Brief overview of lessons

1. *How Big, How Far, How Old?* is about classification and how we use it to make sense of the world. Families try their hand at classifying different groups of things - starting with a bag of carefully-selected "random" objects, then sorting people, and finally testing their skills by sorting objects on Earth and in space by size, distance, and age.

2. *Seeing the Invisible* explores the light that our eyes can - and cannot - see. Families learn about the electromagnetic spectrum, and experience two types of "invisible light" (ultraviolet and infrared). After experimenting with sources and detectors of these different types of light, they use that knowledge to develop secret messages.

3. In *You are Here!*, families explore using models to understand size, scale, and other features. They look at several examples of models and consider what these models show (as well as what they don't) and why we would use each model. Then they build their own models!

4. *‘Tis the Seasons* debunks some of the reasons that people think we have seasons. Families explore the reasons that Earth's seasons exist by acting out a year as the Earth, and by measuring a scale distance model of the Earth and Sun throughout a year.

5. In *Be a Star*, families learn all about stars! They learn that our Sun is a star. They are then led through a kinesthetic modeling activity to learn how the life cycle of a star depends on its mass. Then, families do an activity during which they learn that the Universe's elements are created in stars' cores, and that those elements are dispersed into the Universe and are the building blocks of everything (including us!).
Brief overview of lessons

6. The *Exploring the Moon* session considers the resources people need to live - first, on a cross-country road trip, then on a deserted island, and finally... on the Moon! They map a simulated lunar surface and look at real NASA lunar data to choose a landing site for their imaginary mission.

7. *Batteries Not Included* focuses on the engineering design process. Families build simple solar-powered cars, then design modifications to improve some measurable aspect of their performance. At each stage, they must propose a plan and get it approved by a panel of volunteers.

8. *Now You See It... Now You Don't!* was an especially relevant session for 2017, as it features lunar and solar eclipses! Families learn about the motions of the Earth, Moon, and Sun, focusing first on why we have moon phases and then why we have eclipses. They then build their own eclipse models to show they understand how they work.

9. In *The Search for Other Worlds*, families explore three methods used to detect planets outside of our Solar System (exoplanets): transits, wobbles, and Doppler shift. They also consider the conditions required for life on other planets.

10. Piloted by Anoka County, but still in development; in *Galaxies*, families plot out their full galactic address, create a model to investigate distances in space and the structure of the Milky Way, explore the Hubble Deep Field and identify the forms of different galaxies in space.
NASA Family Science Resources

Anoka County Library Family Science Team

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Astrophysics Education Team at NASA Goddard Space Flight Center

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National Summer Learning Association 2017 presentation


NASA Family Science

https://sdo.gsfc.nasa.gov/epo/families/fsn.php

Global Family Research Project

https://globalfrp.org/

Zooniverse – People-powered Research

https://www.zooniverse.org/
## Family Science Night

<table>
<thead>
<tr>
<th>Resources</th>
<th>Activities</th>
<th>Outputs</th>
<th>Short-Term Outcomes</th>
<th>Indicators</th>
<th>Impact</th>
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</thead>
<tbody>
<tr>
<td>NASA Goddard Space Flight Center – materials and lesson plans</td>
<td>Introductory activity</td>
<td># of attendees</td>
<td>Families gain confidence in their ability to learn together&lt;br&gt;Families gain skill in adult-child communication and collaborations&lt;br&gt;Adults are supported in learning how to learn with children&lt;br&gt;Adults are supported in continuing learning beyond the program&lt;br&gt;Participants will strengthen and demonstrate understanding through open-ended exploration</td>
<td>% of families indicating increase of knowledge&lt;br&gt;% of families sharing an increase in ability to discuss science&lt;br&gt;% of parents indicating an increase in confidence related to family learning&lt;br&gt;Families work together to complete the tasks&lt;br&gt;% of participants engaging in discussion</td>
<td>Families will connect content to real-world and everyday life situations&lt;br&gt;Families will develop/increase positive attitude toward STEM education and career choices&lt;br&gt;Families will see the library as a place to learn together&lt;br&gt;Parents will see the library as a place to gain skills&lt;br&gt;Families will identify strengths and assets of family members and learn as equals</td>
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<td>Sara Mitchell&lt;br&gt;<a href="mailto:Sara.mitchell@nasa.gov">Sara.mitchell@nasa.gov</a></td>
<td>Opening discussion with rules and event topic&lt;br&gt;Core activity&lt;br&gt;Transfer of knowledge activity&lt;br&gt;Staff leads 3 different programs using the above outline based on lesson plans from NASA&lt;br&gt;Staff will support parents as family coaches by coaching and modeling positive family learning behaviors</td>
<td># of families&lt;br&gt;# evaluations completed&lt;br&gt;# of programs&lt;br&gt;# of activities completed</td>
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<td>Volunteers</td>
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<td>National Summer Learning Association program slides and training</td>
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<td>CRL meeting Room, Rum River N Park shelter – tables, chairs, etc.</td>
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<td>Funding for incidental items and program materials</td>
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