YuMi Deadly Maths

Year 1 Teacher Resource:

NA – Put them together

Prepared by the YuMi Deadly Centre
Faculty of Education, QUT

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ACKNOWLEDGEMENT

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Year 1 Number and Algebra

Put them together

Learning goal

Students will:

- rearrange the parts of an addition situation to show commutativity
- use appropriate thinking strategies to solve simple addition problems
- record addition problems with numerals and symbols.

Content description

Number and Algebra – Number and place value

- Represent and solve simple addition and subtraction problems using a range of strategies including counting on, partitioning and rearranging parts (ACMNA015)

Big idea

Number – part-part-whole

Resources

Number tracks, ten frame, doubles chart and rainbow facts chart, manipulatives (two different shapes)

Reality

Local knowledge

Discuss examples of commutativity in local environment, e.g. walking to the shop from home and then walking back home, going upstairs then coming back down, putting shoes on then taking them off, collecting red and yellow flowers then putting yellow and red flowers in a container.

Prior experience

Check that students understand that joining objects together gives a total amount, i.e. that we are adding one group to another. *This is called "addition".*

Kinaesthetic

Number track: Compare 5 girls and 4 boys on squares with 4 boys and 5 girls on another number track in front of the first number track; *When we rearrange the same parts, we get to the same total amount*. Repeat with other examples on the number track: 3 girl and 2 boys with 2 girls and 3 boys, etc. Reinforce how the total remains the same regardless of the arrangement of the parts. Reverse: Start with a total number of students on the number track and find arrangements, using another two number tracks, that give the same total when the parts are rearranged. The number facts may be explored, e.g. 9 + 1 = 1 + 9 = 10; 2 + 8 = 8 + 2 = 10, and so on.

Set model: *What is another way of saying four boys and two boys?* [two boys and four boys] *The order of the parts, which comes first and which comes next, does not change the total amount.* Reverse: *If one group had three girls and they joined with another group of four girls, would it matter if the three girls went to the four girls, or the four girls went to the three girls? What is the total either way?*

Abstraction

Body

Walking the number track: Ask a student to stand at 6, then walk on 4 more. Reverse: Ask another student to stand at 4 and walk on 6 more. *Are they at the same place? What does that tell us? 6 plus 4 equals 4 plus 6.* Repeat with other examples to demonstrate commutativity. When students have a sound understanding of commutativity, go on to count-ons.

Count-ons: *Because we know that we always get the same amount even if we change the order of the parts, it makes it deadly easy to work with count-ons. How will we rearrange three plus six to make the count-on easy?* Demonstrate on walking track, start at 6 and walk on 3. Repeat with other examples.

Set model: Join girls with brown eyes and boys with brown eyes. *How does this compare with joining boys with brown eyes and girls with brown eyes? Give me two ways of joining other items that have the same pairs of numbers.*

Another useful technique is to use our doubles plus one/two. Students practise double one/two/three/four/five (big jumps to the double) then small steps to walk on one/two more.

Examine all the "ten" number facts walking the number track. Emphasise commutativity again, e.g. 1 + 9 = 9 + 1 = 10.

Hand

In pairs, students practise the commutative principle with manipulatives. *Line up three red blocks and one white block. Now line up one white block and three red blocks. What do you notice?* Compare the total of four blue and two yellow blocks with two yellow and four blue blocks. Line both under each other. Repeat using other examples.

Using calculators, check the answers for 4 + 2 and 2 + 4. *What do you notice?* Give other similar examples.

Mind

Students visualise number facts (five big dogs and two small dogs) and the reversals (two small dogs and five big dogs) as the teacher calls them out. Still with eyes closed, students tap the number fact and its reversal on the desk following teacher instructions. Students give examples for classmates to follow: a + b and b + a. Include the reversal: *The total is 10; imagine its parts. What parts did you see?*

Creativity

Students find as many ways as possible to join number sentences of their choice, e.g. using commutativity, count-ons, doubles plus one/two, number facts. Students choose way/s to represent the facts, e.g. drawing, manipulatives, symbols. Encourage as much variety as possible.

Mathematics

Language/ symbols

join, parts, whole, rearrange, add, addition, number, number problem, number fact, altogether, total, amount, plus, and, equals, groups, use counting, use doubles, use ten, number lines, model, represent, representation, solve

Practice

1. In pairs, first student uses two different manipulatives to make a number fact. State the fact that has been made. Partner has to line the reversal fact underneath it and state the reversal. Give the total that both give. Tell a story about each fact that is made.
2. Students use two differently coloured counters and ten frames to demonstrate commutativity with the number facts. Explore facts with totals less than 10. Draw a picture about the facts that have been explored.
3. "Find a flower" with many petals that have jumbled number facts and their reversals. Colour the petals with facts that are the same, the same colour.
4. Teacher models finding and joining matching number facts: Two vertical lists with number facts and their reversals jumbled on the other list. Draw lines to match the fact and its reversal. Provide a similar sheet for students to complete. These may include symbols, pictures, words.

Connections

Make the connection to measurement (pouring water then adding sugar/tea bag is the same as starting with sugar/tea bag then pouring in the water).

Reflection

Validation

Check that students can relate the commutative principle to instances in their world, e.g. carrying books: it doesn't matter whether five are carried first to the shelves and then the four left over or the other way round, four then five.

Application/ problems

Provide applications and problems for students to apply to different contexts independently e.g. *There were three bananas and Mum bought five more. Show how you would find the total bananas there are now.*

Extension

Flexibility. Students give as many ways as possible to show how a number fact may be joined (commutativity, count on, doubles +, rainbow fact).

Reversing. Reverse the parts to get to the total, $a + b = b + a = x$, and also reverse the procedure so that the starting point is the total and from the total the parts are found and then reversed, e.g. $x = a + b = b + a$ and also $x = c + d = d + c$, etc. Go backwards and forwards from any point stories ↔ act out ↔ pictures ↔ language ↔ symbols.

Generalising. *The order that the parts are put together does not affect or change the result/amount.*
To join parts together, we can start at either part and count on. It's easier to start with the bigger number and count on the smaller number.
Using our doubles makes count-ons easy.
Using the rainbow facts also helps with count-ons, e.g. 6 + 5 = 6 + 4 + 1 = 10 + 1 = 11 (Highlight that 5 is 4 + 1, whole-part-part).

Changing parameters. Students explore rearranging more than two parts in an addition situation, e.g. 6 + 2 + 4, the associative principle (6 + 2) + 4. Ask students to explain how the parts could be rearranged to make the calculation easier.
Give students larger numbers as addends and have them check with calculators to see that the commutative principle works for larger numbers, e.g. 341 + 296 = 637 and 296 + 341 = 637 also. Using calculators, students in pairs take turns to add other large numbers written on the whiteboard, one student adding the addends forwards and the other student adding the addends backwards.

Teacher's notes

- Before practice is commenced, ensure students know and understand:
  - the process that addition is joining two like groups
  - the symbols, + and =.
- Demonstrate with manipulatives and give a lot of practice with the commutative principle, e.g. 3 + 4 is the same as 4 + 3, before extending it to count-ons or doubles.
- 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.