# Accessible Astronomy Resources

“The International Astronomical Union (IAU) has recognized the potential of astronomy to contribute to education and creating a better world. To fulfill this potential, however, astronomy must be accessible to everyone, regardless of background, learning styles or ability. By becoming more inclusive, the field of astronomy can help ensure that everyone interested has access to information and, technological resources, and can become involved in astronomy if they set their minds to it.” [Scientific American](http://blogs.scientificamerican.com/voices/making-astronomy-accessible-for-the-visually-impaired/)

## Textbooks

* [Reach for the Stars: Touch, Look, Listen, Learn](http://www.perkins.org/stories/blog/the-stars-come-out-in-accessible-e-book) Free downloadable ebook for Ipads (grades 4-8)
  + <http://www.nbp.org/ic/nbp/REACHSTARS.html> Reach for the Stars Graphic Overlays
* [Touch the Universe](https://www.amazon.com/Touch-Universe-NASA-Braille-Astronomy/dp/030908332X): A NASA Braille Book of Astronomy $200 approx
  + **Touch the Universe** is a unique and innovative astronomy book that will help visually impaired people "see" the wonders of our universe. Using a combination of Braille and large-print captions that face 14 pages of brilliant Hubble Space Telescope photos, it is embossed with shapes that represent various astronomical objects such as stars, gas clouds, and jets of matter streaming into space.
* [The Sky at your Fingertips](http://archive.oapd.inaf.it/ariveder/en/intro.htm) Online book with images that can be printed as tactile graphics.

## Multimedia

### Audio and Video

* [The Blind Astrophysicist](http://www.wnyc.org/story/128509-blind-astrophysicist/) – 8:21
* [Ted Talk with Dr.](http://blogs.scientificamerican.com/voices/making-astronomy-accessible-for-the-visually-impaired/) Wanda Diaz Merced, the blind astrophysicist

### Sounds

* [Jovian Radio Emissions](http://radiojove.gsfc.nasa.gov/library/mm_exhibits.htm)
* [Jovian S Burst](http://radiojove.gsfc.nasa.gov/library/mm_exhibits.htm)
* [Jovian L Burst](http://radiojove.gsfc.nasa.gov/library/mm_exhibits.htm)
* [Galactic Radio Background](http://radiojove.gsfc.nasa.gov/library/mm_exhibits.htm)
* [Sounds of the Magnetosphere](http://www-pw.physics.uiowa.edu/plasma-wave/istp/polar/magnetosound.html)
* [Sounds of Space](http://www-pw.physics.uiowa.edu/space-audio/) (Univ. of Iowa)
* [Juno Waves](http://www-pw.physics.uiowa.edu/juno/audio/)

#### Radio Telescope/Receivers

Listen online to the night sky through the [WCC (Windward Community College) Radio Observatory](http://jupiter.wcc.hawaii.edu/newradiojove/realtime.htm) . Real time data.

Or build your own radio receiver/telescope:

* the [Inspire VLF-3 Radio Receiver Kit](http://theinspireproject.org/default.asp?contentID=27) to collect natural radio and other low frequencies: Approx.$141.
* Or the [RadioJove receiver kit](http://radiojove.gsfc.nasa.gov/office/order_form.html) – $165 - $210

#### Sonification of Space Data

* [Sounds of Space project](http://cse.ssl.berkeley.edu/stereo_solarwind/sounds.html). Associating particular data on space with musical sounds so someone without sight could manipulate the audio model and isolate sounds and see how they mix.
* Berkeley [Solar Wind](http://cse.ssl.berkeley.edu/stereo_solarwind/sounds_links.html): Sonification links for Geospace and Other Planets.

## Tactile Images

[Chandra X-ray Observatory](http://chandra.harvard.edu/resources/misc/visually_impaired.html) has free Braille/Tactile Posters for educators.

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| VISIBLE SUN | 17.25" x 18.25" | [Sun](http://chandra.si.edu/graphics/edu/request/SUNfinal_reduced.pdf) |
| ULTRA VIOLET SUN | 17.25" x 18.25" | [Crab Nebula](http://chandra.si.edu/graphics/edu/request/CRABfinal_reduced.pdf) |
| ETA CARINAE | 17.25" x 18.25" | [Eta Carinae](http://chandra.si.edu/graphics/edu/request/ETAfinal_reduced.pdf) |
| WHIRLPOOL | 17.25" x 18.25" | [Whirlpool](http://chandra.si.edu/graphics/edu/request/WHIRLPOOLfinal_reduced.pdf) |
| KINDS OF LIGHT | 34.5" x 18" | [Kinds of Light](http://chandra.si.edu/graphics/edu/request/EMSfinalreduced.pdf) |

[NASA Space tactile images](http://amazingspace.org/tactile-astronomy/)

* "Star Birth in the Carina Nebula"
* "Globular Star Cluster Omega Centauri"
* "Butterfly Planetary Nebula"
* "Galactic Wreckage in Stephan's Quintet"
* "Barred Spiral Galaxy, NGC 6217"
* "Hubble Views Distant Galaxies  
  Through Cosmic Lens"
* "Hubble Views a Grand Star-Forming Region"
* "Cosmic Ice Sculptures in the Carina Nebula"
* "Starburst Cluster Shows Celestial Fireworks"
* "Galaxy History Revealed in this Hubble View"
* "Saturn and Its Rings"
* "Hubble Finds Bright Clouds on Uranus"
* "Mars: The Dynamic Planet"
* "Asteroid Vesta"
* Neptune Finishes First Orbit Around Sun Since Its Discovery"
* Hubble Discovers Another Moon Around Pluto"
* IN CELEBRATION OF HUBBLE'S 22nd ANNIVERSARY YEAR: "A Panoramic View of a Turbulent Star-Forming Region" This**special release set**, provided as a ZIP file, includes the full image of star-forming region, 30 Doradus, and two enlargements. Each image has a separate caption file.

[SEE Project tactile images](http://analyzer.depaul.edu/SEE_Project/)

* The Moon
  + [Exploring the Moon's Phases](http://analyzer.depaul.edu/SEE_Project/MoonPhases/MoonPhases.htm)
* The Sun
  + [Tracking Sunspots](http://analyzer.depaul.edu/see_project/Sunspots/default.htm)
  + [Our Very Own Star: The Sun](http://analyzer.depaul.edu/see_project/OurSun)*(SEE Project Edition)*
* Asteroids
  + [Tactile Diagrams of Asteroid Orbits](http://analyzer.depaul.edu/see_project/orbits/default.htm)
* The Sky
  + [Tactile Planisphere](http://analyzer.depaul.edu/see_project/Starwheel/Default.htm) \*\*\*
* Stars
  + [Investigating Variable Stars](http://analyzer.depaul.edu/SEE_Project/VariableStars/VariableStars.htm)

### 3D Models

* <http://astrokit.uv.es/downloads.html>
  + The Moon: The 3D file “3Dmoon.stl” has been produced using MeshLab (by Visual Computing Lab -ISTI - CNR), and is ready to be printed at any 3D printing service. It is is licensed under a Creative Commons Attribution-NonCommercial-NoDerivs 3.0 Unported License.
* <https://nasa3d.arc.nasa.gov/models/printable>

### Interactives

<http://prime.jsc.nasa.gov/earthplus/software.htm> Earth+

* [With solar system maps](http://maps.jpl.nasa.gov/)