Five Stars Pathway
Afterschool Science Curriculum

Introducing the Sun: Solar Cookie

Multiverse

THE UNIVERSITY OF CALIFORNIA BERKELEY 1868

SPACE SCIENCES LABORATORY UNIVERSITY OF CALIFORNIA Berkeley

girls inc.®

Introducing the Sun: Solar Cookie

Age Range
Any age

Duration
20-30 minutes,
plus 10 minute discussion

Participants
~ 15

Special Notes

- The wavelengths of light and features of the Sun that are introduced in this lesson will be explored more fully in following lessons. The emphasis of this lesson is on fun observation rather than learning the specifics of the vocabulary terms introduced in the images.
- This is best conducted in small groups to encourage participants to discuss their solar representations (cookies) as they create them.

Overview

Participants create their own edible representations of the Sun using cookies and other baking materials. Images of the Sun in different wavelengths of light help them to realize that the Sun is a dynamic star. This lesson is intended as a fun activity to get participants excited about learning about the electromagnetic spectrum and how it can be used to see different features on the Sun.

Activity Goals

Students will:

- Observe images of the Sun in different wavelengths of light.
- Begin to understand that the Sun is a dynamic star and has features such as sunspots, prominences and coronal holes.

Notes for Preparation

This activity can be messy, so we recommend table coverings and that you have a garbage bag nearby. We suggest dividing the ingredients into a few smaller containers so multiple participants can use them at the same time.

- Cut licorice candy into 1-inch pieces and separate the strands.
- Print the Multiwavelength Sun and Solar Features images to display around the room and/or on the tables for participants to view. PDF and PPT available at http://multiverse.ssl.berkeley.edu/FS_curriculum#solarcookie
- Lay the baking materials out for easy access.

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Materials

- Round plain cookies (most generic brand sugar cookies would work)
- White frosting
- Different colored (e.g. red, orange, yellow, green blue) sprinkles (found with baking decorations and food colorings in grocery stores)
- Mini chocolate chips or mini M&M's
- Pull-n-peel licorice candy, such as Twizzlers
- Plastic knives or spoons (use the back of a spoon for spreading the frosting if knives are not available)
- Small paper plates or napkins
- Containers to hold the Twizzlers, chocolate chips and sprinkles if participants are divided into smaller groups
- Multiwavelength Sun and Solar Features images [PDF, PowerPoint] available at http://multiverse.ssl.berkeley.edu/FiveStars#solarcookie

Lesson Plan

Tell participants that over the next few lessons, they are going to be exploring light from the Sun. Begin by getting participants to describe what they see in the Multiwavelength Sun and Solar Features images of the Sun. Ask probing questions that get the participants to notice the detailed features (sunspots, prominences, loops, etc). As students identify features, encourage the use of correct vocabulary. The Instructor's Notes at the end of the image sets will help with this.

- What do you notice about the images?
- What differences to you see between the images? What is missing? What is present? Do you see the same features (e.g. sunspots) on every image?
- Which images look the most exciting?
- What type of light (e.g. ultraviolet, radio) are most interesting?
- Why do you think scientists look at the Sun in different types of light?

1. Give each participant a plain cookie and encourage them to create their own representation of the Sun using the baking supplies to illustrate features observed in the photos (e.g. M&Ms for sunspots, Twizzlers for loops etc). It is advisable not to give too much guidance at this point – the participants are free to pursue their own interpretations.
2. Once everyone is finished (participants might want to create more than one cookie), ask them to describe their creations. Encourage the proper use of vocabulary. Ask them to point out the features, such as coronal loops or sunspots, on the Sun images. Ask them to point out in which wavelengths you can see these features. The idea is for them to explain how their creation is a representation of the Sun and its features.
3. EAT your solar cookies!

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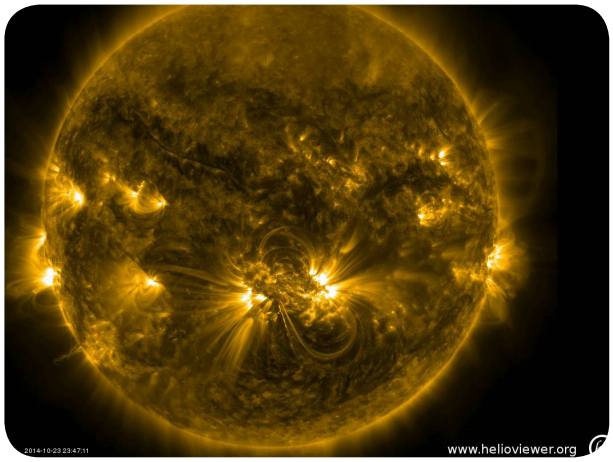

Solar cookie designs based on observations of Multiwavelength Sun and Solar Features images.

Notes for Lesson Plan

You may want to take photos of the solar cookies before they are eaten. Revisit these photos after completing **Lesson #6: Our 3D Sun** (http://multiverse.ssl.berkeley.edu/FiveStars#3DSun) so that participants can consider their solar cookie after learning more about solar features that are seen in different wavelengths of light. [They may want to make a new cookie that reflects what they've learned].

Further Resources

- **Interactive solar imager**— www.helioviewer.org
- **From Core to Corona: Introduction and definitions to the Sun's layers and features**— https://fusedweb.llnl.gov/CPEP/Chart_Pages/5.Plasmas/SunLayers.html
- **Sun-Earth Viewer: Live Solar Images From Multiple Observatories**— (Click "Download Full-Size Image" on the bottom right for printable versions)— http://ds9.ssl.berkeley.edu/viewer/flash/

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