

What to See During an Eclipse

This text is provided courtesy of the Exploratorium.

As the moon passes in front of the Sun, the eclipse goes through stages that provide an evolving spectacle, two plus hours of steadily changing views.

Remember: NEVER view any stage except totality with your naked eyes. Use safe viewing techniques to preserve your eyesight.

Full Sun

Before the eclipse begins, and after it ends, the full disk of the Sun burns in the sky. The visible region of the Sun is called the *photosphere*. While you wait for the eclipse to begin, use safe viewing techniques to look for sunspots, slightly cooler areas on the sun (only 4,500 degrees Celsius!) that look dark compared to the blinding photosphere. The Sun has an eleven-year cycle of sunspot activity. In 2016, we're midway through the cycle, so the Sun is showing a medium number of sunspots.

You can't see the moon as it approaches the Sun, because from Earth we're seeing its dark side-the New Moon. But it's there, as will become obvious at First Contact.

First Contact



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The eclipse begins at the moment the moon first "touches" the edge of the solar disk, approaching it from the right as seen from the Northern Hemisphere. (It doesn't actually touch the Sun, of course-but it appears to as it begins to pass in front of the solar disk.)

The moon, invisible until now in the daytime sky, becomes visible as a black disk blocking the Sun. For the next hour and a half, it slowly consumes a larger and larger chunk of the Sun.

Partial Eclipse



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This image of the partially eclipsed Sun looks purplish because of the filter on the telescope. It was taken using a Calcium-K filter, which sees the Sun in near-ultraviolet light.

Second Contact



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Second contact occurs when the moon almost completely covers the Sun, in the moments before totality. The last bright flash of the Sun, combined with an emerging view of the corona encircling the moon, produces a spectacular effect called the Diamond Ring.

You may see bright pink spots near the "diamond." These are gigantic jets and loops of gas that rise from the sun's surface, usually near sunspots. Called *prominences*, their beautiful hue is the color of glowing hydrogen gas.

Totality



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The Sun is now completely hidden, revealing the full glory of the solar corona. These few minutes of the total solar eclipse are the only times we on Earth can see the corona, the Sun's upper atmosphere, which streams out into space above the sun's surface. Normally, the corona's delicate light is outshone by the bright photosphere.

This is the one time you can safely look at the Sun with your naked eye. If you can draw your eyes away from the Sun for a few moments, you'll notice that the sky has become quite dark and the temperature has dropped, comparable to twilight. In the sky, the brighter stars and planets have come out. The horizon is lit up all around you, like a 360° sunset, where the Earth is experiencing a partial eclipse.

Third Contact



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Totality ends at Third Contact, as the leading edge of the moon begins to move off the Sun. On the moon's trailing edge, the first light of the photosphere shines through mountains and valleys on its surface, creating a necklace-like effect called Bailey's Beads. At totality's end, resume using safe viewing techniques.

Sunlight Restored



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Moments after Third Contact, the sun reemerges in a burst of light, creating a second Diamond Ring on the opposite side of the Sun. As the moon reveals more of the Sun, the corona quickly fades from view in the brightness of the newly restored photosphere.

Fourth Contact



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The eclipse is now nearly over. Fourth Contact, when the outer edge of the moon last touches the Sun, marks its end. From First Contact to this moment takes about two and a half hours.

Vocabulary

eclipse

noun

definition: the blocking from view of the sun, a moon, or a planet by another heavenly body. In an eclipse of the sun, the sun is hidden from earth's view by the moon passing between the sun and the earth.

We all went outside to watch the eclipse of the moon.

Spanish: eclipse

evolve

verb

definition: to develop gradually; come into being.

The plans evolved after weeks of discussion.

Spanish: desarrollar

restore

verb

definition: to return to an earlier or normal condition.

It took many months to restore the old house.

Rest restored him to health.

Spanish: restaurar, restablecer, restituír, reinstaurar, devolver

forms: restored, restores, restoring

1. Before you start reading...

Here are the vocabulary words that will be in this reading. Let's see how well you already know them.

Check the box that shows how well you know each word. It's ok if you don't know them yet (this is not graded)!

	Don't know it	Have heard of it but not sure of its meaning	Know something about its meaning	Know it well
eclipse				
evolve				
restore				

2. Word Matcher

Every word has other words that have similar meanings or even the exact same meaning (these are called synonyms!). Draw a line from each similar word or synonym to the vocabulary word that it matches!

block

conjunction

darkening

develop

grow

eclipse

evolve

restore

arise

fix

repair

return

3. After reading and exploring the words through some activities...

Do you know these words better? Check the box that shows how well you know each word. It's ok if you don't know them yet (this is not graded)!

	Don't know it	Have heard of it but not sure of its meaning	Know something about its meaning	Know it well
eclipse				
evolve				
restore				

Name: _____ Date: _____

1. What is visible in the sky before an eclipse begins?
 - A. the full disk of the Sun
 - B. the new moon
 - C. the full moon
 - D. the atmosphere around the Sun

2. This text describes the sequence of events in an eclipse. What is the first stage of an eclipse called?
 - A. totality
 - B. first contact
 - C. second contact
 - D. sunlight restored

3. During totality, viewers on Earth can see and feel changes associated with the lack of sunlight. What evidence from the text supports this statement?
 - A. "The Sun is now completely hidden, revealing the full glory of the solar corona."
 - B. "Second contact occurs when the moon almost completely covers the Sun, in the moments before totality. "
 - C. "...you'll notice that the sky has become quite dark and the temperature has dropped, comparable to twilight."
 - D. "Totality ends at Third Contact, as the leading edge of the moon begins to move off the Sun. "

4. Four stages of an eclipse are described using the word "contact". What might the word "contact" refer to when talking about an eclipse?
 - A. any point during an eclipse when the moon and the Sun actually collide
 - B. any point during an eclipse when an edge of the moon looks like it touches an edge of the Sun
 - C. any point in an eclipse when a viewer on Earth can look at the Sun with just the naked eye
 - D. any point in an eclipse when part of the moon is covering part of the Sun

5. What is the main idea of this text?

- A. It is very dangerous to view a solar eclipse with the naked eye, so one must use safe viewing techniques.
- B. The most spectacular part of a solar eclipse is the Diamond Ring effect, which occurs just before totality.
- C. The most important stage of an eclipse is totality, when the Sun is completely hidden by the moon.
- D. During an eclipse, the moon passes in front of the Sun, providing changing views over two and a half hours.