

Planning mathematical learning experiences: Place Value Menu

Determine the focus for your assessment task at:

<http://ausvels.vcaa.vic.edu.au/Mathematics/Curriculum/F-10?layout=3>

Key Messages from Research: (Teaching Mathematics, Chapter 15 Introducing Place Value, Di Siemon et al)

The importance of the language of place-value

Place-value knowledge is developed by making (representing) numbers in terms of their place value parts, naming and recording.

Siemon p291

Place value knowledge is consolidated by comparing, ordering, counting forwards and backwards in place value parts, and renaming. Siemon p291

Build flexibility with modelling, describing and manipulating numbers according to their base 10 places.

Knowing 10 of these is one of those, and 1000 of these is one of those.

Building connections increases understanding – relating numbers to experiences such as measurement, population, crowd size, money (with some limits)

With larger numbers, the repetition of ones, tens, hundreds and symmetry around 1's going into decimals.

Expanded notation can be misleading. A more appropriate way to emphasise the value of each digit in a number is to represent it as a count of corresponding place-value units, eg 462 is 4 hundreds, 6 tens, and 2 ones (note the plural form). Siemon p305

Rounding is a sophisticated skill that builds on a solid understanding of place-value and a capacity to rename any number in terms of its place-value parts. Number expanders can be used to support rounding. Rounding can be used to make it easier to comprehend or work with numbers and to estimate. Siemon p316

Numbers above 4 digits should be recorded with a thin space in groups of three digits, and not with commas. Siemon p.311

Links to AusVELS: LEVEL 5 & LEVEL 6

<http://ausvels.vcaa.vic.edu.au/Mathematics/Curriculum/F-10>

Proficiencies

Understanding includes making connections between representations of numbers

Fluency includes using estimation to check the reasonableness of answers

Problem Solving includes formulating and solving authentic problems using whole numbers

Content Description & Elaborations

Recognise that the place value system can be extended beyond hundredths (ACMNA104)

Using knowledge of place value and division by 10 to extend the number system to thousandths and beyond

Recognising the equivalence of one thousandths and 0.001

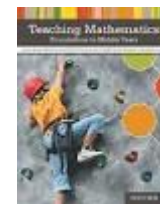
Multiply and divide decimals by powers of 10 (ACMNA130)

Multiplying and dividing decimals by multiples of powers of 10

Achievement Standard

They estimate to check the reasonableness of answers and approximate answers by rounding. Students order decimals and unit fractions and locate them on a number line.

Demonstrate the symmetry of our number system around one.



Data – Informed Teaching Focus:

#Cross checks

#Population Assessment Task (HBPS) – See Place Value Folder (Staff Public Drive) for Lesson Plan and blm.

POPULATION ASSESSMENT TASK			
State	Population	Population	Population
Alabama	4,600,000		
Arizona	6,500,000		
California	38,000,000		
Colorado	5,300,000		
Connecticut	3,600,000		
Delaware	900,000		
Florida	21,500,000		
Georgia	10,500,000		
Hawaii	1,300,000		
Idaho	1,600,000		
Illinois	12,800,000		
Indiana	6,800,000		
Iowa	3,200,000		
Kansas	3,700,000		
Kentucky	4,500,000		
Louisiana	4,600,000		
Maine	1,300,000		
Maryland	6,000,000		
Massachusetts	7,000,000		
Michigan	10,300,000		
Minnesota	5,700,000		
Mississippi	2,900,000		
Missouri	6,200,000		
Montana	1,100,000		
Nebraska	1,900,000		
Nevada	3,000,000		
New Hampshire	1,300,000		
New Jersey	9,000,000		
New Mexico	2,100,000		
New York	20,300,000		
North Carolina	10,400,000		
North Dakota	700,000		
Ohio	11,700,000		
Oklahoma	4,000,000		
Oregon	4,000,000		
Pennsylvania	12,600,000		
Rhode Island	1,100,000		
South Carolina	4,400,000		
South Dakota	800,000		
Tennessee	6,300,000		
Texas	28,000,000		
Utah	3,000,000		
Vermont	600,000		
Virginia	8,000,000		
Washington	7,100,000		
West Virginia	1,800,000		
Wisconsin	5,900,000		
Wyoming	500,000		

1. Order the populations of these states from smallest to largest.

2. Estimate the difference between the largest and smallest population. Circle the range to represent this. 100,000 to 200,000 1,000,000 to 2,000,000 10,000,000 to 20,000,000 100,000,000 to 200,000,000

3. Repeat this task for each state in the table. Repeat the same task for each state in the table.

4. Repeat the population task for each state in the table.

Challenge: Select one town and one capital city. Name _____ and _____. Estimate the difference between the two populations in range _____. Calculate the difference between the two populations.

Mathematical Language:

place-value, rename, expand, ones, tens, hundreds, thousands, tens of thousands, hundreds of thousands, millions, digit, value, number, number system, powers, exponential, expanded notation, place-value parts, place holders, symbol, describe, justify, make, model, represent, record, rounding, estimate, compare, order, sequence, count forwards, count backwards, decimals, tenths, hundredths, thousandths

DEFINITIONS:

Renaming: writing a number in an equivalent form, usually in terms of its place-value parts (eg. 462 is 4 hundreds 6 tens and 2 ones, but it can be renamed as 36 tens and 5 ones, or 3 hundreds and 65 ones), (4.35 = 4 ones, 3 tenths, 5 hundredths = 43 tenths, 5 hundredths = 435 hundredths)

Expanded Notation: the expression of a whole number in terms of the sum of its place-value parts written in symbolic form as ones (eg. 462 = 400 + 60 + 2).

Decimals – Students need to see decimals written as common fractions. $3/10 = .3$, $56/100 = .56$

Warm Up Focus (Review & Practise -NOT new learning):

Make a Number with 0 - 9 cards. Students hold cards, move around within their group to make numbers, largest, smallest, range, rounding, etc.

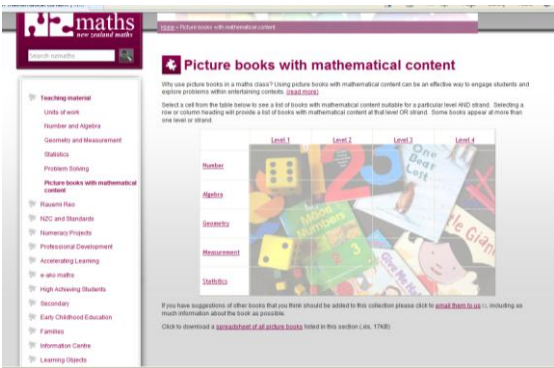
The Price is Right

Learning contexts:	Learning experiences:	Assessment Ideas:
Games	<p>See Place Value Games Menu: (Staff Public Drive – Teaching Place Value Folder)</p> <p>Make 100 – Roll dice. Keep cumulative total. First to exactly 100.</p> <p>Make 1- Start with tenths. Use 10 sided dice, +, - dice. Make to 1. Move to hundredths (play as for Make 100).</p> <p>Dice Digits – Roll dice – different number of dice, read number, rename, expand, make largest, smallest, find difference.</p> <p>Millionaire Place Value Game - http://www.math-play.com/Place-Value-Millionaire/place-value-millionaire.html Only works on PC. Can be used on IWB as a class lesson, hook or warm up. Styled like Who Wants to be a Millionaire, multiple choice. Can choose 2 teams and have the kids provide an answer for each level. Gets harder as you go. Kids have 100 seconds to lock in an answer.</p> <p>Thrice Dice – Dr Paul Swan (Dice Dazzlers , p28) http://www.drpaulswan.com.au/application/sites/drpaulswan/userfiles/pages/files/Freebies/ThriceDice.pdf</p> <p>From Here to There Dr Paul Swan (Dice Dazlers, p46) Plotting numbers on a number line</p>	<p>Place Value Math Games</p> <p>Place Value Comparisons (Grade 2-3) Skills: comparing numbers, add and subtract Players: 2 or more Materials: cards (Aces) 1-9, die Procedure: 1) Place die on face down. 2) Each player turns over 2 cards and makes a 2 digit number. 3) The die is rolled by one player. If the roll is even, the bigger number scores. If it is odd, the smaller number scores. 4) Players repeat their numbers and scores. 5) The first player to score ten points wins. Variation: Add more cards for more digits.</p> <p>Place Value Comparing 100 (Grade 2-3) Skills: comparing place values Players: 2 Materials: cards (Aces) 1-9 Procedure: 1) Deal out the cards even. 2) Each player turns over 2 cards. The first number turned over is the tens and the second number is the ones. 3) Sum player roll but or write down their numbers. (do tens and not ones equals only tens) 4) The player with the larger number gets all of the cards. 5) If there is a tie, WAR is declared. Each player will then place their two cards face down and then turn over two more cards and adds the second number to the first. The player with the larger sum gets all of the cards. 6) Play continues until one player has collected all of the cards. Variation: Players turn over more cards to build larger numbers through the hundreds or thousands.</p> <p>Place Value Guess (Grade 2-3) Skills: place values 1-100, imaginary result Players: 2 Materials: cards (Aces) 1-9 Procedure: 1) Two players sit side by side and deal the deal out even. 2) At the same time, each player turns over one card. One player is assigned the tens number, the other, the ones number. 3) The player who names the correct number first (ie. the card says number and player says one number is 450-yes/no). 4) Play continues until one player has collected all of the cards. 5) If there is a tie, players leave their cards in a "tie pile". The pile builds until one player gets a correct guess before the other and takes all of the cards in the tie pile plus the tie card, game moves over. Variation: Play with more cards and build larger numbers.</p> <p>Who Wants to be a Millionaire (Grade 2-3) Skills: four digit place value, comparing numbers Players: 2 Materials: cards (Aces) 1-9, die, paper, pencil Procedure: 1) One player rolls the die to determine if player will build the smallest or largest number (odd is smallest number, even number is largest number). 2) Player then draws four cards each and makes their numbers. 3) Player then writes their number to their opponent and records their number. 4) Players compare numbers. The player with the larger number scores a point. 5) Players continue to alternate turns until a set number of points is reached. (10-20) Variation: Play with larger groups. Challenge players to use cards for numbers through the 100,000's.</p> 

Six Digit Traveller (Grades 4-6)
 Skills: Identifying place value of 6 digit numbers
 Players: 2-4 Materials: cards (Ace=1)-9, die, paper, pencil
 Procedure:
 1) Each player takes six cards from the deck and makes a six digit number. Arrange the cards face up in the order that they appear.
 2) Players take turns rolling the dice, verbalizing the value of the number that the die indicates and scoring points for the number in that place. (Ex. 162849 rolls a 4 – verbalizes 2 thousands and scores two points.
 3) Players take six new cards, arrange their numbers and repeat.
 4) Play continues until they reach a set score or a set number of rounds are played.

Literature based – picture story book, poem

<http://www.nzmaths.co.nz/picture-books-mathematical-content>



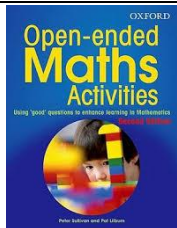
Guinness Book of Records
 Every Minute on Earth
 Every Minute Australia
 Dale Anne Dodds (Author of Mathematical Books)
 Penrose the Cat



Print and electronic media

App – social media counter
 Print media - Shares, financial review, property, attendance, movie gross amounts,
www.worlometers.info/

Open-ended tasks



Open Ended Maths Activities by Peter Sullivan and Pat Lilburn
Place Value – Upper, p 37, 38.

What number could I be?

Number of the Day

The Date – 01/02/2014 – use all the numbers and any operation to create a target number

How Far Could You Go in a Million Steps?

How long would the line of coins be for \$1 000 000


Mathwise – Place Value activities


Write Numbers with eg. 2 in the thousands in the range of 10 000 to 20 000

Number Cards eg. $6 \times 100\,000 + 3 \times 10\,000 + 4 \times 100 + 5$. Write into PV Mat – HTh TTh Th H T O (Refer to page 311, *Siemon* for understanding of the maths)

Figure 15.12 Place-value

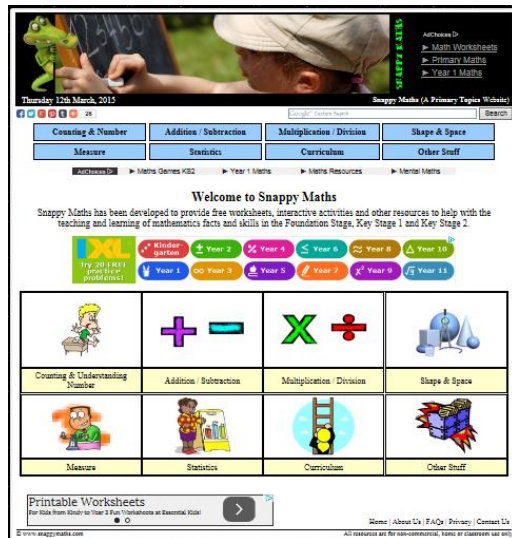
Millions						
Ones					Tens	Ones
		3	4	5	8	1
	6	7	0	8	2	9
2	4	5	2	6	7	3

Real-life experiences	<p>House Prices – Select a given number of properties – order from lowest to highest price, find the differences in price.</p> <p>Swimming Pool – 25 /50 metres. How many laps to swim 1 kilometre.</p> <p>Run to Ballarat (around the school oval) – a cumulative total, gather data, converting m to km,</p> <p>Decimals – Work with a partner. Take two blobs of play dough. Cut each into tenths. Show $\frac{3}{10}$ (.3). With one of the blobs of tenths cut tenths into 10 pieces each. (100 pieces) Show 34 hundredths. Compare $\frac{4}{10}$ to $\frac{34}{100}$. What would $\frac{4}{10}$ be in hundredths?</p>	
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Thinking tools	<p>Renaming using Number Expanders – Mimosa Lesson Plan 1 BLM 1 (See PDF in Staff Public Drive - Place Value Folder)</p>  <p>Anchor Chart –</p> <p>Personal Maths Dictionary – students write their own definitions and information</p>	
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ICT	<p>Place Value Pirates, Shark Number (MAB to numbers) www.math-play.com/place-value-games.html – Place Value Millionaire</p>  <p>Mathletics www.mathletics.com.au</p>	
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Snappymaths.com – place value interactive games



Thursday 12th March, 2015

Snappy Maths (A Primary Topics Website)

Counting & Number | Addition / Subtraction | Multiplication / Division | Shape & Space

Measure | Statistics | Curriculum | Other Stuff

Maths Games KS2 | Year 1 Maths | Maths Resources | Mental Maths

Welcome to Snappy Maths

Snappy Maths has been developed to provide free worksheets, interactive activities and other resources to help with the teaching and learning of mathematics facts and skills in the Foundation Stage, Key Stage 1 and Key Stage 2.

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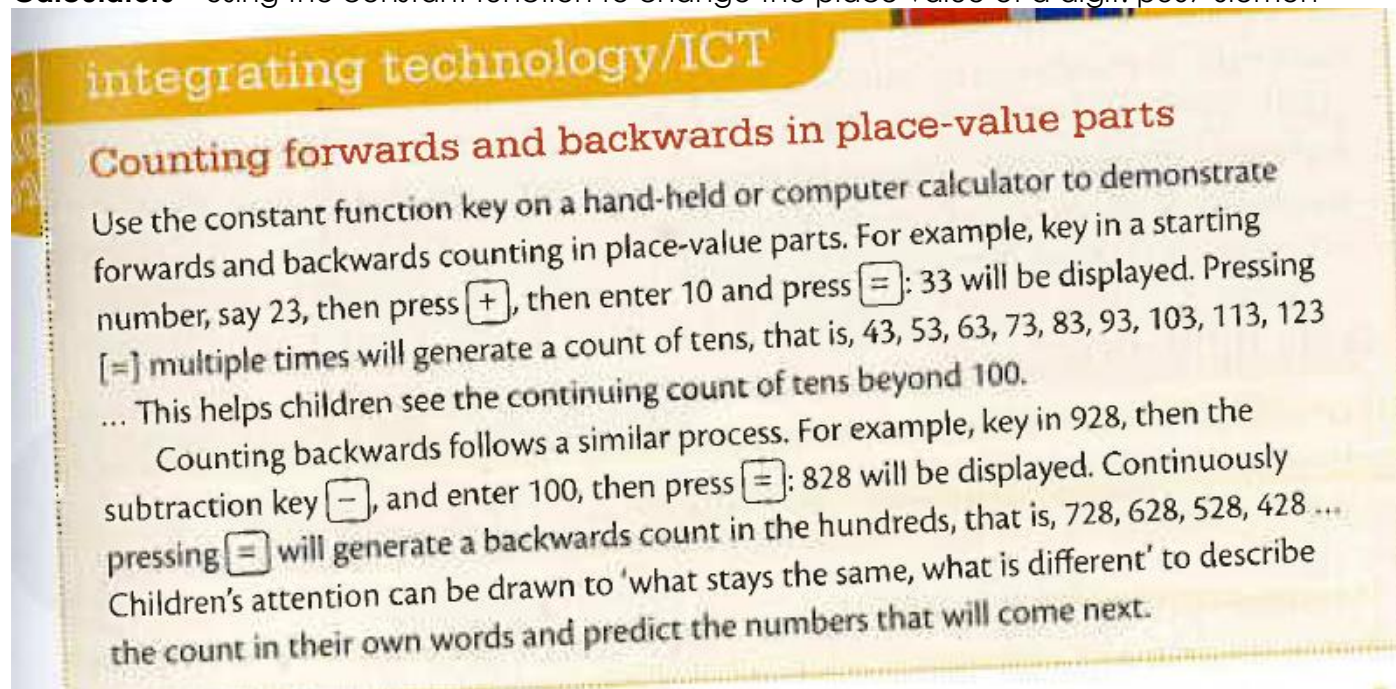
Counting & Understanding Number	Addition / Subtraction	Multiplication / Division	Shape & Space
Measure	Statistics	Curriculum	Other Stuff

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<http://snappymaths.com/>

Calculators – Using the constant function to change the place value of a digit. p307 Siemon



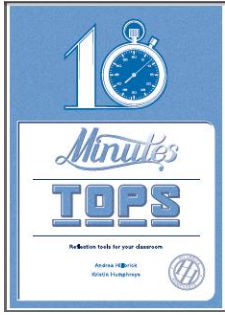
integrating technology/ICT

Counting forwards and backwards in place-value parts

Use the constant function key on a hand-held or computer calculator to demonstrate forwards and backwards counting in place-value parts. For example, key in a starting number, say 23, then press $+$, then enter 10 and press $=$: 33 will be displayed. Pressing $=$ multiple times will generate a count of tens, that is, 43, 53, 63, 73, 83, 93, 103, 113, 123 ... This helps children see the continuing count of tens beyond 100.

Counting backwards follows a similar process. For example, key in 928, then the subtraction key $-$, and enter 100, then press $=$: 828 will be displayed. Continuously pressing $=$ will generate a backwards count in the hundreds, that is, 728, 628, 528, 428 ... Children's attention can be drawn to 'what stays the same, what is different' to describe the count in their own words and predict the numbers that will come next.

Reflection Ideas / Key Questions



Ideas in **Ten Minutes Tops** (CD electronically stored in Staff Public Drive, Reflections Folder)

Stick discussions - Reflection time – 3 icy pole sticks – throw one in when you've spoken. Must use all 3 sticks. Build up – one colour – comment, question. Pairs / buddies, small groups. Teacher roves. Structure – 3 sticks with band – kept by individuals or have an egg carton with 3 sticks in each section.

Websites for teaching ideas:

Teaching ideas from NZ mathematics website

<http://www.nzmaths.co.nz/number-knowledge-lessons>

NAPLAN Teaching Ideas:

http://www.schools.nsw.edu.au/learning/7-12assessments/naplan/teachstrategies/yr2011/index.php?id=numeracy/nn_numb/nn_numb_s1a_11

Teaching Ideas from AAMT:

<http://topdrawer.aamt.edu.au>



Andrea's Pinterest board- Place Value

<https://www.pinterest.com/andyatjuc/place-value/>