

**Eclipse Cereal Box Viewer**  
**Indirect Eclipse Viewing during the Partial Phase**  
**of the August 21, 2017 Eclipse**

Adapted from Hila Science Camp-Hila Research Center  
RR #2, Pembroke, Ontario, Canada

**Background Information:**

A Solar Eclipse is one of the most exciting celestial events we can observe. If you are lucky enough to find yourself along the path of totality, the moon will completely cover the sun allowing you to see the corona, the sun's atmosphere. Outside of the path of totality, you can still enjoy the partial phase of the Solar Eclipse, but you need to use eye protection and/or an eclipse-viewing device for indirect viewing. The only time you can view the eclipse directly, is during the short total phase lasting at the most 2 minutes and 40 seconds, during the August 21<sup>st</sup> eclipse. NASA joins many communities and individuals in observing the August 21, 2017 Solar Eclipse from space and from the ground. Enjoy this rare eclipse, but always view the partial phase safely.

**New Vision for Science Education: National Research Council (2012, p.1)**

<https://www.nap.edu/books/23548/gif/R8.gif>

**Next Generation Science Standards:**

ESS1.B: Earth and the Solar System

- The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them. (MS-ESS1-2),(MS-ESS1-3)
- This model of the solar system can explain eclipses of the sun and the moon. Earth's spin axis is fixed in direction over the short-term but tilted relative to its orbit around the sun.

**Connections to Nature of Science:**

Scientific Knowledge Assumes an Order and Consistency in Natural Systems: Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. (MS-ESS1-1),(MS-ESS1-2)

This activity is appropriate for upper elementary students, with teacher guidance, through middle school.

**Goals:**

- Students gain knowledge about Solar Eclipses through guided research before viewing the Solar Eclipse.

- Students build a pinhole camera device using a cereal box for safe viewing a Solar Eclipse.

**Objectives:**

- Students will use a teacher guided KWL activity to research Solar Eclipses.
- Students will identify safe viewing a Solar Eclipse.
- Students will build their own indirect viewing devise using a cereal box.

By following the steps designed with the use of a KWL worksheet, students will gain interest, curiosity, pose questions and gain knowledge about a Solar Eclipse. They will then create their own indirect eclipse viewer, a cereal box viewer, for safe viewing during the partial phases of a Solar Eclipse.

**Engage:** *What I Know* about a Solar Eclipse

**Explore:** *What I Want* to learn about an eclipse

**Explain:** *What I Learned* about an eclipse

**K: (What I already know)**

- Using the KWL chart students write what they *think* they know about an eclipse.
- Ask students to work in a small group of no more than four to share with each other what they already know about an eclipse.
- Tell the students to combine their responses and share with the entire class. The teacher can record the class responses.

**W: (What I want to learn)**

- Students should record any questions they have about eclipses or questions that need clarification about some ideas other students may have shared.
- Each student should write at least two questions about a Solar Eclipse. The questions are written in the **What I want to learn** section.

**L: (What I learned)**

- As students research Solar Eclipses for this section, they should take notes and draw pictures in the **What I learned** section.
- The eclipse website, <https://eclipse2017.nasa.gov> is a good site for students to gather information for the What I Learned section.

Here are several places on the website for information:

- <https://eclipse2017.nasa.gov/2017-total-solar-eclipse-who-what-where-when-and-how>
- <https://eclipse2017.nasa.gov/safety>
- <https://eclipse2017.nasa.gov/videos-images>

Students can develop the design for the outside of their cereal box from the information and drawings that were recorded in What I learned.

*The cereal box becomes a way to answer questions about an eclipse and steps for safe viewing. The box can be designed by using images that have been cut out and glued to the outside of the box, as well as written steps for safe viewing using solar glasses, and hand drawings of the umbral and penumbral shadow cones. These are only possibilities. The design is totally up to each student.*

### **Elaborate:**

In this section the students expand on what they have learned, by developing an eclipse indirect viewing device that is designed for use as a teaching tool to answer the questions: How can I view a Solar Eclipse safely? and What is a Solar Eclipse?

### **Materials:**

A Cereal Box

Piece of heavy-duty foil

Piece of white cardboard cut to fit in the bottom of the cereal box (for easier viewing)

Paper to cover the cereal box

Markers/Pictures used for the design of the box

Scissors

Tape or glue

### **Procedure:**

- Empty your cereal box including the inner paper that held the cereal.
- Cut a white piece of cardboard that will fit snugly in the bottom of the box, or secure it permanently by gluing it in place.



- Cut the top of the cereal box, removing both ends and leaving the center in tact.
- Put a piece of tape across the center of the top to securely hold it closed.



- Tape a piece of heavy duty foil or double a single layer for additional strength , covering one of the openings at the top of the cereal box.
- The other opening will remain open for viewing.



- Using a small nail (approximately 3mm in diameter) push a hole in the foil.
- The actual size is not a critical issue; you can experiment with different sizes and shapes.



- Cover the entire box with construction paper, leaving the single viewing opening and the foil uncovered.
- The students can use any color, based on their pre-determined design for the box.



- Students should use their notes and drawings to design an Eclipse Viewing Box as a teaching tool.
- Images can include the umbra and penumbra, the path of totality, position of the sun, moon and Earth.
- The finished box should be held with the pin-hole side facing the sun. It may take a little practice pointing the box.
- With the student's back facing the sun, look through the viewing opening.
- A small image of the sun, about ½ cm in diameter can be seen projected on the white paper inside the box.
- **Never look directly at the sun.**



**Extension:**

On the Eclipse website <https://eclipse2017.nasa.gov> in the Activities section there are several activities that students can participate in and add to the website. One of the activities, **Eclipse in Six**, is the perfect way to reflect on the eclipse and have the six words added to the NASA time capsule. <https://eclipse2017.nasa.gov/eclipse-six>

**Eclipse in Six:**

Solar Eclipses have captured the imagination, provoked fear, and changed the course of history. The August 21, 2017 Total Solar Eclipse across America will be seen by millions on four continents. For some, it will have been the first time they have seen a Solar Eclipse. NASA wants to know what the eclipse was like for you. What was your experience? How did you feel? **“I was stunned at its beauty”** could serve as an example.

Let us know what the eclipse meant to you in 6 words. Submit your experience to "Eclipse in Six". We will list it with the other entries on our NASA eclipse website and include it in our [time capsule](#) for opening on the event of the next total Solar Eclipse across America on April 8, 2024.

# Eclipse KWL

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## What I Know

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## What I Want to Know

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## What I Learned

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