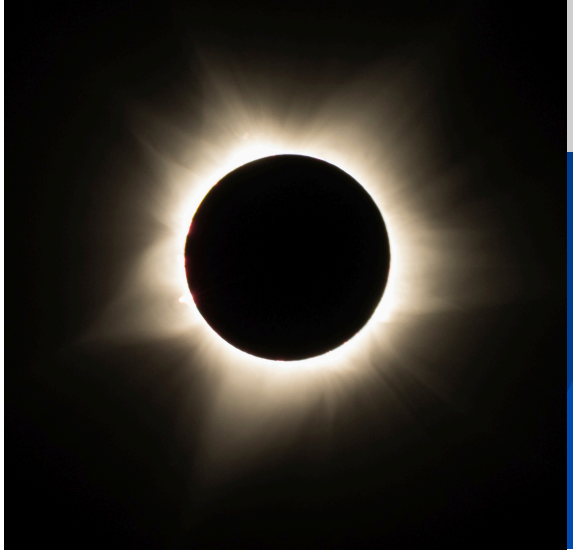

ACTIVITY GUIDE

MAKE A CORONAGRAPH

AT A GLANCE

GRADE LEVEL

- Grade 3-5, 6-8

TIME REQUIRED

- 10-20 minutes prep time
- 20-40 minutes classtime

FORMAT

- Small group exploration
- Large group demonstration

MATERIALS

- 1 Sun model
- Blue paper or construction paper
- Popsicle sticks
- Scissors
- Tape or glue
- Pencils and science journal (or related materials to record observations)

THE SCIENCE EXPLAINED

Coronal mass ejections, or CMEs, are large explosions of plasma and magnetic fields from our sun. When pointed toward Earth, CMEs can cause geomagnetic storms and other types of space weather that can impact satellites, navigation systems, astronaut safety, aviation communications and electric power grids. On Earth, the familiar Aurora displays are the visible manifestations of these storms interacting with Earth's upper atmosphere.

LESSON SUMMARY

Explore how coronagraphs observe the sun in this hands-on activity that demonstrates an artificial eclipse.

OBJECTIVES

The learner will:

- Describe the purpose of a coronagraph and explain how it mimics a solar eclipse by blocking direct sunlight.
- Demonstrate how a coronagraph works by using a handmade model to block sunlight and reveal features around the sun.

PROCEDURE

Activity Prep

This activity is adapted from "Making a Coronagraph", courtesy of the National Solar Observatory. Please view this video to learn how to build the sun model for this demonstration.

Step Two

Cut out one blue "coronagraph" circle, and take one popsicle stick.

Step Three

Tape or glue the coronagraph to one end of the popsicle

Step Four

Face the sun and use your coronagraph to block the light

Step Five

Have students observe what happens, and record observations in their science journals

MAKE A CORONAGRAPH AND NOAA GEOSTATIONARY SATELLITES

CONNECTIONS

The Compact Coronagraph, or CCOR-1, onboard GOES-19 is NOAA's first coronagraph instrument.

CCOR-1 observes the corona, which is the faint outermost layer of the solar atmosphere, to forecast coronal mass ejections (CMEs). These large explosions of plasma and magnetic fields from the sun can product space weather impacts on Earth.

The instrument provides a new image of the corona every 15 minutes by using a disk to "eclipse" the sun and highlight the coronal features.

Did you know ...

CCOR-1 will provide important space weather measurements for the National Oceanic and Atmospheric Administration (NOAA) Space Weather Prediction Center (SPWC).

KEY RESOURCES

Learn more about space weather with SciJinks!

Select the link or scan the QR code to visit the page:

SciJinks - How Does Space Weather Affect Us?

THINKING OUTSIDE THE BOX

Discussion Prompts and Extension Activities

DISCUSSION AND JOURNAL PROMPTS

- What is the corona? List 5 characteristics.
- Discuss the scientific benefits of creating a false eclipse with the coronagraph.
- How will observations from CCOR-1 assist scientists, emergency planners and meteorologists on Earth?
- Describe how the following can be affected by solar weather phenomena:
  - Electric power grids
  - Navigation satellites
  - Astronauts living and working on the International Space Station

SUGGESTED EXTENSION ACTIVITIES

- Partner with an upper grade level (e.g. 3rd and 5th grades). Have the older students build the sun simulator, and then assist the younger students through the activity.
- For a small group activity, assign team roles to each student:
  - Engineer: Builds the sun simulator
  - Optics: Creates the coronagraph
  - Scientist: Performs the experiment
  - Communications: Records observations