



# Teacher's Resource Book

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**ML** equal in mass, gram, heavier, hefting, kilogram, lighter, mass, scales

LESSON PLAN **1**

**TUNING IN**

**WHICH IS HEAVIEST?**

**You will need:** classroom items of varying mass, e.g. stapler, pack of pencils, tennis ball, tape dispenser  
Select two items and hold them up in front of the class. Have students predict which is heaviest. Discuss. Repeat, comparing three or four pairs of items. Collate responses to make a list of prediction statements on the board, e.g. 'We predict that a stapler is heavier than a tennis ball.'

**WHOLE-CLASS INTRODUCTION**

**USING KILOGRAMS**

**You will need:** beam balance, kilogram mass (e.g. 1 kg weight or 1 litre carton filled with water)  
Ask, 'What is mass? What are we doing when we find the mass of an object?' Discuss to assess prior knowledge.  
Ask, 'When might we need to find the mass of an object?' List suggestions, e.g. shopping, cooking.  
Ask, 'What do we use to measure mass?' Discuss kilograms and when we use them, e.g. body weight, grocery items. Ask students to look around the classroom to find examples of things they think would be lighter than, about the same as, or heavier than a kilogram. Ask, 'How could we test these predictions?' Discuss, e.g. hefting, using a beam balance or scales. Present the beam balance to the class and discuss how it works: the heaviest item pushes the beam down. Invite students to test one of their predictions using the kilogram mass on one side and their classroom item on the other. Repeat as necessary.

**INDEPENDENT TASKS**

**Note:** Choose from Tasks 1, 2 or 3.

**You will need:** beam balance, kilogram mass, PowerPoint, access to the internet, Student Book p. 40 'Which Is Heaviest?'

**TASK 1: KILOGRAMS – EQUAL, MORE OR LESS**

Have students look around the room and list five things they think would weigh about a kilogram, five things that would weigh less and five things that would weigh more. Students then weigh the items using a beam balance with a 1 kg weight on one side to check their estimates.

**TASK 2: INTERACTIVE TASK**

Have students work in pairs on computers using PowerPoint to make a presentation about comparing mass. Have students search the internet to find pictures of items and compare two on each slide, e.g. a cat and a car. Students write statements below the pictures, e.g. 'A cat is lighter than a car. A car is heavier than a cat.'

**TASK 3: STUDENT BOOK p. 40 'Which Is Heaviest?'**

**TEACHING GROUP**

**You will need:** classroom items of varying mass, beam balances, uniform units (e.g. MAB, Unifix blocks, dice, counters, felt pens), kilogram mass

**INFORMAL COMPARISON**

- For students who require support, spend more time discussing the meaning of mass and how we compare items. Present students with two obviously unequal items, e.g. a pencil and a tape dispenser. Ask, 'Which is heavier?' Have them heft the items to feel the difference, then compare them on the beam balance.

Once understood, have students find items that they think will have a similar mass, e.g. a pencil and a highlighter pen, and compare these on the beam balance.

**COLLECTIONS EQUAL TO A KILOGRAM**

- For students who require a challenge, provide them with a 1 kg weight and a set of uniform units, e.g. Unifix blocks. Have them predict how many Unifix blocks would have a mass of 1 kg, then use the beam balance to find the actual amount. Repeat with another set of uniform units, e.g. MAB, dice, counters or felt pens, to see if predictions become more accurate over time.

**REFLECTION**

Select from the following to suit your class and their learning outcomes:

- Have students share their experiences with using the beam balance. Ask, 'How did you know whether items were heavier/lighter than a kilogram? Was it difficult to make the beam balance level?'
- Ask, 'Would most items in our classroom weigh more than, less than or equal to one kilogram? Why?'

LESSON PLAN **2**

**TUNING IN**

**PENCIL CASE LINE-UP**

**You will need:** pencil cases

Have four students volunteer their pencil cases – ensure they are of different size and mass. Display the pencil cases in front of the class and label them A, B, C and D. Have students predict their order from lightest to heaviest by eye and record their predictions. Discuss. Allow students to heft each pencil case and alter their predictions if required. Discuss and collate predictions to create a 'class order'. Move pencil cases into the predicted order.

**WHOLE-CLASS INTRODUCTION**

**USING GRAMS**

**You will need:** beam balance, 1000 g weight, 100 g weights, kilogram mass, pencil cases from Tuning In  
Present the beam balance and a set of gram weights. Hold up the weights and ask, 'Do you know what these are?' and the weights to students and have them look at the markings. Ask, 'What is written on the weights?' Discuss. Have students think back to the kilogram activities from Lesson Plan 1 and ask, 'How many grams are there in one kilogram?' Use the 1000 g weight and the kilogram mass with a collection of gram weights to show that 1000 g = 1 kg. Ask, 'How could we measure the mass of our pencil cases? Would they be heavier or lighter than one kilogram?' Discuss. Weigh each pencil case in turn, as accurately as possible, recording the mass of each in grams. Look at the actual mass of each item to decide if the predicted order of pencil cases in Tuning In was correct. Line up the pencil cases in actual order from lightest to heaviest.

**INDEPENDENT TASKS**

**Note:** Choose from Tasks 1, 2 or 3.

**You will need:** BLM 28 'Mass Cards', supermarket catalogues, LO: L10570 'HOTmaths: using a beam balance', Student Book p. 41 'Weighing in Grams'

**TASK 1: SUPERMARKET MASS HUNT!**

Give pairs of students a set of cards made from BLM 28 'Mass Cards' and a supermarket catalogue each. Have them set the cards face down on the table. One student turns over a card, and the pair race to see who can find five items in their catalogue that have this mass (or within 50g of the mass, if necessary). The fastest student receives one point. The winner is the student with the most points after all cards are used.

**TASK 2: INTERACTIVE TASK**

Have students work independently on computers to play LO: L10570 'HOTmaths: using a beam balance' to estimate the mass of everyday objects and check using a beam balance.

**TASK 3: STUDENT BOOK p. 41 'Weighing in Grams'**

**TEACHING GROUP**

**You will need:** a selection of supermarket items measured in grams with weights covered, including one item weighing exactly 500g (e.g. a block of cheese or a tub of margarine); beam balance; supermarket catalogue

**500 GRAMS – HEAVIER OR LIGHTER?**

- For students who require support, have them hold a supermarket item weighing 500g to get a feel for this weight. Then, have them hold all other items and put them into three categories according to weight: 'Less than 500g', 'About 500g' and 'More than 500g'. Then weigh each on the beam balance to check. Finally, reveal each weight shown on the item and compare results.

## ADDING WEIGHTS

- For students who require a challenge, give them a supermarket catalogue and have them combine items measured in grams to make a total weight of 5kg. Have them challenge themselves to see how many different combinations they can create to equal 5kg.

## REFLECTION

Select from the following to suit your class and their learning outcomes:

- Have students write a personal reflection on the 'Pencil Case Line-Up' activity in Tuning In. Did their prediction change from using their eye to hefting? How accurate were their predictions? How could their learning help them solve similar problems in the future?
- Play LO: L10570 'HOTmaths: using a beam balance' on the IWB as a class.

## TUNING IN

### MILK CARTON MASS

**You will need:** four milk cartons, sand

Before the class, fill milk cartons with different amounts of sand, label them A, B, C and D and close them so that students cannot see the amount of sand in each. Have students predict the order of mass (lightest to heaviest) by eye and then by hefting. Discuss so that students realise items can look the same yet have different mass.

## WHOLE-CLASS INTRODUCTION

### USING SCALES

**You will need:** kitchen scales, sand-filled milk cartons from Tuning In

Present a set of kitchen scales and ask, 'Where have you seen these before? What are they used for? How are they different to the beam balance?' Discuss. Look at the markings on the kitchen scales to emphasise the relationship between grams and kilograms ( $1000\text{g} = 1\text{kg}$ ). Place one of the sand-filled milk cartons on the scales, have students watch the pointer move and discuss how to read scales. Select a student to read the weight. Ask, 'What does it weigh? Is this more or less than one kilogram?' Record the exact weight. Repeat for the other sand-filled milk cartons.

## INDEPENDENT TASKS

**Note:** Choose from Tasks 1, 2 or 3.

**You will need:** kitchen scales, empty 1 L bottles or plastic bowls, sand or rice, BLM 'Mass Cards' (excluding top row with kilogram amounts), access to the internet, Student Book p. 42 'Reading and Using Scales'

### TASK 1: MAKING WEIGHT

Have students work in pairs with a set of kitchen scales, a 1 L bottle or plastic bowl, sand or rice and a set of BLM 28 'Mass Cards' (with gram amounts only) between them. Have them select a mass card then fill their bottle or bowl with the amount of sand or rice they predict will be needed to create the specified mass. Then, test their prediction on the kitchen scales, reading the mass shown on the scale and deciding whether they need more or less sand or rice. Have them perform alterations as required until the exact mass is reached. Select another mass card and repeat.

### TASK 2: INTERACTIVE TASK

Have students work in pairs on computers to research the ideal weight for dog breeds in kilograms (sites such as [www.adelaidevet.com.au](http://www.adelaidevet.com.au) have this information). Have them select ten breeds and write down their ideal weight (or range), then order them from lightest to heaviest. Have them find a photo of each breed and create a PowerPoint presentation of their information.

### TASK 3: STUDENT BOOK p. 42 'Reading and Using Scales'

## TEACHING GROUP

**You will need:** kilogram weight, beam balance, classroom or supermarket items, kitchen scales, A3 paper

### REVISING THE KILOGRAM

- For students who require support, have them work in pairs to find combinations of classroom or supermarket items that equal about 1 kg by placing the kilogram weight on one side of the beam balance and adding and removing smaller items until the beam is level. Have them record as many 'kilogram combinations' as they can. Once the idea of a kilogram is established, they may use kitchen scales to weigh items.

## LESSON PLAN

# 3

## BIGGER BUT LIGHTER, SMALLER BUT HEAVIER

- For students who require a challenge, have them find and weigh classroom items to create five of each of the following statements: a) \_\_\_\_\_ is bigger than \_\_\_\_\_, but lighter. b) \_\_\_\_\_ is smaller than \_\_\_\_\_, but heavier. Then have them explain how this is possible and present their information on an A3 poster.

## REFLECTION

Select from the following to suit your class and their learning outcomes:

- Ask, 'Where else do we use scales? What other kinds of scales have you used? Why do we have different scales?'
- Have students who worked on Independent Tasks, Task 2, share their PowerPoint presentations with the class.

## Home Tasks

Select from the possible Home Tasks:

- Have students list as many items in their home as they can with 1 kg marked on them, e.g. pantry items, bathroom scales, laundry powder.
- Have students select a recipe and rewrite all of the ingredients, highlighting those that are measured in grams.

## Assessment

- Have students complete **Student Assessment p. 43**.
- Review with students **Assessment Task Card 3.10**.

### During the three lessons:

- Take photos of students working with the beam balance and kitchen scales to add to their digital portfolios. Students could be invited to write a reflection on the activity and their learning.
- Select students' PowerPoint presentations from Lesson Plans 1 and 3 to show the use of ICT to enhance learning.
- Make notes of any difficulties students have with the Student Book activities.

## Recommendations for Future Learning

**Specific to Student Assessment p. 43; if the student is experiencing some difficulty:**

- Q1 Revise activities of 'Reading and Using Scales' from Lesson Plan 1 where students compared objects by weight.
- Q2 Revise activities from Lesson Plan 1 where students were introduced to the kilogram. Remind the student of the types of items within the classroom that weighed less than, equal to or more than 1 kg.
- Q3 Revisit the activities from Lesson Plan 2. Have the student think about classroom items they weighed in grams and where they see grams in the supermarket.
- Q4 Remind the student of the meaning of 'lightest' and 'heaviest' and have them compare grams and kilograms. Provide concrete materials if required.
- Q5 Revise activities from Lesson Plan 3 where students read scales. Link to the use of number lines. Provide actual scales for the student to look at if necessary.

**If the student has not achieved the recommended skills for this unit:**

- See **Assessment Task Card 3.10** for specific recommendations.
- Have the student further their understanding of heavier and lighter by comparing two items before moving on to ordering collections of items.
- Have the student continue to use hands-on measuring devices, such as the beam balance, where they can add weights to emphasise the idea of equal weight.
- Review *Nelson Maths: Victorian Curriculum Year 2* Unit 13.

**If the student has achieved the recommended skills and these skills are firmly established, consider:**

- Having the student convert weights (grams to kilograms and vice-versa).
- Moving forward to *Nelson Maths: Victorian Curriculum Year 4* Unit 5.
- Having the student complete any of the listed activities using larger objects and deciding for themselves which measuring device is most appropriate.