



Life and Death of Stars

We find a rich periodic table of elements across our planet and the cosmos. Where did all of these elements come from? The answer lies in the stars.

Featured Activities



[3D Printing the X-ray Universe](#)



[Supernova! Toolkit](#)



[Virtual Reality: Walking among the Stars](#)

Resource Library

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<u>Downloadable Posters & Handouts</u>	<u>Presentations & Talks</u>	<u>Reading Materials</u>

[Other STEM Resources](#)

Science Background Resources

- A Guide to Understanding Stellar Evolution (Beta)
<http://chandra.cfa.harvard.edu/stellarev/>
- Chandra: Stellar Evolution Field Guide
http://chandra.harvard.edu/xray_sources/stellar_evolution.html
- Cool Cosmos: Star Birth
http://coolcosmos.ipac.caltech.edu/page/star_birth
- Cool Cosmos: Star Death
http://coolcosmos.ipac.caltech.edu/page/star_death
- Do the Stars Really Move?
<http://www.spitzer.caltech.edu/video-audio/121-ask2005-002-Do-the-Stars-Really-Move->
- How do Stars Live and Die?
https://www.youtube.com/watch?v=ASSkPvXo2mo&feature=player_embedded
- What's a Nebula?
<https://spaceplace.nasa.gov/nebula/en/>
- What's a Supernova?
<https://spaceplace.nasa.gov/supernova/en/>
- What's Between the Stars?
<http://www.spitzer.caltech.edu/video-audio/161-ask2008-006-What-s-Between-the-Stars->
- Why Aren't There Any Green Stars?
<http://www.spitzer.caltech.edu/video-audio/150-ask2008-002-Why-Aren-t-There-Any-Green-Stars->
- Why Stars Explode?
<http://mystery.sonoma.edu/solarsupernova/background.html>

Activities

- 3D Printing the X-ray Universe
<http://chandra.cfa.harvard.edu/deadstar/>
- Chandra: Stellar Evolution Activities
http://chandra.harvard.edu/edu/formal/stellar_ev/
- Interactive: Journey through an Exploded Star
<http://smithsonianeducation.org/supernova/supernova2.html>
- Origami Universe: A Star Explodes
<http://chandra.cfa.harvard.edu/origami/#star>
- Paper Circuits: Stars
<http://chandra.harvard.edu/make/>
- Recoloring the Universe: Coding & Coloring Stars
<http://chandra.cfa.harvard.edu/code>
- Stellar Evolution Scavenger Hunt
http://chandra.harvard.edu/resources/handouts/constellations/activities/stellar_evol.pdf
- Supernova! Toolkit
https://nightsky.jpl.nasa.gov/download-view.cfm?Doc_ID=275
- Supernova Educator Guide
<http://epo.sonoma.edu/xmm/edu/supernova/snguide13web.pdf>
- The 3D Printed Universe: Touching the Stars Tactile/Braille Kit
http://chandra.si.edu/tactile/3d_printing.html
- Unveiling the Invisible Universe Interactives: Star Birth & Star Death
https://viewspace.org/resources/invisible_universe
- Virtual Reality: Walking among the Stars
<http://chandra.cfa.harvard.edu/vr/>

Multimedia

Podcasts: Normal Stars & Star Clusters
http://chandra.harvard.edu/resources/podcasts/by_category_stars.html

ViewSpace
<https://viewspace.org/>

✧ *Videos for young learners:*

A Star is Born
<https://universeunplugged.ipac.caltech.edu/video/think-tank-a-star-is-born>

Space Scoop: A Field Trip to Star School
https://www.youtube.com/watch?v=gkshJ4R_aWw

Space Scoop: A Flare for the Dramatic
<https://www.youtube.com/watch?v=amW00UqBB30>

Space Scoop: The Big Explosion No One Saw
<https://www.youtube.com/watch?v=bJMvGrWy1rk>

Space Scoop: The Most Attractive Stars in the Universe
https://www.youtube.com/watch?v=2N_Zf9Vms5w&list=PLkVRJfUnLRNLXhE-Plav87l8YdYYH5497&index=7&t=0s

Space Scoop: The Mysterious Afterlife of Stellar Giants
<https://www.youtube.com/watch?v=7XSGCxV6CH4>

Space Scoop: The Star That Lived Two Lives
<http://chandra.cfa.harvard.edu/photo/2013/keeper/kids.html>

Space Scoop: X-ray Vision Reveals the Insides of Stars
<https://www.youtube.com/watch?v=LzfuKcx2KSs&list=PLkVRJfUnLRNLXhE-Plav87l8YdYYH5497&index=13&t=0s>

When Stars go Boom
<https://universeunplugged.ipac.caltech.edu/video/think-tank-when-stars-go-b...>

✧ *Videos for teens/adults:*

Hidden Universe: Echoes of a Supernova
<https://www.youtube.com/watch?v=7GPCdCsrQJs&list=PL0975C89E9E457412&...>

Hidden Universe: Orion Nebula
<https://www.youtube.com/watch?v=uL-ciZB89i4&list=PL0975C89E9E457412&...>

Hidden Universe: Protostellar Jets
<https://www.youtube.com/watch?v=Rm3Sj8qAaWg&list=PL0975C89E9E457412&...>

Hidden Universe: The Omega Nebula
<https://www.youtube.com/watch?v=1Ba9lbuVdbw&list=PL0975C89E9E457412&...>

Hidden Universe: The W5 Stellar Blast Furnace
<https://www.youtube.com/watch?v=4UNQH9xWgnU&list=PL0975C89E9E457412&...>

✧ *Science Visualizations:*

A Quick Look at Cassiopeia A
<https://www.youtube.com/watch?v=VbL27QdyBvY&list=PLkVRJfUnLRNkCzBNhoLJBRMZFFIagxC&index=20&t=0s>

A Quick Look at the Crab Nebula
<https://www.youtube.com/watch?v=vxVUZ8lgOks&list=PLkVRJfUnLRNkCzBNhoLJBRMZFFIagxC&index=8&t=0s>

A Tour of Supernova 1987A
<https://www.youtube.com/watch?v=ITvAdZzNFb0&list=PLkVRJfUnLRNICn94JL5Qq-hqz43vNtoBc&index=43&t=0s>

(Multimedia continues on next page.)

Flight through the Orion Nebula in Visible and Infrared Light
<https://www.youtube.com/watch?v=07dve0EnUX8>

Kepler Supernova Remnant in Multiple Wavelengths
<http://hubblesite.org/video/1047/science>

Omega Cen. Hertzsprung-Russell
<http://hubblesite.org/video/35/science>

Stars: Massive Engines of Creation
<https://webbtelescope.org/contents/media/videos/1198-Video>

Tour of Cassiopeia A
<https://www.youtube.com/watch?v=-RYADIW7vk&list=PLkVVRJfUnLRNICn94JL5Qq-hqz43vNtoBc&index=28&t=0s>

Vision across the Full Spectrum: The Crab Nebula, from Radio to X-ray
<http://hubblesite.org/video/1023/science>

✧ **Graphics:**

Blast from the Past! Historic Supernovas Infographic
[JPEG \(72dpi\)](#), [PDF \(300dpi\)](#)

Composition of the First Stars Infographic
<https://webbtelescope.org/contents/media/images/4353-Image>

Lifecycles of Sun-like and Massive Stars Infographic
<https://webbtelescope.org/contents/media/images/4190-Image?itemsPerPage=100>

Massive Stars: Engines of Creation Infographic
<https://webbtelescope.org/contents/media/images/4359-Image?itemsPerPage=100>

Neutron Stars Infographic
[JPEG \(72dpi\)](#), [PDF \(300dpi\)](#)

Stellar Evolution Infographic
[JPEG \(72dpi\)](#), [PDF \(300dpi\)](#)

Stellar Evolution Illustrations
http://chandra.harvard.edu/resources/illustrations/stellar_evolution.html

Supernova Infographic
[JPEG \(72dpi\)](#), [PDF \(300dpi\)](#)

The Life Cycle of a Sun-like Star (annotated)
<https://exoplanets.nasa.gov/resources/165/the-life-cycle-of-a-sun-like-star...>

The Lives of Stars Infographic
<https://exoplanets.nasa.gov/resources/2162/the-lives-of-stars/>

Downloadable Posters & Handouts

Blast from the Past! Historic Supernovas poster

http://chandra.harvard.edu/stellarev/images/Timeline_Blast.pdf

Chandra Lithographs & Handouts

<http://chandra.harvard.edu/resources/handouts/lithos/index.html>

Helix Nebula lithograph

http://amazingspace.org/resource_page/68/stars_stellar_evolution/type#resource_tab

Multiwavelength Crab Nebula lithograph

http://amazingspace.org/resource_page/544/electromagnetic/type#resource_tab

Orion Nebula lithograph

http://amazingspace.org/resource_page/545/stars_stellar_evolution/type#resource_tab

SN 1987A lithograph

http://amazingspace.org/resource_page/540/electromagnetic/type#resource_tab

Secrets of Starlight poster

https://media.history.amazingspace.org/visions/pdf/stars_poster_hi-res.pdf

Star birth in Orion poster

http://history.amazingspace.org/visions/panel_starbirth_orion.php

Star-forming Nebula N90 lithograph

http://amazingspace.org/resource_page/30/electromagnetic/type#resource_tab

Stellar Evolution poster

http://chandra.harvard.edu/stellarev/images/Stellar_Evolution_Poster.pdf

Stellar Explosions poster

http://history.amazingspace.org/visions/panel_stellar_explosion.php

Presentations & Talks

A Multi-wavelength View of Stellar Life and Death in M83

<https://www.youtube.com/watch?v=fRpl4lOggOo&list=PL3r-Yu9CBDbyj1SvcQfJ5...>

Active Luminous Blue Variables in the Large Magellanic Cloud

<https://www.youtube.com/watch?v=e4e56ZhpG-4&list=PL3r-Yu9CBDbyj1SvcQfJ5...>

Ashes to Ashes, Dust to Dust: The Fate of Stars like the Sun

<https://www.youtube.com/watch?v=DN1wu71HvQ4&list=PL3r-Yu9CBDbyj1SvcQfJ5...>

Chasing Supernovae with Kepler

<https://www.youtube.com/watch?v=DS0FE-iJm74&list=PL3r-Yu9CBDbyj1SvcQfJ5...>

How to Hold a Dead Star in Your Hand | TEDxProvidence

<https://www.youtube.com/watch?v=8kTMr5LqIBQ>

Science Briefings: Star Birth

<https://www.universe-of-learning.org/science-briefings/tag/Star+Birth>

Science Briefings: Stellar Death

<https://www.universe-of-learning.org/science-briefings/tag/Stellar+Death>

Star Formation in Orion

<https://www.youtube.com/watch?v=8d-AwbDFxg4&list=PL3r-Yu9CBDbyj1SvcQfJ5...>

The Deaths and Afterlives of Massive Stars

https://www.youtube.com/watch?v=Kzlu8YkfSGE&list=PL3r-Yu9CBDbyj1SvcQfJ5q5SAssXIB_4R

The Harvard "Computers" and the Classification of Stars

<https://www.youtube.com/watch?v=dhF2bOrKWks&list=PL3r-Yu9CBDbyj1SvcQfJ5...>

The Weirdest Stars in the Universe

<https://www.youtube.com/watch?v=xcW0gxkvy-s&list=PL3r-Yu9CBDbyj1SvcQfJ5...>

Reading Materials

Online Articles

- ✧ A History of the Crab Nebula
http://amazingspace.org/resource_page/208/stars_stellar_evolution/type#reso...
- ✧ Hot Stories of Cool Science: Star Birth Edition
http://chandra.harvard.edu/edu/hot_stories.html
- ✧ Key Events in the History of SN 1987A
http://amazingspace.org/resource_page/210/stars_stellar_evolution/type#reso...
- ✧ The Glorious End of Stellar Life
http://amazingspace.org/resource_page/227/stars_stellar_evolution/type#reso...

WorldCat Reading Lists

- ✧ Adults:
<https://www.worldcat.org/profiles/hgreat/lists/3882809>
 - ✧ Teens:
<https://www.worldcat.org/profiles/hgreat/lists/3883219>
 - ✧ Young Readers:
<https://www.worldcat.org/profiles/hgreat/lists/3882318>
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Other STEM Resources

Find *'more to explore'* at the following partner sites:

NASA Wavelength

<https://science.nasa.gov/learners/wavelength>

STAR_net: STEM Activity Clearinghouse

<http://clearinghouse.starnetlibraries.org/>

National Informal STEM Education Network: Earth & Space toolkit

<http://www.nisenet.org/earthspacekit>

Bringing the Universe to America's Classrooms: Black Hole Apocalypse | Stellar Life Cycles

<https://pbslearningmedia.org/resource/nvbh-sci-stellarlife/wgbh-nova-black-hole-apocalypse-stellar-life-cycles/>

NASA's Universe of Learning materials are based upon work supported by NASA under award number NNX16AC65A to the Space Telescope Science Institute, working in partnership with Caltech/IPAC, Jet Propulsion Laboratory, Smithsonian Astrophysical Observatory, and Sonoma State University. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Aeronautics and Space Administration.