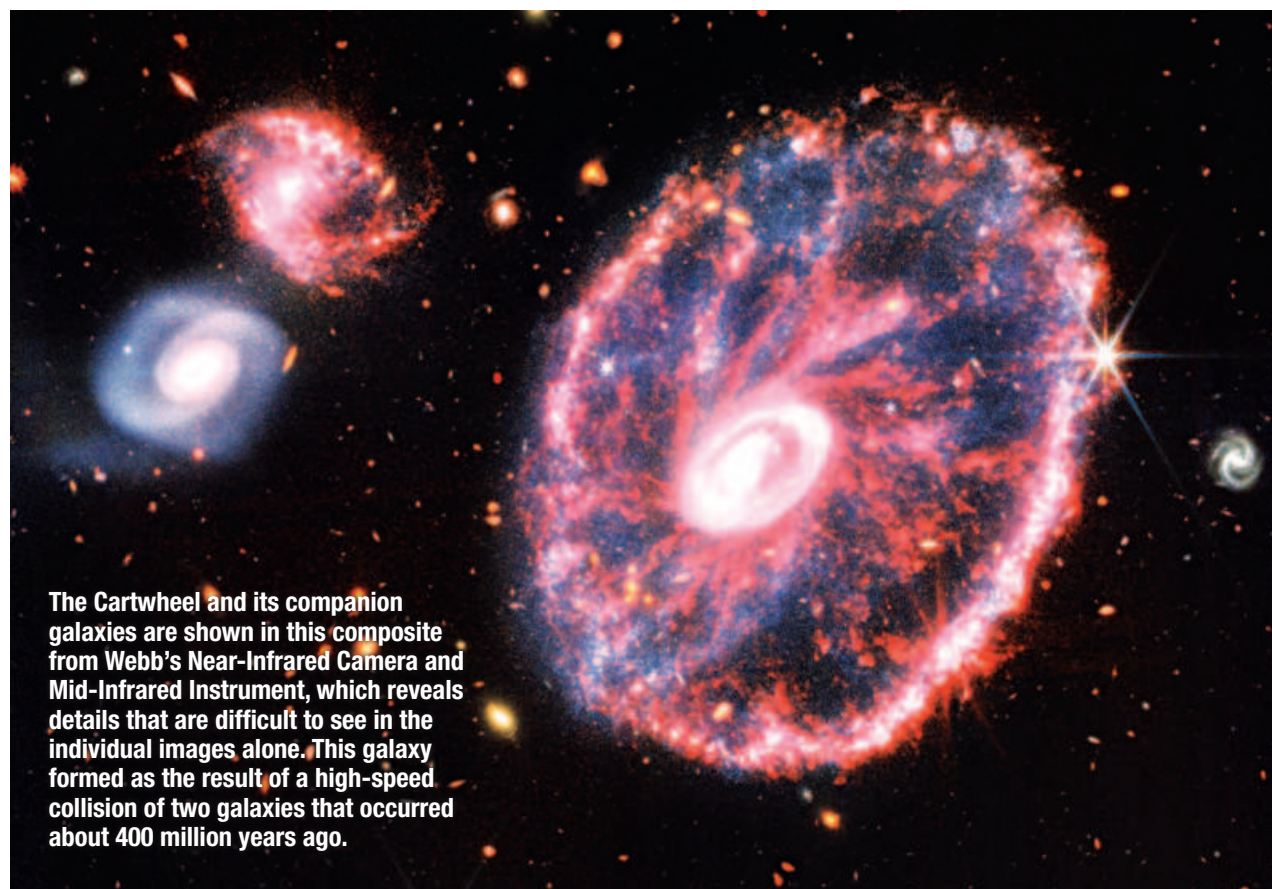


(1,2) This combo of images captured by the two cameras aboard Webb telescope shows NGC 3132, known informally as the Southern Ring Nebula. It is approximately 2,500 light-years away. (3) NGC 7496 galaxy lies just 24 million light-years away in the constellation of Grus. (4) This image shows never-before-seen details of Stephan's Quintet, a visual grouping of five galaxies. The Webb telescope pierced through dust-enshrouded regions to reveal huge shock waves and tidal tails, gas and stars stripped from the outer regions of the galaxies by interactions. It also unveiled hidden areas of star formation.

## Unravelling the mysteries of THE COSMOS

The James Webb Space Telescope, the most powerful ever sent into orbit, has unveiled breathtaking new views of the universe with a clarity that's never been seen before. The images aren't just breathtaking — they contain a wealth of scientific insights and clues that researchers are eager to pursue. Scientists hope this wonder tool will help them to unravel the mysteries of the early universe, how the galaxies were formed and also help to find the origin of life. Nasa estimates Webb has enough propellant for a 20-year life, as it works in concert with the Hubble and Spitzer space telescopes to answer fundamental questions like these about the cosmos.



The Cartwheel and its companion galaxies are shown in this composite from Webb's Near-Infrared Camera and Mid-Infrared Instrument, which reveals details that are difficult to see in the individual images alone. This galaxy formed as the result of a high-speed collision of two galaxies that occurred about 400 million years ago.



This handout photo from Nasa obtained on July 11, 2022, shows the first infrared image from the James Webb Space Telescope.



GLASS-z13, the oldest galaxy ever observed. The galaxy dates to just 300 million years after the big bang.

### James Webb Telescope by the numbers

**MORE THAN 21 FEET:** The centrepiece of the observatory is its huge main mirror, measuring more than 21 feet in diameter and made up of 18 smaller, hexagonal-shaped mirrors. The observatory also has four scientific instruments: cameras to take pictures of the cosmos, and spectrographs, which break down light to study which elements and molecules make up objects. The mirror and the instruments are protected from the light of our Sun by a tennis-court-sized thermal shield which ensures the telescope operates in the darkness needed to capture faint glimmers from the far reaches of the Universe.

**MILLION MILES AWAY:** Unlike the Hubble telescope which revolves around the Earth, Webb orbits around the Sun, nearly 1.6 million kilometers away from us. It took the spacecraft almost a month to reach this region, called Lagrange Point two, where it remains in a fixed position behind the Earth and Sun to give it a clear view of the cosmos. Here, the gravity from the sun and Earth balance the centrifugal motion of a satellite, meaning it needs minimal fuel for course correction.

**13.8 BILLION YEARS:** Webb's infrared capabilities are what make it uniquely powerful — allowing it to detect light from the earliest stars. This lets it peer further back in time than any previous telescope, to within a few hundred million years after the Big Bang, 13.8 billion years ago.

**\$10 BILLION:** Webb is an international collaboration between US space agency Nasa, the European Space Agency (ESA), and the Canadian Space Agency (CSA), involving more than 10,000 people. The lifetime cost to Nasa alone will be approximately \$9.7 billion, according to an analysis by the Planetary Society, or \$10.8 billion adjusted for inflation to 2020 dollars.

SOURCE: AGENCIES

This image shows a landscape of "mountains" and "valleys" speckled with glittering stars which is actually the edge of a nearby, young, star-forming region called NGC 3324 in the Carina Nebula. This image reveals for the first time previously invisible areas of star birth. The Carina Nebula is 7,600 light years away from Earth.

