YuMi Deadly Maths

Year 3 Teacher Resource:

NA – Hundreds and thousands

Prepared by the YuMi Deadly Centre
Faculty of Education, QUT

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ACKNOWLEDGEMENT

We acknowledge the traditional owners and custodians of the lands
in which the mathematics ideas for this resource were developed,
refined and presented in professional development sessions.

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Year 3 Number and Algebra

Hundreds and thousands

Learning goal

Students will:

- compare three-digit numbers, describing them as "bigger than" and "smaller than"
- order a series of three-digit numbers on an empty number line, showing relative position.

Content description

Number and Algebra – Number and place value

- Recognise, model, represent and order numbers to at least 10 000 (ACMNA052)
- Apply place value to partition, rearrange and regroup numbers to at least 10 000 to assist calculations and solve problems (ACMNA053)

Big idea

Number – place value – comparing and ordering three-digit numbers

Resources

Rope, hundred cards 0–1000, Hundreds, Tens, Ones (word cards on Place Value Chart [PVC]), multiple copies of single-digit numeral cards, calculators, clothes line, pegs, cards of different three-digit numbers, number lines

Reality

Local knowledge

Where do you see hundreds and thousands in the local environment? [money, people at sporting events, distances travelled, flocks of birds, schools of fish, berries, hundreds and thousands used to ice cakes]. *Which is bigger, hundreds or thousands?*

Prior experience

Ask: *Why is 62 bigger than 49?* [more tens]. Introduce three-digit numbers and where hundreds are used. *If 62 is bigger than 49 because 62 has more tens, what does this mean for 449 and 262?* [449 > 262 since there are more hundreds]. Check that students can say, read and write three-digit numbers in numerals and words.

Kinaesthetic

Mark out a 10 m rope in hundreds 0–1000 a metre apart, putting the numeral cards at the appropriate place. Line students up in a horizontal line from zero and have all the students walk various three-digit numbers as they are called out, e.g. 532: 5 big steps/jumps for 500 and 3 small steps for 32 (rounded to the nearest ten). After a few numbers have been called, ask: *Why is 532 longer than 286?* [There were 5 big jumps in 532 but only 2 big jumps in 286. We didn't have to jump as far for 286 {rounded to 290 so nearly 300}]. Call out two students and give each a number, e.g. 364 and 249. *Who is going to have to walk the farthest? Why?* Stress the importance of the hundreds position in determining which in a set of numbers is the biggest. For each pair of numbers, ask: *Which is the biggest/longest number? Why?* Reverse: *Who will walk the least distance?* [the student with the fewest hundreds]. For each pair of numbers, ask: *Which is the smallest/shortest number? Why?*

Divide students into four teams. One student from each team throws a bean bag to a three-digit number called out by the teacher. The student whose throw is closest to the mark gets a point for that team. *What numbers need to have the biggest or longest throw?* [the numbers with the biggest number of hundreds].

Draw: Hundreds, Tens, Ones PVC columns on cement in outdoor area with place-value names displayed on appropriate column; multiple cards of single digits in order on a seat.

A student is asked to select three cards of different digits and place them in the PVC columns, saying: *I am putting 2 in the hundreds place, 5 in the tens place and 1 in the ones place. I have represented 251*. All make the number on their calculators and then read the number. (Digits may be placed in any order.)

Repeat process but this time students have to make the biggest number possible with the three cards. *If you were throwing the bean bag or walking the rope, what place gives the biggest throw or longest walk?* [hundreds place]. *Of the three digits you have, which digit*

will go in the hundreds place if you want to make the biggest/longest number? [the largest digit]. *Which is the biggest digit you have to put in this place? Would any of the other digits make you throw as far or walk as long? Which of the other two digits will go in the tens place so that you are making the biggest number possible with those three cards?* Reverse and make the smallest number with the three cards that have been selected. Again, stress the importance of the hundreds in determining the biggest/smallest number.

Abstraction

Body

1. Washing line: String the line between two posts marking the end points – 0 (zero) and 1000 (one thousand). Students are given random cards of three-digit numbers to peg on the line in the appropriate place. *What place is the most important in finding the value of the number?* [hundreds place]. *So when you have found that your number is, e.g. 712, where will you go?* [to the 700s, between 700 and 800]. *Is the number closer to 700 or 800? Is it halfway? What would that be between 700 and 800?* [750]. *Is it quarter way? What would that be?* [725]. *Can you now place 712 close to where it belongs?*

   Seriation: Move on in ones or tens or hundreds from a randomly chosen number to make a larger or smaller number – 1, 10, 100 bigger/smaller than. Have students walk small steps for ones, medium steps for tens and big steps for hundreds, counting for each movement, e.g. 100 bigger than 274 – big steps 100, 200, one hundred more 300, medium steps 310, 320, 330, 340, 350, 360, 370 and finally small steps 371, 372, 373, 374. Repeat using other numbers, making some bigger than and some smaller than the given number.

2. Three cards from a deck of playing cards (Ace [1] to 9) are given to each student in groups of six to make the biggest/smallest number possible from each group of three cards. Write the number on paper and then stand in order from smallest to greatest showing their ordered numbers. With another three different cards, use same process but alternate order from greatest to smallest. Again reinforce: *What place is the most important when you are making either a big number or a small number?* [hundreds]. *If you want a big number, which of the three digits will you choose to put in the hundreds?* [the biggest digit]. Reverse for smallest number, the hundreds place still being the most important with the smallest digit going into the hundreds place.

Hand

In groups of four, students take three cards each from the deck and make the largest/ smallest possible number, then, on an empty number line, arrange in a stated order: either smallest to largest or vice versa.

Mind

Close your eyes and write a large three-digit number; now write a three-digit number that is smaller. Reverse – small to larger. Repeat process with students writing on the carpet.

Creativity

Students draw cupcakes, sprinkle (dots) some hundreds and thousands on the icing and write the number of hundreds and thousands they imagine are on the cake.

Mathematics

Language/ symbols

number, numeral, digit, represent, describe, compare, order, bigger, smaller, place value, digit value

Practice

1. Groups of three: Each student rolls a die and remembers the digit. When all three students have had their turn, they make the biggest number they can and record that number. After five turns, students put the numbers in order from biggest to smallest on a number line. Repeat process making the smallest number and ordering from smallest to biggest.

2. Worksheets:

   - Circle the smallest/biggest number.
   - Arrange in order from biggest to smallest / from smallest to biggest.

Work to be completed in student's pad. Given three-digit numbers, write:

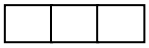
(a) the numeral and its name;

(b) numbers one smaller / one bigger than;

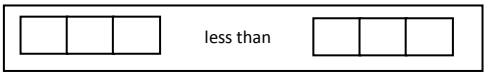
(c) numbers ten smaller / ten bigger than;

(d) numbers one hundred smaller / one hundred bigger than.

3. Three-digit "Chance number" games: Materials – digit cards, boards as below, digit cards to fit into board, card deck (0–9 or 1–9 only).



Chance number board



Chance order board

(a) **Chance number**. The object is to make either a smaller or larger number than the other player(s). Three cards are dealt one at a time. Use first number to place a digit card on board (have to choose tens or ones); other numbers fill the other positions. If make higher/lower number (as applicable), score 1 point, 0 otherwise. The winner is who has highest score after five games. (Variation – when complete, can give up a number and take the value of a fourth dealt card.)

(b) **Chance order**. Six cards are dealt; use the numbers to make the left-hand three-digit number smaller/larger than the right-hand number with digit cards on game board as required. Score 1 point if left-hand three-digit number is correctly larger (smaller) than right-hand three-digit number. Score 2 points if smaller three-digit number is largest possible. The winner is who has highest score after five games.

(c) **Chance order**. Six cards are dealt one at a time; use first number to place a digit card on board (have to choose tens or ones in either the left-hand or right-hand three-digit number), continue making choices and placing digits on board before next card called. Score 1 if correct and 0 if not. The winner is who has highest score after five games.

(d) **Chance order**. Six cards are dealt one at a time; use first number to place a digit card on board (have to choose tens or ones in either the left-hand or right-hand number), continue making choices and placing digits on board before next card called. Score 0 if not correct but score the value in the tens place of the smaller three-digit number if correct. The winner is who has highest score after five games.

Have students work in pairs to design their own game based on innovations of the models just played.

4. For virtual activities, search:
www.apples4theteacher.com/math.html; www.ixl.com/math/;

Connections Relate to measurement (metres, grams, litres), comparison/order, seriation.

Reflection

Validation Students check in their world where three-digit numbers occur, e.g. 100s–900s in the non-fiction section of the library; hundreds of books in the fiction, junior fiction, non-fiction and reference sections; hundreds of students at school in different years; hundreds of tickets available to see a movie; money, measurement, distances. Check the games invented by other students.

Application/ problems Provide applications and problems for students to apply to different real-world contexts independently; e.g. estimate the number of people who attended a movie at the cinema over a period of a week and compare attendance on different days to find the most popular day. *Which day had the most in attendance/the least? What could be the reasons for this?*

Visit the library: *Which of the four sections has the greatest/least number of books? Which of the hundreds in the non-fiction area has the most/least number of books?* Travel: *Which country is the most popular to visit?*

Extension

Flexibility. Students are able to roll forwards and backwards in multiples of tens/hundreds, e.g. the numbers that are within 40 of 358, rolling backwards to 318 and forwards to 398; show three-digit numbers using MAB, number line, calculator. Find situations where three-digit numbers are compared (money, height, mass, km, etc.)

Reversing. Students can tell stories and identify the three places and respective values in three-digit numbers and are able to make biggest/smallest numbers from any three digits. Give numbers → put in order AND give one number and an order and have to find other number.

Generalising. This is the most crucial aspect – have to get students to generalise the importance of the largest PV position as the starting point of comparing. *In three-digit numbers, examine the hundreds first because hundreds have the most effect on the size of the numeral, then the tens and lastly the ones. When we have ten in a group (ten ones, ten tens), we move them over to the next column to add one more ten or hundred respectively. How would you order this set of numbers from smallest to largest?* (691, 782, 634, 726, 638) Check that students understand the process in ordering:

1. look at the hundreds (or highest PV digit) – if the same;
2. look at the tens – if the same;
3. look at the ones.

Changing parameters. Extend the above generalisation to four and more digits: *What number comes after 999? What number will we make when we have ten hundreds? How many digits are there? In a four-digit number, which digit do we look at to find the smallest/biggest number? Is the largest PV position still the starting point? What is the important place value when ordering four-digit numbers?*

Teacher's notes

- Ensure that students understand that to order three-digit numbers or to find bigger/smaller three-digit numbers, we look at the digit in the hundreds place first, then the digit in the tens place and lastly the digit in the ones place. To make the biggest number, the biggest numeral must go in the hundreds place as hundreds are more than tens or ones; the next biggest numeral goes in the tens place and the smallest numeral goes in the ones place. Reverse to make the smallest number: smallest number goes in the highest place and so on.
- Students need to be taught the skill of visualising: closing their eyes and seeing pictures in their minds, making mental images; e.g. show a picture of a kookaburra, students look at it, remove the picture, students then close their eyes and see the picture in their mind; then make a mental picture of a different bird.
- Suggestions in Local Knowledge are only a guide. It is very important that examples in Reality are taken from the local environment that have significance to the local culture and come from the students' experience of their local environment.
- Useful websites for resources: www.rrr.edu.au; https://www.qcaa.qld.edu.au/3035.html
- Explicit teaching that **aligns with students' understanding** is part of every section of the RAMR cycle and has particular emphasis in the Mathematics section. The RAMR cycle is not always linear but may necessitate revisiting the previous stage/s at any given point.
- Reflection on the concept may happen at any stage of the RAMR cycle to reinforce the concept being taught. Validation, Application, and the last two parts of Extension should not be undertaken until students have mastered the mathematical concept as students need the foundation in order to be able to validate, apply, generalise and change parameters.

