT University- School of Education
Founder of the Numeracy Teachers Academy
Mum of 4 children



Bio:
Ange is a passionate presenter who regularly facilitates Professional Development for teachers and schools across Australia. In 2014 she completed her PhD in Mathematics Education focusing on the assessment and teaching of whole number place value in Years 3-4. In her PhD she developed the Place Value Assessment Tool (PVAT) and has since created a suite of teaching resources to support this assessment. Ange currently lectures part-time to pre-service teachers at RMIT University in Melbourne and mentors teachers and leaders through her online website the Numeracy Teachers Academy.

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PLACE VALUE: ASSESSMENT AND TARGETED INSTRUCTION



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Workbook

Name

Date

This Lesson/Purpose

How do I expect to learn and practice at the end of this lesson and what will I be able to do?

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My Assessment 'Story'

- This was my 'assessment book' in 2005
- Purpose: Compliance

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Was I 'assessing' my students? Yes

SINE Number Screening Test- Year 1/2 8
Catholic Education Office Melbourne (2010)

Westwood One Minute Basic Facts Test (1995)

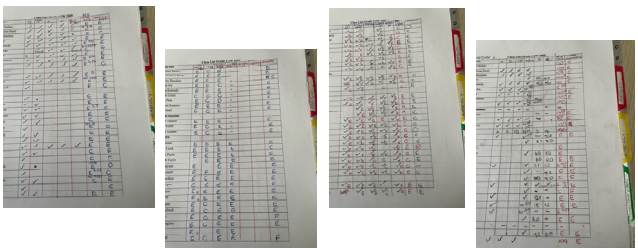
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Was I collecting data? **Yes**

Learning Objectives	Assessment	Mark
1.1.1.1	A	10
1.1.1.2	A	10
1.1.1.3	A	10
1.1.1.4	A	10
1.1.1.5	A	10
1.1.1.6	A	10
1.1.1.7	A	10
1.1.1.8	A	10
1.1.1.9	A	10
1.1.1.10	A	10
1.1.1.11	A	10
1.1.1.12	A	10
1.1.1.13	A	10
1.1.1.14	A	10
1.1.1.15	A	10
1.1.1.16	A	10
1.1.1.17	A	10
1.1.1.18	A	10
1.1.1.19	A	10
1.1.1.20	A	10
1.1.1.21	A	10
1.1.1.22	A	10
1.1.1.23	A	10
1.1.1.24	A	10
1.1.1.25	A	10
1.1.1.26	A	10
1.1.1.27	A	10
1.1.1.28	A	10
1.1.1.29	A	10
1.1.1.30	A	10
1.1.1.31	A	10
1.1.1.32	A	10
1.1.1.33	A	10
1.1.1.34	A	10
1.1.1.35	A	10
1.1.1.36	A	10
1.1.1.37	A	10
1.1.1.38	A	10
1.1.1.39	A	10
1.1.1.40	A	10
1.1.1.41	A	10
1.1.1.42	A	10
1.1.1.43	A	10
1.1.1.44	A	10
1.1.1.45	A	10
1.1.1.46	A	10
1.1.1.47	A	10
1.1.1.48	A	10
1.1.1.49	A	10
1.1.1.50	A	10
1.1.1.51	A	10
1.1.1.52	A	10
1.1.1.53	A	10
1.1.1.54	A	10
1.1.1.55	A	10
1.1.1.56	A	10
1.1.1.57	A	10
1.1.1.58	A	10
1.1.1.59	A	10
1.1.1.60	A	10
1.1.1.61	A	10
1.1.1.62	A	10
1.1.1.63	A	10
1.1.1.64	A	10
1.1.1.65	A	10
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1.1.1.67	A	10
1.1.1.68	A	10
1.1.1.69	A	10
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1.1.1.73	A	10
1.1.1.74	A	10
1.1.1.75	A	10
1.1.1.76	A	10
1.1.1.77	A	10
1.1.1.78	A	10
1.1.1.79	A	10
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1.1.1.91	A	10
1.1.1.92	A	10
1.1.1.93	A	10
1.1.1.94	A	10
1.1.1.95	A	10
1.1.1.96	A	10
1.1.1.97	A	10
1.1.1.98	A	10
1.1.1.99	A	10
1.1.1.100	A	10

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Did it look 'good'? **Yes**



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Did it guide my teaching? **No!**

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Why Not?

I had no idea what the data told me	<ul style="list-style-type: none">• Inexperienced• Lack of Pedagogical Content Knowledge (PCK)• Lack of guidance/support
The data I gathered wasn't very useful	<ul style="list-style-type: none">• Quality of assessments• Too much data• No clear links to instruction
I was too busy	<ul style="list-style-type: none">• Teaching is full on!• Assessment= compliance= wasting time

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Was it worth doing? **Probably not!**

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Fast forward 5 years...

- Started a PhD
- Needed to investigate a giant novel 'problem'
- Thought back to my classroom days...
- Wanted to 'fix' place value

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Place value is critical

- **Big Idea** in Number (Siemon et al, 2012)
- Underpins almost every part of the maths curriculum
- Relates to counting, estimating, money, addition, subtraction, multiplication, division, converting units, scientific notation & percentages.
- negatively impacts: **sense of number** (McIntosh et al., 1992) **decimals** (Maloney & Stacey, 1997) **multi-digit operations** (Fuson, 1990a, 1990b)
- Difficult to assess, teach and learn



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The 'gap'

Stop when incorrect answer?

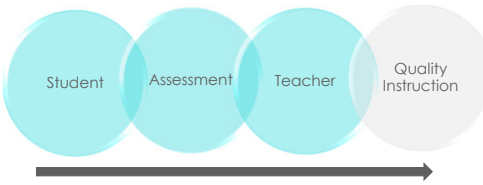
Some students could answer Q16

Q 14 and 15 were really challenging

Question	Response
Q14	10000
Q15	10000
Q16	10000
Q17	10000
Q18	10000
Q19	10000
Q20	10000

Reference: Mathematics Online Interview Victorian Interview Department of Education, 2021 Numeracy Teachers Academy

Where did I start?



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We need to know what they know...

- But also... what they **don't know yet**

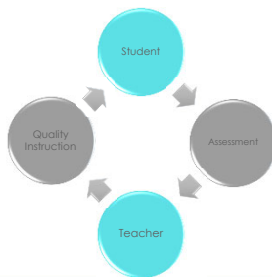
This tells us:

- what to teach next
- what is working in our teaching



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The Teaching Cycle



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Quality Assessment is critical

The most important single factor **influencing learning** is **what the learner already knows**. **Ascertain this** and teach him accordingly" (Ausubel, 1968, vi).

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Appear to know more

place value assessment

Place Value Assessment

Name _____ Date _____

I write the number below

52 131 317

315

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Appear to know less

'Noise' getting in the way

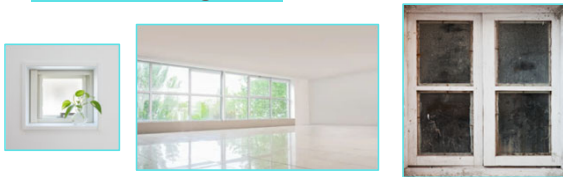
Cathy is about to buy 9 boxes of detergent for her hotel. If she rounds the price to the nearest dollar, what is the estimated cost?

\$4.28 2 for \$8.22 \$14.65

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We are not mind-readers!

- Assessment provides a window into our student's thoughts and understandings... BUT



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An assessment can only tell you what you ask of it...

- It is never the 'end point'
- It doesn't determine good/bad
- It doesn't explain the 'why', just presents the 'what'
- Can provide a roadmap for us



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DEVELOPMENT OF THE PVAT



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Problem 1: What is Place Value?

- 6 aspects (Rogers, 2014)



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Problem 2: Quality Assessment

- If place value is the 6 aspects- how do we accurately assess?
- Superficial place value items-standardized tests
- Not many Place Value items
- Don't address all six aspects
- Interviews-Junior students only
- time consuming

Reference: NAPLAN Assessment Items- ACARA

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Assessment Audit

- Most commonly used assessments in Australian Schools
- Year Level
- Number of PV Items
- Aspects
- Mode

valid assessment of PV?

Assessment	Year Level	PV Items	Aspects	Mode
PAT-M (Yr 4) 2012	4	3/38	Name/Record Compare/Order	Paper
NAPLAN 2009	3	1/35	Name/Record Compare/Order	Paper/Online
ENI-PV Section	F-6	25/25	Name/Record Count Add/Subtract Calculate	Interview
SINE	4	24/48	Count Compare/Order Name/Record Calculate	Paper

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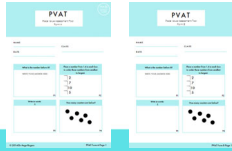
PVAT Blueprint

- **Test Objective-** develop a comprehensive whole number place value assessment tool
- **Test population-** Year 2-8 students (Tier 1,2,3)
- **Test administration-** paper and pen
- **Test evaluation-** Rasch Analysis

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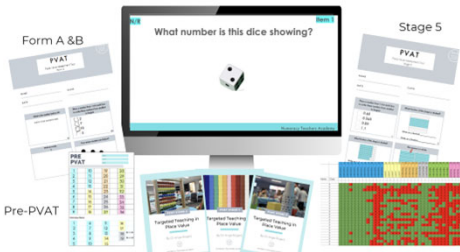
Form A and Form B

- Trialed with over 900 students
- Form A downloaded over 8500 times
- Both **parallel**, **valid** and **reliable** measures of whole number place value in Year 3-6 students



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PVAT Resources- 'PVAT+' course



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PVAT Form A



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WHAT EXACTLY IS PLACE VALUE?



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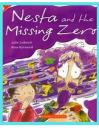
What is Place Value?

- What **words/activities/ideas** come to your mind when you think of place value?
- Place value **system**
- Place value **content**

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The place value system

- The conventions we use to **say and record** numbers.
- Base 10, only symbols are the **digits** 0,1,2,3,4,5,6,7,8,9
- The current system is derived from the Hindu system it is known as **Hindu-Arabic** system.
- Roman Numerals: **MMMCDLVI** is 3457!
- **Zero** is critical, a null value, not 'the place holder'.
(Read: 'Nesta and the missing zero')



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Vocabulary

The typical focus of Numeracy lessons

Tier 3 Domain-specific words used only in mathematics	<ul style="list-style-type: none"> place value numeral Base 10
Tier 2 General academic words that change their meaning in a different context	<ul style="list-style-type: none"> table column
Tier 1 everyday words	<ul style="list-style-type: none"> large small up

Ref: Beck et al (2013) Bringing words to life: Robust Vocabulary Instruction Numeracy Teachers Academy

Place Value Vocabulary

- Place Value:**
The place of a digit in the numeral determines its value.
- Digit:**
0,1,2,3,4,5,6,7,8,9 i.e., The digit 3 is in the tens place
- Number vs Numeral:**
A number **is an idea**, the numeral is **how we write it**.
A numeral stands for a number in a notation system.
E.g., 12, twelve or XII are all numerals

Definition	Facts/Drawing
Word	
Examples	Non-examples

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Frayer Model

Definition A symbol that we can use to make numbers	Facts/Drawing 0,1,2,3,4,5,6 7,8,9
Word digit	
7 9 Examples 3	375 is Non-examples a number with 3,7,5 digit

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To teach place value we need a shared definition of the content...

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Key Ideas in Place Value

- 1. Base-ten Property:** the values of the position increase in powers of ten from right to left
E.g., 333. 3 hundreds is ten times larger than 3 tens
- 2. Positional Property:** the position of the digit in the numeral determines its quantity.
E.g., 342. 3 is in the hundreds column so its value is 3 hundreds
- 3. Multiplicative Property:** the value of an individual digit is found by multiplying the face value of the digit by the value of its position.
E.g., 342. 3 by 100 is 300
- 4. Additive Property:** the quantity represented by the whole numeral is the sum of the values of the individual digits
E.g., 333= 3hundreds + 3 tens + 3 ones
- 5. Use of zero:** a symbol for zero (0) exists and allows us to symbolically represent the absence of something
E.g., 303. There are no tens in 303

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The Six Aspects of Place Value- p. 2/3

Rogers(2014)

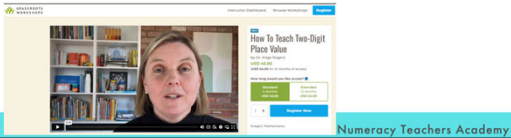
- Name/Record
- Count
- Compare/Order
- Rename
- Calculate
- Make/Represent



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Are they even ready?

- Accurately count a collection to 20 and beyond
- Model, read and write numbers to 10
- Part-Part-Whole for numbers 1-10
- Starting to recognise numbers beyond 10 (1 ten and more)
- Two-digit place value- 6 aspects



What are Thinking Mistakes?

Misconception: a view or opinion that is incorrect because based on faulty thinking or understanding

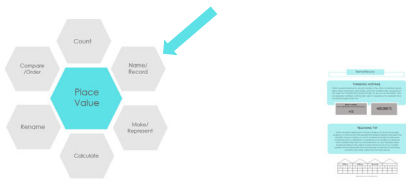
Thinking mistakes-errors made on the journey towards mastery of a topic.

- Show our brain is working hard, struggling to make thoughtful and logical conclusions.
- It is during these times that real brain growth occurs.



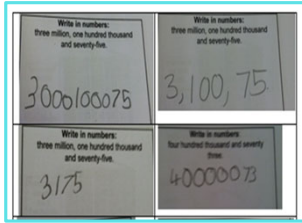
Name/Record

- Read and write a number in words and figures e.g., 75 is written as 'seventy-five'.



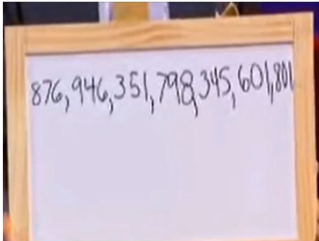
Common Thinking Mistakes

- Adding extra zeros
- Omitting zeros
- Writing what they hear
- Losing track after thousands



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Reading Large Numbers

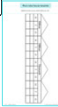


Reference: <https://www.youtube.com/watch?v=wRyc7g5rNB4>

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Reading Large Numbers- p.5

Billions			Millions			Thousands					
H	T	O	H	T	O	H	T	O	H	T	O
			4	2		1	2	3	4	7	5
			1	2	5	3	0	7	1	2	2



Reference: www.nzmaths.co.nz

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Investigate our Number System

- Don't be afraid of using big numbers!
- Children LOVE them!
- They show the pattern of our number system
- Let children investigate the names:
Trillion, quadrillion, quintillion, sextillion, septillion, octillion, nonillion
Googol (100 zeros)

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Teaching Tips

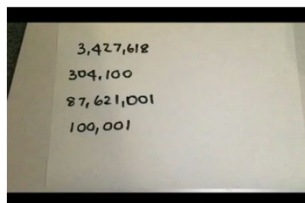
- Once students can read a **three-digit number** they are ready to move them onto larger numbers (think of reading)
- System structure becomes clearer
- Australia follows the international standard of using a **space between periods**. In many countries in the world a comma actually is a decimal marker.



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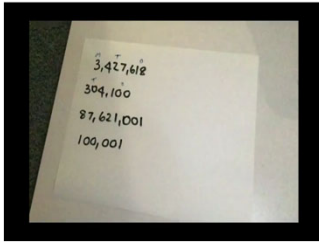
Reading Numbers video

Resource: Paper cups



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Writing Numbers video



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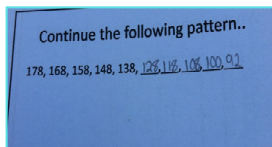
Count

- Bridging forwards and backwards over place value segments
e.g., 995 and one more ten



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Common Thinking Mistake



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Count and Roll- p.7

- Start 456
- Count by tens
- Target: 716



Objectives

Materials

How to Play

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Clickview Mini Clips

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Teaching Tips

- Language: Before/After
- Let them see the pattern
- 1 hundred and...
- Explicitly Model how to solve counting patterns
- ✓ F/B, difference #1, difference #2, check, continue
- 158, 148, 138, _____

Continue the following pattern..

178, 168, 158, 148, 138, ~~128~~, 118, 108, 100, 92

- Renaming Link: 15 tens 8 ones, 14 tens 8 ones, 13 tens 8 ones, 12 tens 8 ones, 11 tens 8 ones, 10 tens 8 ones, 9 tens 8 ones

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Make/Represent

- Use **proportional, non-proportional** materials to represent quantities.
- Create and recognise **canonical and non-canonical** representations of quantities



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Materials

Proportional Materials



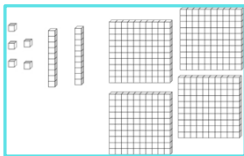
Non-proportional Materials



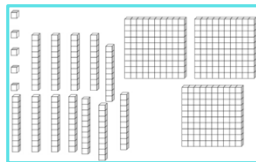
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Representations

Canonical

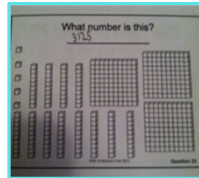
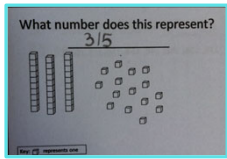


Non-Canonical



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Common Thinking Mistake



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600 Block 'Misconception'

DO YOUR STUDENTS HAVE THE 600 BLOCK MISCONCEPTION?

Key Point:
600 Block

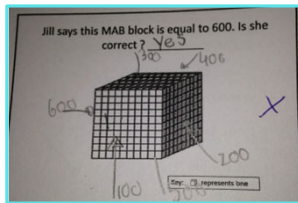
When using a 600 block to represent a number, it is important to understand that the block represents 1000, not 600. This is a common misconception among students. The block is composed of 1000 smaller units (10x10x10), and each unit represents 1. Therefore, the entire block represents 1000.

WHAT IS THE 600 BLOCK MISCONCEPTION?

This misconception occurs when students incorrectly believe that a 600 block represents the number 600. This is often due to the block's shape, which is a rectangular prism with dimensions 10x10x6. Students may be counting the visible faces or the number of units on the front face (600) and incorrectly concluding that the entire block represents 600.

HOW TO AVOID THIS MISCONCEPTION:

Teachers should explicitly teach that the 600 block represents 1000. This can be done by counting all the units in the block (10x10x10) and showing that the total is 1000. It is also important to use the block to represent numbers other than 1000 to reinforce its value.

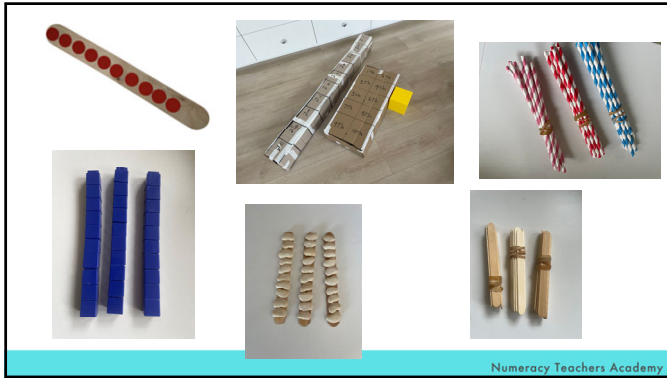


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Teaching Tips

- Approx. 24% of Year 3-6 students displayed 600 block thinking
- Use a variety of materials, consistently
- Continue throughout Years 3-6!
- Ensure the students are thinking
- Don't assume students understand how place value relates
- Use Wooden MAB
- Use non-canonical representations often!



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Compare/Order

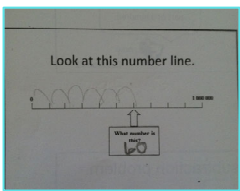
- Compare numbers in a **multiplicative manner**,
- E.g., ten times larger than 54 is 540.

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Common Thinking Mistake

- Number Lines
- Don't attend to the first and last number
- Not sure how to calculate the increments.



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Halving

Think: Halves...
2 **equal** parts

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Quarters

Think: Half and half again
4 **equal** parts

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Placing Numbers on a Number Line

mathframe.co.uk Numeracy Teachers Academy

3 in a Row - p.10

Materials

- 100 small cubes
- 100 small sticks
- 100 small paper clips

How to Play

Students are given 100 small cubes, 100 small sticks, and 100 small paper clips. They are to use these to represent the number 100 in as many different ways as they can. They are to write down each way they can represent 100. The student who can represent 100 in the most different ways wins.

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Rename

• Drawing on the ideas of grouping, regrouping and partitioning, rename numbers in multiple ways in terms of place value parts without the use of manipulatives

e.g., 1260 is equivalent to:
 126 tens
 12 hundreds and 6 tens
 1 thousand and 260 ones

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Standard Renaming

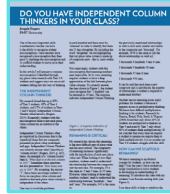
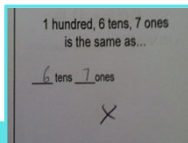
<p>2 digit numbers: T,O O</p> <p>23 2 tens 3 ones 23 ones</p>	<p>3 digit numbers: H,T,O H,O T,O O</p> <p>235 2 hundreds, 3 tens, 5 ones 2 hundreds, 35 ones 23 tens, 5 ones 235 ones</p>	<p>4 digit numbers: Th,H,T,O Th,T,O Th,H,O Th,O H,T,O H,O T,O O</p> <p>1235 1 thousand, 2 hundreds, 3 tens, 5 ones 1 thousand, 23 tens, 5 ones 1 thousand, 2 hundreds, 35 ones 1 thousand, 235 ones 12 hundreds, 3 tens, 5 ones 12 hundreds, 35 ones 123 tens, 5 ones 1235 ones</p>
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Non-Standard renaming: infinite ways

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Common Thinking Mistake

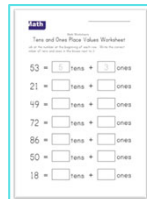
- Independent Column Thinkers
- Look at each column separately
- Cannot see a link between columns
- Makes renaming near impossible
- 80% Year 3
- 48% Year 4
- 15% Year 5 & 6



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Teaching Tips

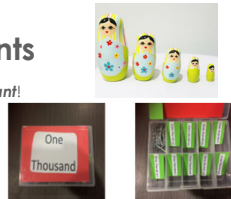
- Column Locator
- In 27, which digit is in the tens place?
- How many tens are in 84?
- 35 = tens and ones
- Canonical representations reinforce
- Be aware of PV worksheets/questions/apps



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Teaching Points

- This is a really difficult concept but the **most important!**
- Renaming requires multiplicative thinking
- Build up the idea of renaming slowly
- Use visualization to help them see the links between PV columns-
 - "In 234 how many tens are there **altogether?**"
- Renaming has important links with the count, calculate, make/represent
 - make the links explicit!



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Make the link

Kim is completing this subtraction problem.

$$\begin{array}{r} 127 \\ - 19 \\ \hline \end{array}$$

After she has traded, Kim reads the subtraction as:
 "one thousand two hundred and seventeen take away nineteen"

a) Is she correct? yes

b) Explain your answer:
 12 ten and 17 ones is another way of writing 137.

- Use the language of renaming
- Avoid "borrowing, carrying"

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Place Value Battles- p.12



1. Everyone renames this number...
2. Reveal your hundreds
3. Reveal your tens
4. Reveal your ones
5. One point for having the highest in each column
6. First to 11 points

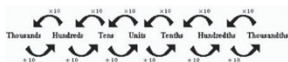
Materials
 1000 base ten blocks
 100 base ten blocks
 10 base ten blocks
 1 base ten blocks

How to Play
 1. Roll the dice to determine the number of blocks to use for each place value.
 2. Build the number using the blocks.
 3. Compare the numbers.
 4. The player with the highest number in each column wins a point.
 5. The first player to reach 11 points wins the game.

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Calculate

- Apply **knowledge and understanding** of the place value system when completing calculations
- E.g., 45 multiplied by ten is 450,
- 120 divided by ten is 12, which is ten times smaller than 120



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Common Thinking Mistakes

10 x 42 = 4,200

4	2	
1	4	2
0	0	0

x

10 x 4,040 = 4 thousands and 40

(4) (0) (4) (0)

(4) (0) (4) (0)

(4) (0) (4) (0)

(4) (0) (4) (0)

+

1000
1000
0000
00000
000000
1000000
10000000

10 x 23 406 =

23406
x 10
00000
234060
234060

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Teaching Tips

- Use number slide to model
- Digits move NOT decimal point
- Relate x10 to moving up a place value column

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Activity- p.14

Reference: <https://xetone1.education.unimelb.edu.au/>

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99 or Bust-multiply by 10 –p.15,16

99 or Bust			
Turn	Number Rolled	Amount to be added	Total
1	3	30	30
2	7	7	37
3	6	6	43
4	2	20	63
5	3	30	93
6	5	5	98
7	7	7	105
Final Total			105

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Target your PV teaching

- Use 6 aspects to guide your planning

Week	Focus
1	Name/Record
2	Count
3	Make/ Represent
4	Rename
5	Compare/Order
6	Calculate



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'Zero Our Hero' App

- Designed for: Years 2-6
- Silent



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The screenshot shows a numeracy quiz interface with four questions:

- Question 5:** Order these numbers from smallest to largest: 60 tens, 6000, 64 hundreds, 6650.
- Question 6:** 3 hundred 2 tens 5 ones = 32 tens 5 ones.
- Question 9:** Show two different ways you can use the blocks below to make the number 1,547.
- Question 2:** Write in words: 56. Answer: Fifty-six.

Each question has a 'Please check my answer' button and a text input field for the answer.

Growth Mindset Messages

The graphic features a blue superhero character with a speech bubble that says: "Incorrect! But mistakes are a good thing—they grow your brain so try again!" Below the character is a button that says "I'm ready to try again!"

No Sound

✓

Review

- What is Place Value?- content/structure
- Thinking mistakes vs misconceptions
- 6 aspects of PV- thinking mistakes, teaching tips
- Be discerning: worksheets/apps/tasks/assessments
- Teach systematically- use the aspects as a structure

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ADMINISTERING THE PVAT

PVAT
Place Value Assessment Test
Form 2

NUMERACY TEACHERS ACADEMY

What is the number before 8?

Write your answers into:

Place a number from 1-9 in each box to make the number 48.

The Six Aspects of Place Value

Rogers(2014)

Shared Language

- Name/Record
- Count
- Compare/Order
- Rename
- Calculate
- Make/Represent

PVAT

<p>Name/Record</p> <p>Write in numbers: three million, one hundred thousand and seventy-five.</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div> <p style="text-align: right; font-size: 8px;">35</p>	<p>Count</p> <p>What number is ten more than 3,7714</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div> <p style="text-align: right; font-size: 8px;">35</p>	<p>Make/Represent</p> <p>How many of each coloured counter will be needed to represent 1,2158</p> <p>Key:</p> <table style="font-size: 8px;"> <tr><td>Red</td><td>1</td></tr> <tr><td>Blue</td><td>10</td></tr> <tr><td>Yellow</td><td>100</td></tr> </table> <div style="border: 1px solid black; height: 40px; width: 100%;"></div> <p style="text-align: right; font-size: 8px;">35</p>	Red	1	Blue	10	Yellow	100
Red	1							
Blue	10							
Yellow	100							
<p>Rename</p> <p>1 hundred, 6 tens, 7 ones is the same as...</p> <p>_____ tens _____ ones</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div> <p style="text-align: right; font-size: 8px;">32</p>	<p>Compare/Order</p> <p>Look at this number line.</p> <p>What number is 8 less?</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div> <p style="text-align: right; font-size: 8px;">48</p>	<p>Calculate</p> <p>10 x 4,040=</p> <div style="border: 1px solid black; height: 40px; width: 100%;"></div> <p style="text-align: right; font-size: 8px;">47</p>						

Form A

- Year 2-6 students (pre-PVAT F-2)
- Items are presented in increasing difficulty
- 4 Practice items- go through these together
- 58 items
- Complete as many items as you can
- 60 minutes to complete
- Average 32 minutes to complete
- Range: 15-57 mins
- Teacher can read items



When to administer?

- Purpose- guide teaching/ track cohorts?
- End of previous year (December/May)
- Students take paper to next teacher (transition)
- Marked by new teacher
- Ready to go at start of new school year
- Data will be mostly accurate (learning loss)
- Start of year/mid year



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MARKING THE PVAT



PVAT
Place Value Assessment Test

NAME: _____ CLASS: _____

DATE: _____

What is the number before 8? 2 7 10 5

Place a number from 1 to 10 on the number line. Write the number on the number line.



NUMERACY TEACHERS ACADEMY

Marking Guide- p.20

- Reliability in scoring
- Some have multiple acceptable responses
- Approx. 5-7 mins per student

How many of each coloured counter will be needed to represent 1,215?

Key:

- Red=1
- Blue=10
- Yellow=100

Red	Blue	Yellow

Item	Answer	Mark
1	1,215	1
2	1,215	1
3	1,215	1
4	1,215	1
5	1,215	1
6	1,215	1
7	1,215	1
8	1,215	1
9	1,215	1
10	1,215	1
11	1,215	1
12	1,215	1
13	1,215	1
14	1,215	1
15	1,215	1
16	1,215	1
17	1,215	1
18	1,215	1
19	1,215	1
20	1,215	1
21	1,215	1
22	1,215	1
23	1,215	1
24	1,215	1
25	1,215	1
26	1,215	1
27	1,215	1
28	1,215	1
29	1,215	1
30	1,215	1
31	1,215	1
32	1,215	1
33	1,215	1
34	1,215	1
35	1,215	1
36	1,215	1
37	1,215	1
38	1,215	1
39	1,215	1
40	1,215	1
41	1,215	1
42	1,215	1
43	1,215	1
44	1,215	1
45	1,215	1
46	1,215	1
47	1,215	1
48	1,215	1
49	1,215	1
50	1,215	1

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Raw Score Translator- p.19

PVAT Stage	Form A Raw Score (not including Practice Items)
1	1 to 20
2	21 to 31
3	32 to 44
4	45+

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PVAT Stages

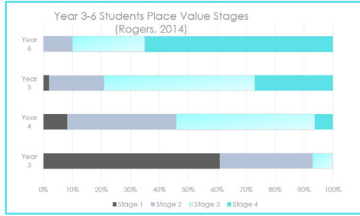
Name	Class	Raw Score (Form A)	PVAT Stage	Colour
1	1	1	1	Red
2	1	2	1	Red
3	1	3	1	Red
4	1	4	1	Red
5	1	5	1	Red
6	1	6	1	Red
7	1	7	1	Red
8	1	8	1	Red
9	1	9	1	Red
10	1	10	1	Red
11	1	11	1	Red
12	1	12	1	Red
13	1	13	1	Red
14	1	14	1	Red
15	1	15	1	Red
16	1	16	1	Red
17	1	17	1	Red
18	1	18	1	Red
19	1	19	1	Red
20	1	20	1	Red
21	1	21	2	Yellow
22	1	22	2	Yellow
23	1	23	2	Yellow
24	1	24	2	Yellow
25	1	25	2	Yellow
26	1	26	2	Yellow
27	1	27	2	Yellow
28	1	28	2	Yellow
29	1	29	2	Yellow
30	1	30	2	Yellow
31	1	31	2	Yellow
32	1	32	3	Blue
33	1	33	3	Blue
34	1	34	3	Blue
35	1	35	3	Blue
36	1	36	3	Blue
37	1	37	3	Blue
38	1	38	3	Blue
39	1	39	3	Blue
40	1	40	3	Blue
41	1	41	3	Blue
42	1	42	3	Blue
43	1	43	3	Blue
44	1	44	3	Blue
45	1	45	4	Green
46	1	46	4	Green
47	1	47	4	Green
48	1	48	4	Green
49	1	49	4	Green
50	1	50	4	Green

PVAT Stage	Colour
1	Red
2	Yellow
3	Blue
4	Green

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PVAT Stage Data

- These data show the break-down of student achievement by stage.
- Ranges from 1-4



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Recommendations- p. 23

- If students are at the following stages they are considered 'at risk' or ready for 'enrichment' in place value

Year Level	PVAT 'at risk' Stage	Enrichment
2	Further Assessment	3,4,5
3	Low Stage 1	3,4,5
4	1	4,5
5	1,2	5
6	1,2,3	

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Stages Analysis-Class

- Sort by Stage
- Identify those 'at risk'
- Identify those who need enrichment
- What will you do with these students?

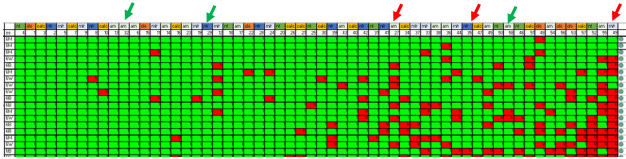
Class	Year Level	Stage
YEAR 4P	21	2
YEAR 4P	22	2
YEAR 4P	23	2
YEAR 4P	24	2
YEAR 4P	25	2
YEAR 4P	26	2
YEAR 4P	27	2
YEAR 4P	28	2
YEAR 4P	29	2
YEAR 4P	30	2
YEAR 4P	31	2
YEAR 4P	32	2
YEAR 4P	33	2
YEAR 4P	34	2
YEAR 4P	35	2
YEAR 4P	36	2
YEAR 4P	37	2
YEAR 4P	38	2
YEAR 4P	39	2
YEAR 4P	40	2
YEAR 4P	41	2
YEAR 4P	42	2
YEAR 4P	43	2
YEAR 4P	44	2
YEAR 4P	45	2
YEAR 4P	46	2
YEAR 4P	47	2
YEAR 4P	48	2
YEAR 4P	49	2
YEAR 4P	50	2

Year Level	PVAT 'at risk' Stage	Enrichment
3	Low Stage 1	3,4,5
4	1	4,5
5	1,2	5
6	1,2,3	

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Item Analysis

- Guttman Chart
- Should be in order from 1-58 (difficulty)
- Which results are unexpected? Why? Look at the items



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What the PVAT allows

1. Item analysis
2. Value Added- Effect Size Improvement
3. Clarity around what students need
4. Clarity around what to teach
5. Guide to targeted teaching
6. Data driven decisions
7. Whole School Approach

Year	Effect Size Improvement
2	0.94
3	0.74
4	0.87
5	0.68
6	0.7

Best method is to compare to localised data...

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Structure your PV teaching

- Use 6 aspects to target student needs

Week	Focus
1	Name/Record
2	Count
3	Make/ Represent
4	Rename
5	Compare/Order
6	Calculate



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Your one take away?

Numeracy Teachers Academy



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