# A KID'S GUIDE to the NIGHT SKY

## SIMPLE Ways to EXPLORE the UNIVERSE

BY ASTRONOMER JOHN READ

## TOTAL ECLIPSE KIT

## HOW TO VIEW A TOTAL SOLAR ECLIPSE

BY JOHN READ


Credit: Dominic Hart


**Key concepts:**

**Totality:** The period, usually two to four minutes, in which the Moon fully covers the Sun.

**Partial Eclipse Phase:** The approximately seventy–minute period leading up to, and following, totality. During this time, the Moon only partially covers the Sun. Proper eye protection is required.

**Eclipse Path (AKA Path of Totality):** The path the Moon's shadow follows across the Earth. Only those directly under the eclipse path will experience a total solar eclipse during totality.

**Corona:** During totality, the Sun's upper atmosphere is visible against the dark sky. These glowing particles follow the Sun's magnetic field lines and solar winds.

**Science:** Every few years, for lucky people somewhere on the Earth, the Moon will pass directly in front of the Sun and cover it completely. You might think this should happen every month, since the Moon and Sun follow approximately the same path across the sky, but it does not! The Moon's orbit is elliptical, which means that sometimes the Moon is too far away to completely cover the Sun. The Moon's orbit around Earth is also inclined, versus Earth's orbit around the Sun, which means that most of the time, the Moon passes above or below the Sun when viewed from the Earth. During a total solar eclipse, the Moon's shadow is only about one hundred miles wide. This is why it is so rare, and so special, to observe a total solar eclipse. Most people will only experience one total solar eclipse in their entire lives.

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### ECLIPSE CHECKLIST

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**Map of the Eclipse Path:** If possible, get to the eclipse path. Remember, only those within the path of totality will experience a total solar eclipse.

**Local Eclipse Time:** Totality will only last 2–4 minutes. These times are local, so you will need to check the local time on the eclipse path map. Note that the partial phases of the eclipse will last over two hours, with totality occurring in the middle of this time.

**Eclipse Glasses:** These are for safely viewing the Sun during the partial phases of the eclipse. These will be available online, or in many retail stores leading up to the eclipse.

**Lawn Chairs:** If you plan to observe the partial eclipse phase which lasts over two hours, it helps to have somewhere to sit.

**Sunscreen:** For most of the eclipse, the Moon is not fully covering the Sun. Wear sunscreen if you plan on observing the partial phases of the eclipse.

**Photography:** If this is your first total solar eclipse, it is recommended that you do NOT attempt to photograph it, as this will distract from the experience for you and for others around you. If you want to photograph totality, a cell phone camera will suffice. Photographing the partial phases will require special camera filters.

**Check the Weather:** If it is overcast, you will not witness the eclipse. Note: If you are within the path of totality and it is cloudy, you will still experience 2–4 minutes of darkness. If you are able, be prepared to travel to where the forecast is expected to be clear.

**Search for Eclipse Parties:** Many cities within the path of totality will host eclipse viewings. Many of these events will even include solar viewing telescopes for close-up views of the Sun!

ECLIPSE GLASSES

Credit: American Paper Optics

STUDENTS AT DALHOUSIE UNIVERSITY ATTEND AN ECLIPSE VIEWING PARTY.

Credit: John Read

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## FREQUENTLY ASKED QUESTIONS

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**Who will experience a total solar eclipse (AKA totality)?** Only those located within the path of totality will experience a total solar eclipse where the Moon completely covers the Sun.

**When is totality?** Totality will occur at different times depending on your specific location along with path of totality. For example, in Texas, totality will occur around 1:30 p.m. local time. In New Hampshire and Maine, totality will occur at around 3:30 p.m. local time.

**How long will the eclipse last?** Totality will last between 2–4 minutes for those within the eclipse path. However, most people plan to view the partial phase leading up to totality, which begins about seventy minutes prior to totality.

**How will you know you have reached totality?** During totality, the Moon will fully cover the Sun. The sky will darken significantly, and the horizon will appear like a sunset in all directions. In the sky, you may be able to see bright stars, or bright planets like Venus. Insects and birds may make evening sounds, and deer and other animals may seem to act strangely as well.

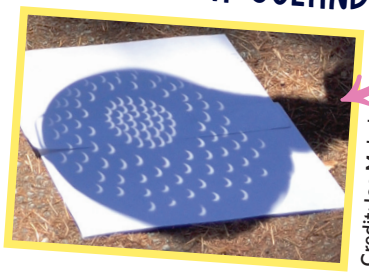
**What will you see if you are not located in the eclipse path?** Without eclipse glasses, nothing. The sky will not darken for you at all, at any point. However, with eclipse glasses, you may be able to observe the partial phase. You will need an app like *Totality* to help you determine the timing of the partial eclipse (https://eclipse.aas.org/totality). NOTE: Without eclipse glasses, it is nearly impossible to tell that an eclipse is occurring.

**When is it safe to look at the Sun?** Technically, never, but during 2–4 minutes of totality, the Moon fully covers the Sun's disk. If you are surrounded in darkness, you may view totality without eye protection.

**What are other ways to observe the partial eclipse?** Nearing totality, the partial eclipse can be observed in the shadow of tree leaves, or by creating pinhole cameras with your hands or a colander.

**In summary:** Unless the sky is nearly black, and you can see stars or planets, DO NOT ATTEMPT TO VIEW THE ECLIPSE WITHOUT WEARING ECLIPSE GLASSES.

VIEWING THE PARTIAL PHASES WITH A COLANDER



Credit: Joe Mabel

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## WORD SEARCH

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ECLIPSE
MOON
SUN

TOTALITY
GLASSES

SOLAR
CORONA

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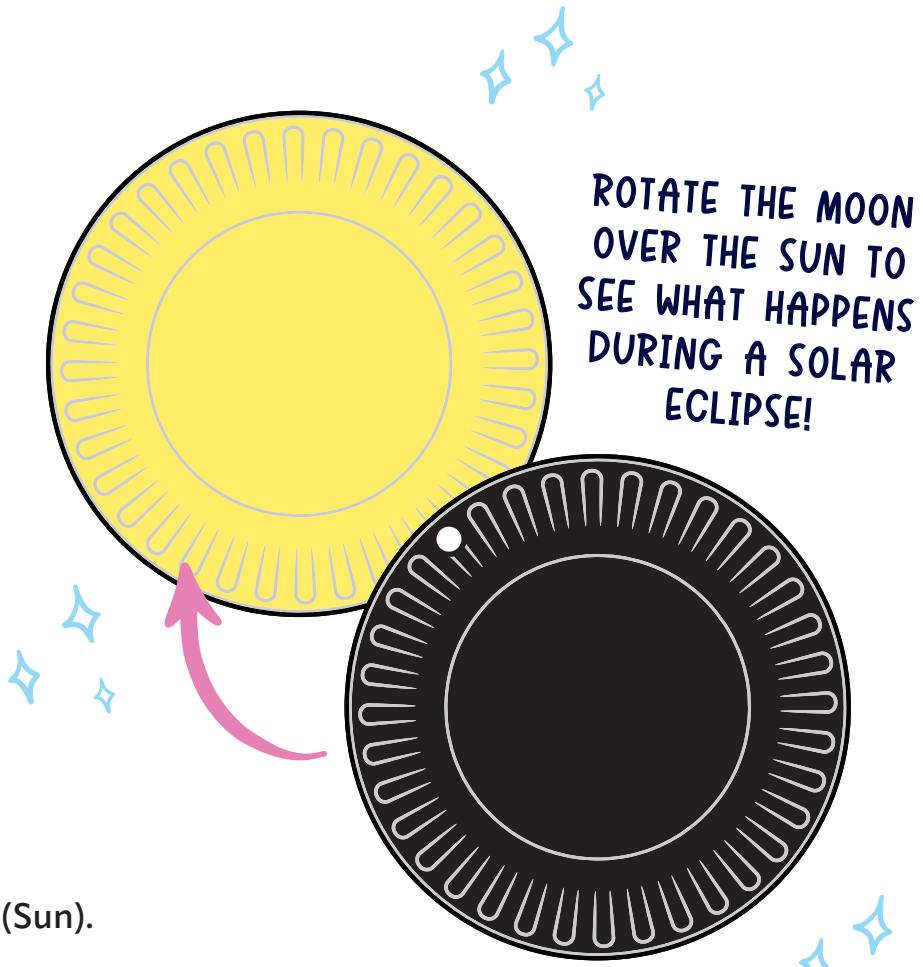
## CRAFT

**Intro:** Use painted paper plates to show how an eclipse works!




### Supplies:

- Yellow or gold paint
- Black paint
- Two paintbrushes
- Two paper plates
- Hole punch
- Brass fastener

### Instructions

- Paint one plate yellow or gold (Sun).
- Paint one plate black (Moon).
- Once the plates are dry, stack the moon plate on top of the sun plate.
- Use the hole punch to create a hole towards the edge of each plate.
- Put a brass fastener through the holes to attach the plates.
- Move the Moon plate in a circle until it fully covers the Sun! This demonstrates what happens during a total solar eclipse.