

James Webb Telescope Launch Kit

This is a compilation of selected screenshots, to view the complete interactive ESA Launch Kit goto:

https://esamultimedia.esa.int/docs/science/Webb-LaunchKit_EN.pdf

Summary Overview:

The screenshot displays the 'WEBB IN A NUTSHELL' overview screen from the James Webb Telescope Launch Kit. The background is dark blue with white and yellow text and graphics. At the top right is the ESA logo. The main title 'WEBB IN A NUTSHELL' is in white, with the subtitle 'Overview of Webb and ESA's contributions to the mission.' below it. On the left, a white Ariane 5 rocket is shown launching. In the center, a group of five people in white lab coats represents the science operations team. To the right, the text states that ESA contributed two of Webb's four science instruments: NIRSpec and 50% of MIRI. Above this text are the logos for NASA, ESA, and CSA ASC. Below the text, a large yellow hexagonal mirror segment is shown being lowered into a white launch cradle. To the right of the cradle, the text describes Webb as the largest and most powerful space telescope ever launched. Further right, three panels describe Webb's observations: near-infrared to mid-infrared light, the Solar System and exoplanets around other stars, and the birth of the first stars and galaxies. At the bottom, there are navigation icons for back, home, forward, and download.

WEBB IN A NUTSHELL
Overview of Webb and ESA's contributions to the mission.

ESA provides a team of **astronomers** and **engineers** to support **science operations**

Webb will reach space on an **Ariane 5** from **Europe's Spaceport** in French Guiana, a launch contributed by ESA

ESA contributed **two** of Webb's four **science instruments**: **NIRSpec** and 50% of **MIRI**

Webb's partners

Webb is the **largest** and most **powerful** space telescope ever launched

Webb observes **near-infrared** to **mid-infrared** light

Webb studies our own **Solar System** and **exoplanets** around other stars

Webb studies the birth of the **first stars** and **galaxies**

WEBB SCIENCE

Webb is designed to answer outstanding questions about the Universe and to make breakthrough discoveries in all fields of astronomy.

What did the **early Universe** look like and when did the first stars and galaxies form?



Understanding how **galaxies and black holes** form and evolve

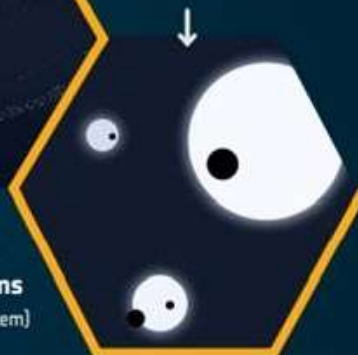
The lifecycle of **stars**: from their birth to their death



Investigating how **planetary systems** (including our Solar System) form and evolve



Studying **exoplanets, their atmospheres,** and the building blocks of life that they might contain



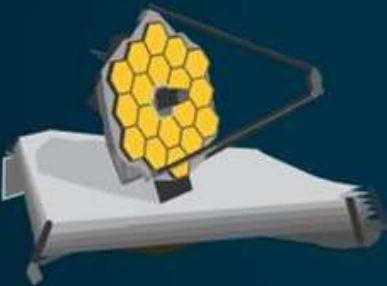
WEBB AND ARIANE 5: A FIT MADE PERFECT

ESA is flying Webb on an Ariane 5 rocket, which has been customised for this extraordinary telescope.

Webb

Height
8 m

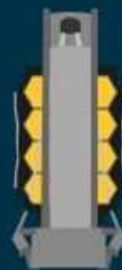
5-layered
sunshield
21.2 x 14.2 m



Folded Webb

Height
10.66 m

Width
4.5 m



Fairing

Height
17 m

Diameter
5.4 m

28 venting ports
allow depressurisation
during launch sequence

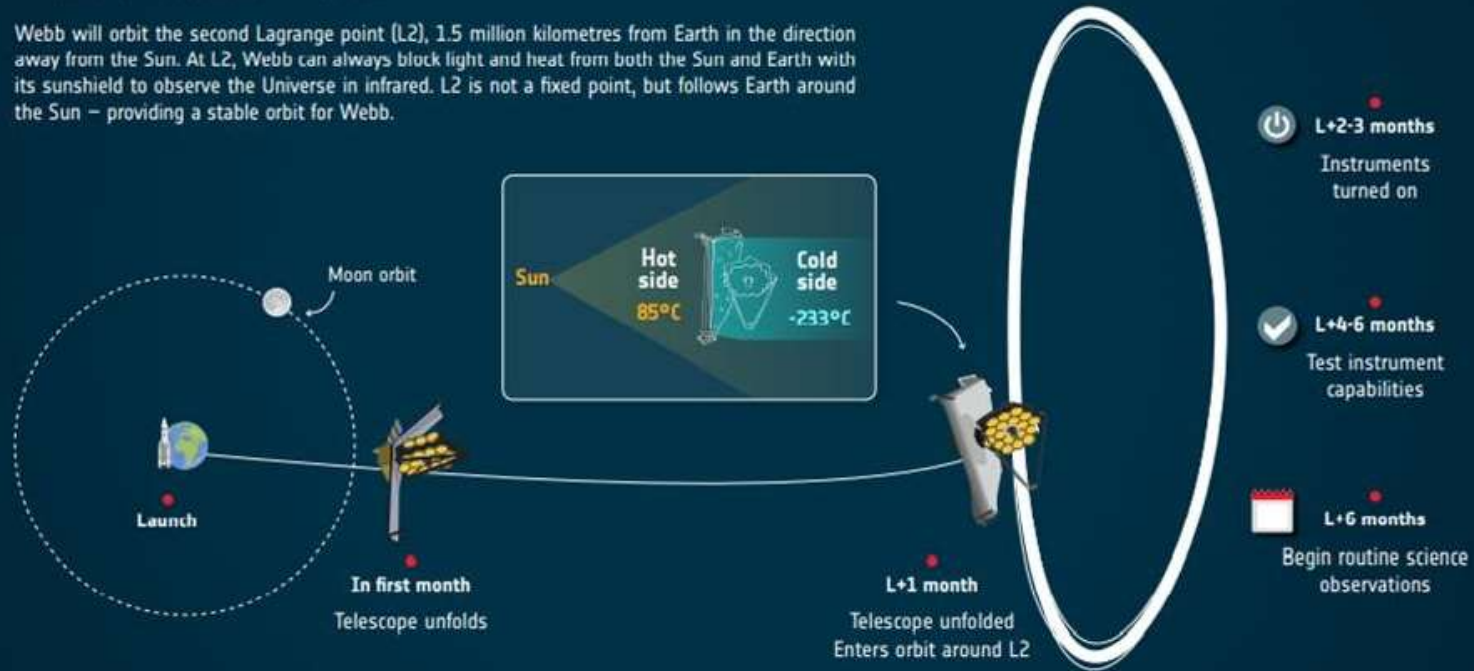
Oscillating

rolling manoeuvre to protect
Webb from solar radiation
after fairing separation



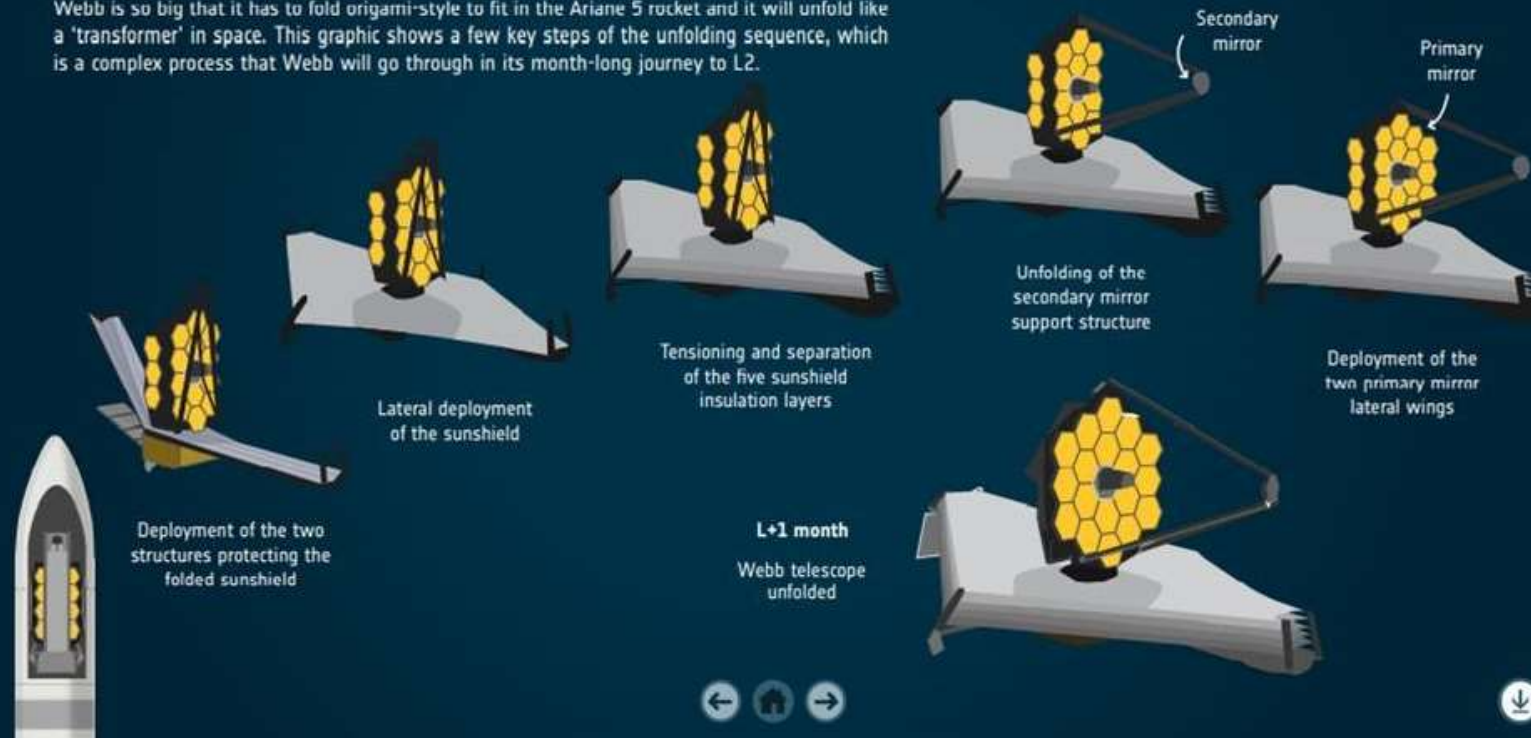
WEBB'S JOURNEY TO L2

Webb will orbit the second Lagrange point (L2), 1.5 million kilometres from Earth in the direction away from the Sun. At L2, Webb can always block light and heat from both the Sun and Earth with its sunshield to observe the Universe in infrared. L2 is not a fixed point, but follows Earth around the Sun – providing a stable orbit for Webb.



WEBB UNFOLDING SEQUENCE

Webb is so big that it has to fold origami-style to fit in the Ariane 5 rocket and it will unfold like a "transformer" in space. This graphic shows a few key steps of the unfolding sequence, which is a complex process that Webb will go through in its month-long journey to L2.



COMPARING WEBB AND HUBBLE

Webb follows the NASA/ESA Hubble Space Telescope in the line of great space observatories. Both space observatories have different capabilities and will operate in parallel, complementing each other.

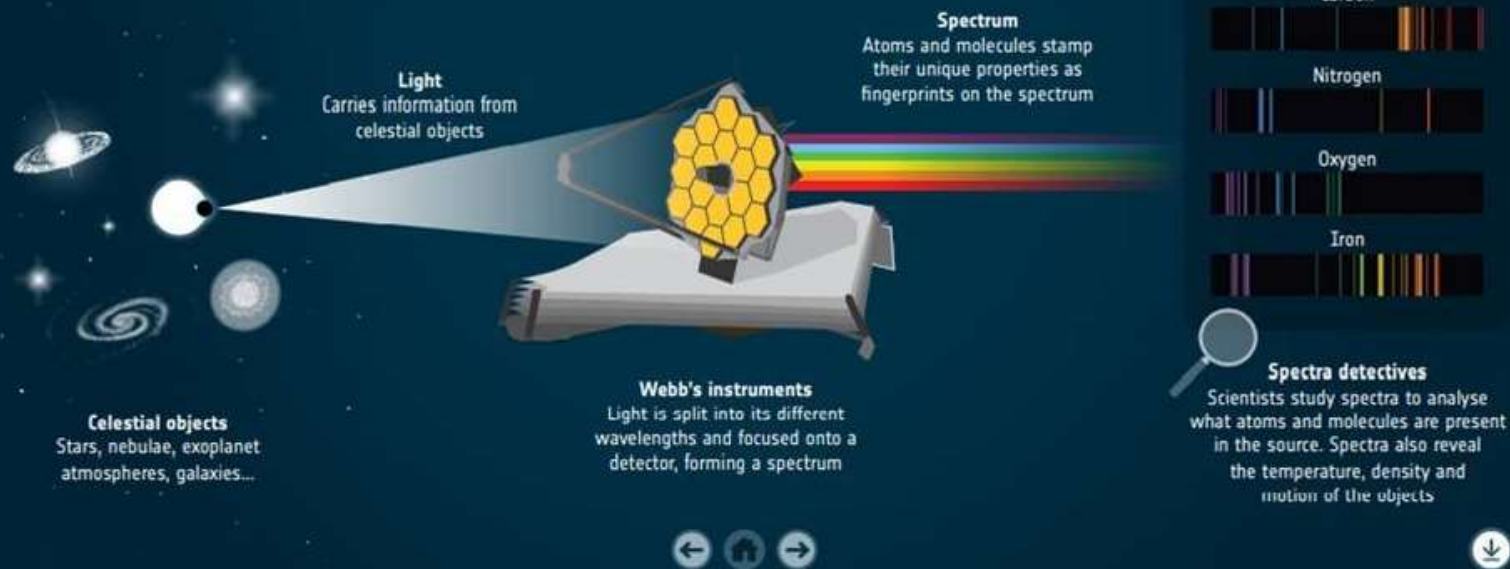


WEBB'S SCIENCE INSTRUMENTS



SPECTROSCOPY WITH WEBB

Spectroscopy is a tool that astronomers use to better understand the physics of objects in space. Like a prism splits white light from the Sun into its colour components (like a rainbow), Webb's spectrographs will dissect infrared light into its many wavelengths. This will provide detailed information about an object, such as how a galaxy moves or what molecules are present in an exoplanet's atmosphere.



WHY STUDY THE UNIVERSE IN INFRARED?



Near-infrared light reveals the formation of galaxies, and peers through the dust layers that enshroud new born stars



Mid-infrared light peers through the cold dusty regions where stars form, and reveals how massive stars and black holes shape their surroundings

The light of galaxies that are billions of light-years away travels to us through space that is expanding. This stretches the light's wavelength into the infrared allowing Webb to see far back in time

