YuMi Deadly Maths

Year 6 Teacher Resource:

NA – Smart shopping

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
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Year 6   Number and Algebra

Smart shopping

Learning goal	Students will compare and evaluate two shopping options.
Content description	Number and Algebra – Fractions and decimals • Find a simple fraction of a quantity where the result is a whole number, with and without digital technologies (ACMNA127) • Add and subtract decimals, with and without digital technologies, and use estimation and rounding to check the reasonableness of answers (ACMNA128) Number and algebra – Money and financial mathematics • Investigate and calculate percentage discounts of 10%, 25% and 50% on sale items, with and without digital technologies (ACMNA132)
Big idea	Number – discrete vs continuous, multiplicative structure, percentage, fractions
Resources	Student-made shop name, posters, brochures, signs, price tags, vouchers, tick-and-flick record sheet, comparative table, hundred board, counters, discount cards, worksheets

Reality

Local knowledge	Discuss the various ways families do their shopping, e.g. bulk buying, supermarket, convenience store, products on sale, online. *What are the differences in these? When are these used? What are the benefits and disadvantages in these? Is there one main type used most of the time?*
Prior experience	Use shopping examples to revise calculating simple fractions of a quantity ($\frac{1}{10}$, $\frac{1}{4}$, $\frac{1}{2}$) and calculating percentage discounts (10%, 25%, 50%).

Kinaesthetic	Act it out: Stationery Materials (Calculators may be used.)
	
	Groups of four students set up a shop with five products, e.g. erasers, lead pencils, blue pens, felt pens, rulers.
	
	Each store:
	
	1. Chooses a name for their shop and designs a poster and/or brochure advertising their products and prices (full price and reduced price, amount of discount, etc.).
	
	2. Creates a financial plan regarding:
	   (a) how much stock to purchase – quality, appeal, cost
	   (b) buying and selling price of goods
	   (c) desired profit margin
	   (d) incentives, e.g. buy one get one free, buy one 50% off second, vouchers
	   (e) if and when to advertise a Sale
	   (f) roles for each partner, e.g. sales person, cashier, recorder – one person for each role or everybody undertaking all three roles (completing the sale).
	
	3. Keeps records of all business transactions (legal requirement for GST and income tax):
	   (a) expenditure – buying price of goods, advertising costs (standard $5)
	   (b) income – record of all sales of goods and takings; check that change is correct
	   (c) profit or loss the business has made
	   (d) individual partner's share of the profit/loss (ideally all shops have the same number of partners).
	
	Reverse: One at a time, each partner from every store is released from duties at the shop to purchase one of each product from the other stores. Partners may NOT buy from their own

store. Students shop around to get the best deal for each product. Students keep a record of their purchases, product, price and the shop where the purchase was made.

After all the shopping has been completed, the stores compare their profits or losses and discuss the results to determine which shop made the most profit, which had the greatest loss, and which gave the best value. *What are the advantages or disadvantages in these scenarios?*

Abstraction

Body

Gathering information via an investigation plan to determine store with the better value: In groups of three to four students, conduct an investigation to compare the prices two different stores offer on five products, e.g. toothpaste, muesli bars, cereal, milk, flour, to see which store gives the better value. Students may select the two stores to compare, e.g. Westfield chain stores, local supermarket, general corner store.

Students use personal visits, newspaper and online advertisements, and catalogues and store brochures to compare prices for the investigation.

Include consideration of:

- travel expenses (petrol, parking, taxi, bus, train)
- specials (sale items; buy one get one free; buy two for reduced price; percentage discounts; reduced prices for quick sale – check due date)
- prices against quantities (per 100 g price; 200 g @ $3.50 against 500 g @ $6).

Hand

Make a shopping list and compare prices in a table to determine the store with the most savings (name the stores):

	Price: Store 1	Price: Store 2	Savings Store 1	Savings Store 2
Item				
1.				
2.				
3.				
4.				
5.				
Total savings				

_____ is the store that gives the better overall value. For the 5 items in our shopping list, _____ gave total savings of $_____.

Mind

Close your eyes and in your mind see the same product in two different stores where one store has a better price than the other store. Where will you make your purchase? See a product costing $12 that is advertised at a 10% discount. What is the discount you will get?

Creativity

Create a brochure showing products at reduced prices.

Mathematics

Language/ symbols

unit fraction, quantity, addition, divide, multiply, sale, percentage, discount

Practice

1. Game – Super Savings: 2 to 4 players, hundred board, counters, discount cards (multiple examples):

   (a) Clearance Sale: 25% off original price. What is the discount on a shirt marked $20?

   (b) Which is the better voucher and by how much? Jumper $120, A. $50 off or B. 50% off.

   (c) Which is the better deal and by how much per DVD? 2 DVDs @ $48 or 5 DVDs @ $125.

Rules: In turn, players select a discount card from the pack, calculate the savings they acquire and move their counter forward one square for every $5 saved. First to 100 squares, wins.

2. Worksheets:

   (a) A six pack of drinks cost $13.50. What is the unit price?

   (b) How much discount do you get if a pair of shoes marked at $85 has 10% discount?

   (c) If you have paid $80 less on a suitcase marked @ $320, what was the percentage of discount you received?

   (d) What is the better deal? ½ kg steak @ $19 or 3 kg steak @ $105? How much per kg do you save?

Connections	Relate to GST, mode, interest, overhead costs.

Reflection

Validation	Students check where shopping around occurs in the real world, e.g. One Big Switch (health, electricity, fuel), bank interest rates, car prices, sales in shops, etc.
Application/ problems	Provide applications and problems for students to apply to different real-world contexts independently; e.g. *You want a smart phone for your birthday. Compare prices from two or more shops and work out the best plan or agreement to take*.
Extension	**Flexibility**. Students are able to compare and calculate prices and their discounts using a variety of strategies (simple fractions, percentages, rates, ratios, subtraction) and, given the amount of discount, they can then calculate the percentage of discount.
	Reversing. Students are able to move between original price ↔ reduction strategies (buy one get one free, 25% discount, 100 g cost etc.) ↔ reduced price ↔ amount of discount, starting from and moving between any given point.
	Generalising. *Many factors impact the outcome in business transactions: cost price, selling price, supply and demand, the need for reductions to obtain sales, the discount percentage given, competition among outlets, prudent use of sales to sell over-stocked items or those nearing their use-by date. A book of records must be kept itemising an outlet's income and expenditure for tax purposes and for monitoring products for ordering and checking purposes. Stores use a variety of tools to discount prices.*
	Changing parameters. Include calculation of GST in the investigations; calculating with different percentages, e.g. 15%, 30%, 40%; track and examine the mode of products for future ordering.

Teacher's notes

- Ensure students have a solid knowledge of calculations with common fractions and percentage before proceeding with the lesson.

- 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 50 cent coin, students look at it, remove the picture, students then close their eyes and see the 50 cent coin in their mind; then make a mental picture of a $5 note.

- 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.