



Through the Telescope Resource Guide

Prepared by the Space Telescope Science Institute

On April 24, 1990, the space shuttle Discovery lifted off from Earth with its precious cargo, the Hubble Space Telescope. The next day, astronauts released the telescope into space to begin its journey of discovery. Today, Hubble continues to churn out groundbreaking science, revealing new views of the cosmos and helping to answer humanity's questions about the universe.

Featured Resources



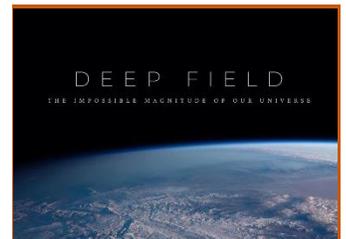
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Things to Do

Hands-on Activities

Make a Galaxy – use a template and everyday craft supplies to build your own spiral or elliptical galaxy.

<https://hubblesite.org/files/live/sites/hubble/files/home/hubble-30th-anniversary/resources/documents/H30%20Make%20a%20Galaxy.pdf>

Galaxy Trading Cards – download and print Hubble Galaxy Trading Cards to collect, sort, or play a game.

<http://amazingspace.org/uploads/pdf/name/52/galaxytradingcards.pdf>

Playing with Time: Modeling the Expanded Universe – use balloons to model the expanding universe and observe how expansion affects the distance between galaxies.

<https://media.universe-of-learning.org/documents/girlsSTEAM-Expanded-Universe-ActivityGuide.pdf>

Hubble Activity Sheets – color, connect-the-dots, decode words, and more.

<https://hubblesite.org/files/live/sites/hubble/files/home/hubble-30th-anniversary/resources/documents/HST%2030th%20Activity%20sheets.pdf>

Online Activities

Hubble Deep Field Academy – take a deep dive into the Hubble Deep Field image. Count and classify galaxies, and identify a mystery object. <https://deepfield.amazingspace.org>

Galaxy Hunter – explore the Hubble Deep Fields from a statistical point of view while investigating bias, variability, and sample sizes. <http://galaxies.amazingspace.org>

Observing with NASA – try your hand at processing images from NASA's telescopes, or capture and process your own. <https://mo-www.cfa.harvard.edu/OWN/index.html>

Interactive Image Explorations

Unveiling the Invisible Universe Interactives – explore the hidden universe, and other wavelengths of light, through these interactive sliders. https://viewspace.org/interactives/unveiling_invisible_universe

Hubble ‘Zoom’ Gallery – get up close and personal with these “zoomable” Hubble images.

<https://www.spacetelescope.org/images/archive/zoomable>

Things to Read

Hubble's Picture Book of the Universe – kid-friendly article about the history of Hubble and its discoveries. http://history.amazingspace.org/news/archive/2005/01/graphics/swn_hubpicturebk.pdf

Hubble Space Telescope: Time Machine to the Galaxies – kid-friendly article about galaxies and the Hubble Ultra Deep Field image.

http://history.amazingspace.org/news/archive/2004/03/graphics/SWN_HUDF.pdf

Hubble eBooks – a collection of digital books on the telescope, including one in Spanish.

<https://hubblesite.org/resource-gallery/ebooks>

Hubble: Mission and Telescope – background on Hubble, its instruments, servicing missions, and more.

<https://hubblesite.org/mission-and-telescope>

HubbleSite Science Articles – online readings about Hubble's key scientific achievements.

<https://hubblesite.org/resource-gallery/articles>

Edwin Hubble Expands Our View of the Universe – a biography of astronomer Edwin Hubble, the Hubble Space Telescope's namesake. <https://frontierfields.org/2014/09/05/edwin-hubble-expands-our-view-of-the-universe>

Hubble Quick Facts – an online collection of commonly asked questions about the telescope.

<https://hubblesite.org/quick-facts>

Things to Watch

Hubble: Voyage of Discovery – video highlights of compelling Hubble imagery and discoveries.

https://www.youtube.com/watch?v=NoOKQTb2h7A&feature=emb_title

The Hubble Space Telescope: Three Decades of Discovery – a fast-paced video montage of more than 600 Hubble images. These images are just a glimpse of the data collected by the telescope.

<https://www.youtube.com/watch?v=h4dYzGImCLs>

Deep Field: The Impossible Magnitude of our Universe – a unique film and musical experience from composer Eric Whitacre, inspired by the Hubble Deep Field image.

https://www.youtube.com/watch?v=yDiD8F9ItX0&list=PL3r-Yu9CBDbxPnzCLdXqkPkr4QJwV_FDk&index=2

Tonight's Sky – a video series of constellations you can observe in the night sky.

<https://www.youtube.com/playlist?list=PLm0MBdI3VIBWDVQvFuMrpZAMyPuBsvR-b>

Cosmic Concepts – short videos that explain key concepts about light, telescopes, and galaxies.

https://www.youtube.com/playlist?list=PLm0MBdI3VIBWUqizfXnOFPwNXWsp_vsQ0

Even More Things

Places to Visit

Hubble 30th Anniversary Events – learn about image unveilings and other anniversary events.

<https://hubblesite.org/hubble-30th-anniversary/events>

NASA Goddard Visitor Center – plan a visit, learn about special events, and check out the newest exhibits.

<https://www.nasa.gov/centers/goddard/visitor/home/index.html>

National Air and Space Museum – visit locations in either Washington, DC or Chantilly, VA.

<https://airandspace.si.edu>

Public Lecture Series – free, monthly lectures broadcast online and held live at the Space Telescope Science Institute. Each lecture features a noted scientist who discusses a different cosmic topic.

<https://hubblesite.org/resource-gallery/learning-resources/public-lecture-series>

Online archive of past lectures: https://www.youtube.com/playlist?list=PL3r-Yu9CBDbyj1SvcQfJ5q5SAssXIB_4R

Offitt Telescope Open House – held on the roof of the Bloomberg Center at the Johns Hopkins University, Homewood Campus. Generally held every Friday evening, weather permitting, starting after dusk. Check the web page for up-to-the-minute information. <https://md.spacegrant.org/observatory-open-house>

Night Sky Network – find astronomy clubs and night-sky observing events near you.

<https://nightsky.jpl.nasa.gov>

Additional Resources

- Hubble 30th Anniversary – <https://hubblesite.org/30>
- Hubble Space Telescope Mission – https://www.nasa.gov/mission_pages/hubble/main/index.html
- Space Telescope Live: What is Hubble looking at now? – <http://spacetelescopelive.org>
- Illuminated Universe Blog – <https://illuminateduniverse.org>
- Future Space Telescopes:
 - James Webb Space Telescope – <https://webbtelescope.org>
 - WFIRST – <https://wfirst.gsfc.nasa.gov>
- NASA Wavelength – <https://science.nasa.gov/learners/wavelength>
- Space Place – <https://spaceplace.nasa.gov>

Words from a Scientist: Hubble Inspiration

Most individuals viewing Hubble Space Telescope images are struck by their beauty. The detail seen in images of nebulae, galaxies, and planets sparks amazement and curiosity. It fascinates me when people take time to linger a bit before a Hubble image, reflecting on it, and then formulating questions about the object and the universe. This is doing science! Hubble imagery causes curiosity in scientists as well, stimulating a quest for more information about our universe and our place in it.

The Hubble Space Telescope is a technical wonder, and its design is a result of the vision and tenacity of scientists and engineers in the 1970s. Hubble was serviced by astronauts five times and is more powerful now than when it was launched into orbit 30 years ago. The resulting advancement in scientific research is the payoff.

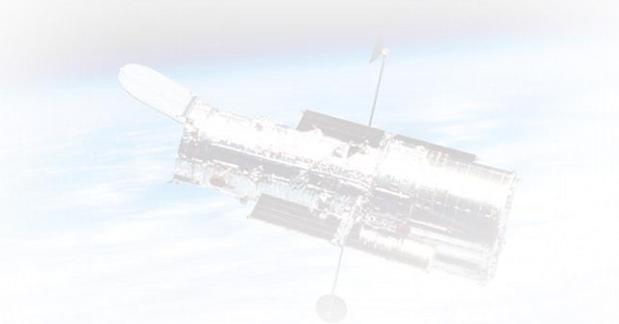
With this amazing telescope, we have studied our solar system: watching collisions of asteroids and comets; surveying huge, whirling storms on the giant planets; and detecting objects far beyond the orbit of Pluto. The diversity of the planets in our solar system, coupled with the detailed study of exoplanets, has shown that various types of planetary systems have formed. Star-forming regions, dying stars, and supernovae explosions have been mapped in great detail with Hubble. We have also seen colliding galaxies, galaxy clusters, and evidence for black holes.

Scientists and the public alike have been fascinated by the number and variety of distant galaxies revealed in the Hubble Deep Field images, which provided the first glimpse of a time when galaxies began forming. We subsequently used gravitational lenses to boost the observing power of Hubble, revealing very distant supernovae explosions, newly formed galaxies, and demonstrating the evidence for dark matter and dark energy.

Hubble arguably provides the most significant advancements in astronomy since Galileo turned a telescope to the sky. Its achievements have generated new scientific questions, along with bold ambitions to build new space telescopes with unique capabilities. These telescopes will study, and help to resolve, the cosmic mysteries that Hubble has begun to unveil.

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