

We are scientists from NASA and The Washington Post talking about today's eclipse. AMA!

washingtonpost ¹ and r/Science AMAs¹

¹Affiliation not available

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Abstract

Happy Eclipse Day r/science! We're here early to answer any last minute questions you might have about today's historical event. Here are your AMA eclipse chat hosts: Alexa Halford is a heliophysics scientist originally from Chippewa Falls WI (go Pack go!). She is a prime example of what happens when you go to college in MN and take up space... You become a space physicist. Because she got her PhD in Oz, you sometimes hear her say x,y, zed instead of x,y, zee. Although she has worked on science questions throughout the solar system, today she sticks a bit closer to home studying the Earth's magnetic field and the impacts of space weather events. She was part of a huge NASA AMA yesterday on the eclipse with a bunch of scientists posting as /u/NASASunEarth. Angela Fritz is The Washington Post's deputy weather editor and an atmospheric scientist who hails from the city of rock and roll and burning rivers – Cleveland, Ohio. She knew from a young age that weather was her true calling. After receiving a B.S. in meteorology from Valparaiso University and an M.S. in earth and atmospheric science from the Georgia Institute of Technology, Angela worked as a meteorologist at CNN in Atlanta and Weather Underground in San Francisco. When she's not forecasting hurricanes or reading the latest climate science papers, Angela enjoys outdoor adventures, public transportation, and Oxford commas. We're going to get started at 10 a.m. ET so get those questions ready! AMA! Proof EDIT: And that's a wrap for now! We may come back later to answer additional questions, but in the meantime, enjoy this historic day, be safe! And if you want more info, follow live coverage from The Washington Post, who is featuring coast-to-coast coverage and a livestream. EDIT 2: One more link: Here is every total solar eclipse happening in your lifetime. Enter your birth year and we'll tell you when and where.

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WASHINGTONPOST [R/SCIENCE](#)

Happy Eclipse Day [r/science](#)! We're here early to answer any last minute questions you might have about today's historical event. Here are your AMA eclipse chat hosts:

[Alexa Halford](#) is a heliophysics scientist originally from Chippewa Falls WI (go Pack go!). She is a prime example of what happens when you go to college in MN and take up space... You become a space physicist. Because she got her PhD in Oz, you sometimes hear her say x,y, zed instead of x,y, zee. Although she has worked on science questions throughout the solar system, today she sticks a bit closer to home studying the Earth's magnetic field and the impacts of space weather events. She was part of a [huge NASA AMA](#) yesterday on the eclipse with a bunch of scientists posting as [/u/NASASunEarth](#).

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Do we yet have a clear understanding of the effects of an eclipse on the animal kingdom? Do animals start falling asleep all over the place or do they just, ignore it?

[Lavidius](#)

Not sure to be honest. As a physicist I didn't need to take Biology so not sure. However, I have read how animals do change their behavior and act as if night is coming. Let us know what you see today! -
Alexa

If the Earth rotates to the East, why is the path of the eclipse starting in the West? I understand how this works, but don't know how to explain it to my children in a manner that they'll easily grasp.

Can you help?

[Synssins](#)

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You can find some great movies to explain this at <https://eclipse2017.nasa.gov/how-eclipses-work>. I've seen demonstrations with kids using three balls, one for the Sun, one for the Moon and one for the Earth. Then have them all moving as the Sun, Earth, and Moon do in their orbits. It's a great way for them to figure it out (and get a bit dizzy which many kids seem to enjoy :)). You can find some educational materials at <https://eclipse2017.nasa.gov/k-12-formal-education> - Alexa

If the Earth rotates to the East, why is the path of the eclipse starting in the West? I understand how this works, but don't know how to explain it to my children in a manner that they'll easily grasp.

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Honestly, I struggle to explain this to adults, let alone children. Here's a video and a post by my friend Sarah Kaplan. This might give you some ideas. --Angela

<https://www.washingtonpost.com/news/speaking-of-science/wp/2017/06/12/dear-science-is-the-eclipse-moving-backward/>

Would even a quick less-than-a-second glance without protection still damage my eyes today? Glasses are sold out everywhere, but I still want to at least glance at this once before it ends.

[brainfreeze91](#)

Honestly, you can glance at the sun but you aren't going to be able to see anything. In addition to protecting your eyes, the glass filter out almost all of the sun's light. Even when the moon is covering most of the sun, the light is still so bright that it overpowers the eclipse.

Go outside and ask someone if you can borrow their glasses. This is an exciting event! People will want to share the experience. --Angela

Would even a quick less-than-a-second glance without protection still damage my eyes today? Glasses are sold out everywhere, but I still want to at least glance at this once before it ends.

[brainfreeze91](#)

If you are not in totality and the moon is not covering up the entire Sun, no it's not worth the risk to your eyes. But that doesn't mean that you have to miss seeing the eclipse! There are multiple (and I think just as fun if not more so) ways to indirectly see the eclipse. You can make a pinhole projector or even use your hands or a pasta strainer to see the shadow on the ground. It doesn't take long to make a pinhole projector, quite literally you just take a piece of paper and poke a small hole in it so that the light shines on the ground or another piece of paper and you can watch the projection. Again never look directly at the Sun without the correct filters or eyewear. You can find more information here <https://eclipse2017.nasa.gov/safety> - Alexa

Astrophysics hasn't received this much public attention since the remake of Cosmos!

What is one awesome factoid about space weather, Earth's magnetic fields, or Earth's atmosphere that you would want the entire country to know?

[adenovato](#)

Oh, there are so many! I could go on all day about the cool things of space weather (and there are many days I do!) but if I had to choose just one, I think it would be the Carrington event. It is a fantastic science paper that all can enjoy and the largest solar storm we've ever observed!

https://science.nasa.gov/science-news/science-at-nasa/2008/06may_carringtonflare The affects of the storms were well documented and it was perhaps the first time that we saw space weather affecting technology. - Alexa

Will we be able to see certain features like Bailey's Beads in detail without binoculars?

[the furies are just](#)

Yes! That is something you will be able to see without any kind of aid. Just make sure you wear your glasses while looking at the sun right up until totality. --Angela

Do you have plans yet for the 2024 total solar eclipse that will pass through the United States?

[laurahelmuth](#)

Not yet, but I'm making some! It should be another exciting event! - Alexa

Pineapple on pizza or no?

[drchopsalot](#)

Only if it also has ham and jalapenos - Alexa

So there has been lots of warnings about not staring directly at the eclipse because of the high levels of concentrated uv rays, but I haven't heard anything about protecting our skin. Wouldn't the same rays that would burn our eyes burn our skin? Or am I stretching it here.

[soup_d_up](#)

There's nothing different about solar radiation or UV rays during an eclipse. The difference is that we're all going to be staring at the sun, which you shouldn't do, so you need glasses.

So I don't get yelled at by the dermatologists in the room -- yes, put sunblock on whenever you're going to spend time outside! :)

--Angela

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You are correct! If you plan on spending long hours in the Sun, sunscreen is a great idea. I think that people are focused on eye safety as we don't normally have a reason to look directly at the Sun and today we do. But that isn't a reason to forget our skin and keep it safe as well! Another thing to remember is road safety as there are likely many people out and about traveling to totality and many

who might get distracted while driving during the eclipse. Stay safe out there everyone!

<https://eclipse2017.nasa.gov/safety> - Alexa

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I think a few miles isn't going to make that much of a difference for clouds in the St. Louis area. Here's the current satellite, though, which you could check out before you leave.--Angela

<http://www.goes.noaa.gov/ceus/conus-vis.html>

Is there anything cool we should pay attention to besides the sun going dark and birds acting weird?

[abecedorkian](#)

If you are lucky enough to be near a solar telescope, you'll be able to see some sunspots! This is quite amazing as we're currently heading into a period of solar minimum or very low solar activity. In fact, if you are further north, tonight you might be lucky to see another space weather event, the Aurora! - Alexa

Is there anything cool we should pay attention to besides the sun going dark and birds acting weird?

[abecedorkian](#)

That's the big question! You'll have to stay aware of your surroundings to see or hear the changes. We know that in some locations you'll be able to see shadow bands

(<https://eclipse2017.nasa.gov/exploring-shadow-bands>) and you'll also be able to see Baily's Beads just before totality (https://en.wikipedia.org/wiki/Baily%27s_beads). --Angela

If you had the right equipment could you assess the moon's optical properties like in optical mineralogy?

[fuzzybunnies15](#)

I'm not sure. We do use transits of exoplanets to identify them. I tend to stick a bit closer to Earth with my studies, but you can find more information about transits and the science that is done with them at <https://eclipse2017.nasa.gov/transits-and-occultations> - Alexa

Im in East Tennessee and didn't buy eclipse viewing glasses. Would it be ok to use dark film from a floppy disk for short viewing?

[brainlegss](#)

No, it's not worth the risk to your eyes. You can indirectly view the eclipse using multiple methods including pin-hole projectors or your hands, or even a pasta strainer!

<https://eclipse2017.nasa.gov/eclipse-viewing>. If you are near a university or national park, many are having eclipse viewing parties and they may have a solar telescope which would be awesome to see as there are a few sunspots currently on the solar surface! - Alexa

I read somewhere that eclipse prediction was some of the earliest scientific research. For example, I've read that the Mayan Dresden Codex may have included eclipse prediction. What methods did ancient societies from different parts of the world use to predict eclipses, and how accurate were they?

[natematias](#)

The earliest astronomers (Babylonian, Chinese) simply kept time tables and tried to figure out the patterns. Their authorities would want to know when the next one was coming, so the astronomers would have to make predictions. Obviously that was very hard since it would take thousands of years to get the pattern of eclipses in just one location. Unfortunately a lot of astronomers lost their heads over bad predictions.

The Islamic World was actually the first to really figure these things out with math. They are the fathers of trigonometry and algebra, and they used it to create the most detailed eclipse tables of their time.

--Angela

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[natematias](#)

I haven't looked too much into historical predictions of eclipses myself, but you can find some information at <https://eclipse2017.nasa.gov/eclipse-history>. - Alexa

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There's nothing different about the sun or the solar radiation during the eclipse. If you don't care about seeing the eclipse, you can go on with your life as you otherwise would -- no glasses needed.

The reason we tell people to make sure to wear their glasses is because you should never stare at the sun, since it will damage your eyes. But you can't see the eclipse if you don't stare at the sun, which is why you need the glasses. They filter out the vast majority of the incoming light so you can actually see the moon covering up the sun without damaging your eyes. --Angela

(edit: added my sign-off)

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The Sun gives out very intense light and looking directly at the Sun can burn our eyes causing blindness. It's never safe to directly look at the Sun, which is in part what makes the eclipse so cool! When the Moon directly covers the solar surface, it blocks out all the light and we can see the solar atmosphere even better than we can with our current instrumentation! - Alexa

Will we be able to see the moon approaching the sun over the course of this morning? I am in Western North Carolina if that matters.

[MoogProg](#)

No -- our side of the moon is dark and the sun is behind it. There's no way to see it now during the day until the moment it starts to block the sun. --Angela

What can I use as sun filter from home so I can get some good camera pics?

[ubettacheckit](#)

You can find some tips about photographing the eclipse at <https://www.nasa.gov/feature/goddard/2017/five-tips-from-nasa-for-photographing-the-total-solar-eclipse-on-aug-21> Hope this helps and make sure to be safe! - Alexa

My son got some paper "glasses" from a kids fair. He's insisting they were given out as legit Eyewear for the eclipse. I don't trust them. How can I tell if they are safe? They are called "eclipse shades" and have the name of a planetarium on them.

[Culvertfun](#)

You can go to <https://eclipse2017.nasa.gov/safety> and check. They should have printed on there that they are ISO 12312-2 compliant and the manufacture and their address should also be printed on them. You can find a list of trusted vendors at the above web address. If you are inside and put them on and can see any light, they are not safe. If you find they are not safe or still are unsure, there are many other ways you can indirectly view the eclipse. Check out some here <https://eclipse2017.nasa.gov/eclipse-viewing> Hope this helps. Have fun today and stay safe - Alexa

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[Culvertfun](#)

Chances are they are totally fine. Here's how to test, from the American Astronomical Assoc.:

"You shouldn't be able to see anything through a safe solar filter except the Sun itself or something comparably bright, such as the Sun reflected in a mirror, a sunglint off shiny metal, the hot filament of an unfrosted incandescent lightbulb, a bright halogen lightbulb, a bright-white LED flashlight (including the one on your smartphone), or an arc-welder's torch. All such sources should appear quite dim through a solar viewer."

I'm in Raleigh, NC. Will it get noticeably darker here during maximum coverage if I am a few hundred miles out of the zone of totality, or will it be just like a cloud going by?

[Laxcougar18](#)

It will not likely get too much darker, but it should still be quite interesting to see! In totality, you would notice a change in temperature. I'm not sure if you will notice one, but you can help us gather data on that as well as how clouds change using the <https://observer.globe.gov/science->

[connections/eclipse2017](#) - Alexa

For people who have to be on the road during eclipse (eg, driving to work/class/doctor/home/whatever), is there any danger vision wise? (I know of more traffic, use headlights, watch out for distracted drivers, but if you can't wear eclipse glasses on the road, how do you protect your eyes?)

[perceptionsinreality](#)

You only have to wear the special glasses if you're going to stare at the sun. --Angela

For people who have to be on the road during eclipse (eg, driving to work/class/doctor/home/whatever), is there any danger vision wise? (I know of more traffic, use headlights, watch out for distracted drivers, but if you can't wear eclipse glasses on the road, how do you protect your eyes?)

[perceptionsinreality](#)

I would definitely not wear the eclipse glasses while driving! It would be like driving blind. But make sure, as always, not to look at the Sun if you are driving. - Alexa

is it "safe" to watch using my phone screen side camera with my back to the sun?

[matttrick](#)

I wouldn't. The Sun can easily damage optical instruments like a camera. In fact, as cameras are typically focusing the light into an even smaller area, they often end up melting the sensor and equipment. But there are many other ways to indirectly view the solar eclipse!

<https://eclipse2017.nasa.gov/how-eclipses-work> - Alexa

Do we learn something new from eclipses or just more data. As is there something that can only be studied from an eclipse?

[brightshinyobjects](#)

The eclipse is incredibly special for many different types of science. During the eclipse, we can a better look at the solar atmosphere than we can with current instrumentation. It's also a fantastic time for us to test ionospheric and atmospheric models! You can check out some of the great science being done today during the eclipse at <https://eclipse2017.nasa.gov/science> and if you would like to get involved and help us get some more data check out <https://observer.globe.gov/science-connections/eclipse2017> and <https://eclipse2017.nasa.gov/citizen-science> - Alexa

So I was looking up how to make an eclipse viewer and found a rather simple one using a cardboard box, some tape, a piece of white paper and some tinfoil.

My husband says that *eeeevvvverybody* (not specifying who that is exactly though) says it's not safe to view the eclipse that way.

[KnockMeYourLobes](#)

There are many great indirect ways to view the eclipse. I'm not sure of the design you're talking about, but it sounds like a kind of pin-hole projector. You can find out how to make them at <https://eclipse2017.nasa.gov/eclipse-viewing> - Alexa

So I have a Canon dslr, would it be okay to take more of a landscape picture with an 18mm lens without a filter? I want the eclipse in the frame, but I'm not planning on zooming in on it or anything. Thanks

[DeadSplicer](#)

I wouldn't without the correct filter. You can find some great tips for getting photos of the eclipse at <https://www.nasa.gov/feature/goddard/2017/five-tips-from-nasa-for-photographing-the-total-solar-eclipse-on-aug-21> and make sure to post your photos to <https://www.flickr.com/groups/nasa-eclipse2017/> - Alexa

Hi from Washington Post! Alma asked if she should wear her eclipse glasses OVER her regular glasses or UNDER them. I figure either way is fine?

[laurahelmuth](#)

Over the glasses :) - Alexa

Is it a coincidence that the moon is the perfect size and distance to perfectly block out the sun or am I missing something?

[IVlars2014](#)

It is a coincidence and since the Moon is moving further and further away, in another 650 or so million years we will no longer have eclipses! - Alexa

I assume the path of the eclipse maps the orbit of the moon relative to the sun, is the diagonal path of it due to the tilt of the Earth or the orbit of the Moon being slightly out of the plane of the Earth-Sun orbit?

[nate](#)

Nothing in nature seems to line up perfectly, so it's a bit of both. You can see some great explanations at <https://eclipse2017.nasa.gov/how-eclipses-work> - Alexa (Edit: Sorry for the double response, apparently the first didn't show up when I refreshed the page :) But it really is a great link so worth the double post.)

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[nate](#)

Yup and you can find some great videos explaining the orbits at <https://eclipse2017.nasa.gov/how-eclipses-work> - Alexa

Is it better to take quick glances or just keep looking.

[WallStreetGuillotin9](#)

If you're wearing the special eclipse glasses, you can stare at the sun all day and be just fine. :) --
Angela

Is it better to take quick glances or just keep looking.

[WallStreetGuillotin9](#)

If you are using eclipse glasses, you can keep looking for an extended period of time, but I wouldn't as you might start getting a neck cramp. Also, there are a ton of cool things to see on the ground, so make sure to take a moment to see everything around you! <https://eclipse2017.nasa.gov/eclipse-101> -
Alexa