

The Amazing Atom

by Christopher Conway

Introduction

The tiny atom has led to some huge questions. Plants, people, buildings – they're all made from atoms, which are one of the smallest building blocks in the universe. I remember learning about the atom as a boy in secondary school. My boring science teachers just taught me facts and figures about the atom. However, they neglected to mention that the atom raises some big questions about the nature of the universe. For me, these questions have fed my sense of wonder and mystery. They drive scientists to discover new theories and evidence to prove them. By learning more about the atom you can understand the importance of these questions and the possible answers to them. And now, I'd like to share some amazing facts about the atom which I hope will inspire you to do so.

Idea 1

The first incredible fact about the atom is that it's almost empty. In your science textbooks, you probably saw pictures of the atom like this. The nucleus is in the centre and contains most of the mass. You can also see electrons going around the nucleus. Despite pictures like this, you may have thought the atom is solid like a marble. However, around a 100 years ago a British scientist with a loud voice and loud laugh called Ernest Rutherford changed our understanding of the atom forever / He discovered that an atom is 99.9% empty space / Let me give you an analogy to help you understand / if the atom was a football stadium, the nucleus would be the size of a fly / so imagine you removed all this empty space from every single person in the world / if you put them together they would be the size of a sugar cube / a sugar cube with the total weight of all these people / you might be thinking 'If I'm mostly empty, why can't I walk through walls' – the reason you can't is pretty simple / the electrons in the wall are negative, the electrons in my body are negative and like charges repel / the wall is literally pushing my body away / Now, take a few moments to touch your face / you can feel your skin and your hair, but this is just an illusion / touch is just your brain's interpretation of the electrons pushing each other apart / you never really touch anything in your life.

Idea 2

However, there's much more to the atom than being nearly empty. Another strange fact about the atom is that it's both a particle and a wave. Let me explain these terms – a particle is a small, solid thing like a dot or a grain of sand. In contrast, a wave is energy moving from one place to another. In school, you were probably taught that an atom is a particle with a definite location / actually, the reality is a lot stranger than that! / based on the work of several scientists such as Werner Heisenberg we know that the atom has a split personality / when you're not observing an atom, it's spread out like a wave – it's everywhere and nowhere / on the other hand, when you observe it, it appears in one place like a particle / Now, you might

think this sounds crazy and most scientists would agree – the atom is really weird / however, it's important to remember that only very small things like atoms act in this way / so you don't need to worry about your keys or your smart phone suddenly disappearing.

Idea 3

My final fact will blow your mind – the atom is constantly recycled and there are a couple of reasons for this. First of all, the atom is virtually indestructible and they last a really long time / the distinguished scientist, Martin Rees, provides this number for the life span of an atom / That's a lot of zeros, right? Amazingly, the life span of an atom is longer than the current age of the universe. Let me ask you a quick question – have you played with Lego before? / when you're playing with lego, you can make various things such as cars, robots, animals. You can take them apart and make something else with them. Atoms are much the same / let me give you a few examples / the atoms in your bodies have passed through several stars which exploded spectacularly at the end of their lives / not only that, atoms from every animal that ever lived are in your bodies / for instance, an atom that was once in a dinosaur's tail could be in your hand / And do you recognize these three famous people? / you have millions of atoms in your body that once belonged to Shakespeare, Buddha & Beethoven / all these geniuses are a part of you!

Conclusion

In conclusion, I explained three amazing facts about the atom. One – they're virtually empty. Two – they're both a particle and a wave. And three – they're constantly recycled. And now let's go back to those big questions I mentioned at the start. We're smashing atoms into each other and discovering a zoo of smaller particles. All this to answer the question - what is the smallest particle? We're looking up into space and checking the speed of distant galaxies spinning around. All this to answer the question - what is over 90% of the universe made of? We still don't know the answers to these profound questions. You can appreciate not only the wonders of the atom, but mysteries such as these that keep us searching for answers. The story of the atom isn't finished yet.