Skynet Junior Scholars Three Dimensional Learning Example

Science Practices

1. Skynet Junior Scholars are presented with ideas about the Universe and then ask their own Investigable questions. In this case, SJS youth want to compare two types of star clusters.

2. Developing and using models:
A companion hands-on activity engages youth in modeling the role of astronomical filters. A hands on activity with mixed bird seed filtered through a sand sieve illustrates the true purpose of a filter – to sort and measure the light from stars at different wavelengths in order to better understand the properties of that star

3. Planning and carrying out investigations:
In this example, an SJS participants plan the objects they will observe, the filters and telescopes they will use, and their technique for determining the color of their clusters.

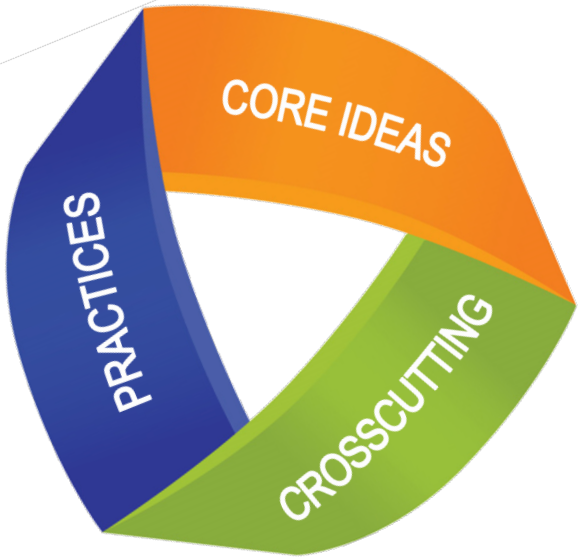
4. Analyzing and interpreting data:
SJS youth made mathematical measurements of the brightness of stars in their clusters using the Skynet data analysis program called Afterglow. They developed their own comparative techniques for measuring the color of the stars.

5. Constructing explanations from evidence, and communicating results: Participants grapple with results that do not turn out as expected. SJS teacher-leaders, staff, and scientists mentor youth groups to help them translate their results into conclusions that are based on the evidence, and to report those results and conclusions to others. Other SJS community members ask questions, and provide suggestions for how to improve the investigation, and the cycle may start all over again.

Disciplinary Core Ideas

ESS1: Earth's place in the universe–
The properties of stars and what those properties tell us about stellar evolution are implicated in both middle school and high school disciplinary core ideas. Skynet Junior Scholars directly observe, and consider these properties in their investigations.

Here is an example of an SJS project that SJS participants developed: Scientists say hot blue stars live shorter lives than yellow or red stars. They also say globular star clusters are much older than many open clusters of stars. My investigable question is: do globular clusters have more red stars than open clusters?



Crosscutting Concepts

A comparative study of star clusters fits well within a discussion of:
1. Patterns. Scholars collect empirical evidence to gain knowledge about star populations.
2. Scale, proportion, and quantity. Astronomical ideas require the use of models perhaps more than other disciplines. In this case SJS youth are constructing parts of a model for the lifecycle of a star.
3. Nature of Science. Science is done by people, and people get attached to their hypotheses, even when the evidence may contradict them. Skynet Junior Scholars explicitly address these nature of science ideas as part of their project work.