How do we know how old the universe is?

KS3 Ages 11-14 ⏰ 2 min read

The universe is roughly **13.8 billion years old**, which is an almost impossibly huge number. But how on earth (or should we say, how in the universe) do scientists figure this out? After all, no one was around with a stopwatch when everything began!

The Universe is Growing

The key clue comes from something called the **Hubble constant**, named after astronomer Edwin Hubble. In the 1920s, Hubble made a startling discovery: nearly every galaxy in the universe is moving away from us. Not only that, but the farther away a galaxy is, the faster it's moving away.

Think of the universe like a balloon with dots drawn on it. As you blow up the balloon, every dot moves away from every other dot. The dots that were farther apart to begin with end up moving away from each other faster than the dots that were close together.

This discovery told scientists that the universe is expanding—getting bigger all the time. And if it's expanding now, that means it must have been smaller in the past. Much smaller.

Running the Film Backwards

Once scientists knew how fast the universe is expanding, they could do something quite clever: run time backwards, like rewinding a film. If we know galaxies are moving apart at a certain speed today, we can calculate how long it would take to rewind all the way back to when everything was squashed together in one tiny point.

It's a bit like watching a explosion in reverse—if you know how fast the pieces are flying apart, you can work out when the explosion happened.

Double-Checking with Ancient Light

Scientists don't rely on just one method, though. They also study something called the **cosmic microwave background**—basically the leftover heat from when the universe

was very young and incredibly hot. This ancient radiation acts like a baby photo of the universe, taken when it was only 380,000 years old.

By studying this ancient light with powerful telescopes and satellites, scientists can measure the universe's properties and calculate its age from another angle. Remarkably, they get almost exactly the same answer: 13.8 billion years.

So while we can't travel back in time to witness the universe's birth, we can use the clues it left behind—like cosmic detectives solving the ultimate cold case.