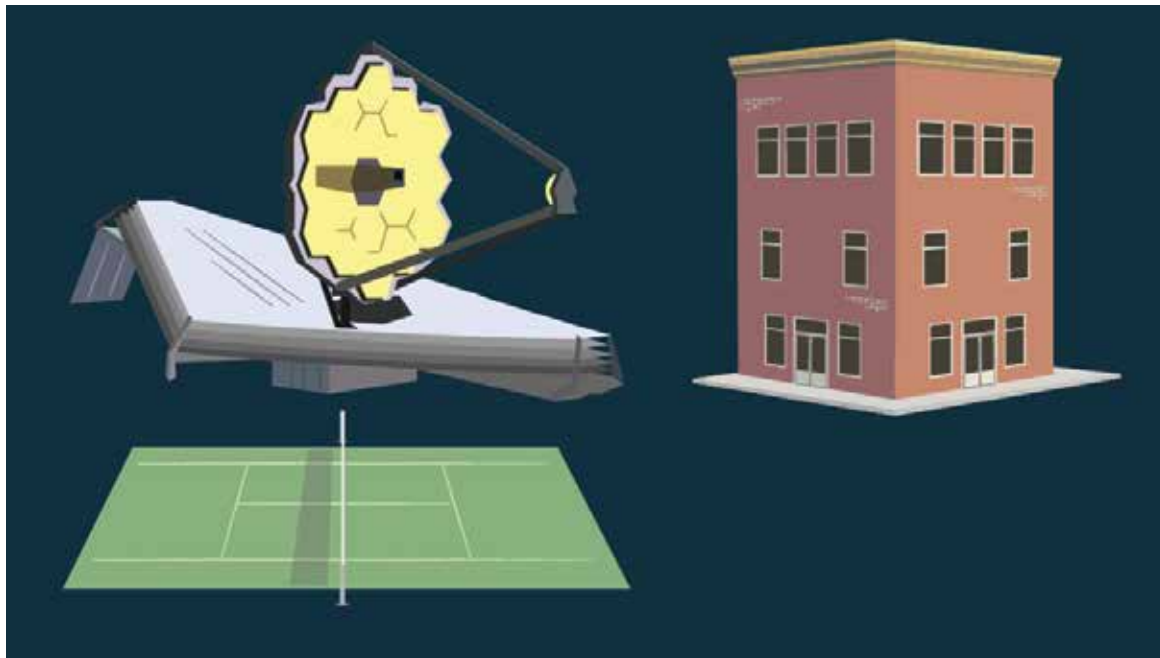


The James Webb Space Telescope

The James Webb Space Telescope is the most powerful and largest space telescope. The telescope can see some of the first galaxies ever formed. It can look inside dust clouds to see where new stars and planets are forming. It can also see the atmospheres of planets that are orbiting other stars.

The telescope is very big.

The James Webb Space Telescope is as tall as a 3-story building. It is as long as a tennis court. The mirrors of the telescope can fold up. They can then fit inside the rocket. When in space, the mirrors unfold.

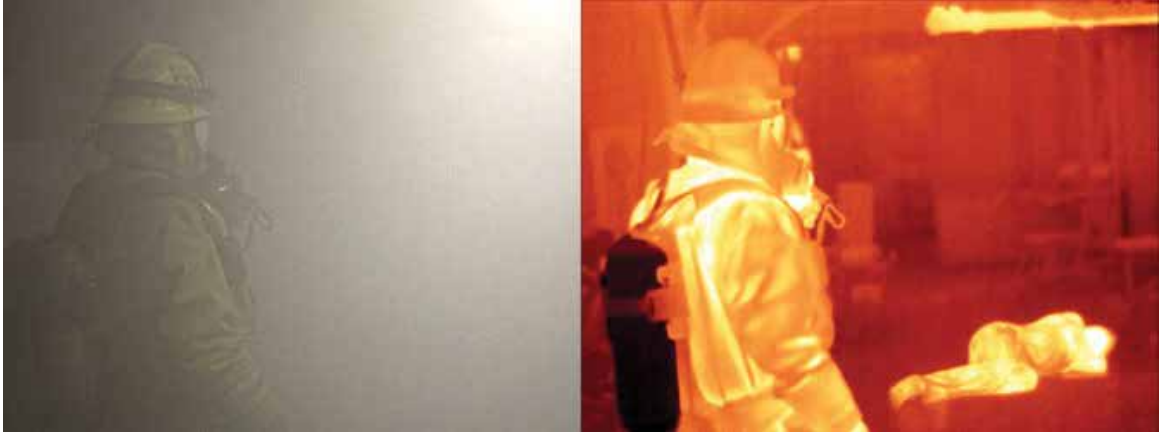


Credit: NASA/JPL-Caltech

The James Webb Space Telescope is about the same size as a tennis court and about as tall as a 3-story building!
<https://spaceplace.nasa.gov/james-webb-space-telescope/en/>

1. Is there a building near you that is 3-stories tall?
2. What would it be like to see a telescope that big?

It can see radiation that we cannot see.



Credit: NASA/IPAC/Pasadena Fire Dept.

Infrared cameras can see through dust and smoke.
<https://spaceplace.nasa.gov/james-webb-space-telescope/en/>

The James Webb Space Telescope sees the universe differently than many other telescopes. Most use visible light that we can see. The James Webb Space Telescope uses a kind of light called **infrared radiation**. We feel it as heat. On Earth, firefighters use infrared cameras during a fire. They can then see through smoke and rescue people. Stars and planets form inside dust clouds. The James Webb Space Telescope uses its infrared cameras to see through dust. Telescopes that use visible light cannot see through the dust well. The James Webb Space Telescope is able to see galaxies that are far away and formed long ago. The light coming from them is infrared.

3. What kinds of things could you see if you could see infrared radiation? (Think of places that are hot).

You could see infrared radiation from fires, machinery that produces heat, the heat given off by people and animals.



These are two Hubble images of the “Pillars of Creation” in the Eagle Nebula. The left image captures a visible light view, showing an opaque cloud of gas and dust. On the right, near-infrared light penetrates much of the gas and dust, revealing stars behind the nebula and hidden away inside the pillars.
<https://webbtelescope.org/contents/media/images/4178-Image>

A sun shield protects the telescope.

The James Webb Space Telescope has a sun shield. This protects its mirrors and instruments. They are sensitive to heat from the sun. It works like a hat that blocks some sunlight from getting to your eyes. If the sun shield wasn't in place, the temperature would be more than 600 degrees Fahrenheit.

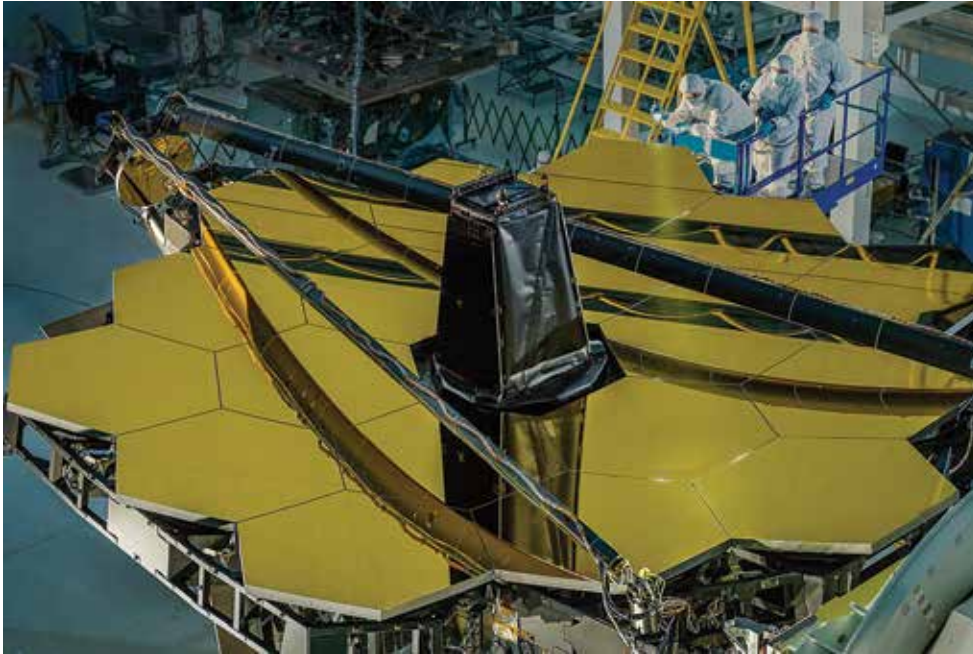


This image shows how the sunshield unfolded when the Webb telescope reached its home.
<https://spaceplace.nasa.gov/james-webb-space-telescope/en/>

4. The sun shield blocks some sunlight from the telescope and keeps the telescope from getting too hot. What are some other things that block sunlight from getting to your eyes?

Hats and visors, umbrellas, sunglasses and awnings all block sunlight from getting into our eyes.

There are 18 mirrors that fold up to make the telescope smaller.



Credit: NASA/Chris Gunn

Engineers inspecting the Webb telescope's mirrors at NASA's Goddard Space Flight Center.
<https://spaceplace.nasa.gov/james-webb-space-telescope/en/>

Mirrors are used by space telescopes to collect and focus light from distant stars. A bigger mirror sees more details. One big, heavy mirror is hard to get into space. So the Webb telescope was made from 18 smaller mirrors. The 18 mirrors are able to collect light from many different directions all at the same time. They fit together and fold up. The mirrors are connected and form one large mirror when it is in space.

The mirrors have a thin layer of gold to help reflect infrared light.

5. How can the mirrors of the Webb telescope fit in a spaceship?

The mirrors of the Webb telescope fold up so it can fit in the spaceship.

6. How does the James Webb space telescope collect light?

The James Webb Space Telescope has 18 small mirrors rather than one large mirror. The small mirrors can collect and focus much more light from many different directions all at the same time.

It will be hunting for signs of life on other planets.

Our solar system isn't the only home for planets. Scientists have discovered thousands of planets orbiting stars other than our Sun. The James Webb Space Telescope will help to study the atmospheres of these planets. The atmospheres of some planets could hold the building blocks for life. The James Webb Space Telescope can also help us understand more about how stars and galaxies form.