YuMi Deadly Maths

Prep Teacher Resource:

NA – Bits and pieces

Prepared by the YuMi Deadly Centre
Faculty of Education, QUT

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ACKNOWLEDGEMENT

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refined and presented in professional development sessions.

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Prep Number and Algebra

Bits and pieces

Learning goal

Students will:

- partition small collections
- add by combining parts of a whole
- subtract by removing a part from a whole.

Content description

Number and Algebra – Number and place value

- Represent practical situations to model addition and sharing (ACMNA004)

Big idea

Number – part-part-whole

Resources

Rope, hoops, objects in groups of 10 (e.g. shells, nuts, blocks, cars, snakes, ten mat)

Reality

Local knowledge

Consider familiar collections, e.g. sharing the catch of fish with their family.

Prior experience

Song: "Ten Green Bottles".

Kinaesthetic

Class forms a circle on the oval and plays a game to model part of the body going into the circle and the other part of the body staying outside the circle. Emphasise at each stage: *My right arm is the part of my body that is inside the circle and the part outside is another part; both parts make up my whole body*.

Students are broken into small groups in different areas of the room (the ideal is to have groups of the same number e.g. 4, 5, 6, whatever is a factor of the total class number). Whole → part-part: Teacher (T) tells the students to count how many are in their whole group. T then says students are to break their whole group into parts: *One student is to separate from the group; how many are left in the other part? What are the parts of the whole group?* (1 and ?). Part-part → whole: *Can the parts (students inside and students outside) join back together again? Is the whole group the same as the parts joined or added together?* Whole → part-part: Break the whole into different parts (2 and ?). Identify each time what the parts are and the whole that is made from the parts.

Part-part → whole: Make a different whole by combining two groups, 2 parts. Count how many were in each part and, now, how many there are in the whole big group. Repeat the above activities, going from part-part to whole and reversing, going from whole to part-part.

Abstraction

Body

Make the rope into a large circle/rectangle/square. T calls out 10 students to stand outside the shape. *We have 10 students standing outside the shape*. T then breaks the students into groups so that 6 (count) go inside the shape and 4 (count) stay outside. *Part of the group of 10* (count 6) *is inside the shape and the other part* (count 4) *is outside the shape. What happens if the 4* (count) *outside go into the shape? What is the whole/total/how many do we have now inside the shape?* (count 10). *So the part inside and the part outside have come back together/combined to make the whole again*. Reverse – start with the whole and break into parts, 2 and 8, etc.

Ten frame: Given the **whole** ten (walk and count to 10). *If one part is 7* (walk from the start, 0, to 7), *what is the other part/how much more to make 10?* (walk and count on from 7) ***1, 2, 3****; 3 is the other part to make 10, 10 is made up of 7 and 3*, etc. Reverse: *I have 6. What is the other part to make 10?* Walk on from 6, **7, 8, 9, 10.** *I needed to walk on 4 more places, so the other part is 4; 6 and 4 make 10*.

In pairs, students take a hoop and a group of 10 objects. T directs students to start with their 10 objects inside the hoop and then repeats the above process so that all the addends

	of 10 are considered. Each time, the whole of the objects is counted, then the parts. Go from whole → part-part and reverse going from part-part → whole.
Hand	Students are given 10 animals/counters. They partition them to display different arrangements and describe the parts of 10 they can make from the whole. They observe and note that when the various different parts (addends) of 10 are re-joined, the whole remains the same – 10. Again, ensure the reversing process is used.
Mind	*See in your mind Mary's cake with 5 candles. If her brother was 8, how many more candles than 5 does he need for his cake? What is the other part that goes with 5 to make 8? Put those candles on the cake for him to make up the whole 8 candles. Imagine a bowl of 6 chocolates on the table. If your brother counted 2, that's one part, see the other part that makes up the whole 6. Visualise the two parts together making up the whole 6.*
Creativity	Students select their own medium (drawing, collage, objects, toys) to represent whole → part-part and part-part → whole. Students could work in pairs to split collage into parts and then join the parts together to make the whole collage.

Mathematics

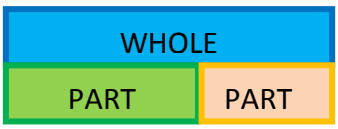
Language/ symbols	part, whole, join, makes, combine, and, more, total, altogether, combine, total, add, more, less, partition, re-join, visualise, describe, record
Practice	Activities are language based so that students gain fluency with the language of part-part-whole when combining collections. Students work in pairs: One student uses some objects to make a whole and the partner takes part of the whole. They discuss the whole they started with, the part that was taken and the part that was left. They record both parts verbally, saying, for example, *Our whole A was broken into part B and part C*. When the first student puts the part left back together with the part taken on the partner's desk, they verbally record: *B and C are parts of the whole A that we started with*.
Connections	Part-part-whole relates to addition, 2 + 3 = 5 (addends and sum); given whole and part to find other part is subtraction; while multiplication is 2 groups of 3 students give 6 altogether – part-part (factors) and whole (product).

Reflection

Validation	Students go back into their world and find/draw collections that are partitioned, e.g. eggs and cartons of eggs, families – children at school and parents at home or work.
Application/ problems	Provide partitioning examples and problems for students to apply to different contexts independently, e.g. home (dog biscuits – different dishes for small and large dogs), school, play, shopping.
Extension	**Flexibility**. Think of more than one way we could partition the same collection, e.g. size and position of the parts, small part – big part → whole, big part – small part → whole; equal parts → whole. **Reversing**. Give examples in going from part-part → whole and reversing to understand whole → part-part. **Generalising**. Whole collections may be broken into parts. The parts of the same collection will always make up that same whole collection again. The same whole may be partitioned in several different ways. The whole and its parts form a triadic relationship that never changes, i.e. a triad of related facts: part-part → whole; whole-part → other part. **Changing parameters**. Encourage students to explore partitioning a collection into three or more parts. *Does the generalisation still exist?* Part-part-part → whole and whole → part-part-part.

Teacher's notes

- Use language-based consultation with students describing and explaining the partitioning of collections, emphasising the triadic relationship that always exists regarding the parts and the whole or the whole and its parts.



- These activities are precursors that explore the concept of addition and subtraction creating the understanding that:
  - part and part → whole, joining parts to make the whole is addition; and
  - whole and part → part, knowing the whole and one part to count on to find the other part is an inverse joining activity that is modelling subtraction. Subtraction is removing one part from the given whole to find the other part that is left.
- The activities are all set models but the number line may be introduced later.
- 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 leaf, 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 leaf.
- 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.