3.1 Kilograms and Grams

Objectives

- Review kilograms and grams.
- Estimate and weigh objects in kilograms and grams.
- Read scales.
- Convert between kilograms and grams.
- Add or subtract weight in kilograms and grams.

Material

- Balances
- Weighing scales
- Kilogram weights
- Gram weights

Prerequisites

Students should be familiar with kilograms and grams as units of weight (mass), be able to estimate and weigh objects to the nearest kilogram or 100 grams, and use a balance and weighing scale. The first lesson for this part includes a brief review. If more review is needed, you may want to revisit or use the lessons from *Primary Mathematics* 2A for a more thorough introduction.

Students will be adding and subtracting in compound units, primarily using mental math strategies involving making 1000, and adding or subtracting 2-digit numbers. These strategies were reviewed in the previous unit.

Notes

Students weighed objects and read scales in either kilograms *or* grams in *Primary Mathematics* 2A. Here, they will weigh objects in compound units, kilograms *and* grams. Students will also learn to convert between kilograms and grams and add and subtract in compound units. Since 1 kilogram equals 1000 grams, the process is similar to adding and subtracting kilometers and meters.

If possible, give students practical work in weighing objects and in using different weighing scales, particularly if they have not used earlier levels of *Primary Mathematics*. Encourage them to estimate the weight of an object before weighing it.

If you do not have enough kilogram or gram weights, you can substitute other items. It is not necessary at this stage to use very accurate weights. Modeling clay is sometimes sold in one pound blocks; two and a fifth of these is about a kilogram. Four hundred pennies weigh about 1 kilogram. 4 pennies weigh about 10 grams, so you can make 10-gram weights by taping 4 pennies together and 50-gram weights by taping 20 pennies together.

A gram is very light; the unit cube of a base-10 set or two small paper clips weigh about a gram. A simple primary balance will not weigh accurately to a gram, but, depending on the balance, can weigh to 10 or 50 grams. Experiment with any you have in the classroom to see whether 5, 10, 20, or 50 grams tips the balance enough, and then have students weigh to that multiple of a gram.

Strictly speaking, the kilogram and gram are units of mass (a measure of the amount of matter in the object), not of weight (a measure of the force of gravity on an object). However, since we use the term weight in daily speech when weighing things, it will be used here. You can substitute the term mass for metric weights if students have learned the difference between mass and weight.

If students are familiar with their own weights, it may seem odd that the children in the word problems might only weigh (have a mass of) perhaps 35 kilograms, when they themselves weigh about 60 pounds. Since 1 kilogram weighs 2.2 pounds on Earth, that is, a bit over two pounds, you can double the weight (mass) in kilograms to get an estimate of the weight in pounds. So when the textbook says a person weighs 35 kilograms, then that person weighs about 70 pounds (and is likely a child). An adult would weigh about 60 kilograms or more.