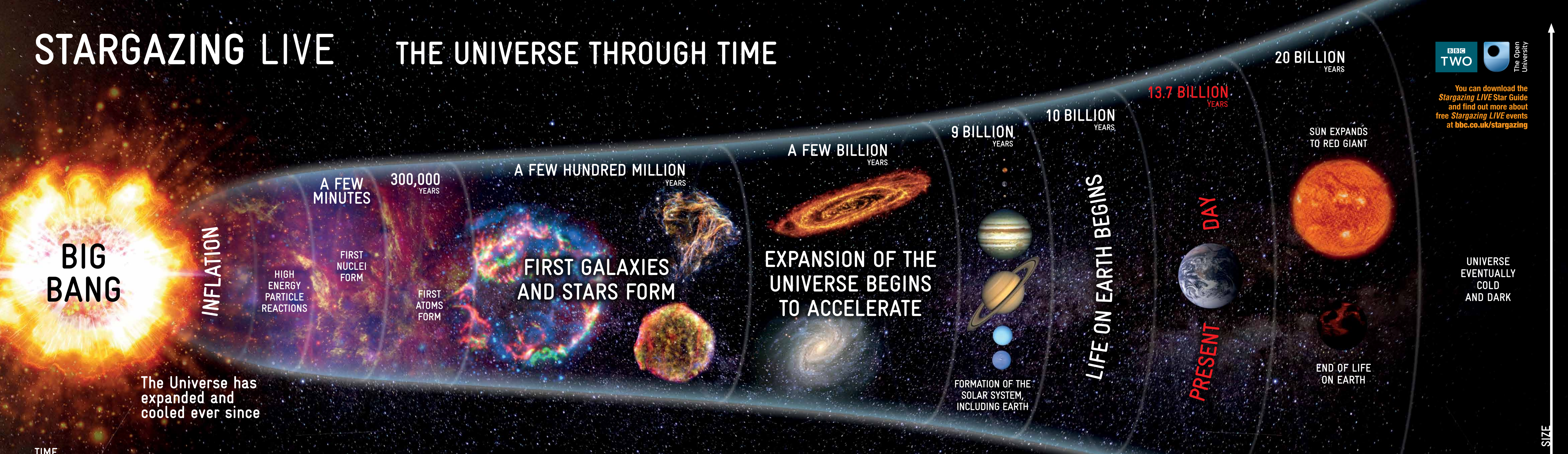


STARGAZING LIVE

THE UNIVERSE THROUGH TIME



You can download the *Stargazing LIVE* Star Guide and find out more about free *Stargazing LIVE* events at bbc.co.uk/stargazing



TIME

SIZE

UNOBSERVABLE UNIVERSE (PAST)

POTENTIALLY OBSERVABLE UNIVERSE (PAST)

TODAY

FUTURE

<p>THE BEGINNING</p> <p>The Universe begins 13.7 billion years ago with an event known as the Big Bang. Both time and space are created in this event.</p>	<p>FRACTION OF A SECOND</p> <p>Rapid expansion occurs during a billionth of a billionth of a second – the visible Universe is the size of a grapefruit.</p>	<p>1 SECOND</p> <p>The Large Hadron Collider at CERN is recreating the conditions that prevailed a fraction of a second after the Big Bang.</p>	<p>100 – 1000 SECONDS</p> <p>Nuclei of hydrogen, helium, lithium and other light elements form.</p>	<p>300,000 YEARS</p> <p>We can detect radiation from the early formation of the Universe back as far as this point. Before this, the Universe is opaque: it's as if a veil has been pulled over it.</p>	<p>A FEW HUNDRED MILLION YEARS</p> <p>Matter clumps together under its own gravity forming the first protogalaxies and within them, the first stars. Stars are nuclear furnaces in which heavier elements such as carbon, oxygen, silicon and iron are formed. Massive stars exploding as supernovae create even heavier elements. Such explosions send material into space ready to be incorporated into future generations of stars and planets.</p>	<p>A FEW BILLION YEARS</p> <p>Initially, the expansion of the Universe decelerated – but a few billion years after the Big Bang, the expansion began to accelerate. The acceleration is caused by a mysterious force known as 'dark energy', the nature of which is completely unknown.</p>	<p>9 BILLION YEARS</p> <p>The Sun, along with its eight planets, and all the asteroids, comets and Kuiper Belt objects, such as Pluto, form from the debris left behind by earlier generations of stars.</p>	<p>10 BILLION YEARS</p> <p>The first life appears on Earth in the form of simple cells. Impacting comets and asteroids might have contributed organic molecules to Earth. Life spreads across the globe.</p>	<p>13.7 BILLION YEARS</p> <p>This is where we are today. Using our own ingenuity, humanity is probing the depths of the Universe and trying to unravel its mysteries, from our tiny, home planet, Earth. The visible Universe contains billions of galaxies, each comprising billions of stars. Within our own Galaxy, hundreds of exoplanets have been discovered orbiting other stars.</p>	<p>20 BILLION YEARS</p> <p>In a few billion years the Sun's outer layers will expand as it turns into a Red Giant star. Life on Earth will become impossible. Expansion of the Universe will continue to accelerate.</p>	<p>10¹⁰⁰ YEARS</p> <p>Stars no longer form; matter is trapped in black holes or dead stars. Protons decay and black holes evaporate, leaving the Universe to its ultimate fate as cold, dead, empty space, containing only radiation, which itself too will eventually disperse.</p>
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Stargazing LIVE is a BBC and Open University co-production. Credit: Photography sourced from NASA.