

# Predict the Corona Activities

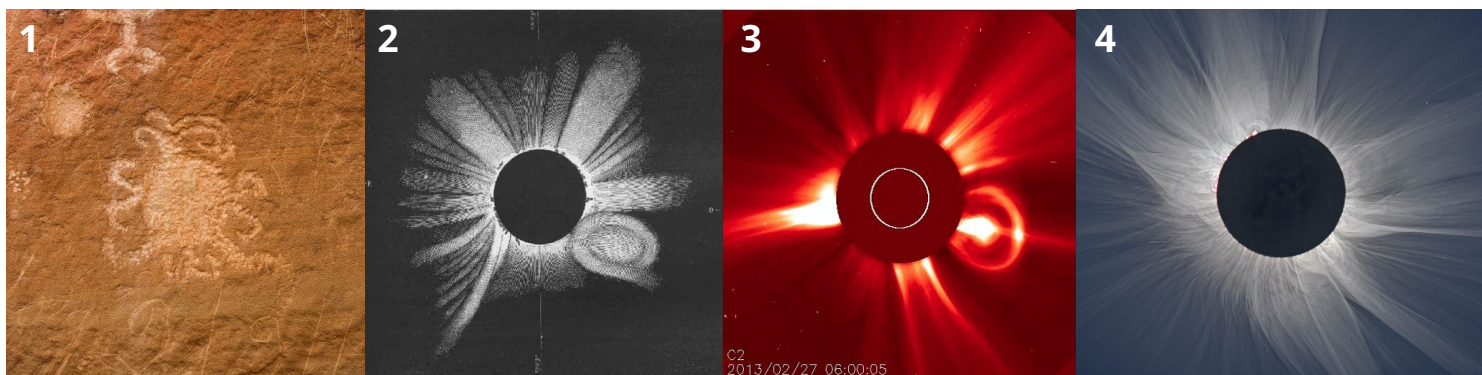
**Next Generation Science Standard MS.ESS1-1** - Develop and use a model of the Earth-Sun-Moon system to describe the cyclic patterns of lunar phases, eclipses of the Sun and Moon, and seasons.

## Overview:

Choose to use chalk art or cake art to predict what the corona will look like during the **Monday, April 8, 2024, total solar eclipse** with these two engaging activities. Or try both!

## Background Knowledge:

Long before there were cameras or telescopes, early peoples recorded what they saw in the sky in words, carvings, drawings, and paintings. While those early observations made valuable contributions to scientific discoveries, now NASA has advanced equipment they can use to learn even more about the Sun and the solar system. Total eclipses are a unique opportunity to study the Sun because they allow scientists to see a part of the Sun's atmosphere – known as the corona – which is key to answering fundamental questions about how heat and energy are transferred from the Sun out into the solar wind, the constant stream of particles that the Sun scatters into the solar system.



**Compare the images of the Sun above. What are the similarities and differences between these observations of the Sun?**

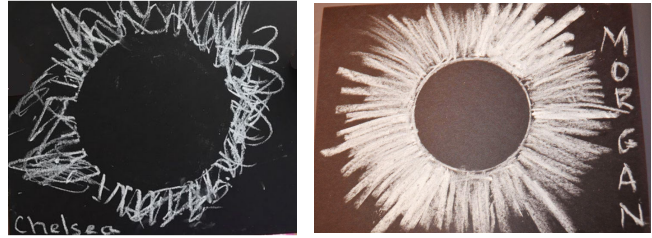
1. Ancient rock art in Chaco Canyon may depict a total solar eclipse in 1097. Credit: National Park Service
2. A drawing depicts the 1860 eclipse. Additional drawings created by observers during this eclipse, in various locations, also depicted what appears to be a solar eruption, as seen as a loop in this drawing. Credit: G. Tempel
3. A This coronagraph image was taken by the SOHO spacecraft. A coronagraph simulates a solar eclipse, blocking the Sun to reveal its outer atmosphere, the corona. Eruptions like the one depicted in Tempel's drawing are common observations when the Sun is active. Credit: NASA/ESA SOHO
4. This image is a highly processed composite of the detailed features of the corona, meaning it is taken with special equipment and includes multiple images on top of one another. Credit: S. Habbal, M. Druckmüller, and P. Aniol

# Predict the Corona: Chalk Art

**After examining the images of the Sun, make a prediction!  
What will you observe during the April 8, 2024, total solar eclipse?**

## Materials:

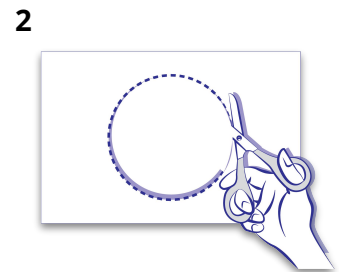
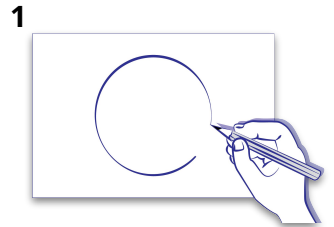
- ❑ Cardstock Paper
- ❑ Black or Dark Blue Construction Paper
- ❑ White Chalk
- ❑ Scissors
- ❑ Tape (Optional)



The whole family can get involved in learning about eclipses! Morgan (age 11) and Chelsea (age 8) drew their predictions of the corona.

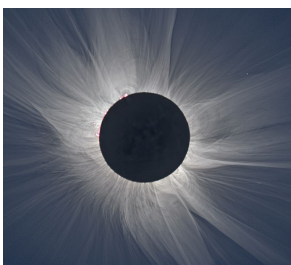
## Directions:

1. Trace a large circle (like a bowl or a cup) approximately 3 inches in diameter on stiff paper, like cardstock.
2. Carefully cut out the circle.
3. Place the circle template on construction paper and hold it down (or tape it). Draw a thick circle or lines of chalk around the template a few times – it doesn't need to be neat.
4. Holding the template in place with one hand, use the other hand to smudge the chalk away from the circle, outward in all directions to represent the corona of the Sun.
5. When you are done smudging, remove the circle. You've made total solar eclipse art like observers of the past did!



**Step 6: Analyze!** Examine the four images of a total solar eclipse on the previous page. Based on your analysis of these images, what do you predict the corona would look like during a total solar eclipse? Do you expect to see a solar eruption, as seen in images 2 and 3? Save your drawing and compare your prediction to your observations of the **Monday, April 8, 2024**, total solar eclipse.

## What Features of the Corona Will You See in the Path of Totality?



Credit: S. Habbal, M. Druckmüller  
& P. Aniol

These two images show the solar corona, but the left image is more processed than the right image. You can expect to see something in between these two images with your own eyes during totality, when it is safe to remove your solar eclipse glasses. However, the April 8, 2024, eclipse has the potential to display coronal loops and other coronal features as the Sun approaches a period of high activity, called solar maximum (predicted 2025).



Credit: NASA/Nat Gopalswamy



# Predict the Corona: Cake Art

Make learning about total solar eclipses, easy, yummy, and fun with this hands-on, art-infused, 10- to 20-minute activity for learners of all ages.



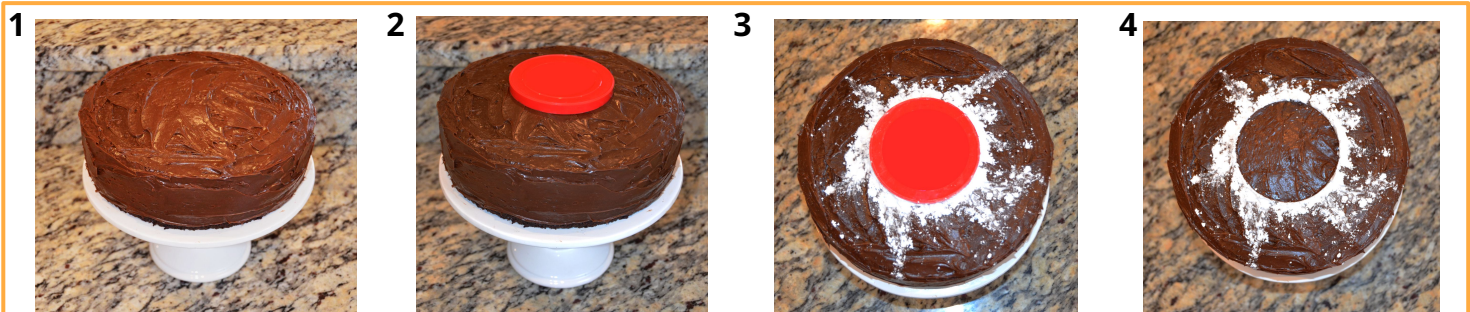
Credit: NASA HEAT/ Shannon Reed

## Materials:

- ❑ 9" Circular Cake With Dark Icing or Frosting
- ❑ Powdered Sugar
- ❑ Approx. 3" Circular Object (an icing container lid works well)

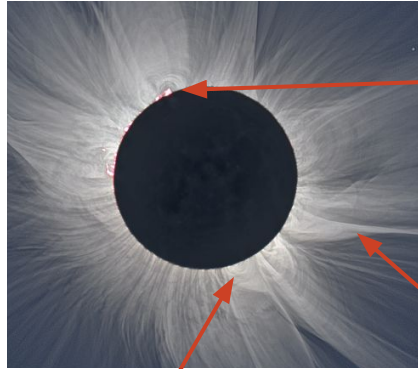
## Directions:

1. Bake a cake and frost it. Chocolate icing or frosting works well!
2. Place the circular object in the center of the iced cake. The circular object represents the Moon covering the Sun in the middle of the cake.
3. Sprinkle the powdered sugar around the circular object, creating shapes in the corona to match your prediction.
4. Remove the circular object. You've made total solar eclipse cake art! Take pictures of your corona cake and compare your prediction to your observations of the **April 8, 2024**, total solar eclipse.



## Coronal Features

There are many interesting coronal features – which may be hard to see during a total solar eclipse – that are best observed through the eyes of NASA. These features are caused by the complex interactions of the Sun's magnetic fields.



Credits: S. Habbal, M. Druckmüller & P. Aniol

### Prominences -

bright strands of cooler, denser solar material suspended above the Sun's surface by magnetic fields

### Coronal Loops -

found near sunspots, these loops of solar material connect magnetic regions on the solar surface

### Helmet Streamers -

large cap-like structures with long pointed peaks that usually overlie sunspots and active regions

# Safety Messaging For Viewing a Total Solar Eclipse



**You will need to use a solar filter, like solar eclipse glasses, to view the partial phases of the solar eclipse on Monday, April 8, 2024.**

**Solar eclipse glasses may be removed during the total phase of the eclipse, just for a few minutes, by observers in the path of totality ONLY. Observers outside the path will experience a partial solar eclipse.**

Check the 2024 solar eclipse map below or online at [svs.gsfc.nasa.gov/5123](https://svs.gsfc.nasa.gov/5123) for your location and follow the appropriate safety guidelines below.



*Safety guidelines for viewing a total solar eclipse. Credit: AAS*



*Solar Eclipse Glasses. Credit: NASA*



View the eclipse with special eclipse glasses.



Regular sunglasses are not safe to view the eclipse.



Credit: Michala Garrison and the Scientific Visualization Studio (SVS), in collaboration with the NASA Heliophysics Education Activation Team (NASA HEAT). Eclipse Calculations by Ernie Wright, NASA Goddard Space Flight Center.