Superheated

1 The incomprehensibly hot ball of hydrogen and helium at the center of the solar system is known to us as the sun. The sun's diameter is more than 100 times greater than Earth's. A yellow dwarf star, the sun has a mass more than 300,000 times greater than Earth's, making it the most massive object in the solar system. The sun alone accounts for more than 99% of all matter in our solar system.

2 Scientists estimate that the sun was formed more than 4.5 billion years ago as the result of what is known as a gravitational collapse. The gravity where the sun is now became so strong that it continued to attract more and more matter to it. As the matter within the center of the collapse became increasingly dense, individual atoms began to fuse together in a process known as nuclear fusion. Nuclear fusion has sustained the sun ever since, resulting in the release of massive amounts of energy.

3 Life on earth owes its existence to this energy. This energy takes on many forms, one of which is light radiation. It takes light from the sun just over eight minutes to reach Earth, on average. Once here, sunlight supports virtually all life on Earth, powering photosynthesis, heating the surface of the earth, and influencing climate and weather patterns. Another form of this energy comes in the form of particle radiation, which influences unique properties in Earth's ionosphere – the topmost layers of the earth's atmosphere. Thanks to particle radiation from the sun, the ionosphere is electrically charged, allowing radio waves – and the ideas they carry – to bounce around the world.

4 The sun has been ejecting this radiation into space for quite some time, and will continue to do so for another 4-5 billion years. But this does not mean that the sun will remain the same forever.

5 The sun as we know it will exist for an estimated 10 billion years, sustained by the nuclear fusion of hydrogen at its core. But once this hydrogen has been completely exhausted, the sun will begin turning into what is known as a red giant star. Once the sun's core hydrogen reserves have been depleted, the sun will start to grow larger and brighter. Every 500 million years or so, the sun will double in size until it reaches a size more than 200 times larger than it is today. By then, the sun will be thousands of times brighter than it is today. During this process, Mercury, Venus, and most likely even Earth will be consumed by the swelling star.

6 During its red giant phase, with no hydrogen left, the sun will burn off all of its helium. Once this happens, the sun becomes unstable and constantly loses matter in powerful solar ejections. Eventually, after many more millions of years, the sun will begin to cool and shrink, eventually becoming a white dwarf star with approximately half the mass it had during its yellow dwarf stage.

Celestial Object	Mass (Relative to Earth)
Mercury	0.06
Mars	0.11
Venus	0.82
Earth	1.00
Neptune	17.15
Uranus	14.54
Saturn	95.16
Jupiter	317.83
Sun	332,889.71