

PLANET EARTH AND BEYOND

Astronomical systems

Unit 1 The Universe

Size

The Universe is everything that we know exists. What appears to be mostly empty space between the stars contains gases, radiation, and 'dark energy'. The radiation includes light rays, radio waves, and gamma rays. Dark energy is a great scientific mystery – it seems to act as a force against gravity, making the Universe expand.

Gravity is an important force in holding the Universe together. It keeps the planets in orbit, and holds the stars in orbit in galaxies. The Sun is one of 100 billion stars in the Milky Way galaxy. The Universe has over 100 billion billion stars, grouped in galaxies.

Distances in space are so vast they are measured in light years. A light-year is 9 460 billion km – the distance that light travels in space in a year. Our nearest galaxy – Andromeda – is 2 million light years away. Compare this with the 8 minutes it takes light to travel from the Sun to Earth!

- Does the Universe have an end?
- Does the Universe go on for infinity?
- If the Universe does have an 'edge', then what lies beyond that boundary?

Astronomers can see objects about 12 billion light years away in the Universe. This is our 'visible horizon'. No one knows what lies beyond this horizon, but it's thought that the visible Universe could be a small part of something larger. There may even be other Universes that we don't know about.

Activity – Universe quiz: True or False?

Circle the correct answer.

- | | |
|---|--------------|
| 1. Space is mostly empty. | True / False |
| 2. Dark energy is not fully understood. | True / False |
| 3. Gravity makes the Universe expand. | True / False |
| 4. Sunlight is 8 minutes old by the time it gets here. | True / False |
| 5. The visible horizon is as far as astronomers can see at present. | True / False |
| 6. There is only one Universe that we know exists. | True / False |

