



Preface

[Music: Puccini - Tosca - E lucevan le stelle - and the stars were shining]

Hello, and welcome to our video book on 'How old is it'. This is our 4th video book. The other 3 all started here in my back yard. The first one was 'How far away is it', where we started with direct measurements and triangulation in the backyard, and took it across the earth, the solar system, the galaxy, the Virgo supercluster out to the farthest reaches of space.

Our second video book was 'How small is it'. We started here with a strand of hair; took it to the microscopic; all the way down to the tiniest elementary particles; Quantum Mechanics; the standard model of particle physics; and the Higgs boson. Our third video book was 'How fast is it', where we started here with a snail moving across the tile. And took it to the speed of light; special relativity; general relativity; and gravitational waves. For this video book we're not going to start in the backyard. We're going to start at the cosmos - the very beginning of the expansion of the Universe. And over a number of chapters work our way to the backyard at the end.

Our first chapter is on the big bang theory where we'll cover the cosmological principle and the idea of space expanding. We'll take a look at Newton's view of how the universe would have expanded with his Newtonian mechanics, if he had given it a try. We'll look at how Einstein equations would be used to describe it. We'll go into the observational evidence for accelerating universe: Hubble's law; the cosmic microwave background that made all the difference. And then step by step we'll go back to the beginning, and then move back into the future.

In subsequent chapters, we will cover not only how old is the universe, we'll cover how old is the sun, and the solar system, and how old is the earth, how old is the moon, how old is the ground we're standing on, how old is the water in the swimming pool. We'll move on to how old life - the vast array of living things around us is. And we'll conclude with how old are human beings.

And again we will always go through the evidence that we have that leads us to our current thinking on these subjects. I trust you'll find it informative and entertaining.

Thank you.