Student book answers

6.5 The Big Bang theory is supported by evidence

Pages 148–149

Check your learning 6.5

Remember and understand

1 Why is the Big Bang not a bang at all?

The Big Bang is the rapid expansion of the universe that occurred silently.

2 Write a description of the Big Bang theory.

The Big Bang theory is the idea (supported by evidence) that the universe started from a single location and rapidly exploded, causing all energy and matter to be thrown outwards.

Apply and analyse

3 A theory is never final. Evidence is always needed to reinforce a theory. The Planck satellite was designed to examine cosmic microwave background radiation. How do you think evidence obtained from the Planck satellite will help support the Big Bang theory?

The increased detail of cosmic microwave background radiation and its distribution that the Plank satellite is discovering support the Big Bang theory by mapping the fluctuations in the cosmic background radiation. These fluctuations have been found to correlate with the formation of nearby matter.

4 What is cosmic microwave background radiation? Why is its existence important?

Cosmic microwave background radiation is the electromagnetic radiation energy left from the Big Bang. This energy was converted into elementary matter, causing correlating fluctuations in the background radiation. This provides evidence that supports that the Big Bang started with explosive energy.

5 Cosmic microwave background radiation has been called ‘ancient whispers’. Why is this name appropriate?

The cosmic microwave background radiation detected was produced about 14 billion years ago, and is certainly ancient. It can be thought of as whispers as the intensity of this radiation has reduced over the years to a very low level.

6 What other evidence supports the Big Bang?

The proportion of lighter mass elements such as hydrogen correlate with the fluctuations in the cosmic microwave background radiation. The observations of distant galaxies provide a glimpse into how stars originally formed.