

NASA Science4Girls Resources in Astrophysics

Created by [Science4Girls](#) Last updated 2/21/2014

This list includes many activities that have been used in Astrophysics-focused Science4Girls events in 2012 and 2013. Peruse the list to find one that may complement your 2014 Science4Girls event.



Observing with NASA

Notes: The MicroObservatory telescopes have been a successful part of NASA Science4Girls programs over the last two years! With this resource, users can control the ground-based MicroObservatory telescopes from their computer and download their images themselves, with no human intervention in the loop. Users can access the Observing With NASA "Control Telescope" web interface at anytime. The telescopes are weatherproof and do not require a dome for protection, and the "Control Telescope" software automatically lets users know which targets are up that night. Even first-time observers can control the instrument without dependence on a telescope operator or other outside experts.

AAAS Benchmarks: [4A/E2](#), [4A/H3](#), [10A/M2](#)

More info: <http://www.nasawavelength.org/resource/nw-000-000-003-111>

Resource URL: <http://mo-www.harvard.edu/OWN/>



Here, There and Everywhere Poster Set

Notes: HTE is now in its third year as a NASA Science4Girls partner! This series of visual presentations illustrates common physics principles across vastly different scales, using human-scale photographs, earth science and astrophysics imagery. The products look at such topics as shadows, wind, bow waves and collisionally-excited gas. The intent is to show how familiar processes on Earth are connected to more exotic and less well-known phenomena across the Universe. These laws apply here (in daily life), there (around Earth and the Solar System), and everywhere (throughout the cosmos). The poster set is part of the Here, There, Everywhere (HTE) collection.

AAAS Benchmarks: [1A/H1](#)

More info: <http://www.nasawavelength.org/resource/nw-000-000-003-116>

Resource URL: <http://hte.si.edu/images/posters.pdf>



Visions of the Universe: Four Centuries of Discovery

Notes: Visions of the Universe was part of the inaugural year of NASA Science4Girls and has been featured at events every year since! This exhibit uses text and images to portray humanity's views of the universe and how they have evolved over time. It includes six two-sided panels that feature key astronomical discoveries from the past



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400 years. The exhibit also highlights the technological advancements that made these discoveries possible. Exhibit topics range from celestial objects within our own "cosmic backyard" to those beyond the realm of our solar system. Featured objects include the sun, the moon, Saturn, Mars, comets, stars, nebulae, and galaxies. Images are accompanied by captions that highlight relevant, historical discoveries. Each exhibit panel is supported by supplemental resource materials available online in a downloadable, PDF format. Resource materials include science background information in the form of Q

More info: <http://www.nasawavelength.org/resource/nw-000-000-002-836>

Resource URL: <http://amazing-space.stsci.edu/visions>



Afterschool Universe

Notes: Afterschool Universe was created by one of the original NASA Science4Girls science education teams and is excellent in venues such as libraries. This astronomy program is designed for middle school children in out-of-school-time settings. The program explores basic astronomy concepts (like invisible light, telescopes) and focuses on the universe outside the solar system (stars, galaxies, black holes). The program is structured for use in a variety of settings, including astronomy days, summer camps, or year-long afterschool programs. Although session activities build concepts sequentially, each session activity is designed to be freestanding as not all participants may attend every session. A manual provides background information and descriptions of how to conduct each activity. A companion website provides additional information and resources for the program leader.

More info: <http://www.nasawavelength.org/resource/nw-000-000-002-835>

Resource URL: <http://universe.nasa.gov/au/>



Universe Discovery Guides

Notes: Designed for informal audiences, the Universe Discovery Guides highlight astrophysics education and public outreach resources from across more than 30 NASA astrophysics missions and programs. The 12 free guides, one per month, are designed to be short and modular, so that users can easily select content based upon their needs. So it is easy to find activities that match what's happening in tonight's sky. Each of the guides addresses a common astrophysics topic and contains the following sections: interpretive story, night sky feature(s) to observe, media and strategies useful in conveying the science topic, activities that have passed the NASA education product review, and background information and contemporary press-releases for context.

AAAS Benchmarks: [4A/M1bc](#), [4A/M2de](#), [4A/H2ab](#), [4A/H2ef](#), [4A/H6](#)

More info: <http://www.nasawavelength.org/resource/nw-000-000-003-839>



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Resource URL: http://nightsky.jpl.nasa.gov/news-display.cfm?News_ID=611



Supernova Explosions

Notes: In this activity, students are reminded that the Universe is made up of elements and that the heavier elements are created inside of a star, as they learned in the "Elements and You" activity. They are introduced to the life cycle of a star and to the way in which a star's mass affects its process of fusion and eventual death. Students discuss the physical concept of equilibrium as a balancing of forces and observe an experiment to demonstrate what happens to a soda can when the interior and exterior forces are not in equilibrium. An analogy is made between this experiment and core collapse in stars, to show the importance of maintaining equilibrium in stars. Finally, students participate in an activity which demonstrates how mass is ejected from a collapsed star in a supernova explosion, thereby dispersing heavier elements throughout the Universe. This activity is part of a series that has been designed specifically for use with Girl Scouts, but the activities can be used in other settings. Most of the materials are inexpensive or easily found. It is recommended that a leader with astronomy knowledge lead the activities, or at least be available to answer questions, whenever possible.

AAAS Benchmarks: [4A/H2cd](#), [4A/H2ef](#)

More info: <http://www.nasawavelength.org/resource/nw-000-000-002-799>

Resource URL:

<http://bigexplosions.gsfc.nasa.gov/documents/activities/SupernovaExplosions.pdf>



Black Hole Orbits

Notes: Students are introduced to the basic properties, behavior and detection of black holes through a brief discussion of common conceptions and misconceptions of these exciting objects. They "act out" a way black holes might be detected through their interaction with other objects. In this activity, girls represent binary star systems in pairs, walking slowly around one another in a darkened room with each pair holding loops of wire to simulate the gravitational interaction. Most of the students are wearing glow-in-the-dark headbands to simulate stars, some are without headbands to represent black holes, and a small set of the black holes have flashlights to simulate X-ray emission. This activity is part of a series that has been designed specifically for use with Girl Scouts, but the activities can be used in other settings. Most of the materials are inexpensive or easily found. It is recommended that a leader with astronomy knowledge lead the activities, or at least be available to answer questions, whenever possible.

More info: <http://www.nasawavelength.org/resource/nw-000-000-002-800>

Resource URL:

<http://bigexplosions.gsfc.nasa.gov/documents/activities/BlackHoles.pdf>



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Space School Musical

Notes: "Join Hannah on a trip through the solar system in this ultra-cool edu-tainment "hip-hopera" that is out of this world! Move and groove along with the planets, moons, meteors, comets, asteroids and even some rockin' scientists as they sing, dance and serve up the freshest facts in the galaxy. Space is definitely one cool place." This resource includes many activities that accompany the educational videos.

External Resorce URL: <http://discovery.nasa.gov/musical/index.cfm>



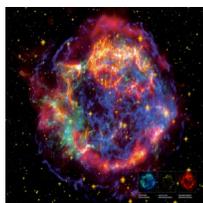
Telescopes: Eyes on the Universe Outreach Toolkit

Notes: This manual provides an overview of how telescopes have changed our understanding of the universe and contains simple demonstrations to use at star parties to get across basic ideas of optics. This manual will also help explain why the images that folks see at the eyepiece of a telescope at an outreach star party is so different from images published in magazines. The manual was produced to accompany an outreach toolkit developed for the NASA Night Sky Network. The toolkit is no longer being manufactured, but the activities are available through the manual, which can be freely downloaded.

AAAS Benchmarks: [4A/E2](#)

More info: <http://www.nasawavelength.org/resource/nw-000-000-003-677>

Resource URL: http://nightsky.jpl.nasa.gov/download-view.cfm?Doc_ID=139



Constellations: Wonders Within

Notes: This poster series highlights six astronomical images observed with NASA's Great Observatories (Hubble, Chandra and Spitzer) and found within the "From Earth to the Universe" (FETTU) exhibition. Each poster contains additional information on the historical context of the astronomical objects (constellation, view with the unaided eye), as well as basic facts about the specific object, the category of object, the NASA missions used, and the contributions to advancing knowledge of the universe enabled by the NASA observations. The materials expand on the theme of demonstrating how far understanding and knowledge have come since Galileo's telescope 400 years ago with illustrations of specific NASA contributions, provide background information on which informal educators can draw for NASA-related activities in their programming, and include student activities.

AAAS Benchmarks: [3A/M2](#), [4A/H3](#)

More info: <http://www.nasawavelength.org/resource/nw-000-000-003-110>

Resource URL: <http://chandra.harvard.edu/resources/handouts/constellations/>



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Supernova! Outreach Toolkit

Notes: This toolkit includes PowerPoints and scripts, videos and accompanying activities and handouts about supernovae. Following are specific items in the kit: Supernova in the Lives of Stars PowerPoint and Script; Let's Make a Supernova (participants imagine themselves inside a large star at the end of its life, just as it is about to go supernova); Nuclear Fusion (a simple and engaging activity explains nuclear fusion and how radiation is generated by stars, using marshmallows as a model); Supernova Star Maps (allow visitors to experience finding stars in the night sky that will eventually go supernova); A Universe Without Supernovae (an active game to illustrate the value of supernovae in the universe); and Lives of Stars (an activity and handout about the lifecycle of stars and when supernovae happen).

AAAS Benchmarks: [4A/H2ef](#)

More info: <http://www.nasawavelength.org/resource/nw-000-000-003-118>

Resource URL: http://nightsky.jpl.nasa.gov/download-view.cfm?Doc_ID=275



Star Witness News: Hubble Reveals Orion in Picture Perfect Glory

Notes: The article explains how an area in the constellation, Orion, called the Orion Nebula is a stellar nursery, where more than 3,000 stars are being born. Students read about why astronomers are interested in this region of space and how they go about studying the nebula. This science content reading identifies and defines scientific words and phrases that might be new to the student. The discussion questions with answers are available to help focus the student's attention on important information and to challenge the student to delve deeper into the subject of star formation. Star Witness is a series of articles that mirror the content of recent Hubble Space Telescope press releases.

AAAS Benchmarks: [1B/M1b](#), [4A/E5](#)

More info: <http://www.nasawavelength.org/resource/nw-000-000-003-082>

Resource URL: <http://amazing-space.stsci.edu/news/archive/2006/01/>

