

JWST SPECIAL EDITION

December 23, 2021



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Are you ready to see the light from the first galaxies in the Universe through golden mirrors?

WEBB





WHAT IS THE JAMES WEBB SPACE TELESCOPE?



The James Webb Space Telescope, also called Webb or JWST, is a large, space-based observatory, optimized for infrared wavelengths, which will complement and extend the discoveries of the Hubble Space Telescope. Webb will launch on December 25, 2021 07:20am EST (2021-12-25 12:20 GMT/UTC).

It will cover longer wavelengths of light than Hubble and will have greatly improved sensitivity. The longer wavelengths enable JWST to look further back in time to see the first galaxies that formed in the early universe, and to peer inside dust clouds where stars and planetary systems are forming today.



WHAT ARE THE MOST EXCITING THINGS WE WILL LEARN?



We have yet to observe the era of our universe's history when galaxies began to form. We have a lot to learn about how galaxies got supermassive black holes in their centers, and we don't really know whether the black holes caused the galaxies to form or vice versa. We can't see inside dust clouds with high resolution, where stars and planets are being born nearby, but Webb will be able to do just that. We don't know how many planetary systems might be hospitable to life, but Webb could tell whether some Earth-like planets have enough water to have oceans. We don't know much about dark matter or dark energy, but we are expecting to learn more about where the dark matter is now, and we hope to learn the history of the acceleration of the universe that we attribute to dark energy. And then, there are the surprises we can't imagine!



WHY IS WEBB AN INFRARED TELESCOPE?



By viewing the universe at infrared wavelengths Webb will show us things never before seen by any other telescope. It is only at infrared wavelengths that we can see the first stars and galaxies forming after the Big Bang. And it is with infrared light that we can see stars and planetary systems forming inside clouds of dust that are opaque to visible light.



ORBIT OF JAMES WEBB SPACE TELESCOPE



The James Webb Space Telescope will not be in orbit around the Earth, like the Hubble Space Telescope is - it will actually orbit the Sun, 1.5 million kilometers (1 million miles) away from the Earth at what is called the second Lagrange point or L2. What is special about this orbit is that it lets the telescope stay in line with the Earth as it moves around the Sun. This allows the satellite's large sunshield to protect the telescope from the light and heat of the Sun and Earth (and Moon).

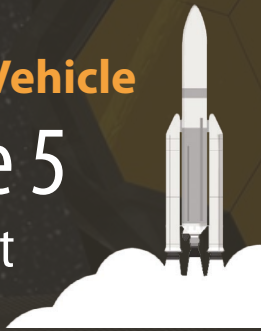


QUICK FACTS ABOUT JAMES WEBB SPACE TELESCOPE



Launch Vehicle

Ariane 5
ESA Rocket



Launch Site

Kourou,
French Guiana



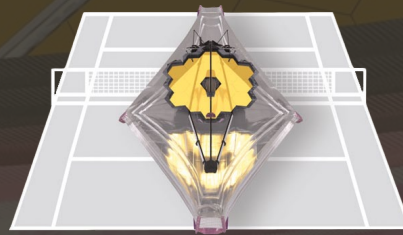
Size

18
Mirror segments



Sunshield Size

About 21 m x 14 m,
comparable to a tennis court



Materials

Beryllium

Coated with a super thin layer of gold only about 700 atoms thick.



Mass

6200 kg

Roughly the mass of a full-size school bus.



Fun Fact

Webb is so sensitive it could theoretically detect the heat signature of a bumblebee at the distance of the Moon.



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