

# Lesson 1: The Big Bang

Have you ever wondered where *everything* came from? Not just the ground under your feet or the air you breathe, but every star, every ocean, every atom in your fingernail. The answer, as best as scientists can tell, is that it all started from a single unimaginably tiny point. About 13.8 billion years ago, space itself did not exist. Time did not exist. And then something happened.

Scientists call it the **Big Bang**. But do not picture a bomb going off in an empty room. There was no room yet. The Big Bang was not an explosion in space. It was the creation of space itself, beginning to stretch and grow. In less than a second, the **universe** went from being smaller than a grain of sand to incomprehensibly vast. And it has been growing ever since. Right now, as you read this sentence, the galaxies around us are drifting further apart, carried outward by that original surge, which scientists call **expansion**.

At first, everything was pure energy, far too hot for any matter to exist. But as space stretched and cooled, particles appeared, then joined together into simple atoms: mostly hydrogen and helium. From those humble ingredients, gravity would slowly draw stars into being, and from stars, everything else would eventually grow. How do we know the Big Bang really happened? Two powerful clues. First, astronomers can see that galaxies are moving away from us in every direction, like dots on a balloon drifting apart as it inflates. Wind that movement back in time and you arrive at a single starting point. Second, wherever scientists point their instruments in space, they detect a faint warmth: the leftover glow from the very first moments of existence. This faint glow is called **cosmic background radiation**, and it is like a photograph of the universe just after its birth. It fills the entire sky, in every direction, an echo of the moment everything began.

Here is something worth sitting with: every atom in your body, the carbon in your cells, the oxygen in your lungs, the iron in your blood, was born in those first moments or forged inside stars that came later. You are not just living in the universe. You are part of it, made from the same ancient stuff. It is not poetry. It is science. And it is where our long story of life on Earth begins.