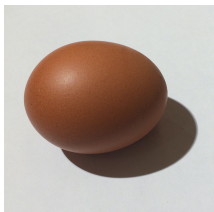


## HOW HEAVY?



In your kitchen or in a supermarket, look at the information on labels on unopened packages and discover how heavy the items are. Some small items may be labelled in grams and other items will be labelled in kilograms.



A hen's egg, a pen, a new born baby and a glass of water.

How heavy do you think these things are?

Can you arrange these things in order from the lightest to the heaviest?

Here are their masses in grams:

440 grams; 6 grams; 60 grams; 4000 grams (or 4 kilograms).

Can you match the correct mass to each one?

Now find some other objects, weigh them if you have scales and compare their masses with these four things.

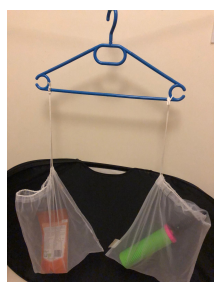
How heavy are you? How much has your mass increased since you were a small baby?

## HELP

Work with a partner. Find 3 objects that can be weighed such as a stone, a pencil, a brick, a book or anything else you have around. Try to find a light object, a heavy one and one that is in-between.



Any sort of scales can be used.



You could make your own scales with a coathanger and two bags to put objects in. Then to weigh an object you need to balance it against known masses.

Handle the objects and try to estimate the masses. Then actually weigh them. Check your estimates. Ask for help in reading the scales if you need it. How close were your estimates?

## NEXT

1. What is the approximate weight of an average man, a family car, a cow, a South African taxi, and a double decker bus?



Not to  
scale



1000 milligrams = 1 gram  
1000 grams = 1 kilogram  
1000 kilograms = 1 metric tonne

1 litre of water weighs 1 kilogram  
A medicine spoon holds 5 millilitres or 5 milligrams

### RECIPE FOR SOUP FOR 8 PEOPLE

1 tablespoon olive oil  
1 large onion, finely diced  
4 celery stick, finely diced  
3 carrots, peeled and cubed  
1 large potato, peeled and cubed  
150 g or 1 cup cubed butternut squash  
1 teaspoon salt  
1 teaspoon dried thyme or other seasoning  
1.4 litres or 6 cups hot chicken stock (broth)  
900 g chicken meat  
3-4 tablespoon tomato paste  
1 zucchini (courgette), cubed  
150 g or 1 cup sweet corn  
150 g or 1/2 cup pasta  
1 tablespoon lemon juice  
2 tablespoon parsley, chopped, plus extra to serve  
Salt and pepper to season  
A little graded cheese to serve (optional)

Suppose you have to make enough soup to feed 120 people and you can get most of these ingredients but perhaps not all of them.

What would you put in your soup? Make a list of the ingredients you would use and the quantities of each one.

## NOTES FOR TEACHERS

There is enough work here for several lesson so just choose what seems most suitable for your class.

### SOLUTION

Pen 6 grams,

Egg 60 grams,

Glass of water 440 grams,

New born baby 4000 grams or 4 kilograms.

Approximate weights:

An average man 85 kilograms;

A family car 1800 kilograms;

A cow 300 –1100 kilograms (depending on the breed);

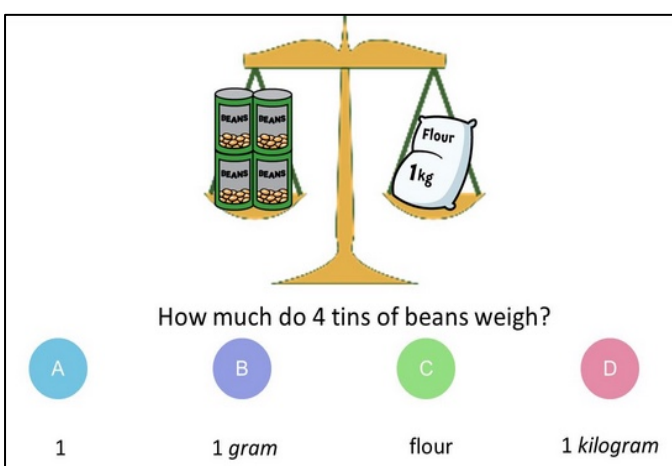
South African Minibus Taxi (e.g. Toyota Quantum) 3500 kilograms

Double decker bus 16.6 tonnes = 16600 kilograms.

**Diagnostic Assessment** This should take about 5–10 minutes. This is a good question to check prior understanding of the concept of balancing to show two masses are the same.

Write the question on the board, say to the class:

**“Put up 1 finger if you think the answer is A, 2 fingers for B, 3 fingers for C, 4 fingers for D”.**



2. Notice how the learners responded. Ask a learner who gave answer A to explain why he or she gave that answer and DO NOT say whether it is right or wrong but simply thank the learner for giving the answer.

3. It is important for learners to explain the reason for their answer. Putting their thoughts into words may help them to clarify their thinking and develop communication skills.

4. Then do the same for answers B, C and D. Try to make sure that learners listen to these reasons and try to decide if their own answer was right or wrong.

5. Ask the class again to vote for the right answer by putting up 1, 2, 3 or 4 fingers. Notice if there is a change and who gave right and wrong answers.

6. The concept is needed for the lesson to follow, so explain the answer or give a remedial task.

D. is the correct answer.

### Common Misconceptions

A. Learners may not understand the importance of units.

B. Can these learners read 1 kg on the bag of flour. Do they know the word kilogram? Do they know that 1 kilogram = 1000 grams?

C. The question asks for a unit of mass not just that the 4 cans weigh the same as a bag of flour.

<https://diagnosticquestions.com>

## Why do this activity?

This activity gives an opportunity for learners to talk about the masses of some familiar objects and to get some feeling for their comparative sizes. Each one of these examples is only a representative of like objects with a range of masses so averages can be discussed in this context.

The activity could be accompanied by work on data collection. The class could all weigh themselves and draw a graph of their weights. Another possibility might be to weigh some common objects.

## Learning objectives

In doing this activity students will have an opportunity to:

- use measuring instruments such as bathroom scales and kitchen scales (analogue and digital) and balances to find the masses of common objects.
- To estimate, measure, record, compare and order the masses in grams (g) and kilograms (kg).

## Generic competences

In doing this activity students will have an opportunity to develop life skills and confidence about using and applying in everyday life what they learn in school.

## Suggestions for teaching

If possible take some scales into the classroom. Any sort of scales will do but it would be an advantage to have bathroom scales so that they can weigh themselves. Organise the learners to weigh some common objects and to weigh themselves.

In everyday language we talk about weights and masses interchangeably but in mathematics and science we must use the words correctly.

The term **mass** is the property of objects that is the same wherever they are and **weight** is the force of attraction that pulls an object towards another object. So our weight will be different in space or on the moon but our mass will remain the same.

Before weighing the objects you can discuss with the class which one is the lightest and which the heaviest, arrange them in order and try to estimate their masses.

The most practical way to do this could be to give the class some written work, and for small groups to take turns to do the weighing and to record their findings.

You might like to discuss with the class the masses of some objects that they are familiar with. You can also discuss the typical range of masses. Perhaps discuss health issues related to obesity or social issues related to being underweight and to poverty and malnutrition.

If the learners all weigh themselves then there can be discussion about reading the scales to the nearest 100 grams or 0.1 kilograms.

The class can then collect all the data and work out the mean mass. They could make a table of results and draw a bar chart, grouping the masses to make the boundaries between the groups clear.

For example  $20 \text{ kg} < \text{mass} \leq 25 \text{ kg}$  includes 25 kg and all masses between 20 and 25 kg but does not include 20 kg. We might use the groups:

$< 20 \text{ kg}$ ;

$20 \text{ kg} < \text{mass} \leq 25 \text{ kg}$ ;

$25 \text{ kg} < \text{mass} \leq 30 \text{ kg}$ ;

$30 \text{ kg} < \text{mass} \leq 35 \text{ kg}$ .

## Key questions

- Which of those objects do you think is the lightest?
- Which of those objects do you think is the heaviest?
- Do you think that it is best to give that mass in grams or in kilograms? Why?

## Follow-up ideas

### Primary

Comparing Mass <https://aiminghigh.aimssec.ac.za/years-6-to-8-comparing-mass/>

Metric Measures <https://aiminghigh.aimssec.ac.za/years-3-7-metre-measures/>

Estimate my Girth <https://aiminghigh.aimssec.ac.za/years-5-7-estimate-my-girth/>

How Hot <https://aiminghigh.aimssec.ac.za/years-5-to-8-how-hot/>

### Lower Secondary

Comparing Mass <https://aiminghigh.aimssec.ac.za/years-6-to-8-comparing-mass/>

Thousands and Millions

<https://aiminghigh.aimssec.ac.za/years-6-9-thousands-and-millions/>

### Upper Secondary

Belt around the Earth

<https://aiminghigh.aimssec.ac.za/years-8-to-12-belt-around-the-earth/>

Extremes <https://aiminghigh.aimssec.ac.za/years-6-10-extremes/>



Go to the **AIMSSEC AIMING HIGH** website for lesson ideas, solutions and curriculum links: <http://aiminghigh.aimssec.ac.za>

Subscribe to the **MATHS TOYS YouTube Channel**

<https://www.youtube.com/c/mathstoys>

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