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BRAIN BASICS

Your brain is super-powered! It makes one quintillion calculations every second. That's a bigger number than the number of stars in our galaxy. If you had one quintillion grains of rice, they would fill the Empire State Building 85,000 times over!

In fact, some scientists believe your brain is more powerful than every computer in the world put together.

But what is your brain? What does it look like? How does it work? And how does it connect to the rest of your body?

It's time to meet your brilliant brain.



HOW BIG IS YOUR BRAIN?

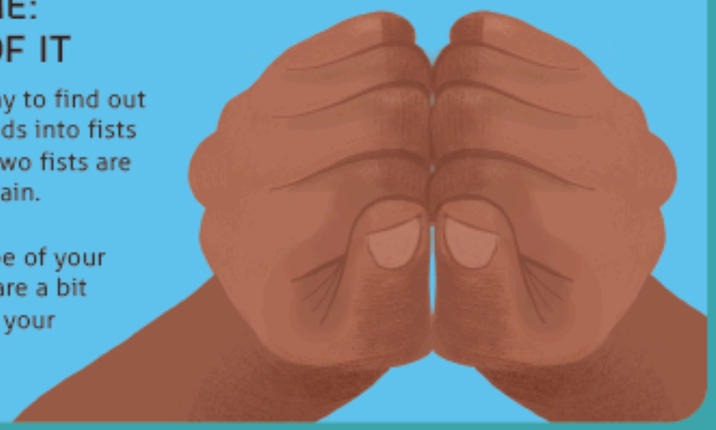
IT'S NOT BIG, BUT IT IS CLEVER

Unless you're willing to chop off the top of your head and have a look inside (*never, ever* try this), you'll never see how big your brain is. So how do you find out about its size, shape and how much it weighs?

TRY IT AT HOME: MAKE A FIST OF IT

Luckily, there is a very easy way to find out your brain's size. Ball both hands into fists and hold them together. Your two fists are about the same size as your brain.

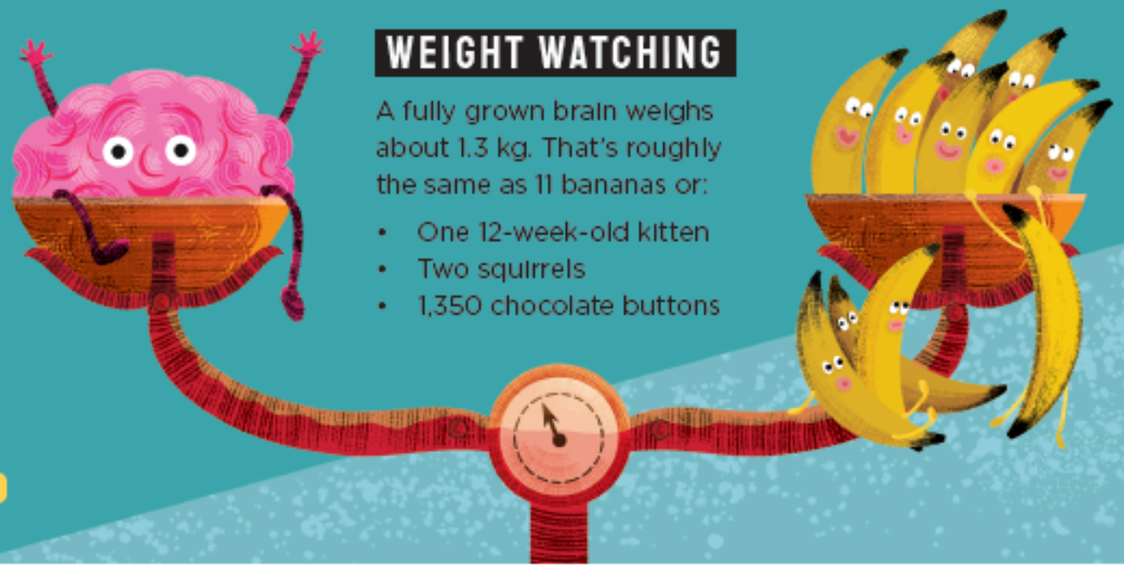
Your fists show the rough shape of your brain too. Its ridges and folds are a bit like the bumps and grooves of your knuckles and fingers.



WEIGHT WATCHING

A fully grown brain weighs about 1.3 kg. That's roughly the same as 11 bananas or:

- One 12-week-old kitten
- Two squirrels
- 1,350 chocolate buttons

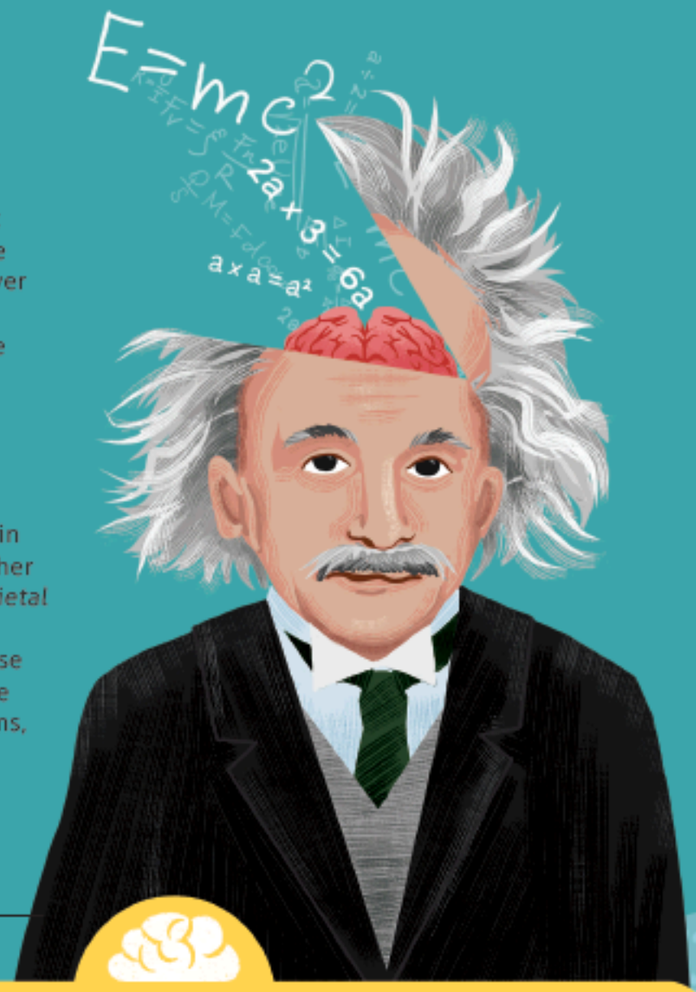


EINSTEIN'S MARVELLOUS MIND

Not every brain is the same size or shape. Take the brain of Albert Einstein, for example. He was one of the cleverest scientists who ever lived. That would make his brain bigger and heavier than everyone else's, right?

WRONG!

When Einstein died in 1955, scientists discovered that his brain was actually lighter than most other people's. However, Einstein's *parietal lobe* was 15% bigger than the average. This makes sense because the parietal lobe is the part of the brain that handles maths and sums, and maths was Einstein's thing!



Albert Einstein

DID YOU KNOW?

Your brain might look tough like an old pink raisin, but it's actually very soft, wet and wobbly.

In fact, three-quarters of your brain is just water, so you could think of it as being like an incredibly clever jelly.

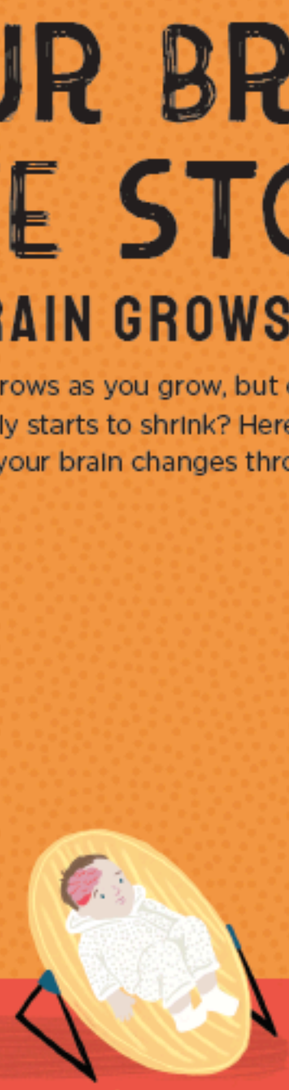


YOUR BRAIN'S LIFE STORY

HOW YOUR BRAIN GROWS (AND SHRINKS)

Your brain grows as you grow, but did you know that it eventually starts to shrink? Here's a look at how the size of your brain changes throughout your life.











FOETUS

The first sign of your brain appeared after just 25 days. At this stage, your whole body was roughly the size of a poppy seed! Something called a *neural tube* appeared, which later became your brain and spinal cord.

BABY

Three months after your birth, your brain was double the size it was when you were born. At this point your brain was the size of an apple and half the size of an adult brain.

CHILD

In the first few years of life, you had to learn how everything in the world works, as well as how to walk and talk. A toddler's brain is 80% of the size of an adult's brain, but twice as busy!

ADULT

You might have done all your growing by the time you reach 18, but that doesn't mean you will have a grown-up brain. The parts of your brain that help you make sensible decisions and spot danger will keep developing until you're around 25 years old.

OLD AGE

By the age of 40, your brain will become less active. It will actually start shrinking and lose about 5% of its size every ten years. By the time you reach 60 or 70, the parts of your brain controlling memory will begin to be affected.

PROTECTING YOUR BRAIN

WHY A SKULL IS NOT DULL

Your brain is fragile and needs your bony skull to protect it from accidents. But it takes more than just a skull to cushion your brain from the dangers of everyday life.

TRY IT AT HOME: THE JAR EGGS-PERIMENT

Find an egg. It's going to represent your brain. If you put the egg in a jar, the egg is protected by the glass, just like your brain is protected by your skull. But what happens if you shake the jar? **OOPS!** It's bye-bye egg.

Instead, try filling the jar with water. Screw on the lid and give the jar a shake.

The water protects the egg from being bashed against the sides of the jar. Inside your skull, your brain is surrounded by a layer of liquid called *cerebrospinal fluid (CSF)*. CSF stops your brain from hitting the inside of your skull – just as the water protects that egg.



SOFT SPOTS

Your skull isn't just one big bone. It's made of 22 different bones that have fused together. However, when you were first born, these bones hadn't quite joined up yet.

On a newborn baby's head there are two places called *fontanelles* – or soft spots – where there are still gaps in the skull. Most babies' fontanelles close up after a few months.



WHY DON'T WOODPECKERS GET SORE BRAINS?

Have you ever seen a woodpecker tapping on a tree? They're able to move their heads back and forth 20 times a second!

You might think a woodpecker would need an extra-hard skull to cope with all that pecking, but in actual fact it has a soft, spongy skull that acts like a cushion. A bone called the *hyoid bone* acts just like a seat belt, holding the brain in place.

The weirdest part, though, is the woodpecker's tongue. It's so long that it wraps all the way around the top of the bird's brain!