




Solar Eclipse

AUGUST 21, 2017

S C I E N C E A C T I V I T Y G U I D E

A composite image showing the Earth from space, with the Moon and Sun in the background, illustrating a solar eclipse. The Earth's horizon is visible at the bottom, showing continents and oceans. The Moon is positioned in the center, partially obscuring the Sun, which is visible as a bright, glowing orb with a lens flare effect. The background is a deep space filled with stars and nebulae.

This guide contains links and information for students to safely experience the solar eclipse of August 21, 2017.

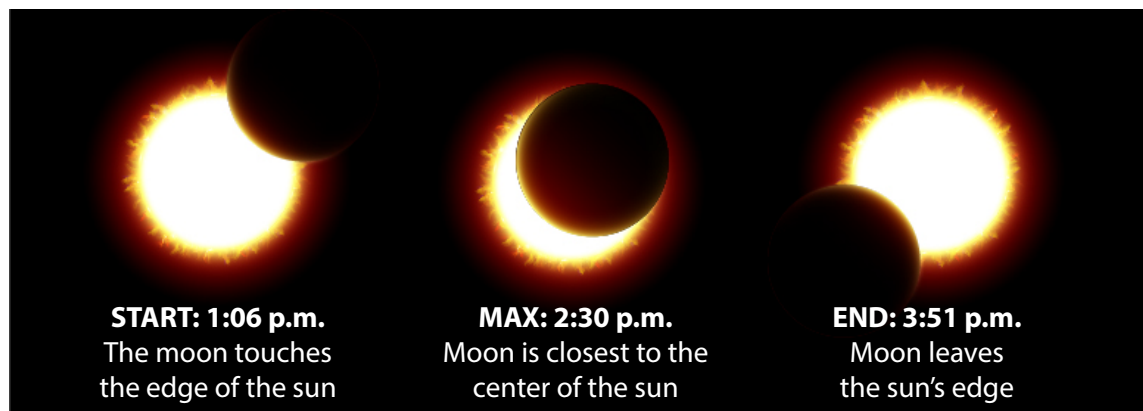
SOLAR ECLIPSE IN CLEVELAND – Tips and activities for safe viewing

Monday, Aug. 21 will bring the first solar eclipse across the United States in 38 years. It's an exciting astronomical event that Cleveland Metropolitan School District students and teachers might not want to miss. It's important that teachers have a plan for students to view this rare event while keeping their eyes safe.

According to NASA, the only safe way to look at the uneclipsed or partially eclipsed sun in Cleveland is through special-purpose solar filters, such as "eclipse glasses" or hand-held solar viewers.



Phases and Local Times of this Eclipse



SAFE OBSERVATION

As the solar eclipse begins during the school day, teachers who wish to have their students view the eclipse should be aware of all safety precautions.

There are two basic ways to view the eclipse safely: direct and indirect observation. Looking directly at the sun without optical aid is dangerous, especially when used with magnification through a telescope, but there are several safe methods that teachers can employ to ensure the safety of their students while observing. Teachers who plan to take students outside

during the eclipse must have the proper eyewear. ISO-certified Solar Eclipse Glasses are the only safe option. Homemade filters or ordinary sunglasses, even very dark ones, are not safe for looking at the sun.

NASA released a list of vendors that sell eclipse glasses and/or handheld solar viewers that have been verified by an accredited testing laboratory to meet the international safety standards for such products. The list can be found at:

eclipse2017.nasa.gov/safety

An alternative method for safe viewing of the partially eclipsed sun is pinhole projection. Directions can be found at the website above.

For both methods, teachers must ensure that students understand and follow directions and monitor them during the viewing.

Teachers and staff should follow the following link to find safety instructions, material safety data and resources for viewing the eclipse:

nasa.gov/content/eye-safety-during-a-total-solar-eclipse

PRE-VIEWING ACTIVITIES FOR TEACHERS

Please spend adequate time warning students that it is not safe to look directly at the sun with their naked eye.

1. An animation of what viewers in Cleveland will experience while viewing the eclipse with the proper safety eyewear can be found at:

timeanddate.com/eclipse/in/usa/cleveland

2. PBS LearningMedia provides a short video where scientists explain how solar eclipses happen and why they are so difficult to witness. Find the video here:

ideastream.pbslearningmedia.org/resource/ess05.sci.ess.eiu.eclipse/solar-eclipses/#.WZRHCa2ZPBI

3. National Geographic has an online guide for how to build a viewer, and it provides lesson supports. It can be found here:

nationalgeographic.org/activity/build-a-solar-eclipse-viewer

4. Make your own 2D/3D Printed Pinhole Projector in the shape of the USA or a US state, including Ohio. NASA has downloadable files here:

eclipse2017.nasa.gov/2d3d-printable-pinhole-projectors

5. Build a solar viewing projector, a technique of using a small hole to focus light that goes back to the 5th century B.C. Directions here:

eclipse2017.nasa.gov/solar-viewing-projector

6. Celebrate the eclipse by taking a selfie of your students and the eclipse in a safe way and add it to NASA's Solar Eclipse Flickr Group or post on Instagram by using #EclipseSelfie.
7. Math challenges: NASA provides a selection of math challenges that will take you through some of the basic mathematics related to the eclipse. The mathematics levels span all grades and abilities from elementary proportions and algebra all the way up to trigonometry and calculus.

NASA has compiled several other fun and safe eclipse-related activities at:

eclipse2017.nasa.gov/activities

PRE-VIEWING ACTIVITIES FOR FAMILIES

Join the Great Lakes Science Center and NASA Glenn Research Center for a Stellar Eclipse Weekend, Saturday, Aug. 19 through Monday, Aug. 21.

Head to the Science Center for whole weekend of hands-on activities, special demonstrations, simulcast eclipse coverage from around the country on NASA TV and even an outdoor sun salutations yoga session.

Guests can catch a Big Science Show, get hands-on in a water workshop, learn about ultraviolet light from the sun, launch a rocket and watch the eclipse from our garage lawn.

Hours are Saturday, Aug. 19 from 10 a.m. to 5 p.m., Sunday, Aug. 20 from noon to 5 p.m. and Monday, Aug. 21 from 10 a.m. to 5 p.m.

FOLLOW-UP

Educators can use the eclipse as a springboard to further STEAM or STEM activities by signing up for curriculum resources developed by educators and astronomers at the following link:

astronomerswithoutborders.org/awb-programs/community-based-programs/eclipse-stem-education-program.html