

How much is a million?

More Details

Large and small numbers cause headaches! Especially when they are connected to each other. The best way to make this clear is to take a good example: about 90 percent of all people worldwide have brown eyes. The rest is divided between blue, green and grey, with green and blue being the rarest. But what does it mean that only 2% of people are green-eyed? How many people is that exactly? With such a small proportion, can it be that you know several people with green eyes? Even adults are often wrong about these questions. Quite intuitively they associate the 2% with a rather small number. But 2% of the world's population (7 billion) is an incredible number! If you do the math, you get 140 million people worldwide. That's roughly the combined population of France and Germany!

It is not unusual to miscalculate with large numbers. After all, they rarely occur in every-day life. It is therefore difficult to imagine such quantities. A look at the experiment is also surprising: in each of the drums there are exactly one million tiny spheres to be seen! But there is still more play on the topic of „large numbers“. In the rear cylinder, the spheres are colourfully mixed. 888889 blue spheres, then the numbers decrease gradually: 10% i.e. 100,000 of the spheres are yellow, 1% i.e. 10,000 of the spheres are red, 0.1% i.e. 1000 of the spheres are white, 0.01% i.e. 100 of the spheres are pink, 0.001% i.e. 10 of the spheres are green

and only 0.0001 percent, i.e. a single sphere, is a black specimen. Would you have expected this mixture? Probably not. After all, red spheres appear everywhere, even though they are only 1 percent of all the spheres! Even the white can be seen flashing in all the chaos.

The single tiny sphere becomes the main actor in the second part of the exhibit. There, in the front cylinder, it is a single blue sphere hiding among the 999,999 yellow ones. Will you ever find it? The gut feeling is clear: if so, it must take hours. But once again the mass of yellow balls is leading us on the wrong track: if you turn the cylinder slowly, you will be lucky after a few minutes! This means that even a millionth of all the spheres is still perceptible under a million.

Day-to-day life: Small and large numbers are mainly used in statistics. Numerous bizarre and interesting examples have been circulating in the media in recent years: „the rate of delayed long-distance trains was just under 20% in 2011“; „only 17% of all people struck by lightning to date are female“ or „2.5% of the water on the Earth’s surface is freshwa-ter“. Election results or polls are also often presented in proportions. We rarely get the absolute figures straight. But sometimes it can be a pleasure to get to the bottom of them: For example, if you think about what it means that 3% of all pet owners (over 15 million) give presents to their pets on Valentine’s Day.