

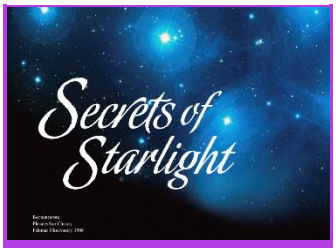
Life and Death of Stars

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 Resources



Walking Among the Stars



Secrets of Starlight



Supernova! Toolkit



When Stars Go Boom!

Inside this Guide

Science Background Resources	Activities	Multimedia
Downloadable Posters & Handouts	Presentations & Talks	Reading Materials

Other STEM Resources

Science Background Resources

A Guide to Understanding Stellar Evolution
http://chandra.cfa.harvard.edu/stellarev

Ask an Astronomer: Do the Stars Really Move?
https://www.youtube.com/watch?v=uUuVMhp-4pA

Ask an Astronomer: How do Stars Live and Die?
https://www.youtube.com/watch?v=ASSkPvXo2mo&feature=player_embedded

Ask an Astronomer: What's Between the Stars?
https://www.youtube.com/watch?v=DUkBmURrZjo

Ask an Astronomer: Why Aren't There Any Green Stars?
https://www.youtube.com/watch?v=m8GXpk8PZ-o

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

What Is a Nebula?
https://spaceplace.nasa.gov/nebula/en

What Is a Supernova?
https://spaceplace.nasa.gov/supernova/en

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

The 3D Printed Universe: Touching the Stars Tactile/Braille Kit
http://chandra.si.edu/tactile/3d_printing.html

Unveiling the Invisible Universe Interactives: Star Death
https://viewspace.org/interactives/unveiling_invisible_universe/star_death/crab_nebula

Unveiling the Invisible Universe Interactives: Star Formation
https://viewspace.org/interactives/unveiling_invisible_universe/star_formation/eagle_nebula

Virtual Reality: Walking among the Stars
https://chandra.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

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=amWO0UqBB30

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
https://www.youtube.com/watch?v=P4jzms8MYkY

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

Think Tank: A Star is Born
https://www.youtube.com/watch?v=-XJlfSMkNqc

Think Tank: When Stars go Boom
https://www.youtube.com/watch?v=mYjXYRTzqjk

Videos for Teens / Adults

Ask the Astronomers: A 3D Look into the Orion Constellation
https://universeunplugged.ipac.caltech.edu/video/ata-20-08-05

Ask the Astronomers: Supernovas!
https://universeunplugged.ipac.caltech.edu/video/live-chat-apr-9-2020

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=PLkVRJfUnLRNKcHazBNhoLJBRMZFFlAgxC&index=20&t=0s

A Quick Look at the Crab Nebula
https://www.youtube.com/watch?v=vxVUZ8IgOks&list=PLkVRJfUnLRNKcHazBNhoLJBRMZFFlAgxC&index=8&t=0s

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

Crab Nebula: The Multiwavelength Structure of a Pulsar Wind Nebula
https://www.youtube.com/watch?v=Qm1VscNlMK8&feature=emb_title

Eta Carinae: The Great Eruption of a Massive Star
https://www.youtube.com/watch?v=07hqULmszC8

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

Kepler Supernova Remnant in Multiple Wavelengths
https://www.youtube.com/watch?v=ebaUBUmIB9M

Omega Cen. Hertzsprung-Russell
https://www.youtube.com/watch?v=PsS80huL47c

Massive Stars: Engines of Creation
https://www.youtube.com/watch?v=LIYb3IWcyN0

Tour of Cassiopeia A
https://www.youtube.com/watch?v=-RYADIlW7vk&list=PLkVRJfUnLRNICn94JL5Qq-hqz43vNtoBc&index=28&t=0s

Vision across the Full Spectrum: The Crab Nebula, from Radio to X-ray
https://www.youtube.com/watch?v=xBNJumQd4WM&feature=emb_title

Graphics

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

Composition of the First Stars Infographic
https://science.nasa.gov/asset/webb/first-stars-composition/

Lifecycles of Sun-like and Massive Stars Infographic
https://science.nasa.gov/asset/webb/life-cycles-of-sun-like-and-massive-stars/

Massive Stars: Engines of Creation Infographic
https://science.nasa.gov/asset/webb/massive-stars-engines-of-creation-infographic/

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

Stars Lithographs
https://science.nasa.gov/mission/hubble/multimedia/lithographs/#stars

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

Stellar Evolution poster
http://chandra.harvard.edu/stellarev/images/Stellar_Evolution_Poster.pdf

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

Visions of the Universe: Secrets of Starlight poster
https://www.universe-of-learning.org/files/live/sites/uol/files/home/resources/projects/_documents/7-visions_stars_poster_hi-res.pdf

Visions of the Universe: Star Birth in Orion poster
https://www.universe-of-learning.org/files/live/sites/uol/files/home/resources/projects/_documents/8-visions_starbirth_orion_poster_hi-res.pdf

Visions of the Universe: Stellar Explosions poster
https://www.universe-of-learning.org/files/live/sites/uol/files/home/resources/projects/_documents/9-visions_stellar_explosions_poster_hi-res.pdf

Presentations & Talks

A Multi-wavelength View of Stellar Life and Death in M83
https://www.youtube.com/watch?v=fRpl4I0ggOo&list=PL3r-Yu9CBDbyj1SvcQfJ5...

Active Luminous Blue Variables in the Large Magellanic Cloud
https://www.youtube.com/watch?v=e4e56ZhpG-4&list=PL3r-Yu9CBDbyj1SvcQfJ5...

Ask the Astronomers Video Series
https://universeunplugged.ipac.caltech.edu/series/ask-the-astronomers-live

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...

Cloudy with a Chance of Stars
https://www.youtube.com/watch?v=6MCw8q6CCKA&list=PL3r-Yu9CBDbyj1SvcQfJ5q5SAssXIB_4R&index=13

Eta Carinae and the Homunculus Nebula in 3D
https://www.youtube.com/watch?v=H1WuiiVZJaM&list=PL3r-Yu9CBDbyj1SvcQfJ5q5SAssXIB_4R&index=3

How to Hold a Dead Star in Your Hand | TEDxProvidence
https://www.youtube.com/watch?v=8kTMr5LqIBQ

Science Briefings: Life & Death of Stars
https://www.universe-of-learning.org/resources/projects/science-briefings

Star Formation in Orion
https://www.youtube.com/watch?v=8d-AwbDFxg4&list=PL3r-Yu9CBDbyj1SvcQfJ5...

The Crab Nebula and Things that Go Kaboom in the Night
https://www.youtube.com/watch?v=_2Fte8xkTpo&list=PL3r-Yu9CBDbyj1SvcQfJ5q5SAssXIB_4R&index=12

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...

Why We Need to Understand Stars to Find the Next Earth
https://www.youtube.com/watch?v=rzX4zznekY8&list=PL3r-Yu9CBDbyj1SvcQfJ5q5SAssXIB_4R&index=45&t=0s

Reading Materials

Online Articles

Hot Stories of Cool Science: Star Birth Edition
http://chandra.harvard.edu/edu/hot_stories.html

What Were the First Stars Like?
https://science.nasa.gov/mission/webb/science-overview/science-explainers/what-were-the-first-stars-like/

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

Other STEM Resources

Find 'more to explore' at the following sites:

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: Space Collection
https://mpt.pbslearningmedia.org/collection/universe/topic/space/

SVS Astrophysics Gallery
https://svs.gsfc.nasa.gov/Gallery/astro.html

The Origin of the Elements
http://www.astronomy.ohio-state.edu/~jaj/nucleo

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