



EVERYDAY STEM

10 hours = 600 minutes



Learn physics and maths with us ...



Science is so thrilling!

a sphere



low density



12 kg

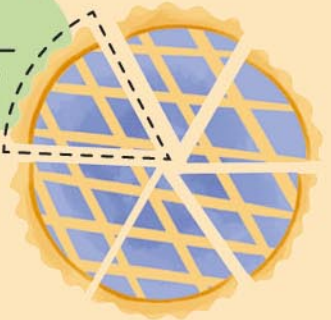


GRANDMA'S Amazing CELEBRATION

1 l = 1,000 ml



$\frac{1}{6}$



$\frac{3}{4}$ h > 10 min



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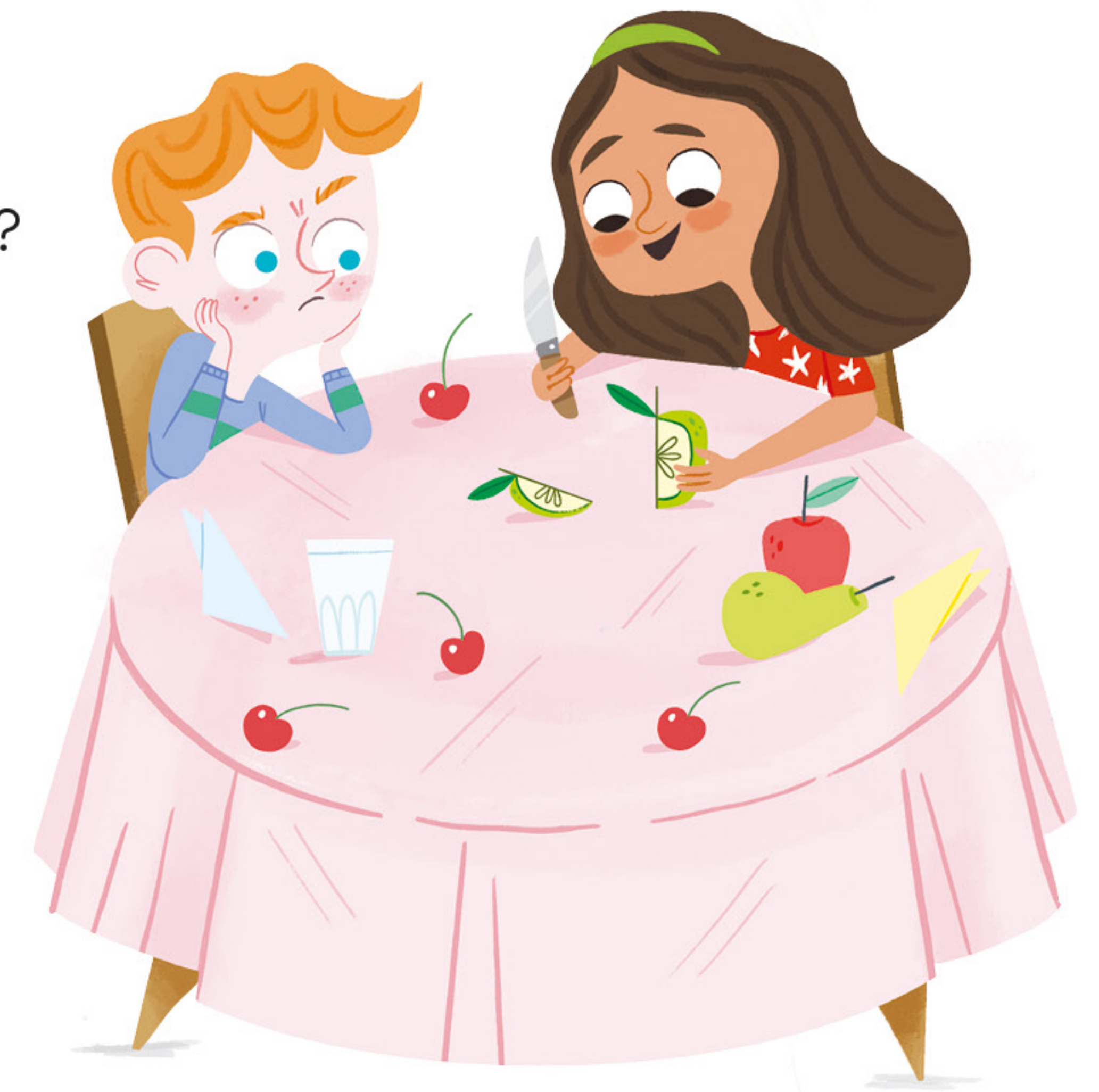
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01 MEASURING WEIGHT

HOW DO WE BAKE THE CAKE?

You can't have a proper birthday party without a cake. So Victor and Teresa found a tempting cake recipe and had the urge to start baking straight away. But what were all the numbers and letters in the recipe for? What role do they play in baking?



EXPLANATION

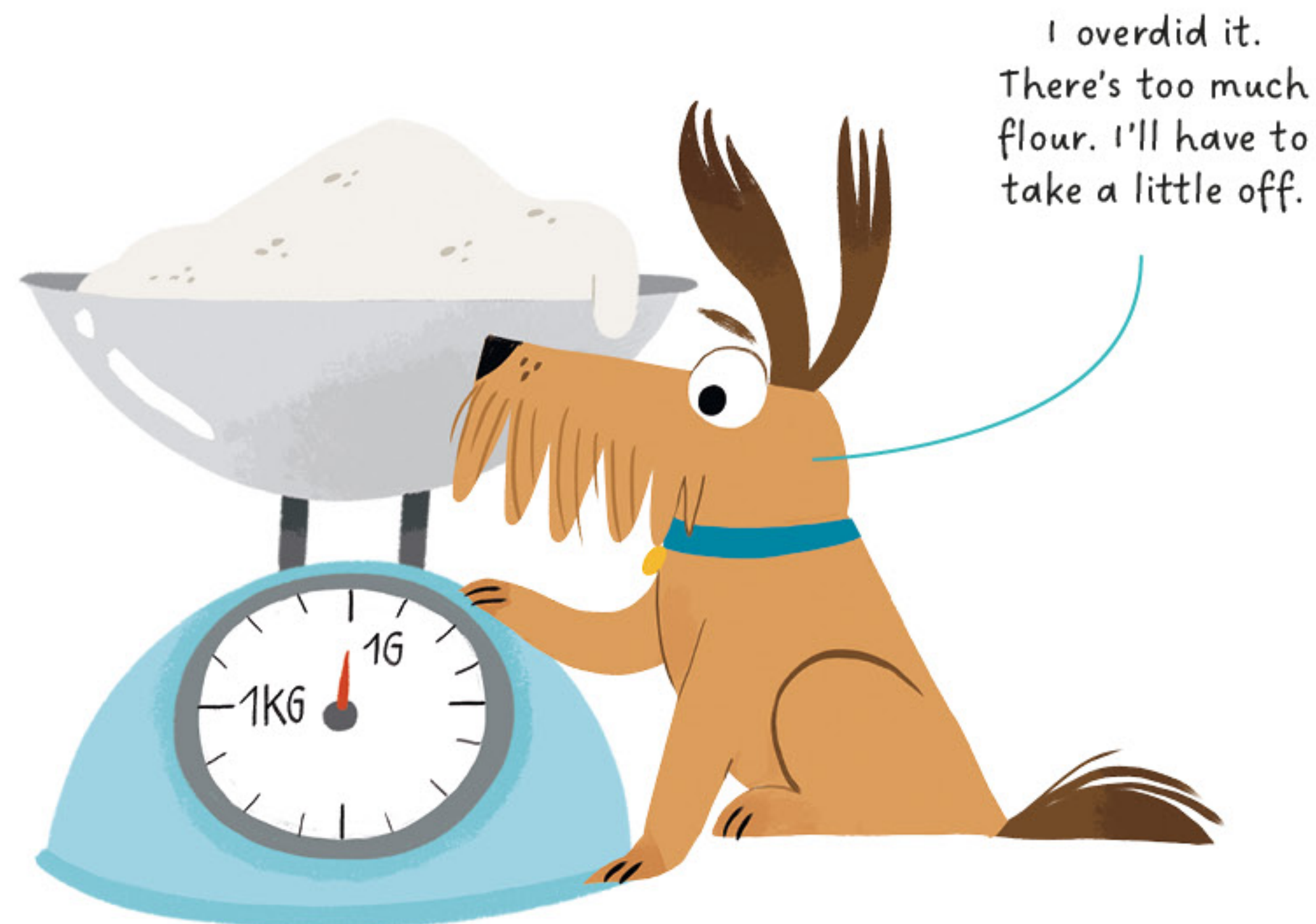
How much does it weigh?

To make proper cake mixture, we have to measure out all the ingredients. We weigh loose or solid ingredients, such as flour or butter, to find out their weight.

UNITS

When we talk about weight, we usually express it in grams (g) and kilograms (kg). When we ask for something by weight in a shop, we can also use decagrams (dag or dkg).

Sometimes we can recognize a heavier object at first sight, because it's bigger, but this is certainly not always the case. If we compare, for example, a soft pillow and an exercise dumbbell, the dumbbell is much heavier, even though it's smaller.

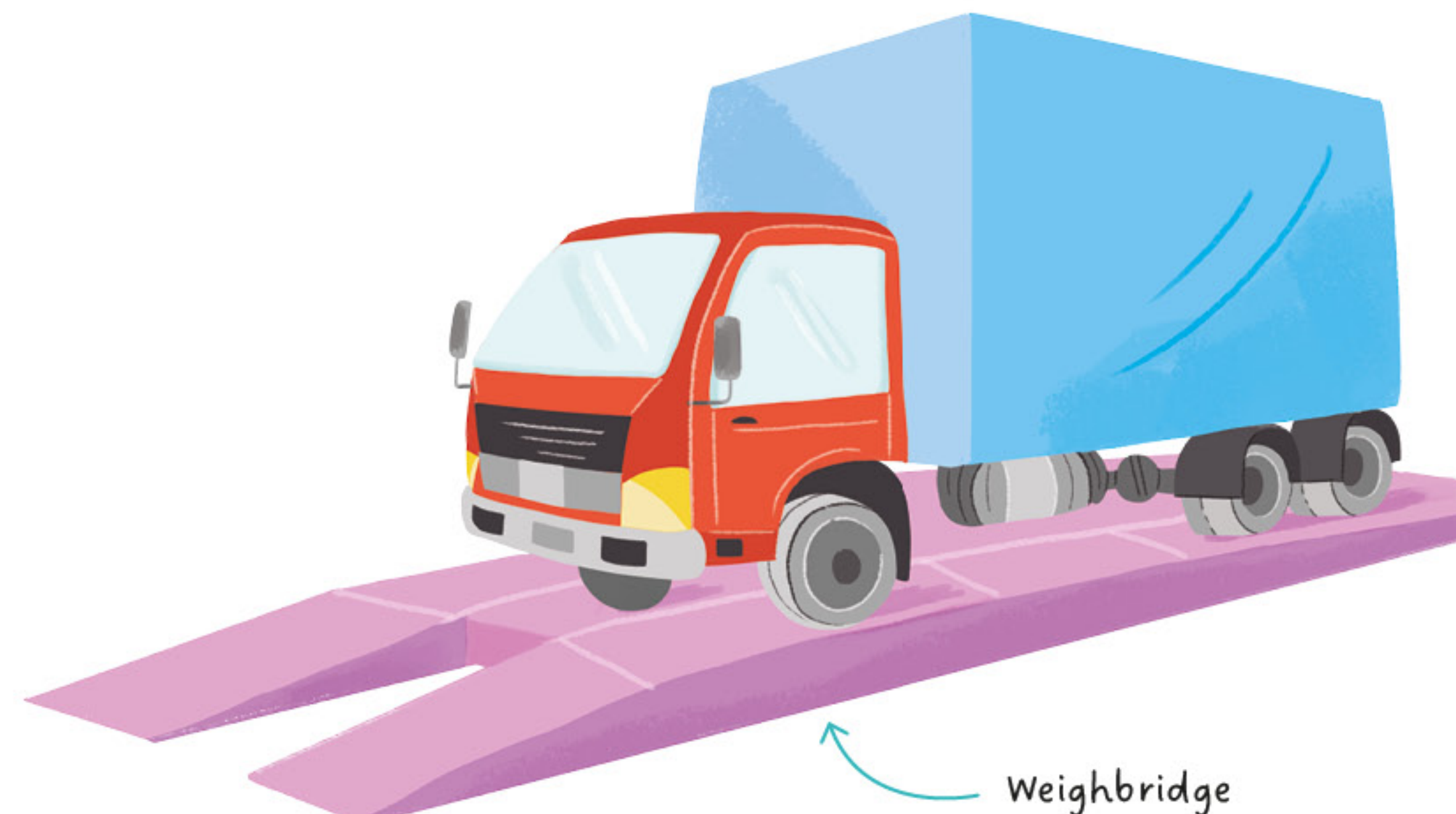
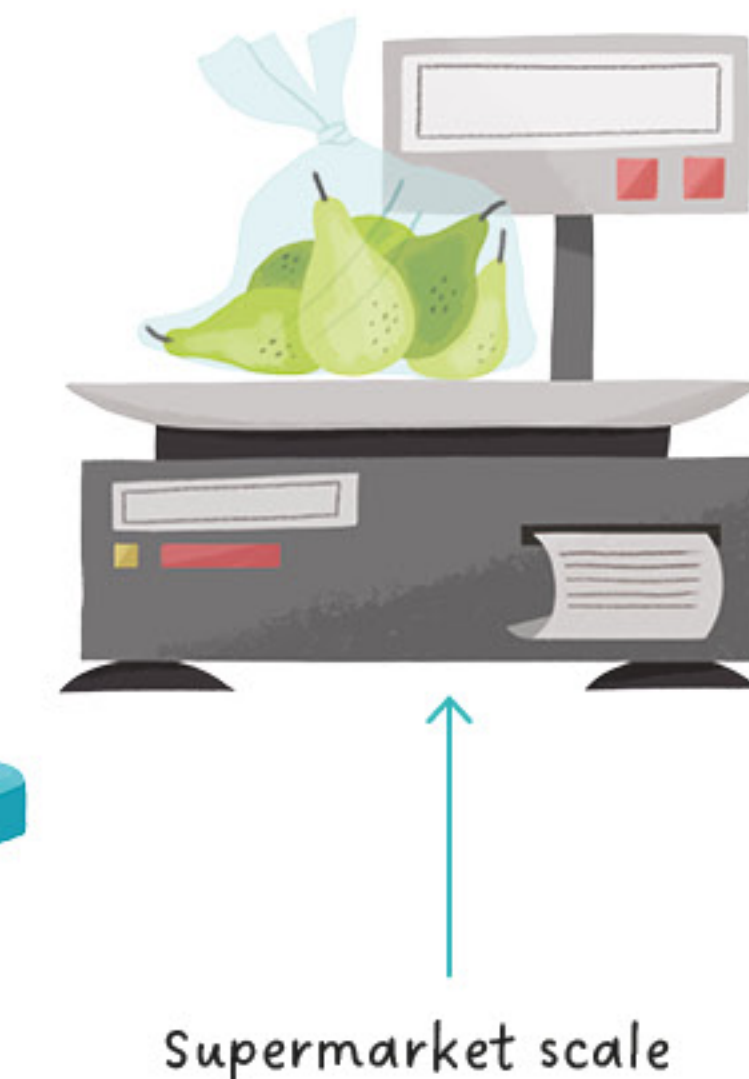
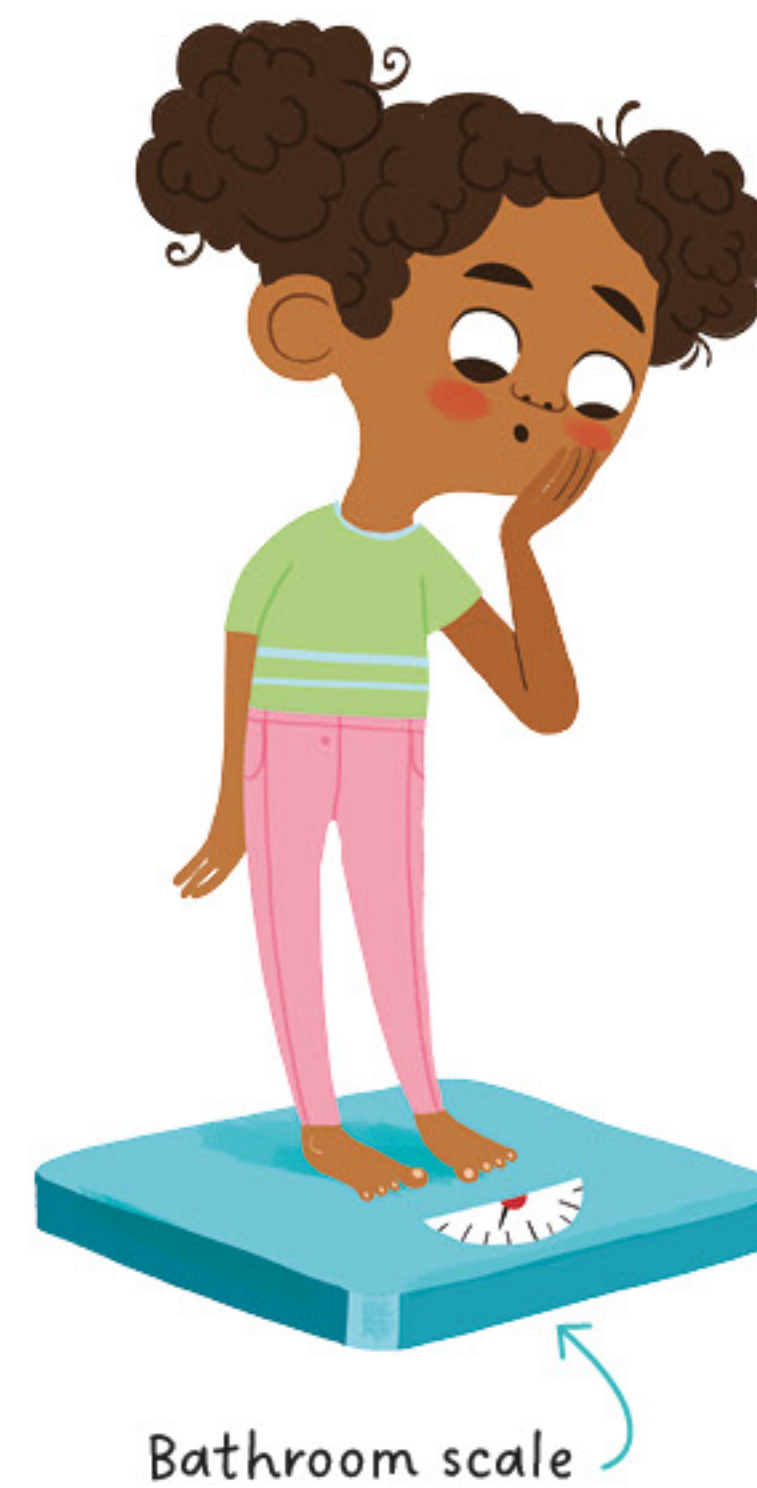
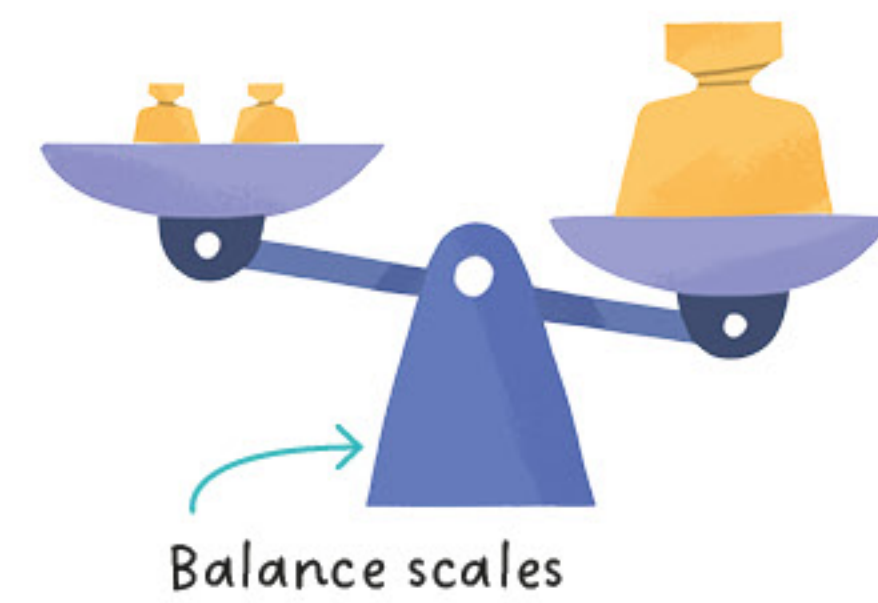


UNIT CONVERSIONS
 1 kg = 1,000 g
 1 kg = 100 dag

MEASURING DEVICES

What do we weigh with?

If we want to find out the exact weight of something, we have to use the right kind of scale for our measurements. This is because we use different scales to weigh small and large objects.



COMPARE ...

Can you imagine how much it weighs?

Sometimes it's difficult to imagine how much things weigh when expressed in grams. But if we assign objects we know to weights that we see often, it becomes easier to imagine ... and it's also fun to do. So, a car weighs about the same as three polar bears.

	1 g Paper clip
	100 g Apple
	250 g Butter
	500 g Shampoo
	100 kg Cheetah
	1,000 kg = 1 ton Polar bear

03 MEASURING TIME

HOW LONG DO WE BAKE THE CAKE FOR?

Hooray! Grandma's cake is ready to go in the oven. "And how long does it need to be in there before it's done?" asked Victor. Teresa knew what to do immediately – she looked at the recipe and then set the timer on the oven.



EXPLANATION

How time flies!

We look at time measurements every day. Knowing what the time it is allows us to meet up with friends and make doctor's appointments. We can tell the time from a traditional clock, which we read from the large minute hand and the small hour hand, or from a digital clock, where the hours and minutes are separated by a colon.

But we can also talk about a period of time, for example, between the beginning and the end of baking our cake.



1 second 1 minute 1 hour

UNIT CONVERSIONS

1 hour = 60 mins

1 minute = 60 seconds

UNITS

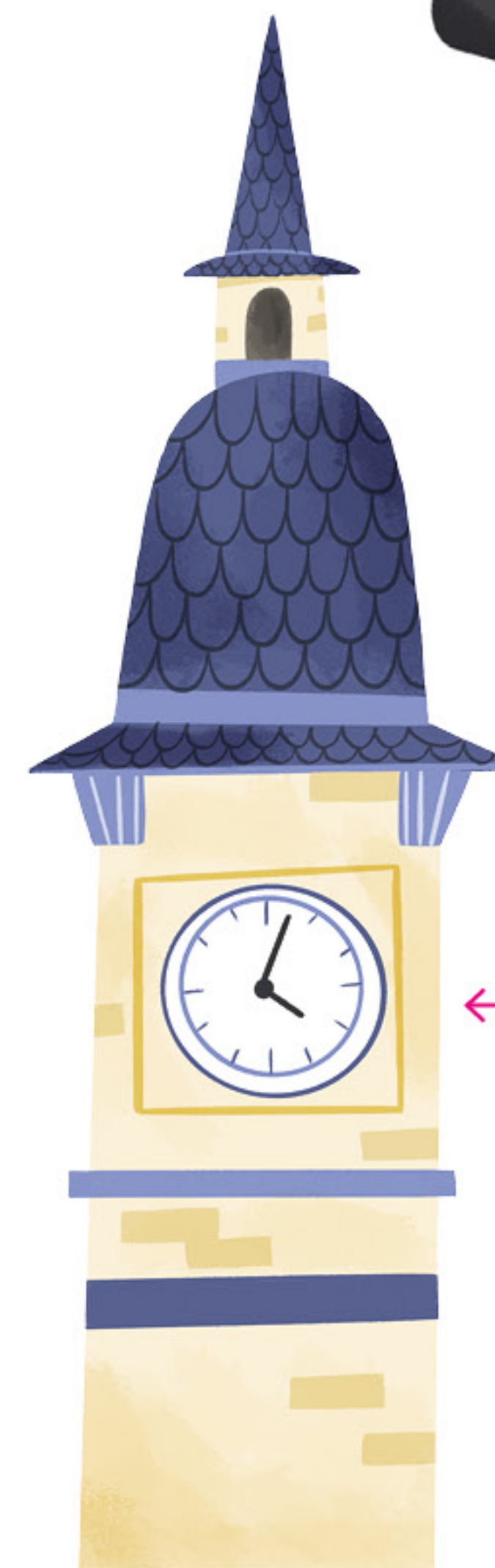
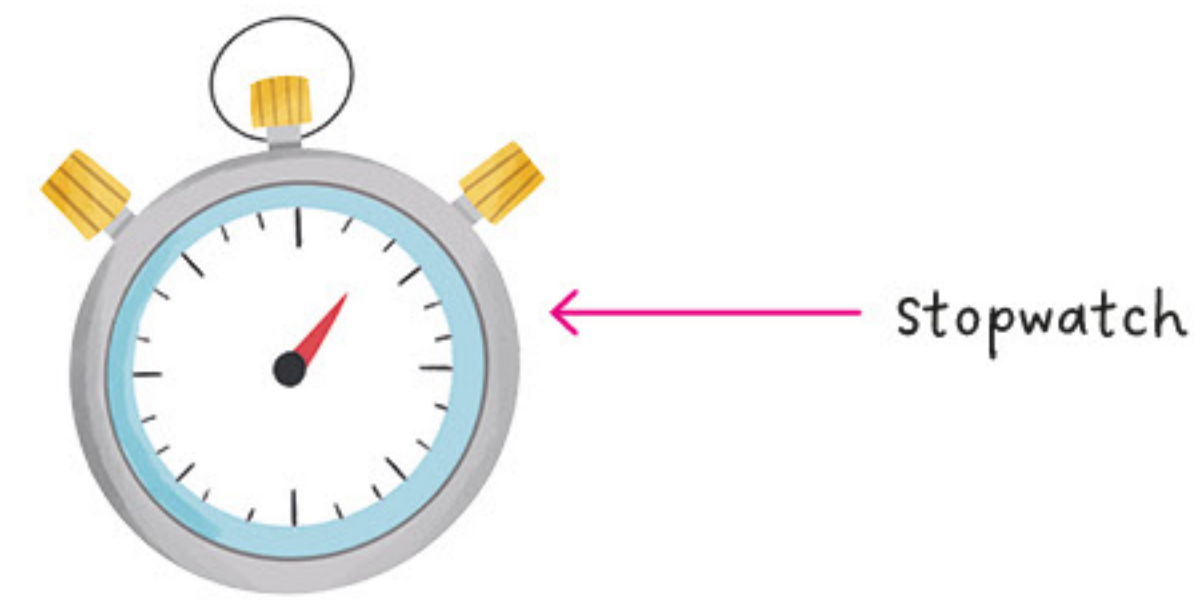
How do we talk about time?

You've probably heard someone say "Just give me a minute!" or "Time is really dragging by today". But what are the precise names we give to periods of time? The basic unit is a second – in one second you can clap your hands once. After that, short periods of time are measured in minutes (mins) and longer ones, such as the time people spend at school or work, in hours (hrs).

MEASURING DEVICES

How do we measure time?

Our ancestors could only use cycles in nature (sunrise, sunset, etc.) to tell the time. Today, our opportunities are much wider ...



Can you think of any other devices for measuring time?

COMPARE ...

Time how long it takes you to ...



HOW DO WE MAKE THE BALLOONS FLY?

Victor saw how easily Teresa handled the decorations and decided to blow up the balloons. But why weren't they flying up into the air, like they did at the amusement park? "It's simple," smiled Teresa, "you just have to use your head a bit!"



EXPLANATION

We already know that there can be differences in the sizes and weights of things. And this is precisely the idea expressed by the term density. Heavy and solid materials are more dense than those that are light and take up a lot of space. For example, candyfloss takes up a lot of space and is very light, unlike a glass marble. This means a piece of candyfloss has a lower density than a glass marble of the same size.

The density of liquids and gases can also vary.

An example of this is a spoonful of honey in a cup of tea. Before you stir it, it sinks to the bottom of the cup, because honey has a higher density than tea.

And it's the same with blowing up balloons. At the amusement park, the balloons were filled with a low-density gas called helium, which is lighter than the air we blow into balloons from our mouths. So if Victor wants the balloons to fly, he'll have to have them filled with special gas.



tea with honey before stirring



tea with honey dissolved in water



UNITS

Density is expressed in kg/m^3 . You can see that this combines two units of measurement we've come across already – the units for weight and volume.

UNIT CONVERSION
 $1 \text{ kg/m}^3 = 0.001 \text{ g/cm}^3$

ONE MORE THING

The air on our planet doesn't have the same density everywhere. At high altitudes, the air is 'thinner'. That's why, for example, inexperienced mountain climbers may feel dizzy as they reach the top of a mountain.

GRANDMA'S AMAZING CELEBRATION

Written by Lenka Chytilová & Helena Haraštová

Illustrated by Xiana Teimoy



EXPLANATION

Physics, mathematics ... They say they're boring and complicated sciences. Nothing for kids, longing for fun and adventure! But what if it's just the opposite? What if physics and maths CREATE the wonderful, fascinating world we love to play in and explore so enthusiastically? What if these sciences are the CAUSE of all the breathtaking wonders around? Seriously, that's how it is. Why is a kilo of feathers bulkier than

a kilo of iron? How do I find out whether I can buy my Grandma a present? Why am I hot in my cap one day and cold the next? And who's going to arrive first at Grandma's birthday party?

Let's discover the laws of science and engineering in the most natural way – by encountering them every day. Together with Teresa, Victor and the whole Bright family, you will get everything ready for the best Grandma's birthday party, and see that science is all around us. It's life itself. Let's learn to understand it!



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FOR BRIGHT MINDS
FROM 6 YEARS OLD