YuMi Deadly Maths

Year 4 Teacher Resource:

NA – Tuckshop orders

Prepared by the YuMi Deadly Centre
Faculty of Education, QUT

ACKNOWLEDGEMENT

We acknowledge the traditional owners and custodians of the lands
in which the mathematics ideas for this resource were developed,
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Year 4   Number and Algebra

Tuckshop orders

Learning goal	Students will make calculations with money.
Content description	Number and Algebra – Money and financial mathematics • Solve problems involving purchases and the calculation of change to the nearest five cents with and without digital technologies (ACMNA080)
Big idea	Number – subtraction, inverse, part-part-whole
Resources	Play money Australian notes and coins, tuckshop menu, shop catalogues, strip mat, note/coin words, place value (PV) cards, key-ring digit cards

Reality

Local knowledge	Ask students to tell their money stories, e.g. how much they get for pocket money, items they have seen increase in cost, items that are cheaper if you buy more in number or in quantity, how they like to spend their pocket money, what are essential goods to buy.
Prior experience	Check that students know the Australian coins/notes and their value. Check that they understand the multiplicative relationship that exists between coins and notes.
Kinaesthetic	Display the tuckshop menu and prices. Have the students act out the roles of student buying and person selling. The student buying selects an item to purchase, tenders appropriate note, coins or note and coins, and checks the change that is being given. Seller checks money tendered before giving change. Have students use the additive method for giving change; e.g. meat sandwich for $2.65, a $5 note tendered, change given: $2.65 + 5c → $2.70 + 30c → $3 + $2 → $5 (total change is $2.35). After one student buys from the tuckshop giving money and receiving change, reverse so that the buyer becomes the seller and the seller goes to the back of the line to become a buyer. Students and teacher check each transaction and change given for accuracy by using calculators. Whole to parts – given $10 note: In groups, make as many different combinations as possible to show other ways of giving $10 change when a $10 note is not available. Share with the class.

Abstraction

Body	Set up a shop for tuckshop orders: Each student is given a purse containing different amounts of play money and a tuckshop menu. They select items from the menu and calculate how much their order will cost and how much change they will receive. One by one they go to the student tuckshop convenor, make their purchase/s and give the total cost. The convenor counts out the change and the student checks the amount given. All students participate in calculating total cost and amount of change to be given at each transaction. Use the additive strategy for giving change as above; e.g. $5 tendered – cost of 4 chicken nuggets = $3.45, change given: $3.45 + 5c (up to $3.50), + 50c (up to $4), + $1 (up to $5). Change is 5c + 50c + $1 = $1.55. After each role play, write the transaction in symbols: $5 – $3.45 = $1.55. After purchasing one item and receiving change, purchase two items, add to obtain total and then calculate the total change.

Students use the strip mat, note/coin words, PV cards, key-ring digit cards to make given amounts of money as follows:

Hundreds	Tens	Ones	Tenths	Hundredths
$100	$10	$1	10c	5c
3	6	2	4	1

Read the amount of money made, e.g. *Three hundred and sixty-two dollars and forty-five cents.* (Note: Explain to students that as there are no longer 1c pieces, hundredths are in groups of 5c.)

Hand	Using the play money, students in groups, count out amounts given by the teacher and then write the amount in the PV chart as above. Students describe situations where the given amount may have been the cost of an item, the notes/coins to be tendered, and change given from a set total. They role play the transaction and write it as a calculation. Always check the transactions with a calculator. From above: A phone cost $362.45; $400 was tendered; change is $362.45 + 5c → $362.50 + 50c (or could be + 20c + 20c + 10c) → $363 + $2 → $365 + $5 → $370 + $10 → $380 + $20 → $400. $400 − $362.45 = $37.55.

Note: Change may be given in a variety of ways depending on the notes/coins chosen. Students should look for many ways of giving the same amount of change. |
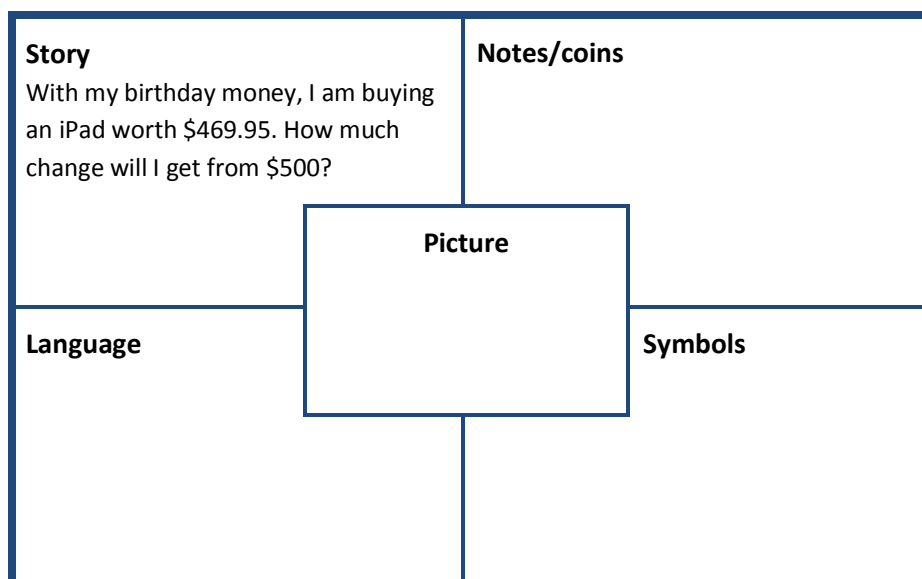| **Mind** | Students visualise tuckshop items and their cost and in their mind see the notes and/or coins that would be needed to buy the item. Reverse: Given $5 to spend – *What could be bought? How much change would there be? How could that be given to you?* |
| **Creativity** | Students write their own tuckshop menu and cost per item. Buy three items, calculate cost and change required. |

Mathematics

Language/ symbols	dollars, cents, coins, notes, equivalent amounts, change, tender, subtract, estimate, round, change, budget
Practice	1. Use the thinkboard to create practice examples for students to complete the missing parts, for example:

Story	Notes/coins
With my birthday money, I am buying an iPad worth $469.95. How much change will I get from $500?	
	Picture	
Language	Symbols

2. Use catalogues from various stores; provide examples that involve all four operations.

3. Include worksheet on equivalence in money using different notes and coins.

4. Provide virtual activities:
   http://au.ixl.com/math/year-4
   http://www.australiancurriculumlessons.com.au/wp-content/uploads/2013/06/Lets-go-shopping-worksheet-1.pdf

Connections	Place value, strategies for the four operations.

Reflection	
Validation	Students discuss where money exchange occurs in their world, e.g. getting/spending pocket money, shopping, banking.
Application/ problems	Provide applications and problems for students to apply to different real-world contexts independently; e.g. *Calculate how much you will save in a year if you bank $1.50 each week out of your $10 weekly pocket money. If you had done that since you were four years old, how much would you have now?*
	Can you put $453 into notes and coins? Reverse: *How much is 4 lots of $10 notes + 2 lots of $5 notes, 3 lots of ten cent coins and a 5 cent coin?*
Extension	**Flexibility**. Students are able to give many ways to represent an amount of money. Students count the money in their wallets, record the parts and tally the whole. Share and check the results with a partner.
	Reversing. Students should work from stories through to symbols on the board, and then reverse from symbols back to stories: stories ↔ acting out/modelling with materials ↔ pictures (drawing) ↔ language ↔ symbols.
	Generalising. Students understand that large coins/notes are multiples of smaller coins/notes so that there are many ways to represent the same amount. The four operations that are applied to integers are applied in the same way to money.
	Changing parameters. Students are given examples using money that extend to ten thousands.
	Extend to buying three or more items and calculating change from a given amount.
	Students explore currencies of other countries to investigate the relationship between the money denominations of the particular countries.

Teacher's notes

- Teachers using thinkboards often photograph them when students have finished them so that a permanent record of the students' work can be displayed.

- 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.