Problems involving mass teacher notes

Measurement and Geometry: Measurement 135-144

The ACER Maths team have taken the original PAT Teaching Resources Centre teaching activity, *Problems involving mass (Measurement and Geometry, 135-144)* and have adapted it so that it can be used for remote learning.

You may use the resources we have provided directly with your own students, or you could use them as a model to create your own remote learning resources. You could furthermore adapt other PAT Teaching Resource Centre concept builders in the same way.

This activity can be used with students that have already been introduced to measuring mass informally, reading a scale and converting between units of mass. This resource builds on these ideas.

Accompanying components for this teaching activity:

- Student Problems Involving Mass Video 1 and Video 2 (with accompanying scripts below)
- Student Problems Involving Mass Worksheet

Students will also need:

- Digital kitchen scales
- Three household objects that the students can weigh on digital scales (e.g. a cup)
- Three household objects that have packaging with their mass written on them (e.g. a box of cereal)

Script for Problems Involving Mass Video 1

Today's activity is problems involving mass. For this activity, you will need a copy of the worksheet 'Problems involving mass' and some digital kitchen scales. You can either print out the worksheet or type directly into it.

You might need an adult for help with this activity, and before you begin, you will need to collect 3 different objects from around your home. You will be putting these on the scales, so they can't be too big. These can be things like a book, an item of clothing or a cup.

First, turn on your scales and have a look at the display. What do you see? Are there any numbers? Is there anything else? On my display I have a zero and a small g.

In your worksheet, describe in words what you see in the display.

Now look at the 3 objects that you have collected. Write down the name of each object in the table in your worksheet.

After you have carefully written the name of each object, you are going to weigh each one using the scales.

My first object is a pear. When I place it on the scales, what do you see on my display? Is the mass of my object displayed in grams or kilograms? And how can you tell? You will have to answer these questions for each of your objects.

Remember, there are 1000 grams in 1 kilogram.

Now, go ahead and use the scales to weigh each of your three objects and complete questions 1, 2 and 3 in your worksheet. Once you've done this, please click on Problems Involving Mass Video 2.

If you get stuck at any point, contact your teacher, or ask an adult at home for help.

Script for Problems Involving Mass Video 2

For the next part of Problems involving mass, you will need three more objects. This time, it is important that the objects have packaging. Something from the pantry would be good, like a box of biscuits, or a tin of something. A tube of toothpaste would also be okay. What's important is that each object has a mass written on the outside of it. They may have just a mass written, or they may have the word 'net' alongside. There could be other words included as well.

For each of your 3 objects, you'll weigh the object and record the mass in grams and kilograms in the table just like you did previously. This time you'll also write down the mass that is written on the packaging, and any other words that are written alongside it. These might be 'net' or there might be even more words.

Now please go ahead and answer Question 4 in the worksheet.

Once you are finished, please send your completed worksheet to your teacher.

Feedback and task extension

When considering students' completed worksheets, here are some things to look out for:

- Question 2b: have students understood the conversion of units from grams to kilograms? It is a common error to think there are 100 grams in 1 kilogram (they may confuse grams and kilograms with the conversion from centimetres to metres).
- Question 3c: some students may be unfamiliar with non-metric units and give responses such as lb and oz that are the abbreviations of imperial units (pounds and ounces) as they are shown on their displays. This may be worth discussing with the students. You could ask them to look for an American recipe that uses pounds and ounces. It may also lead to an opportunity to discuss non-metric units for capacity such as pints and fluid ounces.
- Question 3d: have students understood that as mass increases, it is sensible to express weights in kilograms rather than grams? It could be confusing to refer to the mass of something big like a car, in grams.

Question 4 asks student to think about the meaning of the word 'net'. Depending on how much teacher/student interaction is possible, you may wish to use this is as the basis of discussion. Discussion questions could include:

- Why do you think the mass written on the packaging (net mass) is different to the total mass of the packaging and contents (the gross mass)?
- What might happen if the only mass written on the packaging was the gross mass?
- Would it be fair to buy a product based on the gross mass if it was packaged in a very heavy box?

An additional extension activity has been provided. This can be used as a challenge activity for some or all students.

You could also move on to the following Teaching Resources Centre activities, which are within the same achievement band of 135-144:

- Mass and temperature
- Conversion between units of mass.

The ideas explored in this activity are also found in the following annotated questions:

- PAT Maths 4th Ed, Test 5, Q21
- PAT Maths 4th Ed, Test 6, Q25 / PAT Maths Plus, Test 8, Q20.

Australian Curriculum reference: Measurement and Geometry: Choose appropriate units of measurement for length, area, volume, capacity and mass (ACMMG108).