



Mathematical modelling: How much can you save?

In this lesson, provide students with a real-world problem related to shopping. The [problem](#) centres around gathering evidence to answer the question: ‘would choosing sales items make much difference to what you pay for groceries over a year?’

The intention of this lesson is for students to use mathematical modelling to solve the problem. It is suggested not to scaffold the problem too much so as to unintentionally limit students’ investigative thinking. It is preferable that students choose an appropriate mathematical operation and use computational thinking to break the problem into parts to help solve it. In the process, they may use several strategies to model and solve the problem.

Ideally, you introduce the following steps for students to follow in the construction of their approach. Some guidance is included based on the problem about sales.

1. Describe the real-world problem

- Find out if discounts impact grocery spending over time.

2. Specify the mathematical problem

- Calculate how much money can be saved by buying discounted grocery groceries over a year.

3. Formulate the mathematical model

Assumptions

- Not everything can be purchased at a discount.
- Sometimes groceries might be on sale.
- Grocery bills vary from family to family, depending on numbers and dietary habits.

Model equation

- Include calculations of percentage to work out discounted price.
- Work out a weekly saving and apply it to a monthly model, then to a year.

Potentially graph the data to make predictions and comparisons, include probability chance of finding groceries on sale.

4. Solve the mathematics

- Correctness of calculations of percentage to work out discounted price.

5. Interpret the solution

- Comparisons of costs with totals.
- Projections for a year based on known information.

6. Evaluate/validate the model

- Ask students: How can you test your model? How do you know it works?

7. Report the solution

- Communicate their findings. How might they present this to their families?

Guide the students with the suggested process to follow. Use questioning and feedback, to support students in the process, rather than giving them the approach to solve the problem.

Some students may need explicit teaching to calculate percentages.



How much can you save?



In this task you will answer the question:

- Would choosing sales items make much difference to what you pay for groceries over a year?

Two people approach shopping in different ways.

- Marie shops for specials waiting for sale items. She always gets a bargain.
- Marco prefers to buy when he needs something and prefers not to wait. Sometimes, when he shops he finds an item on sale but not often.

Here's a list of the common items they purchased over a week. This only includes the sale items.

Item	Normal price	Sale Discount
Laundry liquid detergent	\$26	50% off
Toothpaste	\$9.00	50% off
Butter chicken with rice	\$7.00	10% off
Apple crumble scroll	\$3.50	20% off
Orange mineral water	\$2.50	40% off
Tea bags	\$5.80	50% off
Margarine	\$6.00	20% off
Pasta sauce	\$4.00	10% off
Pasta	\$3.50	20% off
Peanut butter	\$7.50	30% off
Bread	\$4.50	10% off
Fresh strawberries	\$3.00	20% off
Cauliflower	\$4.50	30% off



Let's use this process to solve the problem.

