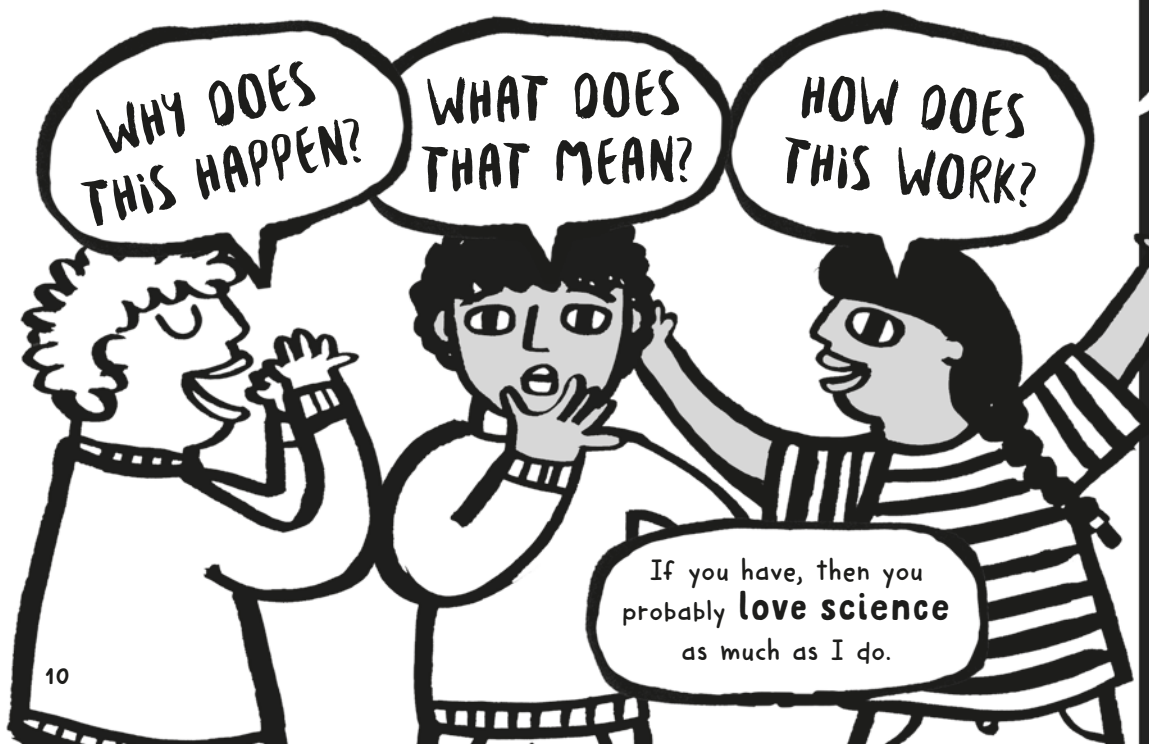
SCIENCE is AWESOME!

Hi, I'm **Dr Emily** and **I love science!** Because science is about making sense of what's going on in the world around us.

When I was growing up my **favourite** word was **"Why?"** I was constantly asking **questions**. I wouldn't accept anything anyone told me ... unless they could give me an explanation. I used to drive my parents and teachers totally **bonkers!**

It's said that the average child asks **73** questions a day. How many do **you** ask? Have you ever asked something like ...



My favourite feeling is that
light-bulb moment
"Ohh!"
when suddenly everything makes sense.

I wrote this book because I wanted to share with you some of my most **favourite** and **weirdest** facts about **science**. There are some **strange** and **amazing** things that happen in the world around us. You'll find them in the form of **30 mind-bending questions**, each with 4 possible answers.

But here's the **important** part:
as you read each question, see if you can figure out the answer. I don't just mean which one is right, but think about **why** it might be true.

Ask yourself ...

Which answer makes the most sense?
Which answer is definitely **not** true?
Why might **this one** happen?
How might **that one** work?

If you don't know the answer, just have a guess. Please don't worry if you get it wrong. Some of the **best discoveries** in science came about when people got stuff wrong, made mistakes or mucked up their experiments. Do you know about Alexander Fleming?

Alexander Fleming was doing an experiment on **bacteria** when he made a **mistake**. The story goes that he left his dish of bacteria next to an open window and ... went on holiday. The thing is, the dish also contained food for the bacteria and if you leave food by an open window, what happens?

When Fleming got back from his holiday he realised his mistake. **Oops!** I'm sure he was pretty annoyed with himself. But instead of giving up and chucking the mouldy dish away, he took a second look at it. And then he probably said something that is one of the most **important phrases in science**.

What Fleming found so funny was that around the fluffy bits of mould on the dish, the bacteria had **died**. Fleming and his pals went on to isolate a chemical from the mould that could kill bacteria. They called it **penicillin** and it was the first **antibiotic**. Penicillin went on to save **millions** of **lives**.

So go on, have a go at answering the first question. And don't worry if you get it wrong. Getting things wrong is the best way to **learn** and **progress**. First, have a go at figuring out the answer yourself. Then you can see if my **explanation** makes sense. And then maybe **you'll** feel that light-bulb moment too.

DR EMILY XX

Pain is your brain's way of warning you that something is wrong, so that you protect that part of your body from further damage.

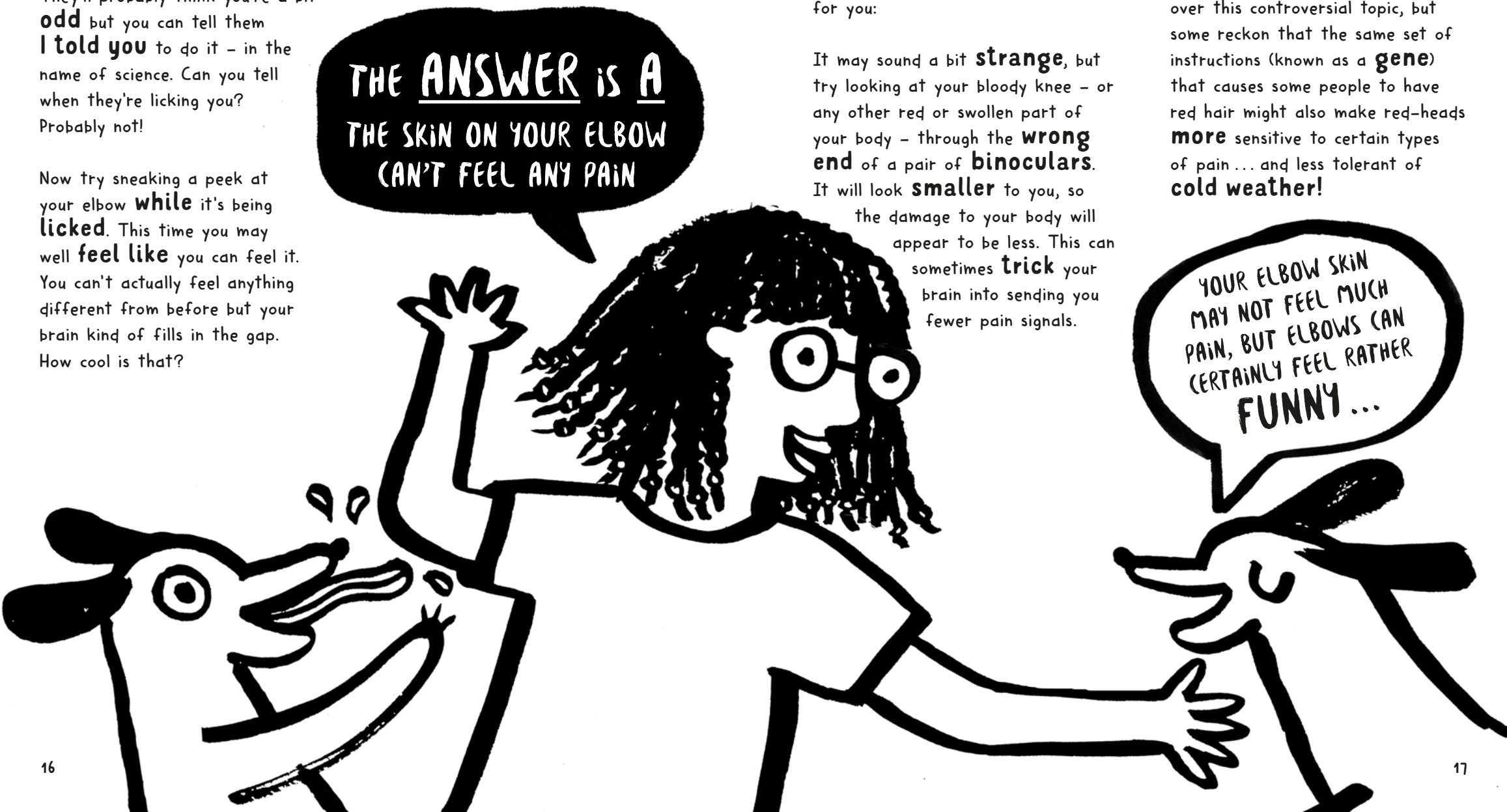
Pain is detected by **receptors** on your skin, which send electrical signals to your brain along long fibres called **nerves**.

The skin on the end of your **elbow**, called the **wenus**, is so jolly thick and tough that it contains practically no nerve endings or pain receptors. So you can **pinch** your mum's elbow-skin as hard as you like and she will hardly feel it!

In fact, your elbow skin has so few **sensations** that if someone licked it (not that anyone would) you wouldn't even be able to **feel it** ...

Ask a friend to lightly **lick** your elbow while you look the other way. They'll probably think you're a bit **odd** but you can tell them **I told you** to do it – in the name of science. Can you tell when they're licking you? Probably not!

Now try sneaking a peek at your elbow **while** it's being **licked**. This time you may well **feel like** you can feel it. You can't actually feel anything different from before but your brain kind of fills in the gap. How cool is that?



Speaking of pain, next time you hurt yourself (somewhere other than your elbow skin), here's a **sneaky tip** for you:

It may sound a bit **strange**, but try looking at your bloody knee – or any other red or swollen part of your body – through the **wrong end** of a pair of **binoculars**. It will look **smaller** to you, so the damage to your body will appear to be less. This can sometimes **trick** your brain into sending you fewer pain signals.

Bizarrely, it might also hurt less if you're **NOT a red-head**. Scientists are currently arguing over this controversial topic, but some reckon that the same set of instructions (known as a **gene**) that causes some people to have red hair might also make red-heads **more** sensitive to certain types of pain ... and less tolerant of **cold weather!**

WHY is YOUR ELBOW SOMETIMES CALLED YOUR FUNNY BONE?

A YOU CAN USE YOUR ELBOW TO TICKLE PEOPLE

B IT FEELS FUNNY WHEN YOU HIT YOUR ELBOW

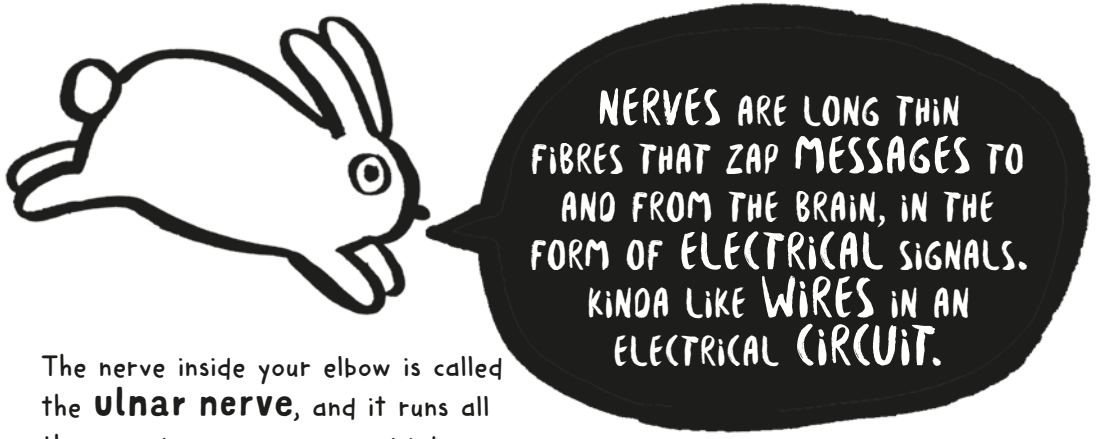
C COURT JESTERS USED TO WAVE THEIR ELBOWS AROUND TO ENTERTAIN KINGS

D THE NAME OF THE BONE IN YOUR UPPER ARM SOUNDS FUNNY

AAARGH!

When you **bash** your funny bone it sure feels weird, right? It can send you **hopping** around the room making all sorts of strange noises.

When your sister jumps in the air yelling that you've hit her **funny bone** – whilst pulling a face that would appear to suggest that she's actually just been bitten on the bottom by a **piranha** – what she **really** means is that you've **squished** a section of a **nerve** hiding inside her elbow.



The nerve inside your elbow is called the **ulnar nerve**, and it runs all the way down your arm and into your little fingers. The job of this nerve is to send **signals** from your **brain** to the **muscles** that move your fingers, and to send signals **back** to the brain telling it how your fingers **feel**. It works pretty hard when you're playing the piano. Or when your finger gets **nibbled** by a rabbit.

Like the other nerves in the body, the ulnar nerve is **protected** from the outside world, at least for **most** of its length, by layers of **bone** and **muscle**.

So you probably won't be able to feel it, even if you **push** quite hard on the skin of your forearm with something hard and pokey. Like a **carrot**.

But if you **straighten** your arm you might be able to feel that there's a little **gap** between the **knobbly** bits of bone on the underside of your elbow, **on the side closest to your body**.

CAN YOU FEEL IT?

Here, your nerve is only protected by your **skin**. So, if you bash your elbow in **just this very spot**, your poor **delicate** ulnar nerve gets temporarily **squashed** against the bones in your upper arm.

This can cause a **weird**, **tingly**, **numb** feeling in your little fingers, which might also feel a bit **painful**.

Some people think this **funny** feeling is how the funny bone got its **nickname**. This is probably true ...

... but a more satisfying explanation is that the funny bone is also a **play on words**, because the proper name for the **bone in the upper arm** is ... wait for it ... the **humerus!**