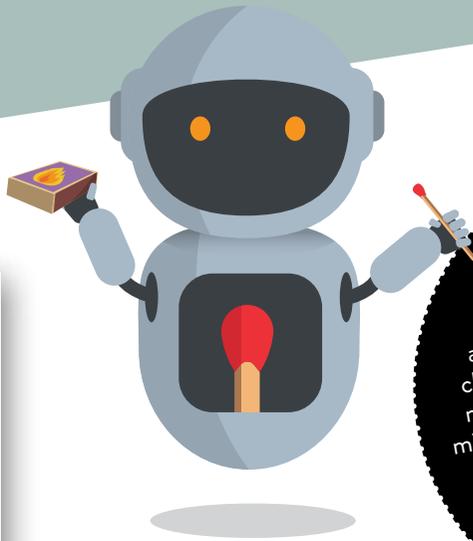
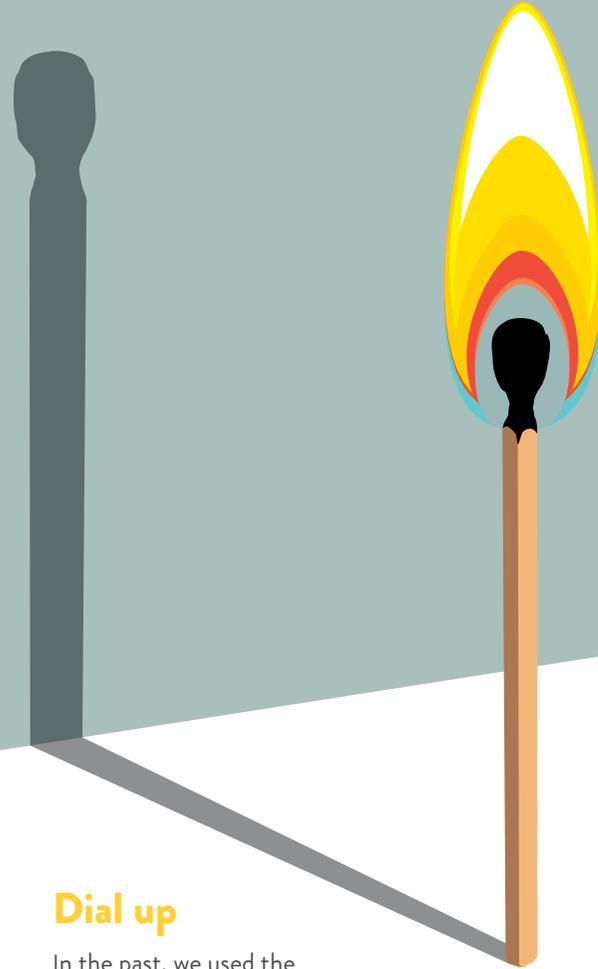




# LIGHT HAS NO SHADOW

A shadow is a dark area created around an object whenever light is unable to travel through it. If you look around, you'll see shadows absolutely everywhere! From tables to toys and trees to termites, any object (living or not) can cast a shadow.

But you'll be surprised by the one thing that does not cast a shadow! Light! This is because light cannot block light. In fact, if you were to shine a light on light then all you'd be doing is adding to the intensity of the first light, helping it to grow brighter still.



## SCIENCE CHALLENGE

Make your own sundial out of a paper plate and a pencil. Draw a clockface with twelve evenly spaced numbers and insert the pencil in the middle of the plate so that it stands tall. On a sunny day, place it on a flat surface and make sure that it faces due south. The shadow from the pencil will fall on the time. Ta-da!

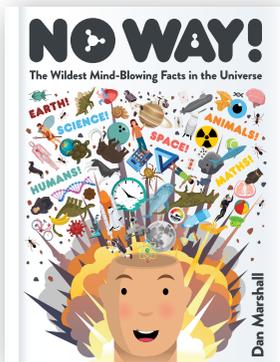
## Dial up

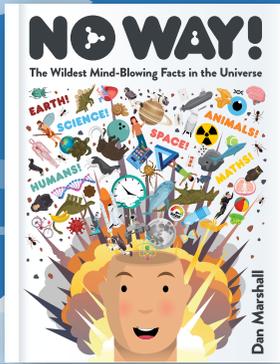
In the past, we used the shadows cast by the Sun to develop the world's first ever clocks, called **sundials**. We don't know who invented them, but they are one of the oldest scientific instruments of the world.



## Size up

As well as being used as early time-keeping devices, shadows were also used to first accurately calculate the size of the Earth. Over **2000 years ago**, **Eratosthenes** was able to combine simple geometry and shadow measurements to first perform this incredible task!





**EARTH CHALLENGE**  
On the next blue-sky day with fluffy clouds, see if you can count each cloud and estimate the volume of water floating in the fluffy shapes above you.

# FLUFFY CLOUDS WEIGH HALF A MILLION KILOGRAMS

Imagine lying on your back on a beautiful day and looking up at the bright blue sky filled with fluffy clouds. One minute, the clouds look like an ice cream, but moments later they appear to be a face or an animal. Those little white clouds you see dotted around the sky may look light and fluffy, but they are actually extremely heavy! They're called **cumulus clouds** and on average they weigh an astonishing **500,000 kilograms!**

As well as cumulus clouds, there are also **cirrus clouds** (which are thin and wispy), **stratus clouds** (that form a huge, grey blanket across the sky) and **nimbus clouds** (the dark clouds you see during a thunderstorm).



## Shape shifters

The wonderful ever-changing shapes of cumulus clouds are caused by the air that surrounds them. The clouds are affected by the air temperature, which is constantly changing. When it's windy, the clouds are pushed and pulled, which results in their fantastic variety of shapes.

## The elephant in the room

To put the weight of a cumulus cloud into perspective, **500,000 kilograms** is equal to **100 elephants!**



## Floating on air

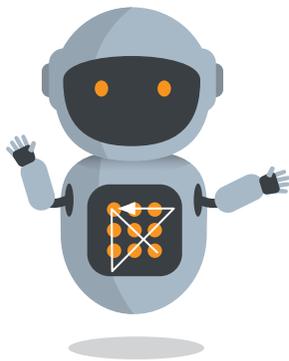
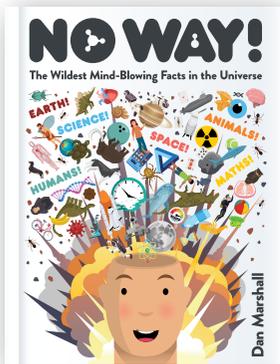
Clouds are made up of water, and water is heavier than air. So how do clouds float? Although most clouds do contain a large amount of water, it's spread out across a giant area in the form of very, very small droplets or crystals. They are so small that gravity hardly affects them.

# CAN YOU CONNECT ALL THESE DOTS WITH JUST FOUR LINES?

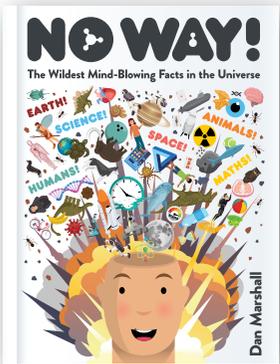
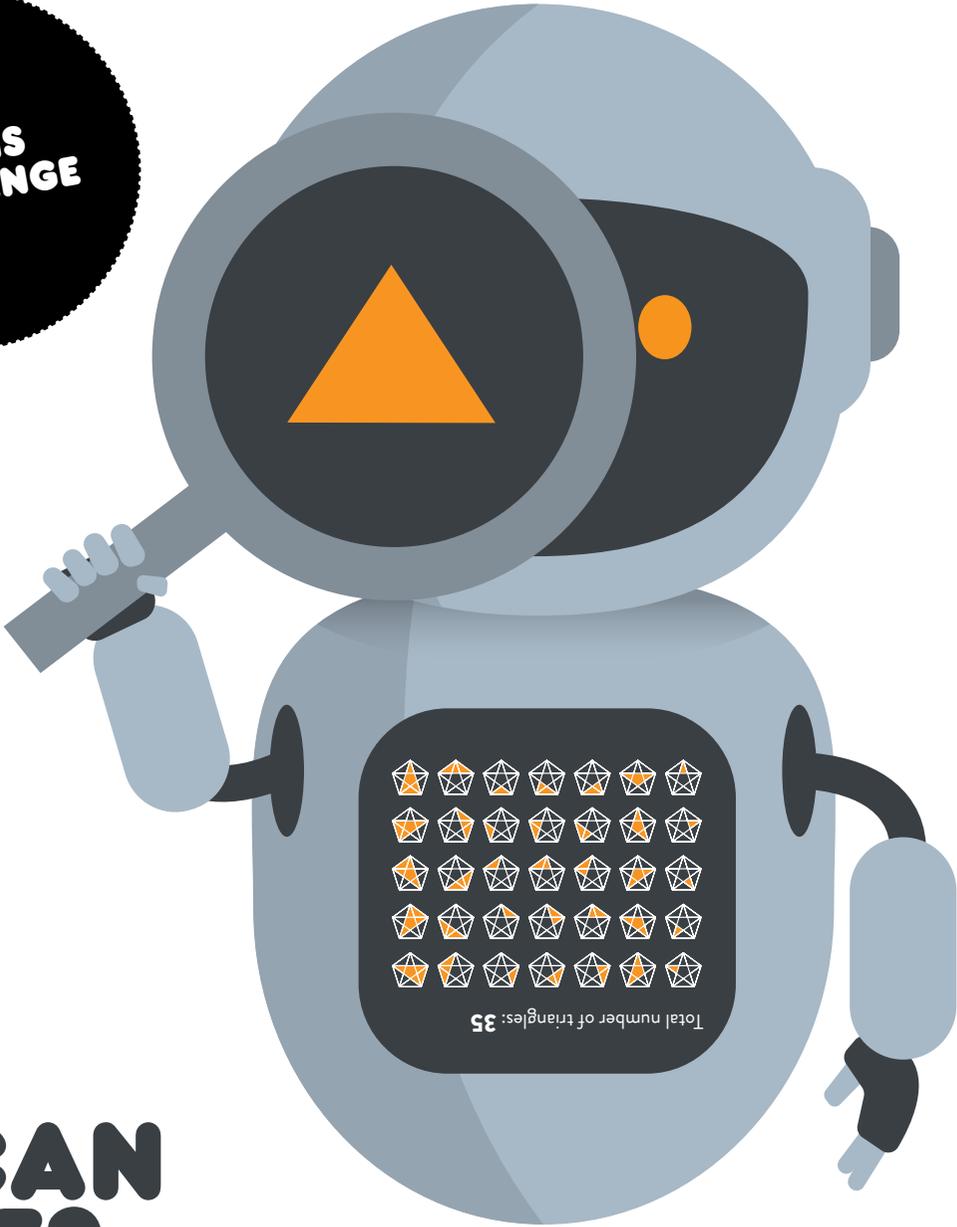
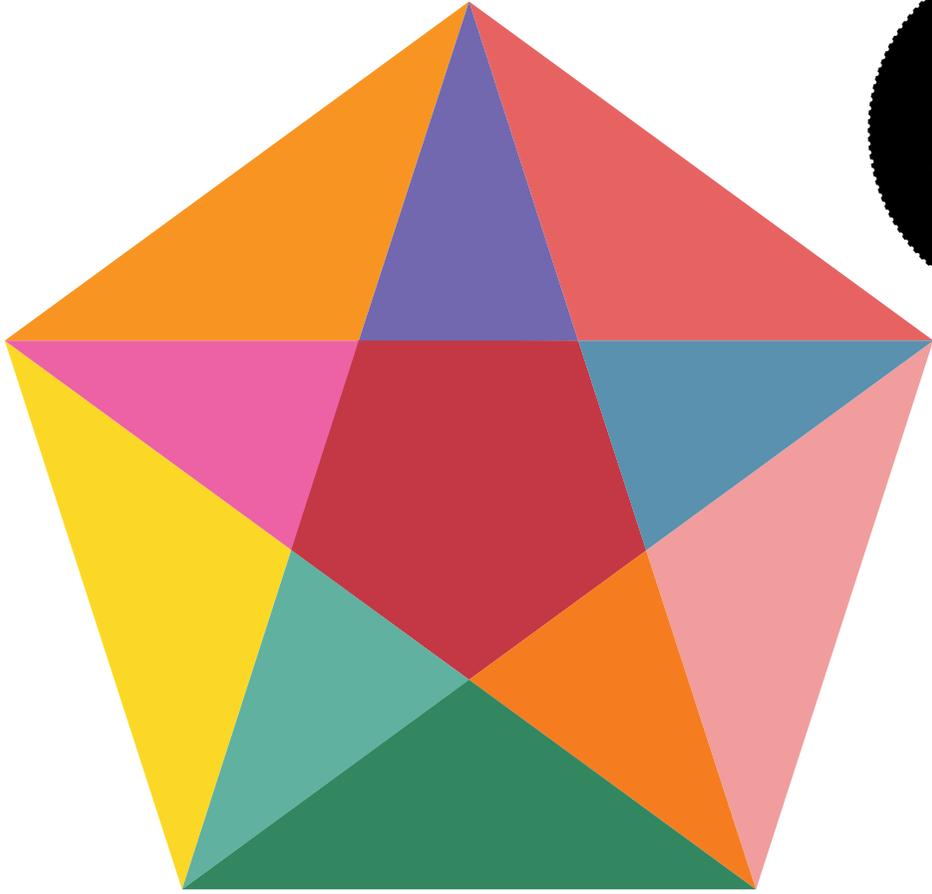
See if you can connect all **nine dots** with no more than **four straight lines**. Each dot is not to be connected more than once, and you have to do it all without lifting your hand from the paper. KLAUS has the answer below!



**MATHS  
CHALLENGE**



**MATHS  
CHALLENGE**



# HOW MANY TRIANGLES CAN YOU SEE HERE?

The coloured hexagonal shape above contains a number of triangles. Look very closely. Can you see them all? KLAUS has the answers, but no sneaky peeks! To help count the triangles grab a pencil and paper and draw them as you see them!