

The Power of Doubling

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There is a story concerning the invention of the game of chess. Although it may be entirely fallacy, it is still quite interesting. As the story goes, an ancient emperor issued a challenge for someone to develop a game which required great skill and concentration to play. When the game of chess was presented to him, the emperor was so impressed that he granted its inventor anything he wished as a reward. After some careful thought, the crafty fellow uttered his simple request. He asked for one grain of rice for the first square of the chess board and the subsequent doubling of the number of rice grains for each additional square.

The emperor considered this to be an amusing request and promptly granted the wish. Filling in the first row of eight squares was a trivial task - one rice grain on the first square, two on the second square, four on the third, eight on the fourth square, and so on. The eighth square held only 128 grains and the total for the entire row was a mere 255 rice grains.

By the end of the second row, the sixteenth square required 32,768 rice grains and there was a total of 65,535 rice grains. Of course this amount could no longer fit on the chess board and the pile beside it continued to grow at an alarming rate. As the pile grew, so did the emperor's grave concern about the deal he had struck. After a few serious calculations, it became apparent that it would take over nine quintillion grains of rice to meet the demands of the sixty-fourth square. That's a nine with eighteen zeroes after it! The total number of grains of rice from all 64 squares would total well over eighteen quintillion. There were not enough grains of rice in the entire world to equal this huge number.

While we may never encounter the power of doubling on a scale such as the emperor, this type of growth rate is present in the world around us. Many of the microorganisms present in our food and water grow through a process of splitting. One cell becomes two, these two split and become four, and so on. Under favourable conditions, the time between each splitting can be relatively short, which is rather worrisome. Another troubling thing is that we cannot see these microorganisms nor detect their presence until the danger level has been exceeded.

In the case of contaminated water, it takes a population of about one million microorganisms per millilitre before the water starts to become cloudy. This translates to about five million per teaspoon. Just the thought of five million living cells in a teaspoon of water is mind-boggling. When microorganisms are present in solid foods, we have absolutely no way of seeing them.

If a harmful bacteria doubled every hour, by the end of 24 hours, a single cell could proliferate to more than eight million. This is why we must exercise care in the way we store and handle the foods we eat. Leaving certain foods sitting at room temperature, or allowing a picnic lunch to sit in the trunk of a car on a hot summer day is just asking for trouble.

If you are ever tempted to test suspicious foods by tasting them: don't do it. If you are on a trip and someone tries to entice you, against your better judgment, into eating at a rather "dodgy" restaurant: don't do it. Even if you eat only a small amount of a spoiled food, it may not take long for the "bugs" to reach a dangerous level. Remember, the "bugs" know all about the power of doubling.

In spite of potential food safety risks around us, we do not need to become obsessive or paranoid about it. There are some fundamental precautions which you can easily take. Storing your food under the appropriate conditions, cooking your meat thoroughly, and taking proper care with the water you use, especially when travelling, are just a few things you can do to ensure your safety. Not only that, but you will also be slowing down the doubling process considerably.

You may want to think about another example of the power of doubling. Consider earning money starting with one cent on the first day of the month and doubling it every day for the entire thirty-one days. The payment on the last day is astonishing!

Wow !! 9,223,372,036,854,780,000 rice grains for the 64th square!