**Life Cycle of Stars**

Communicate scientific ideas about the way stars, over their life cycle, produce elements.

Use 2 different formats to communicate the scientific information, and cite the origin of the information as appropriate. You can present the information orally, short paper, slide show, movie, poem, however! You will need to cite at least 3 credible sources.

You need to be able to identify and communicate the relationships between:

·      The life cycle of stars

·      Production of elements

·      Conservation of the number of protons plus neutrons in stars

Also, be sure to include the description of:

·      Formation of Helium

·      Formation of heavier elements up to Iron

·      Formation of heavier elements past Iron

·      Correlation between a star’s mass, stage of development and the elements created during its lifetime

·      Electromagnetic emission and absorption spectra are used to determine a star’s composition, motion and distance to Earth

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| NGSS Strand | Not Yet | Approaches Expectations | Meets Expectations | Advanced |
| HS-ESS1-3 | Identifies or otherwise applies irrelevant content OR relevant content with major errors or omissions. | Identifies or otherwise applies relevant content with minor errors or omissions. | Explains or otherwise applies relevant and accurate content. | Explains and applies relevant and accurate content. |
| ***OBTAIN, EVALUATE, AND COMMUNICATE INFORMATION*** | When conducting independent research, relies on one or two relevant sources without evaluating their credibility. | When conducting independent research, selects a limited number of relevant scientific sources and evaluates their credibility minimally. | When conducting independent research, selects multiple relevant scientific sources, and evaluates the evidence and credibility of each source. | When conducting independent research, selects multiple relevant, high-quality scientific sources representing a variety of viewpoints, and thoroughly evaluates the evidence and credibility of each source. |

**Life Cycle of the Sun**

Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun’s core to release energy in the form of radiation.

Be able to identify and describe the following components:

·      Hydrogen as the sun’s fuel

·      Helium and energy as the products of fusion processes in the sun

·      The life span of the sun is based on the initial mass (lifespan is about 10 billion years)

·      Relationship between the process of radiation, and how energy released by the sun reaches Earth’s systems

Also, you will need to be able to:

·      Use your model to predict how the relative proportions of hydrogen to helium change as the sun ages

·      Use your model to qualitatively describe the scale of the energy released by the fusion process as being much larger than the scale of the energy released by chemical processes.

·      Use your model to explicitly identify that chemical processes are unable to produce the amount of energy flowing out of the sun over long periods of time, thus requiring fusion processes as the mechanism for energy release in the sun.

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| NGSS Strand | Not Yet | Approaches Expectations | Meets Expectations | Advanced |
| HS-ESS1-1 | Identifies or otherwise applies irrelevant content OR relevant content with major errors or omissions. | Identifies or otherwise applies relevant content with minor errors or omissions. | Explains or otherwise applies relevant and accurate content. | Explains and applies relevant and accurate content. |
| ***DEVELOP MODEL*** | Designs and explains a model that generates data to support explanations, predict phenomena, analyze systems, and/or solve problems. Design or explanation of the model includes major errors or omissions. | Designs and explains a model that generates data to support explanations, predict phenomena, analyze systems, and/or solve problems. Design or explanation of the model includes minor errors or omissions. | Designs and explains a model that generates data to support explanations, predict phenomena, analyze systems, and/or solve problems. | Designs, explains, and evaluates a model to generate data to support explanations, predict phenomena, analyze systems, and/or solve problems. |