

Your Shortcut to... Science that was Wrong

We believed the Earth was flat. We thought illness came from too much phlegm and black bile. And we were sure that heavier things fell faster than lighter ones. This is your Squiz Kids Shortcut to Science That Was Wrong — the podcast where we dive into the who, what, when, where, why and how of the big news stories.

I'm Christie Kijurina.

And I'm Bryce Corbett.

Bryce, why are there empty cereal boxes, fidget spinners, and half a dozen coat hangers all wired together on your desk?

Don't touch it! You're looking at the world's very first perpetual motion machine! Once it starts moving, it never stops. Unlimited energy. I'm thinking Nobel Prize... maybe my own museum...

Right. Except... physics says perpetual motion machines are impossible.

Well, yeah... with what we know now. But that's the great thing about science, Christie. It's based on evidence—and evidence can change. Once, people thought the Earth was the centre of the universe. Or that sickness came from bad smells and unbalanced bile. Now we've got Wi-Fi and flying robots. So maybe one day, my invention will work. Just imagine!

Now that's a Shortcut I can get behind.

Today, we're unwrapping what science used to get wrong, how science learns from its mistakes, and why being wrong is actually one of the best things about science.

So grab your lab coat and your magnifying glass and let's get started!

Listen carefully. There's a S'Quiz at the end.

WHAT

Bryce, before we had microscopes, telescopes, and supercomputers, people used the best tools they had: their eyes... and their imagination. Which led to some very creative ideas about how the world worked.

Like thinking the Sun went around the Earth instead of the other way round. I mean, it does look like it moves across the sky...

That idea stuck for a long time, especially because the Catholic Church supported it. But then along came Galileo. With his telescope, he noticed planets and moons doing

things they shouldn't if Earth was the centre. He said, "Hang on... we're going around the Sun!"

"And the Church said, "You're grounded—for life."

No, really! Galileo was found guilty of heresy and spent the rest of his life under house arrest. Just for telling the truth."

It wasn't the only idea we eventually tossed out. People also believed in the four humours. Four liquids inside your body called blood, yellow bile, black bile, and phlegm. If you were sick, they'd try to balance them. Sometimes by bleeding you.

"Yikes. "Doctor, I have a sore throat."

"Let's just drain a litre of blood and see what happens!"

And there was spontaneous generation, the belief that living creatures like maggots just appeared from rotting meat. Until scientists like Francesco Redi sealed meat in jars and proved that maggots only appeared when flies could lay eggs.

So... turns out maggots don't magically appear and my perpetual motion machine probably won't start spinning by itself either.

Unlikely, Bryce. But these outdated ideas show us something important: people believed them because they didn't have better evidence yet. When new tools and new minds came along, those old ideas were replaced.

OK, so how did science figure out it had been wrong? And how do we make sure the new ideas are actually right?

HOW

So... if science has been wrong before, how do we know we can trust it now?

Yeah! If scientists once thought the Earth was flat and that leeches were good medicine... what if they're wrong again?

It's a fair question. But here's the thing: science isn't about guessing or making stuff up. It's about asking questions, collecting evidence, and testing ideas. And when we get new evidence, we don't ignore it, we update our thinking. That's what makes science strong.

So, it's kind of like... your teacher marking a maths problem and saying, "Oops, that answer's not right, let's try again."

You wouldn't want them to keep the wrong answer just to look smart.

Exactly! Would you rather science stubbornly stick to the old, wrong ideas? Or admit a mistake and get closer to the truth?

Yeah, like if we never updated science, we'd still be afraid of going over the edge of the Earth on a ship...

Or think that mosquitoes were born out of swamp mud. Instead, we have something called The Scientific Method. A step-by-step way of figuring things out. You make an observation, ask a question, form a hypothesis (that's a fancy word for a testable idea), run experiments, collect results... and then share your findings so others can check your work.

Which is why Galileo dropped two objects of different weights from the Leaning Tower of Pisa... to test if heavy things really did fall faster.

And they didn't. They hit the ground at the same time. So that old belief? Out the window.

Same goes for atoms. The word "atom" actually means uncuttable in Greek, because people thought they were the tiniest things in the universe. Now we know atoms have electrons, protons, neutrons, and even smaller particles inside them.

And that whole "we only use 10% of our brain" idea? Totally false. Brain scans show we use all of our brain, just not all at once.

Which is good to know. I was starting to think I had a super lazy brain.

So science doesn't always get it right the first time, but it does have a way of learning from its mistakes. Which might sound like a problem... but it's actually one of science's greatest strengths.

Hmmm... I think I get it, but I need a bit more of an explanation. So tell me Christie, why is admitting to being wrong, the smartest move science can make?

WHY

So far, we've looked at some pretty wild scientific ideas that turned out to be wrong, like maggots appearing from meat, or the Earth being the centre of the universe. And we've seen how science improves when it tests, questions, and admits when it's made a mistake.

But what happens when someone doesn't admit they're wrong?

That's when things can go very wrong. Take the myth that vaccines cause autism. In 1998, a British doctor published a study claiming there was a link between the MMR vaccine (that's measles, mumps and rubella) and autism. The study scared a lot of people.

And lots of people stopped vaccinating their kids, right?

Yes, and that led to outbreaks of diseases that had almost disappeared. But here's the thing: other scientists tried to repeat the experiment and couldn't. Investigations found the doctor had used only 12 children, changed medical records, and didn't follow proper research rules. The study was removed from the scientific journal, and the doctor lost his licence to practise medicine.

So the system did catch the mistake, but not before it caused a lot of damage.

Exactly. That's why science has something called peer review... which means other scientists check your work before it's shared with the world. They look at your evidence, test your ideas, and try to make sure it's accurate. It doesn't always catch every problem straight away, but it helps make science more trustworthy.

So being wrong isn't the problem... pretending you're right when you're not? That's where it gets dangerous.

That's the thing about science, it doesn't pretend to have all the answers. But it gives us the best explanations we've got so far, and it keeps asking questions to get even closer to the truth.

Which is kind of brilliant. Because if science never changed its mind, we'd still be using leeches to fix a cold... and thinking Earth was the centre of the universe.

And this National Science Week is the perfect time to celebrate that curiosity. To ask questions. To explore new ideas. And to remember that being wrong is just the first step to getting things right.

So don't be afraid to make mistakes, as long as you learn from them. Because that's not just science... that's smart.

THE S'QUIZ

This is the part of the podcast where you get to test how well you've been listening...

1. Which one of these fluids was not one of the four humours people believed controlled health?

- A) Blood
- B) Phlegm
- C) Stomach acid
- D) Black bile

(C. Stomach Acid)

2. True or False. Galileo was rewarded with a medal for discovering that the Sun is at the centre of the solar system. (False — he was put under house arrest.)

3. What is peer review?

A) Your friend checking your homework

B) Scientists checking each other's work before it's published

C) A type of science exam

(B. Scientists checking each other's work before it's published)

That's all we have time for today. Thanks for joining us as we explored the who, what, how, where, when, and why of Science that was wrong!

Now get out there, and have a most excellent day!

Over and out.