

Read Me_NASA Helio Club

The NASA Helio Club is a collection of six lessons that complete a comprehensive module created for a middle-school audience (ages 10-14) to introduce basic heliophysics concepts to learners. Each club session explores at least one NASA mission.

This resource bundle is designed to be flexible to meet the needs of different educators in a variety of settings. Sessions and activities can be applied to an afterschool club or can be used as lesson plans for a formal classroom setting. Materials are intended to be affordable and easily accessible.

Each session takes approximately two hours, which includes a pre and post assessment, warm-up activity, and three main hands-on activities, each taking about twenty five minutes. If you don't have the time to do an entire two hour session, the activities can also be used independently to engage students in learning specific concepts or to practice the application of Science, Technology, Engineering, and Mathematics (STEM) skills. Sessions build upon one another but can exist independently.

For formal educators, sessions are connected to the Next Generation Science Standards (NGSS) and resources are designed so that they can be integrated into Google Classroom. To modify the sessions for different audiences, educators can make a copy of the Google Docs to edit and customize the session for their specific program or curriculum.

This Google Folder contains all six sessions, including all handouts, a youth guide, background information for educators, and an optional capstone project. Or go directly to the session or activity that you want to run using the direct links below.

Session 1: Heliophysics 101

This session defines heliophysics and gives an overview of the topics that heliophysicists study. Activities in this session include: [1] Modeling the Heliosphere [2] Cosmic Return Address [3] Building an Earth-Sun Scale Model. Missions introduced in this session are the Interstellar Boundary EXplorer (IBEX) mission and the Voyager mission.

Session 2: Observing the Sun

This session explores ways to safely observe the Sun. Activities in this session include: [1] Safely Observing the Sun [2] What Color is the Sun? [3] How NASA Studies the Sun. Missions introduced in this session are the Solar Terrestrial Relations Observatory (STEREO) mission, the Solar Dynamics Observatory (SDO), and the Hubble Space Telescope.



Session 3: Parker Solar Probe Engineering Challenge

This session includes two engineering challenges inspired by NASA's Parker Solar Probe mission. Activities in this session include: [1] Challenge 1: Speed [2] Challenge 2: Insulation [3] Comparing Ways to Study the Sun (includes solar eclipse content).

Session 4: Predicting Space Weather

This session introduces the concept of space weather. Activities in this session include: [1] Modeling Magnetic Fields [2] Predicting Space Weather [3] MMS Spacecraft Model. Missions introduced in this session include the Magnetospheric Multiscale (MMS) mission, the Solar Dynamics Observatory (SDO), the Solar and Heliospheric Observatory (SOHO), the Time History of Events and Macroscale Interactions during Substorms (THEMIS) mission, and the Artemis Mission.

Session 5: Aurora: The Beauty of Space Weather

This session explores the science behind aurora. Activities in this session include: [1] Learning from Light [2] Predicting the Aurora [3] Aurora Art. Missions introduced in this session include the Ionospheric Connection Connection Explorer (ICON) mission and the International Space Station.

Session 6: Beyond the Heliosphere

This session compares our Sun to other stars and planetary systems and explores how NASA looks for exoplanets. Activities in this session include: [1] Life Cycle of Stars [2] Finding Exoplanets [3] The Search for Extraterrestrials. Missions introduced in this session include the Transit Exoplanet Survey Satellite (TESS) mission, the Kepler mission, the Spitzer mission, the Chandra X-ray observatory, the James Webb Space Telescope (JWST), and the International Space Station (ISS).

Capstone Project: Mission Proposal

In this optional capstone project learners are challenged to use what they learned about NASA missions throughout the club sessions to design their own mission. This project introduces even more NASA missions, examines the different ways of collecting data on missions, and models the steps that scientists and engineers take to conceptualize and execute a mission.

If you have questions or feedback about the activities in NASA Helio Club or about other NASA resources for educators, or questions about heliophysics or space science topics, connect with a NASA HEAT educator or scientist by filling out this [form](#).

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