**Investigating Star Life Cycles with Science and Art**

Many of the wonderful things we see in space are different phases of a star’s life cycle. These beautiful objects represent different forces and processes at work within or around a star. The pictures we have seen from space for these objects are as beautiful as any work of human made art. This project is an opportunity for you to investigate some of these concepts involved in star life cycles in depth. It is a chance for you to meld science with art to create something that shows your understanding of the evolution of stars. There are many different ways you can do this but all include decisions made by you in three areas: a product decision, a process decision and a science decision. These decisions can be made in any order but they should work together to show what you understand about stars’ life cycles.

**Product Decision:** What will your final product be? What do you want to create? Would you like to work with words, your hands, your voice or electronic media? Some ideas …

Illustrated Diagrams and Maps 3D Model Animated Short

Journal Entries Musical Skit Whiteboard Video

Design a Video Game Create a Painting Infographic

Slow Motion Video Write a Biography Magazine Article

Informational Cartoon Triptych Write a Play

Create a podcast/Ted Talk Digital Storytelling Create a Skit

Illustrate a Graphic Novel Create a Sculpture Design a Puzzle

Write & Perform in a Haiku A Child’s Picture Book Choreograph a Dance

Diorama Collage Quilt/Embroidery

Mural (in room 322?? 4th floor) Mosaic Mobile

**Process Decision:** How will you create your product? What tool(s) will you use? Some ideas …

Physical Media - Chalk Pastels; Paint; Watercolors; Stencils; Colored Pencils; Pen & Ink/Charcoal; Clay; Cut Paper; Magazine Pages; Fabric; Wire; Wood; Paper; Thread; Yarn; Plaster; Beads; Cardboard

Digital Media

*Adobe Spark* Graphic Design – Create graphics, web stories, animated videos [https://spark.adobe.com]

*StoryboardThat* – Create storyboards [http://www.storyboardthat.com]

*PowToon* Website – Animated Videos/Presentations [https://www.powtoon.com]

*Piktochart*– Create Infographics [https://piktochart.com]

*Canva* – Create Infographics [https://www.canva.com/create/infographics/]

*Fontstruct* – Create Fonts [https://fontstruct.com]

*Scratch* – Use coding to create interactive stories, animations, games [https://scratch.mit.edu]

*Flame Painter Free* – Online drawing using flames[http://www.escapemotions.com/experiments/flame/index.php]

*myoats* – Online drawing, geometric drawing [https://www.myoats.com/create.aspx]

*bomomo* – Online drawing, abstract [http://bomomo.com]

*Grafitti Playdo* – Online drawing, spray paint on a wall [http://graffiti.playdo.com]

*Texturizer* – Make pictures from text [http://lapin-bleu.net/software/textorizer/]

*APOD* – Astronomy Picture of the Day Index [https://apod.nasa.gov/apod/lib/aptree.html]

**Science Decision:** What will you focus on? What are you interested in finding out more about? Some ideas …

* Follow the path of a low mass, medium mass, or high mass star’s life cycle, explaining its evolution and the science involved at each stage
* Delve deep into one stage of a star’s life cycle; Find out about the deeper science that is going on during this stage; Would this stage appear on a HR diagram? If so, where? What are scientists currently researching about this stage?

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| **Type** | **Common name** | **Other name** | **Constellation** |
| Nebulae-Protostars | Lagoon nebula | M8 | Sagittarius |
|  | Trifid nebula | M20 | Sagittarius |
|  | Orion nebula | M4 | Orion |
|  | Rosette nebula | NGC 2237 | Monoceros  |
|  | Eagle nebula | M16 | Serpens |
| Brown Dwarfs | ULAS J133553.45+113005.2 (T dwarf) 2/100 of Mass of Sun |  | Virgo |
|  | Teide 1 5/100 of Mass of Sun |  | Taurus (in the Pleiades) |
| Main sequence star | Siruis A 2 x Mass of Sun | Alpha CMa | Canis Major |
|  | Vega 2 x Mass of Sun | Alpha Lyr | Lyra |
|  | Spica 10 x Mass of Sun | Alpha vir | Virgo |
|  | Fomalhaut 2 x Mass of Sun | Alpha PsA | Piscis Austrinus (Southern) |
|  | Proxima Centauri 1/8 of Mass of Sun | Alpha Cen  | Centaurus |
|  | Barnard’s star 1/10 of Mass of Sun |  | Ophiuchus |
|  | Altair 2 x Mass of Sun | Alpha Aql | Aquila |
|  | Sun |  |  |
|  | Van Biesbroeck’s star (red dwarf)  8/100 of Mass of Sun | VB 10 | Aquila |
| Red Giant | Pollux 2 x Mass of Sun | Beta Gem | Gemini |
|  | Arcturus 1 x Mass of Sun | Alpha Boo | Bootes |
|  | Aldebaran 1.5 x Mass of Sun | Alpha Tau | Taurus |
| Super Giant | Betelgeuse 11 x Mass of Sun | Alpha Ori | Orion |
|  | Antares 7 x Mass of Sun | Alpha Sco | Scorpius |
|  | Rigel 23 x Mass of Sun | Beta Ori | Orion |
| Planetary nebulae | Dumbbell nebula | M27 | Vulpecula |
|  | Ring nebula | M57 | Lyra |
|  | Cat’s eye nebula | NGC 5463 | Draco |
|  | Helix nebula | NGC 7293 | Aquarius (Southern) |
|  | Owl nebula | M97 | Ursa Major |
|  | Eskimo nebula | NGC 2932 | Gemini |
| White Dwarf / Black Dwarf | Siruis B 98% of Mass of Sun |  | Canis Major |
|  | Procyon B 6/10 of Mass of Sun |  | Canis Minor |
| Supernova | Crab nebula | M1 | Taurus |
|  | Veil nebula | NGC 6992 / 95 | Cygnus |
|  | Witch head nebula | IC 2118 | Eridanus (Southern) |
| Neutron star- Pulsars | Crab nebula | M1 | Taurus |
|  | PSR B1257+12 |  | Virgo |
| Blackhole | Cygnus X-1 |  | Cygnus |
|  | NGC 6240 |  | Ophiuchus |
|  | NGC 4261 |  | Virgo |
|  | NGC 4151 |  | Canes Venatici |
|  | V404 cygni |  | Cygnus |
| Supershell (Superbubble) | HI supershell in M101 |  | Ursa Major |
|  | Orion-Eridanus Superbubble |  | Orion |