
NASA SCIENCE LIVE
WATCH A
TOTAL SOLAR ECLIPSE
LIVE FROM
AUSTRALIA

1
00:00:00,299 --> 00:00:03,700
foreign

2
00:01:54,850 --> 00:00:39,290
[Music]

3
00:02:03,109 --> 00:01:56,520
thank you

4
00:02:14,650 --> 00:02:04,690
foreign

5
00:02:21,770 --> 00:02:18,650
hello and welcome to another episode of

6
00:02:23,570 --> 00:02:21,780
NASA's science live this is an

7
00:02:25,729 --> 00:02:23,580
opportunity for you to interact with

8
00:02:28,369 --> 00:02:25,739
NASA experts and have your questions

9
00:02:31,729 --> 00:02:28,379
answered in real time I'm your host

10
00:02:34,250 --> 00:02:31,739
Denise Hill and we are taking you all

11
00:02:38,330 --> 00:02:34,260
the way to Australia where there's a

12
00:02:41,390 --> 00:02:38,340
total solar eclipse happening right now

13
00:02:44,330 --> 00:02:41,400

this event is unique and rare because

14
00:02:46,670 --> 00:02:44,340
it's both a total and annular Eclipse

15
00:02:48,830 --> 00:02:46,680
which is known as a hybrid Eclipse we're

16
00:02:50,449 --> 00:02:48,840
going to see real-time views thanks to

17
00:02:52,309 --> 00:02:50,459
our friends at time and date we're going

18
00:02:55,190 --> 00:02:52,319
to talk about the Sun and answer some of

19
00:02:57,830 --> 00:02:55,200
your burning questions you can send us

20
00:02:59,449 --> 00:02:57,840
questions using ask nasasa on social

21
00:03:01,850 --> 00:02:59,459
media or drop them in the comment box

22
00:03:05,210 --> 00:03:01,860
wherever you're watching us from

23
00:03:08,390 --> 00:03:05,220
the sun touches everything it is Earth's

24
00:03:11,690 --> 00:03:08,400
life force the sun earth connection is a

25
00:03:13,850 --> 00:03:11,700
vital part of our lives and Society it

26
00:03:16,850 --> 00:03:13,860
influences a variety of systems on earth

27
00:03:19,910 --> 00:03:16,860
like agriculture economics climate

28
00:03:22,670 --> 00:03:19,920
change politics food and food scarcity

29
00:03:25,430 --> 00:03:22,680
as well as the physical mental and

30
00:03:28,369 --> 00:03:25,440
emotional health of humans we see its

31
00:03:32,270 --> 00:03:28,379
influence throughout our culture in art

32
00:03:34,009 --> 00:03:32,280
music religion fashion and sports and a

33
00:03:36,410 --> 00:03:34,019
host of other trends

34
00:03:39,290 --> 00:03:36,420
during tonight's event we're also going

35
00:03:43,309 --> 00:03:39,300
to share a special upcoming opportunity

36
00:03:45,770 --> 00:03:43,319
for you to participate in Sun science

37
00:03:47,869 --> 00:03:45,780
so let's Jump Right In

38
00:03:51,350 --> 00:03:47,879

I'm joined today by NASA Sun science

39
00:03:53,750 --> 00:03:51,360
scientist Dr Kelly Kirk Kelly thank you

40
00:03:55,369 --> 00:03:53,760
so much for being here today

41
00:03:57,710 --> 00:03:55,379
thank you so much Denise it's my

42
00:04:00,470 --> 00:03:57,720
pleasure

43
00:04:02,809 --> 00:04:00,480
so I think we should start off by first

44
00:04:05,390 --> 00:04:02,819
explaining the reason why we're here the

45
00:04:08,390 --> 00:04:05,400
eclipse in Australia so can you tell us

46
00:04:09,890 --> 00:04:08,400
how solar eclipses work and why this one

47
00:04:11,869 --> 00:04:09,900
is called the hybrid eclipse and what

48
00:04:14,270 --> 00:04:11,879
that even means

49
00:04:17,030 --> 00:04:14,280
definitely yeah let's get started so

50
00:04:19,430 --> 00:04:17,040
what a solar eclipse is is it's in

51
00:04:22,490 --> 00:04:19,440
alignment and a dance between the moon

52
00:04:24,650 --> 00:04:22,500
the Earth and the Sun so the Earth the

53
00:04:27,469 --> 00:04:24,660
in the Moon is in between uh the Earth

54
00:04:28,310 --> 00:04:27,479
and the Sun and casts a shadow on the

55
00:04:29,870 --> 00:04:28,320
earth

56
00:04:33,469 --> 00:04:29,880
um and that's a total solar eclipse when

57
00:04:34,790 --> 00:04:33,479
it completely blocks out uh the blocks

58
00:04:36,350 --> 00:04:34,800
out the Sun and that's because it's

59
00:04:38,570 --> 00:04:36,360
close to Earth

60
00:04:40,249 --> 00:04:38,580
um and we go through the as the moon

61
00:04:41,870 --> 00:04:40,259
goes around we don't have one every

62
00:04:44,390 --> 00:04:41,880
every month but we do get them

63
00:04:47,150 --> 00:04:44,400

occasionally we also have an annular

64
00:04:50,210 --> 00:04:47,160
eclipse and an annular eclipse happens

65
00:04:52,129 --> 00:04:50,220
because the Sun the moon doesn't stay in

66
00:04:53,570 --> 00:04:52,139
a perfectly circular orbit and it

67
00:04:55,850 --> 00:04:53,580
sometimes is a little bit further away

68
00:04:57,650 --> 00:04:55,860
so it doesn't completely block out the

69
00:05:00,170 --> 00:04:57,660
Sun so it leaves this ring of fire

70
00:05:01,790 --> 00:05:00,180
around the Sun like in the image that

71
00:05:04,189 --> 00:05:01,800
you're seeing here

72
00:05:07,730 --> 00:05:04,199
um in that annular eclipse and this

73
00:05:09,890 --> 00:05:07,740
eclipse in Australia is a hybrid so part

74
00:05:11,510 --> 00:05:09,900
of the path of totality is going to see

75
00:05:14,390 --> 00:05:11,520
totality so you're going to completely

76
00:05:16,670 --> 00:05:14,400
block out the sun another part is going

77
00:05:18,230 --> 00:05:16,680
to see the actual Ring of Fire and so

78
00:05:19,550 --> 00:05:18,240
that's why it's a hybrid based on the

79
00:05:20,990 --> 00:05:19,560
curvature of the earth and where you are

80
00:05:22,850 --> 00:05:21,000
on the path you're either going to see

81
00:05:25,610 --> 00:05:22,860
the total or you're going to see the

82
00:05:32,870 --> 00:05:29,870
okay so eclipses are super cool events

83
00:05:34,730 --> 00:05:32,880
to see in the sky but why do scientists

84
00:05:37,370 --> 00:05:34,740
care about eclipses and what can we

85
00:05:40,129 --> 00:05:37,380
learn about them during these events

86
00:05:42,409 --> 00:05:40,139
great question so what happens during

87
00:05:45,590 --> 00:05:42,419
these events is that we can actually see

88
00:05:47,510 --> 00:05:45,600

with our own eyes the sun's Corona are

89
00:05:49,790 --> 00:05:47,520
hot outer atmosphere and that's

90
00:05:51,290 --> 00:05:49,800
something that we before uh before the

91
00:05:53,270 --> 00:05:51,300
Space Age we really couldn't do any

92
00:05:55,370 --> 00:05:53,280
other way so we were able to study

93
00:05:58,550 --> 00:05:55,380
things that flow off of the sun seeing

94
00:06:01,010 --> 00:05:58,560
this constant solar wind during these um

95
00:06:03,050 --> 00:06:01,020
during these eclipses we also did things

96
00:06:04,670 --> 00:06:03,060
like experiments in relative general

97
00:06:06,830 --> 00:06:04,680
relativity

98
00:06:08,749 --> 00:06:06,840
um and Discovery a discovery of helium

99
00:06:09,950 --> 00:06:08,759
and other elements of the Sun so there's

100
00:06:13,129 --> 00:06:09,960
a lot of different things that you can

101
00:06:16,189 --> 00:06:13,139
do with eclipses

102
00:06:18,290 --> 00:06:16,199
So speaking of sun science is there

103
00:06:20,689 --> 00:06:18,300
anything happening in Australia

104
00:06:22,730 --> 00:06:20,699
right now actually there is

105
00:06:24,529 --> 00:06:22,740
um there is a kite experiment that is

106
00:06:26,330 --> 00:06:24,539
going on during this Eclipse so it's a

107
00:06:28,550 --> 00:06:26,340
new platform for us

108
00:06:30,170 --> 00:06:28,560
um to actually take data from

109
00:06:32,270 --> 00:06:30,180
um we've done things before in Rockets

110
00:06:35,029 --> 00:06:32,280
or balloons or spacecraft but this is

111
00:06:37,909 --> 00:06:35,039
now a kite um and you're shown here as a

112
00:06:40,730 --> 00:06:37,919
picture this kite is 21 feet across

113
00:06:44,330 --> 00:06:40,740

um and it'll fly around 3 500

114
00:06:46,370 --> 00:06:44,340
um feet and uh it will actually take a

115
00:06:48,770 --> 00:06:46,380
spectrometer so it'll split the light up

116
00:06:51,469 --> 00:06:48,780
is the is the instrument aboard as it

117
00:06:52,610 --> 00:06:51,479
looks um at the Sun and try to find that

118
00:06:55,189 --> 00:06:52,620
flow that I was talking about that

119
00:06:57,469 --> 00:06:55,199
constant solar wind and how that escapes

120
00:06:58,610 --> 00:06:57,479
uh the Sun during this eclipse and if

121
00:06:59,870 --> 00:06:58,620
it's successful

122
00:07:02,270 --> 00:06:59,880
um they'll hopefully fly it again in

123
00:07:03,770 --> 00:07:02,280
2024 when the eclipse comes to North

124
00:07:06,590 --> 00:07:03,780
America

125
00:07:09,830 --> 00:07:06,600
that's so cool who knew flying a kite

126
00:07:11,990 --> 00:07:09,840
could be both fun and educational I love

127
00:07:13,490 --> 00:07:12,000
it so I mentioned at the top of the show

128
00:07:16,070 --> 00:07:13,500
that there will be opportunities for

129
00:07:17,570 --> 00:07:16,080
people to participate in Sun science can

130
00:07:20,450 --> 00:07:17,580
you tell us a little bit about the

131
00:07:22,969 --> 00:07:20,460
heliophysics figure what it is and how

132
00:07:26,150 --> 00:07:22,979
folks watching can get involved

133
00:07:28,010 --> 00:07:26,160
definitely the Sun and all of us are in

134
00:07:30,710 --> 00:07:28,020
for a big year

135
00:07:33,409 --> 00:07:30,720
um starting in October of 2023 with the

136
00:07:36,170 --> 00:07:33,419
annular Eclipse that goes across uh the

137
00:07:38,089 --> 00:07:36,180
U.S and then down into uh Central and

138
00:07:41,510 --> 00:07:38,099

South America

139
00:07:43,370 --> 00:07:41,520
um then going to the uh April 8th 2024

140
00:07:45,409 --> 00:07:43,380
total solar eclipse

141
00:07:46,370 --> 00:07:45,419
um and then finally ending the long big

142
00:07:49,909 --> 00:07:46,380
year

143
00:07:51,890 --> 00:07:49,919
um December 2024 with Parker solar probe

144
00:07:55,309 --> 00:07:51,900
um goes to the closest approach to the

145
00:07:56,629 --> 00:07:55,319
sun 94 of the way uh to the Sun to study

146
00:07:58,309 --> 00:07:56,639
that outer atmosphere that we're going

147
00:08:00,950 --> 00:07:58,319
to see here in a few minutes with uh

148
00:08:04,010 --> 00:08:00,960
with this total eclipse and so this year

149
00:08:06,650 --> 00:08:04,020
is a way that we can all belong in

150
00:08:08,809 --> 00:08:06,660
science and all belong uh to learning

151
00:08:10,550 --> 00:08:08,819
about the Sun and all the different ways

152
00:08:13,430 --> 00:08:10,560
that the sun touches our lives and the

153
00:08:16,010 --> 00:08:13,440
term Big Year actually is a burning term

154
00:08:18,409 --> 00:08:16,020
um a citizen science burning term that

155
00:08:20,749 --> 00:08:18,419
is that is studying as many species as

156
00:08:22,550 --> 00:08:20,759
possible of birds in one year and what

157
00:08:25,430 --> 00:08:22,560
we're challenging folks to do is to

158
00:08:26,930 --> 00:08:25,440
study as many different things or relate

159
00:08:29,390 --> 00:08:26,940
to as many different things as they can

160
00:08:31,189 --> 00:08:29,400
about the Sun so can you see an annular

161
00:08:33,589 --> 00:08:31,199
Eclipse can you see a total eclipse what

162
00:08:35,990 --> 00:08:33,599
about Aurora what about seeing a solar

163
00:08:37,969 --> 00:08:36,000

flare go off what about participating in

164
00:08:41,510 --> 00:08:37,979
a sport or another event

165
00:08:43,850 --> 00:08:41,520
um that relates you to the Sun

166
00:08:45,769 --> 00:08:43,860
and you mentioned citizen science and

167
00:08:47,329 --> 00:08:45,779
citizen science is a big part of how

168
00:08:50,870 --> 00:08:47,339
folks can participate in the

169
00:08:53,750 --> 00:08:50,880
heliophysics figure a few specifics come

170
00:08:55,910 --> 00:08:53,760
to mind like uh eclipse soundscaping

171
00:08:57,769 --> 00:08:55,920
soundscapes is a citizen science project

172
00:08:59,930 --> 00:08:57,779
that allows you to participate in

173
00:09:02,150 --> 00:08:59,940
Eclipse research by observing and

174
00:09:05,150 --> 00:09:02,160
collecting audio recordings during

175
00:09:08,269 --> 00:09:05,160
upcoming upcoming solar eclipses you

176
00:09:10,550 --> 00:09:08,279
then take the data and analyze it and

177
00:09:13,070 --> 00:09:10,560
determine how eclipses may affect the

178
00:09:14,389 --> 00:09:13,080
ecosystem and to learn more about that

179
00:09:17,810 --> 00:09:14,399
one

180
00:09:21,430 --> 00:09:17,820
um you go to eclipse soundscapes.org

181
00:09:24,470 --> 00:09:21,440
another one is is called the Nationwide

182
00:09:26,690 --> 00:09:24,480
Eclipse ballooning project and this one

183
00:09:29,690 --> 00:09:26,700
will engage teams from a range of

184
00:09:32,269 --> 00:09:29,700
colleges and universities in an

185
00:09:33,769 --> 00:09:32,279
adventure in scientific ballooning these

186
00:09:36,410 --> 00:09:33,779
teams will participate in scientific

187
00:09:39,170 --> 00:09:36,420
ballooning during the upcoming annular

188
00:09:43,070 --> 00:09:39,180

and total solar eclipses in 2023 and

189
00:09:45,530 --> 00:09:43,080
2024 across the eclipse Path student

190
00:09:47,930 --> 00:09:45,540
teams will use Innovative balloon

191
00:09:52,449 --> 00:09:47,940
systems to conduct experiments to learn

192
00:09:58,970 --> 00:09:57,470
go.nasa.gov n e b p

193
00:10:00,949 --> 00:09:58,980
all right thank you Kelly we'll come

194
00:10:02,690 --> 00:10:00,959
back to you in just a moment to answer

195
00:10:04,850 --> 00:10:02,700
some of the questions we have coming in

196
00:10:07,670 --> 00:10:04,860
don't forget to submit your questions

197
00:10:09,290 --> 00:10:07,680
using hashtag asknessa or pop them in

198
00:10:11,030 --> 00:10:09,300
the comment box on the platform that

199
00:10:13,850 --> 00:10:11,040
you're watching

200
00:10:16,190 --> 00:10:13,860
so as Kelly just mentioned there's a big

201
00:10:19,009 --> 00:10:16,200
year of sun science ahead of us mark

202
00:10:22,009 --> 00:10:19,019
your calendars because on October 14th

203
00:10:24,590 --> 00:10:22,019
2023 there will be an annular Eclipse

204
00:10:27,110 --> 00:10:24,600
where the moon only blocks the center

205
00:10:29,150 --> 00:10:27,120
part of the Sun and creates what looks

206
00:10:33,290 --> 00:10:29,160
like a ring of fire

207
00:10:35,269 --> 00:10:33,300
and then on April 8th 2024 millions of

208
00:10:38,449 --> 00:10:35,279
people across the U.S will have the

209
00:10:40,490 --> 00:10:38,459
chance to see a total solar eclipse

210
00:10:43,730 --> 00:10:40,500
where will you be

211
00:10:45,110 --> 00:10:43,740
NASA has some new maps that could help

212
00:10:55,590 --> 00:10:45,120
you decide

213
00:10:55,600 --> 00:11:04,430

[Music]

214
00:11:04,440 --> 00:11:14,310
foreign

215
00:11:14,320 --> 00:11:37,370
[Music]

216
00:11:42,350 --> 00:11:39,590
yeah

217
00:11:44,810 --> 00:11:42,360
I am so excited for these upcoming

218
00:11:48,050 --> 00:11:44,820
eclipses and truth be told I've never

219
00:11:49,610 --> 00:11:48,060
seen a total or an annular Eclipse but

220
00:11:51,650 --> 00:11:49,620
for the annular eclipse coming up later

221
00:11:54,050 --> 00:11:51,660
this year I know exactly where I'm going

222
00:11:57,410 --> 00:11:54,060
to be I am going to be in Albuquerque

223
00:11:59,690 --> 00:11:57,420
New Mexico and I am so excited

224
00:12:01,730 --> 00:11:59,700
so to take a closer look at the NASA

225
00:12:03,490 --> 00:12:01,740
eclipse maps in more detail you can

226
00:12:08,590 --> 00:12:03,500
visit

227
00:12:13,190 --> 00:12:08,600
go.nasa.gov us Eclipse Maps

228
00:12:15,889 --> 00:12:13,200
let's chat with a NASA expert who is in

229
00:12:18,470 --> 00:12:15,899
Australia right now for tonight's solar

230
00:12:21,650 --> 00:12:18,480
eclipse we are joined by planetary

231
00:12:24,530 --> 00:12:21,660
scientist Dr Henry through thank you so

232
00:12:28,790 --> 00:12:24,540
much for being with us Henry

233
00:12:35,750 --> 00:12:31,550
so you're in Australia right now can you

234
00:12:37,550 --> 00:12:35,760
tell me exactly where you are

235
00:12:39,530 --> 00:12:37,560
wait a minute Australia which is in the

236
00:12:41,930 --> 00:12:39,540
ningaloo peninsula in the in Western

237
00:12:44,150 --> 00:12:41,940
Australia this is a really remote region

238
00:12:45,949 --> 00:12:44,160

of Australia uh it's a long way from the

239
00:12:48,170 --> 00:12:45,959
closest city Perth closest large city

240
00:12:50,990 --> 00:12:48,180
Perth which is uh itself a very remote

241
00:12:52,850 --> 00:12:51,000
uh uh capital city so there are

242
00:12:55,370 --> 00:12:52,860
thousands of people down here who have

243
00:12:56,990 --> 00:12:55,380
made the Trap trick track all the way

244
00:12:59,509 --> 00:12:57,000
out to xmouth

245
00:13:01,430 --> 00:12:59,519
um waiting for this uh for totality

246
00:13:04,430 --> 00:13:01,440
which is going to be coming up here in

247
00:13:08,090 --> 00:13:04,440
um in a little more than an hour

248
00:13:10,490 --> 00:13:08,100
a little less so cool that is so cool it

249
00:13:11,449 --> 00:13:10,500
looks I a ton of equipment back there do

250
00:13:13,790 --> 00:13:11,459
you have any

251
00:13:16,730 --> 00:13:13,800
who and what are you going to be doing

252
00:13:18,050 --> 00:13:16,740
so I have a solar uh telescope here

253
00:13:20,509 --> 00:13:18,060
myself I'm going to be watching the

254
00:13:23,690 --> 00:13:20,519
saunas it as it disappears in uh in h

255
00:13:25,370 --> 00:13:23,700
Alpha which is the the wavelength where

256
00:13:27,170 --> 00:13:25,380
you see it a lot of the activity of the

257
00:13:29,329 --> 00:13:27,180
sun you see a lot of these uh features

258
00:13:31,009 --> 00:13:29,339
on the sun both on the disc itself and

259
00:13:32,210 --> 00:13:31,019
off to the off to the side there are

260
00:13:34,069 --> 00:13:32,220
thousands of people here with their own

261
00:13:36,290 --> 00:13:34,079
telescopes uh recording this on taking

262
00:13:38,150 --> 00:13:36,300
pictures of it in various ways but most

263
00:13:40,970 --> 00:13:38,160

the people here are not scientists they

264
00:13:42,590 --> 00:13:40,980
are fans of the Sun and are here for the

265
00:13:44,990 --> 00:13:42,600
excitement of of being here at the

266
00:13:46,430 --> 00:13:45,000
eclipse um uh there are there are

267
00:13:48,050 --> 00:13:46,440
thousands of people who've been coming

268
00:13:50,150 --> 00:13:48,060
in all morning let me just give you a

269
00:13:51,650 --> 00:13:50,160
little tour of the of the of the site

270
00:13:53,629 --> 00:13:51,660
here

271
00:13:54,410 --> 00:13:53,639
uh you can see

272
00:13:56,329 --> 00:13:54,420
um

273
00:13:58,850 --> 00:13:56,339
going here we are at Royal right next to

274
00:14:00,910 --> 00:13:58,860
the right next to the ocean here a great

275
00:14:03,410 --> 00:14:00,920
place for seeing whale sharks

276
00:14:05,750 --> 00:14:03,420
here's looking looking at the eclipse

277
00:14:08,509 --> 00:14:05,760
instead you can see all the thousands of

278
00:14:12,050 --> 00:14:08,519
people behind us there

279
00:14:14,810 --> 00:14:12,060
that is awesome I am so jealous right

280
00:14:17,329 --> 00:14:14,820
now that looks so awesome okay we're

281
00:14:19,850 --> 00:14:17,339
gonna let you go so you can go enjoy the

282
00:14:23,389 --> 00:14:19,860
eclipse and uh see you firsthand thank

283
00:14:28,550 --> 00:14:26,150
so here's a question

284
00:14:31,250 --> 00:14:28,560
since the moon orbits around Earth

285
00:14:33,889 --> 00:14:31,260
roughly once per month

286
00:14:35,990 --> 00:14:33,899
how come we don't have 12 solar eclipses

287
00:14:40,810 --> 00:14:36,000
every year

288
00:15:12,510 --> 00:15:10,310

[Music]

289
00:15:22,030 --> 00:15:12,520
foreign

290
00:15:27,110 --> 00:15:25,129
antibody eclipses so let's get to some

291
00:15:29,090 --> 00:15:27,120
of those now remember if you have

292
00:15:31,610 --> 00:15:29,100
questions you can send them to us on

293
00:15:33,350 --> 00:15:31,620
social media using the hashtag asknasa

294
00:15:35,629 --> 00:15:33,360
or just drop them in the comment box

295
00:15:38,569 --> 00:15:35,639
from wherever you're watching us from

296
00:15:40,790 --> 00:15:38,579
so now I'm back with sun expert Dr Kelly

297
00:15:43,310 --> 00:15:40,800
Couric and we're about 30 minutes away

298
00:15:46,310 --> 00:15:43,320
from totality as a reminder you are

299
00:15:48,110 --> 00:15:46,320
seeing real time views of the eclipse in

300
00:15:50,930 --> 00:15:48,120
Australia thanks to our friends at time

301
00:15:52,310 --> 00:15:50,940
and date Kelly let's tackle some of

302
00:15:54,650 --> 00:15:52,320
these questions that are coming in

303
00:15:57,530 --> 00:15:54,660
online but first I want to jump the line

304
00:16:00,470 --> 00:15:57,540
and ask a question myself I am curious

305
00:16:04,910 --> 00:16:00,480
about how do you watch an annular

306
00:16:07,370 --> 00:16:04,920
eclipse in a solar eclipse safely

307
00:16:09,530 --> 00:16:07,380
that's a great question because really

308
00:16:12,470 --> 00:16:09,540
safety is our number one priority here

309
00:16:15,829 --> 00:16:12,480
so for the annular Eclipse you will

310
00:16:17,930 --> 00:16:15,839
always have to use a pair of uh solar

311
00:16:20,269 --> 00:16:17,940
viewing glasses these are not sunglasses

312
00:16:21,590 --> 00:16:20,279
there are specific glasses

313
00:16:22,910 --> 00:16:21,600

um that are made to a certain standard

314
00:16:25,910 --> 00:16:22,920
so that you can look at the sun through

315
00:16:28,189 --> 00:16:25,920
the annular eclipse or you could make an

316
00:16:30,290 --> 00:16:28,199
a indirect viewing of device which means

317
00:16:31,610 --> 00:16:30,300
that your back is to the Sun and that

318
00:16:34,069 --> 00:16:31,620
device is in front of you whether that's

319
00:16:36,410 --> 00:16:34,079
a strainer like a kitchen strainer or

320
00:16:37,370 --> 00:16:36,420
even your hands you can make a strainer

321
00:16:39,110 --> 00:16:37,380
this way

322
00:16:43,670 --> 00:16:39,120
um and project the image of the Crescent

323
00:16:45,829 --> 00:16:43,680
Moon on uh or the ring of fire onto onto

324
00:16:48,430 --> 00:16:45,839
a wall or a floor things things like

325
00:16:50,569 --> 00:16:48,440
that for the total solar eclipse

326
00:16:52,310 --> 00:16:50,579
whenever the sun is only partially

327
00:16:54,949 --> 00:16:52,320
eclipsed you must again have those

328
00:16:57,650 --> 00:16:54,959
glasses the safe eclipse glasses not

329
00:17:01,249 --> 00:16:57,660
sunglasses to watch or the indirect

330
00:17:03,650 --> 00:17:01,259
viewing method and during totality we

331
00:17:06,590 --> 00:17:03,660
want you to be able to look directly at

332
00:17:09,530 --> 00:17:06,600
that Corona um directly at that Sun's

333
00:17:11,809 --> 00:17:09,540
Corona the beautiful atmosphere that we

334
00:17:14,090 --> 00:17:11,819
study and that really flows out towards

335
00:17:16,490 --> 00:17:14,100
us and connects us to the Sun so that's

336
00:17:18,350 --> 00:17:16,500
how you safely view an annular and a

337
00:17:20,990 --> 00:17:18,360
total solar eclipse

338
00:17:23,090 --> 00:17:21,000

okay so I think I got it so for an

339
00:17:25,309 --> 00:17:23,100
annular eclipse

340
00:17:27,230 --> 00:17:25,319
eclipse glasses the entire time or

341
00:17:30,650 --> 00:17:27,240
indirect viewing method the entire time

342
00:17:34,250 --> 00:17:30,660
and for a total solar eclipse

343
00:17:35,930 --> 00:17:34,260
glasses indirect viewing until totality

344
00:17:39,710 --> 00:17:35,940
and then back to classes in direct

345
00:17:44,029 --> 00:17:41,690
all right

346
00:17:48,110 --> 00:17:44,039
um our first question from viewers

347
00:17:50,090 --> 00:17:48,120
online from is from mitsuhari ujja and

348
00:17:52,310 --> 00:17:50,100
if I said that if I mispronounced that

349
00:17:56,450 --> 00:17:52,320
please forgive me on Twitter she's

350
00:17:58,430 --> 00:17:56,460
asking why are some eclipses longer than

351
00:18:00,590 --> 00:17:58,440
others

352
00:18:03,409 --> 00:18:00,600
that's a really good question and it

353
00:18:04,970 --> 00:18:03,419
does have to do with how they line up in

354
00:18:06,350 --> 00:18:04,980
the video that we saw just a little

355
00:18:08,330 --> 00:18:06,360
while ago

356
00:18:10,310 --> 00:18:08,340
um to get the eclipse you have to have

357
00:18:12,650 --> 00:18:10,320
the Moon and the Sun and the Earth in

358
00:18:15,230 --> 00:18:12,660
that direct straight line and so

359
00:18:16,850 --> 00:18:15,240
sometimes it's just a little bit uh off

360
00:18:19,370 --> 00:18:16,860
in One Direction so you get some of the

361
00:18:21,890 --> 00:18:19,380
Shadow but not a lot and based again

362
00:18:23,810 --> 00:18:21,900
um where that position actually is is

363
00:18:25,250 --> 00:18:23,820

how long you get the eclipse so about

364
00:18:28,310 --> 00:18:25,260
the longest we could ever get

365
00:18:30,409 --> 00:18:28,320
theoretically is around seven minutes uh

366
00:18:32,930 --> 00:18:30,419
seven minutes of eclipse we're only

367
00:18:35,690 --> 00:18:32,940
going to get around a minute today

368
00:18:38,090 --> 00:18:35,700
um in Australia but we're very lucky to

369
00:18:41,630 --> 00:18:38,100
get about four and a half minutes

370
00:18:44,210 --> 00:18:41,640
um next year in 2024 for the totally

371
00:18:45,830 --> 00:18:44,220
excellent so I'm looking at what we're

372
00:18:48,049 --> 00:18:45,840
seeing now can you tell us what it is

373
00:18:50,450 --> 00:18:48,059
we're seeing what we're looking at

374
00:18:53,570 --> 00:18:50,460
so right now what we have what we're

375
00:18:57,770 --> 00:18:53,580
looking at is the uh yellow or the white

376
00:18:59,510 --> 00:18:57,780
ball is the Sun and we have the uh black

377
00:19:01,010 --> 00:18:59,520
Crescent on the bottom is actually the

378
00:19:02,750 --> 00:19:01,020
moon's shadow

379
00:19:05,630 --> 00:19:02,760
um going across or the moon's disk that

380
00:19:07,730 --> 00:19:05,640
you see blocking out the sun

381
00:19:09,470 --> 00:19:07,740
um so we've already made what is called

382
00:19:10,909 --> 00:19:09,480
First Contact so when the first looks

383
00:19:12,650 --> 00:19:10,919
like there's a little bite taken out of

384
00:19:15,350 --> 00:19:12,660
the Sun by The Moon

385
00:19:17,570 --> 00:19:15,360
um and we're moving through towards

386
00:19:20,210 --> 00:19:17,580
um what will become uh the second

387
00:19:22,490 --> 00:19:20,220
contact which meaning that that disc of

388
00:19:25,430 --> 00:19:22,500

the moon will will touch the other side

389
00:19:28,130 --> 00:19:25,440
of the disc of the Sun

390
00:19:29,150 --> 00:19:28,140
wow that's amazing it's absolutely

391
00:19:30,590 --> 00:19:29,160
beautiful

392
00:19:32,750 --> 00:19:30,600
all right so let's head back to

393
00:19:36,169 --> 00:19:32,760
questions online Prince Z on YouTube

394
00:19:38,630 --> 00:19:36,179
asks how many times does this happen and

395
00:19:40,190 --> 00:19:38,640
how long does it last and what impact

396
00:19:42,529 --> 00:19:40,200
does it have on our planet so let's take

397
00:19:45,650 --> 00:19:42,539
that one at a time how many times do

398
00:19:48,650 --> 00:19:45,660
total eclipses happen

399
00:19:51,110 --> 00:19:48,660
so there are there is a solar eclipse

400
00:19:52,430 --> 00:19:51,120
about every 18 months

401
00:19:53,990 --> 00:19:52,440
um somewhere on the Earth but there's

402
00:19:55,490 --> 00:19:54,000
the Earth is large and there's a lot of

403
00:19:57,289 --> 00:19:55,500
bodies of water so sometimes it's over

404
00:19:59,750 --> 00:19:57,299
water and not land

405
00:20:01,549 --> 00:19:59,760
um so it's it's relatively

406
00:20:02,510 --> 00:20:01,559
um relatively common you know every year

407
00:20:04,630 --> 00:20:02,520
and a half

408
00:20:08,150 --> 00:20:04,640
um but in one place it averages around

409
00:20:10,250 --> 00:20:08,160
375 to 400 years to get one in a

410
00:20:12,169 --> 00:20:10,260
specific place so it's it's special to

411
00:20:13,789 --> 00:20:12,179
have it in your place

412
00:20:15,770 --> 00:20:13,799
um and you could probably find one If

413
00:20:17,870 --> 00:20:15,780

you flew somewhere in the in the worlds

414
00:20:20,690 --> 00:20:17,880
every 18 months

415
00:20:23,870 --> 00:20:20,700
okay and

416
00:20:26,210 --> 00:20:23,880
um how long you kind of answered this

417
00:20:28,070 --> 00:20:26,220
um how long they last and if you want to

418
00:20:29,630 --> 00:20:28,080
elaborate on that talking about like the

419
00:20:31,490 --> 00:20:29,640
different time frames that you mentioned

420
00:20:34,010 --> 00:20:31,500
before

421
00:20:34,610 --> 00:20:34,020
yeah definitely so they can last

422
00:20:37,310 --> 00:20:34,620
um

423
00:20:40,310 --> 00:20:37,320
anywhere from a few a few seconds or a

424
00:20:42,409 --> 00:20:40,320
minute uh to actually you know up to

425
00:20:43,789 --> 00:20:42,419
seven um is the seven minutes would be

426
00:20:46,130 --> 00:20:43,799
the longest one but that one's not going

427
00:20:49,130 --> 00:20:46,140
to happen for for quite a long time

428
00:20:51,049 --> 00:20:49,140
um so really uh about four minutes is

429
00:20:52,310 --> 00:20:51,059
what we four and a half to minutes we're

430
00:20:56,150 --> 00:20:52,320
going to see

431
00:20:58,970 --> 00:20:56,160
um along the path in um in 2024.

432
00:21:00,169 --> 00:20:58,980
and is there any impact of eclipses on

433
00:21:02,570 --> 00:21:00,179
the planet

434
00:21:05,090 --> 00:21:02,580
on Earth definitely so we're and we

435
00:21:08,029 --> 00:21:05,100
actually use them as a scientific study

436
00:21:09,770 --> 00:21:08,039
um both here and um and elsewhere so

437
00:21:10,970 --> 00:21:09,780
when you're experiencing a total solar

438
00:21:12,830 --> 00:21:10,980

eclipse and this is one of the things

439
00:21:14,990 --> 00:21:12,840
that as beautiful as this image is it

440
00:21:16,610 --> 00:21:15,000
can't quite capture is it's a full body

441
00:21:18,830 --> 00:21:16,620
experience

442
00:21:20,150 --> 00:21:18,840
um so it becomes cooler so those are

443
00:21:22,490 --> 00:21:20,160
temperature change

444
00:21:24,529 --> 00:21:22,500
um it also gets darker so animals um

445
00:21:26,270 --> 00:21:24,539
that normally go to sleep at night go to

446
00:21:28,430 --> 00:21:26,280
sleep because they think it's they think

447
00:21:30,830 --> 00:21:28,440
it's nighttime and then they wake up

448
00:21:32,510 --> 00:21:30,840
after the Sun comes back up so a rooster

449
00:21:34,970 --> 00:21:32,520
would Crow or crickets would chirp and

450
00:21:36,230 --> 00:21:34,980
stop tripping and and um all of these

451
00:21:37,730 --> 00:21:36,240
things so

452
00:21:39,890 --> 00:21:37,740
um it does have an effect on the earth

453
00:21:43,190 --> 00:21:39,900
and we're actually using it also um in

454
00:21:45,230 --> 00:21:43,200
2023 and 2024 to study the ionosphere or

455
00:21:48,169 --> 00:21:45,240
layer of the atmosphere where we

456
00:21:50,149 --> 00:21:48,179
actually use for a lot of communications

457
00:21:51,890 --> 00:21:50,159
um and how that you know data instant

458
00:21:55,310 --> 00:21:51,900
day night shift we're actually using it

459
00:21:58,130 --> 00:21:55,320
as a way to study that effect on Earth

460
00:21:59,930 --> 00:21:58,140
that's awesome that's amazing that and

461
00:22:03,110 --> 00:21:59,940
it does have this impact and that

462
00:22:04,850 --> 00:22:03,120
animals and nature responds I think that

463
00:22:07,310 --> 00:22:04,860

is so cool

464
00:22:10,310 --> 00:22:07,320
um okay so next question Tunisia Tucker

465
00:22:14,450 --> 00:22:10,320
on YouTube asks these really seem rare

466
00:22:16,070 --> 00:22:14,460
So when is the next hybrid eclipse

467
00:22:17,750 --> 00:22:16,080
oh that's a good question I actually

468
00:22:19,370 --> 00:22:17,760
don't know when the next hybrid eclipse

469
00:22:20,990 --> 00:22:19,380
is I'm gonna have to look that up and

470
00:22:23,330 --> 00:22:21,000
we'll have to we'll have to find that

471
00:22:25,970 --> 00:22:23,340
and put that on the NASA website

472
00:22:28,730 --> 00:22:25,980
do you know how rare they are

473
00:22:31,070 --> 00:22:28,740
uh they do tend to be uh tend to be a

474
00:22:33,770 --> 00:22:31,080
little bit more rare than uh than the

475
00:22:35,149 --> 00:22:33,780
total or uh annular Eclipse uh because I

476
00:22:37,270 --> 00:22:35,159
think they have to happen at just a

477
00:22:39,830 --> 00:22:37,280
certain kind of geographic location so

478
00:22:43,250 --> 00:22:39,840
they're a little more rare than uh than

479
00:22:46,730 --> 00:22:43,260
the total of the annular

480
00:22:49,730 --> 00:22:46,740
Carolyn Craig has a great question that

481
00:22:52,070 --> 00:22:49,740
I also have so like what equipment do we

482
00:22:54,230 --> 00:22:52,080
use to determine when an eclipse like

483
00:22:57,710 --> 00:22:54,240
this is going to happen and how far in

484
00:22:59,750 --> 00:22:57,720
advance are these predictions

485
00:23:01,850 --> 00:22:59,760
um made how far in advance can we make

486
00:23:03,409 --> 00:23:01,860
can we predict when an eclipse is going

487
00:23:06,289 --> 00:23:03,419
to happen

488
00:23:08,090 --> 00:23:06,299

that's a great question and because we

489
00:23:11,029 --> 00:23:08,100
understand

490
00:23:12,950 --> 00:23:11,039
um the orbital dynamics of the Moon and

491
00:23:15,110 --> 00:23:12,960
the Sun and the Earth we can actually

492
00:23:17,270 --> 00:23:15,120
predict them out very far

493
00:23:18,890 --> 00:23:17,280
um there are maps of you know hundreds

494
00:23:20,750 --> 00:23:18,900
of years if not thousands of years of

495
00:23:22,310 --> 00:23:20,760
data because you can project where the

496
00:23:24,529 --> 00:23:22,320
where the sun the Earth and the moon

497
00:23:26,570 --> 00:23:24,539
will be and so we rely on that

498
00:23:28,850 --> 00:23:26,580
predictability and actually in millions

499
00:23:31,190 --> 00:23:28,860
of years from now the moon will be

500
00:23:33,230 --> 00:23:31,200
moving moving away so that it will not

501
00:23:34,810 --> 00:23:33,240
be able to actually do the do eclipses

502
00:23:40,610 --> 00:23:34,820
anymore but that's

503
00:23:40,620 --> 00:23:44,330
that is yes

504
00:23:50,750 --> 00:23:46,610
oh wow that's really cool

505
00:23:52,130 --> 00:23:50,760
um Mickey minoya on YouTube asks

506
00:23:53,330 --> 00:23:52,140
um a question you kind of already

507
00:23:55,669 --> 00:23:53,340
answered but I'd love for you to

508
00:23:57,770 --> 00:23:55,679
elaborate on it it's about like nature

509
00:24:00,169 --> 00:23:57,780
and it's like will the birds go silent

510
00:24:01,850 --> 00:24:00,179
and do we know why like

511
00:24:05,870 --> 00:24:01,860
what do they think is happening since

512
00:24:11,390 --> 00:24:08,210
it um it's for a short amount of time

513
00:24:12,710 --> 00:24:11,400

but you kind of have a somewhat normal

514
00:24:15,350 --> 00:24:12,720
lead-in

515
00:24:16,789 --> 00:24:15,360
um to night time so when you're um when

516
00:24:19,490 --> 00:24:16,799
you're experiencing a normal nighttime

517
00:24:21,110 --> 00:24:19,500
the sky gradually gets dimmer

518
00:24:23,029 --> 00:24:21,120
um you know you start to see with a

519
00:24:24,710 --> 00:24:23,039
sunset maybe a pink or orange or

520
00:24:26,450 --> 00:24:24,720
beautiful colors

521
00:24:28,310 --> 00:24:26,460
um and so you know you know how to kind

522
00:24:31,490 --> 00:24:28,320
of get ready for bed

523
00:24:33,350 --> 00:24:31,500
um or get ready for it to be night time

524
00:24:34,490 --> 00:24:33,360
um and so it's not

525
00:24:37,610 --> 00:24:34,500
um you know it's

526
00:24:39,770 --> 00:24:37,620
the light is Eerie actually as

527
00:24:42,110 --> 00:24:39,780
um as you go into the solar eclipse it's

528
00:24:43,909 --> 00:24:42,120
not quite the sunset

529
00:24:45,409 --> 00:24:43,919
um but it has some characteristics of

530
00:24:47,450 --> 00:24:45,419
the sunset

531
00:24:50,029 --> 00:24:47,460
um so I'm not an animal expert

532
00:24:51,950 --> 00:24:50,039
um but I would guess I would guess that

533
00:24:53,149 --> 00:24:51,960
they would just sense that it is the

534
00:24:53,750 --> 00:24:53,159
same

535
00:24:55,549 --> 00:24:53,760
um

536
00:24:57,289 --> 00:24:55,559
the same kind of characteristics of

537
00:24:59,270 --> 00:24:57,299
night time so okay let's get ready for

538
00:25:01,010 --> 00:24:59,280

bed and then suddenly the Sun comes back

539
00:25:03,370 --> 00:25:01,020
up and they're like well yes that was

540
00:25:06,649 --> 00:25:03,380
the shortest nap ever

541
00:25:08,750 --> 00:25:06,659
I love that analogy that is amazing that

542
00:25:12,710 --> 00:25:08,760
and it makes sense

543
00:25:15,409 --> 00:25:12,720
um Kevin bokenight on Twitter asks

544
00:25:17,690 --> 00:25:15,419
um does it go completely dark during

545
00:25:20,450 --> 00:25:17,700
totality

546
00:25:21,770 --> 00:25:20,460
it gets very very dark and like I said

547
00:25:24,409 --> 00:25:21,780
that the

548
00:25:26,810 --> 00:25:24,419
um the light is very eerie when I saw my

549
00:25:29,090 --> 00:25:26,820
first eclipse the total eclipse in um

550
00:25:32,570 --> 00:25:29,100
South Carolina it was definitely that

551
00:25:34,310 --> 00:25:32,580
like gray dark uh dark around v-clips

552
00:25:37,730 --> 00:25:34,320
and then there was this Erie All Around

553
00:25:40,789 --> 00:25:37,740
The Horizon like orangey light uh much

554
00:25:42,950 --> 00:25:40,799
like a sunsetty type colors

555
00:25:45,049 --> 00:25:42,960
um so it was very eerie light and it it

556
00:25:47,210 --> 00:25:45,059
is significantly dark

557
00:25:49,310 --> 00:25:47,220
oh that's excellent I'm so looking

558
00:25:51,950 --> 00:25:49,320
forward to it it just sounds so artistic

559
00:25:54,649 --> 00:25:51,960
and creative and amazing

560
00:25:58,190 --> 00:25:54,659
um oh this is a good one so my Mech on

561
00:26:01,909 --> 00:25:58,200
Facebook is asking for um first to go in

562
00:26:04,370 --> 00:26:01,919
a little bit more detail on actual uh

563
00:26:07,669 --> 00:26:04,380

safety and eye safety on the glasses

564
00:26:10,070 --> 00:26:07,679
during the eclipses

565
00:26:11,450 --> 00:26:10,080
so like when you were talking about sort

566
00:26:15,230 --> 00:26:11,460
of thinking about like in Australia

567
00:26:18,710 --> 00:26:15,240
they're having both a hybrid and uh a

568
00:26:21,409 --> 00:26:18,720
total eclipse uh so annular and total so

569
00:26:23,870 --> 00:26:21,419
can you talk about the differences and

570
00:26:26,029 --> 00:26:23,880
go through that again

571
00:26:28,549 --> 00:26:26,039
so where our friend Henry was

572
00:26:30,110 --> 00:26:28,559
um they will have a total solar eclipse

573
00:26:31,970 --> 00:26:30,120
um so right now it's partial the The

574
00:26:33,230 --> 00:26:31,980
View that you're you're seeing from time

575
00:26:36,649 --> 00:26:33,240
and date

576
00:26:38,149 --> 00:26:36,659
um is a partial eclipse and um so at

577
00:26:40,010 --> 00:26:38,159
that point in time you must have your

578
00:26:42,169 --> 00:26:40,020
safety glasses on your eclipse glasses

579
00:26:44,149 --> 00:26:42,179
must be on or again indirect viewing

580
00:26:45,950 --> 00:26:44,159
method one of those two things so Henry

581
00:26:48,649 --> 00:26:45,960
right now should only be looking at this

582
00:26:50,990 --> 00:26:48,659
through through safety glasses

583
00:26:53,210 --> 00:26:51,000
um and then once it becomes total

584
00:26:55,190 --> 00:26:53,220
he'll take them he can take them off and

585
00:26:56,570 --> 00:26:55,200
be able to look at look at the Sun and

586
00:26:58,490 --> 00:26:56,580
look at the Corona and see what it's

587
00:27:00,230 --> 00:26:58,500
doing I'm very interested to see see

588
00:27:04,010 --> 00:27:00,240

what we're gonna see

589
00:27:06,350 --> 00:27:04,020
um and uh then uh once he knows that

590
00:27:07,610 --> 00:27:06,360
it's going to the sun is the moon is

591
00:27:09,289 --> 00:27:07,620
moving back and you're going to see more

592
00:27:11,450 --> 00:27:09,299
sunlight um that's when you have to put

593
00:27:13,370 --> 00:27:11,460
your glasses back on for the total

594
00:27:15,110 --> 00:27:13,380
um now if you were to go uh kind of a

595
00:27:16,970 --> 00:27:15,120
little bit further along the path of

596
00:27:18,409 --> 00:27:16,980
this Eclipse that is where you're going

597
00:27:19,850 --> 00:27:18,419
to see the annular clip so they're

598
00:27:21,830 --> 00:27:19,860
actually not going to get an annular and

599
00:27:24,230 --> 00:27:21,840
a total in the same place they'll get a

600
00:27:25,970 --> 00:27:24,240
total in this place but then further

601
00:27:28,010 --> 00:27:25,980
along the path it will become annular

602
00:27:30,230 --> 00:27:28,020
because the curvature of the earth is

603
00:27:32,570 --> 00:27:30,240
then making the moon just that slight

604
00:27:35,450 --> 00:27:32,580
farther away so it just again doesn't

605
00:27:37,850 --> 00:27:35,460
block out the whole entire Sun

606
00:27:39,169 --> 00:27:37,860
um so that and that they must those

607
00:27:40,970 --> 00:27:39,179
people who are further along the past

608
00:27:42,169 --> 00:27:40,980
past the path of this Eclipse who are

609
00:27:44,269 --> 00:27:42,179
getting the annular must keep their

610
00:27:47,750 --> 00:27:44,279
glasses on the entire time so they will

611
00:27:51,409 --> 00:27:47,760
not be able to see the corona themselves

612
00:27:55,190 --> 00:27:51,419
okay excellent thank you for clarifying

613
00:27:58,310 --> 00:27:55,200

um Adam F on Twitter asks how wide is

614
00:28:00,710 --> 00:27:58,320
the path of a solar of a total solar

615
00:28:03,529 --> 00:28:00,720
eclipse in general would you say

616
00:28:05,269 --> 00:28:03,539
right um in general uh it could be

617
00:28:08,810 --> 00:28:05,279
normally around a couple hundred miles

618
00:28:10,850 --> 00:28:08,820
or 100 miles um so I think it's 150 uh

619
00:28:13,789 --> 00:28:10,860
in 2024

620
00:28:15,529 --> 00:28:13,799
um uh and uh so yes it's about that wide

621
00:28:20,330 --> 00:28:15,539
it's not super wide

622
00:28:26,930 --> 00:28:23,029
um okay next one sunrit gauche on

623
00:28:30,230 --> 00:28:26,940
YouTube asks so this is a hybrid eclipse

624
00:28:31,909 --> 00:28:30,240
from Australia so in Australia it's a

625
00:28:34,370 --> 00:28:31,919
total eclipse where's the annular

626
00:28:35,630 --> 00:28:34,380
Eclipse taking place do you know it

627
00:28:38,750 --> 00:28:35,640
happens you know

628
00:28:42,710 --> 00:28:38,760
it is uh I think uh Papua New Guinea

629
00:28:44,210 --> 00:28:42,720
like as you go uh up up the path of

630
00:28:46,250 --> 00:28:44,220
totality so

631
00:28:49,490 --> 00:28:46,260
um I don't have the I don't have a

632
00:28:51,230 --> 00:28:49,500
visual of the of the path right now but

633
00:28:52,610 --> 00:28:51,240
uh but yes as you as you would go for

634
00:28:54,649 --> 00:28:52,620
the path you would see something again

635
00:28:58,130 --> 00:28:54,659
much more uh like you see on the right

636
00:29:00,049 --> 00:28:58,140
to the annular Eclipse that ring of fire

637
00:29:03,470 --> 00:29:00,059
okay and this is a really good question

638
00:29:05,750 --> 00:29:03,480

so uh Bray Kimberly on YouTube is asking

639
00:29:10,010 --> 00:29:05,760
are there special cameras or lenses made

640
00:29:12,350 --> 00:29:10,020
for cameras to record solar eclipses

641
00:29:13,549 --> 00:29:12,360
there are and this is another

642
00:29:15,590 --> 00:29:13,559
um thing that we have to worry about

643
00:29:17,390 --> 00:29:15,600
with safety or at least think about plan

644
00:29:19,370 --> 00:29:17,400
about for safety

645
00:29:22,010 --> 00:29:19,380
um and so

646
00:29:23,690 --> 00:29:22,020
um we don't want to just use our glasses

647
00:29:25,909 --> 00:29:23,700
um with this so there are special

648
00:29:29,330 --> 00:29:25,919
filters for telescopes

649
00:29:31,970 --> 00:29:29,340
um binoculars uh cameras uh that you can

650
00:29:33,230 --> 00:29:31,980
get you can research and find

651
00:29:36,710 --> 00:29:33,240
um appropriate

652
00:29:38,450 --> 00:29:36,720
front of those

653
00:29:39,710 --> 00:29:38,460
um at the entrance of the Sun so we

654
00:29:40,549 --> 00:29:39,720
don't want to use our glasses in this

655
00:29:42,169 --> 00:29:40,559
case

656
00:29:44,149 --> 00:29:42,179
um we want to use we want to use

657
00:29:45,830 --> 00:29:44,159
specific things designed for telescopes

658
00:29:48,610 --> 00:29:45,840
phones or

659
00:29:52,370 --> 00:29:48,620
um or binoculars

660
00:29:53,870 --> 00:29:52,380
excellent okay Muhammad Alma on YouTube

661
00:29:56,330 --> 00:29:53,880
asks

662
00:29:58,669 --> 00:29:56,340
um a question about the geometry of

663
00:30:01,789 --> 00:29:58,679

eclipses so why is the Sun and the Moon

664
00:30:03,830 --> 00:30:01,799
from our perspective exactly the same

665
00:30:06,350 --> 00:30:03,840
size

666
00:30:10,250 --> 00:30:06,360
that's great and it's a matter of

667
00:30:12,310 --> 00:30:10,260
distance and size so the Moon is the

668
00:30:15,169 --> 00:30:12,320
right distance away and the right size

669
00:30:17,630 --> 00:30:15,179
because the sun is bigger but it's so

670
00:30:20,389 --> 00:30:17,640
far away so it's 93 Million Miles Away

671
00:30:22,010 --> 00:30:20,399
versus the Moon being much closer so

672
00:30:23,510 --> 00:30:22,020
it's the same that I've been explaining

673
00:30:25,250 --> 00:30:23,520
it as

674
00:30:27,409 --> 00:30:25,260
um the fact that when you put your hand

675
00:30:29,090 --> 00:30:27,419
right up in front of your face like this

676
00:30:30,769 --> 00:30:29,100
you can block out almost ever and see

677
00:30:33,649 --> 00:30:30,779
everything so the moon's just that close

678
00:30:35,810 --> 00:30:33,659
where if you put it further away you can

679
00:30:37,190 --> 00:30:35,820
see you know around it and everything so

680
00:30:39,590 --> 00:30:37,200
it's just the fact that the moon happens

681
00:30:41,330 --> 00:30:39,600
to be the right right size and shape and

682
00:30:44,389 --> 00:30:41,340
then very close and so that's why it's

683
00:30:45,830 --> 00:30:44,399
able to able to block out the whole huge

684
00:30:49,610 --> 00:30:45,840
Sun

685
00:30:58,430 --> 00:30:49,620
ah it's all a matter of perspective I

686
00:31:04,130 --> 00:31:01,190
on YouTube asks

687
00:31:06,649 --> 00:31:04,140
um why is the annular Eclipse called a

688
00:31:10,930 --> 00:31:06,659

ring of fire and then she also sends us

689
00:31:14,450 --> 00:31:10,940
love from Arizona and says we rock

690
00:31:17,210 --> 00:31:14,460
yay I love Arizona too

691
00:31:19,850 --> 00:31:17,220
um and uh so why they call it a ring of

692
00:31:20,990 --> 00:31:19,860
fire is that it looks like there is that

693
00:31:23,210 --> 00:31:21,000
orangey

694
00:31:26,149 --> 00:31:23,220
um Ring of Fire

695
00:31:28,549 --> 00:31:26,159
um around the around the Moon as as this

696
00:31:30,350 --> 00:31:28,559
image shows um it looks like kind of

697
00:31:32,149 --> 00:31:30,360
something's on fire

698
00:31:34,610 --> 00:31:32,159
um in a ring so that's why it's called

699
00:31:36,409 --> 00:31:34,620
the ring of fire uh Eclipse when it's an

700
00:31:38,690 --> 00:31:36,419
annular eclipse

701
00:31:41,690 --> 00:31:38,700
right so there's the sun is not actually

702
00:31:43,250 --> 00:31:41,700
on fire there's no actual fire it's just

703
00:31:46,549 --> 00:31:43,260
describing what it looks like is what

704
00:31:50,029 --> 00:31:48,049
the sun is safe

705
00:31:53,810 --> 00:31:50,039
excellent

706
00:31:56,149 --> 00:31:53,820
SimCity on YouTube as if the moon moves

707
00:31:58,190 --> 00:31:56,159
on a horizontal plane why are we

708
00:32:00,289 --> 00:31:58,200
watching the moon rise from the bottom

709
00:32:02,870 --> 00:32:00,299
up

710
00:32:08,810 --> 00:32:02,880
so does the moon move on a horizontal

711
00:32:11,690 --> 00:32:08,820
plane great okay so the this the Moon is

712
00:32:13,070 --> 00:32:11,700
um inclined so if the Earth's road if

713
00:32:15,889 --> 00:32:13,080

the earth goes on this plane it's

714
00:32:17,810 --> 00:32:15,899
incline the Moon is inclined

715
00:32:21,110 --> 00:32:17,820
um there we go but there's the graphics

716
00:32:22,850 --> 00:32:21,120
to get there um is Inc is inclined

717
00:32:24,830 --> 00:32:22,860
um as shown in this graphic so it

718
00:32:28,190 --> 00:32:24,840
doesn't always hit

719
00:32:31,190 --> 00:32:28,200
earth and that's again why we don't have

720
00:32:33,289 --> 00:32:31,200
12 eclipses um every year

721
00:32:35,090 --> 00:32:33,299
um because it's slightly off and due to

722
00:32:36,889 --> 00:32:35,100
that geometry that's why uh that's why

723
00:32:40,310 --> 00:32:36,899
it doesn't it doesn't do so it's not in

724
00:32:42,470 --> 00:32:40,320
a necessarily a horizontal plane

725
00:32:44,930 --> 00:32:42,480
um and uh and that's again why we don't

726
00:32:48,289 --> 00:32:44,940
get eclipse every month

727
00:32:50,630 --> 00:32:48,299
all right Chrissy Astro Millie on

728
00:32:53,870 --> 00:32:50,640
Twitter asks What observations are being

729
00:32:55,970 --> 00:32:53,880
done from space of the eclipse and then

730
00:32:58,490 --> 00:32:55,980
anything from the other side of the moon

731
00:33:00,950 --> 00:32:58,500
or the Moon Shadow that you know of

732
00:33:04,190 --> 00:33:00,960
oh cool all right great

733
00:33:06,830 --> 00:33:04,200
um so for the uh assets that we have in

734
00:33:08,870 --> 00:33:06,840
space that are watching uh the sun

735
00:33:11,990 --> 00:33:08,880
um they aren't necessarily in the path

736
00:33:14,350 --> 00:33:12,000
of the um of this Eclipse right they

737
00:33:17,630 --> 00:33:14,360
don't necessarily uh live right over

738
00:33:20,509 --> 00:33:17,640

Australia uh per se

739
00:33:23,110 --> 00:33:20,519
um but we do make instruments that

740
00:33:25,610 --> 00:33:23,120
simulate an eclipse so things called

741
00:33:27,470 --> 00:33:25,620
coronagraphs so we basically make a

742
00:33:28,789 --> 00:33:27,480
false moon that kind of looks like a

743
00:33:30,590 --> 00:33:28,799
thumb that goes up in front of the

744
00:33:33,649 --> 00:33:30,600
camera and blocks out the center of the

745
00:33:36,649 --> 00:33:33,659
Sun so that then we can go and see

746
00:33:38,630 --> 00:33:36,659
um the corona that's coming off of it so

747
00:33:40,730 --> 00:33:38,640
we do make space-based Eclipse

748
00:33:43,549 --> 00:33:40,740
observations but they're not the natural

749
00:33:45,529 --> 00:33:43,559
Eclipse observations they end up being

750
00:33:46,789 --> 00:33:45,539
um they end up being manufactured we do

751
00:33:49,850 --> 00:33:46,799
sometimes

752
00:33:52,250 --> 00:33:49,860
um in certain telescopes like hinode

753
00:33:54,049 --> 00:33:52,260
um and I think sdo as well Solar

754
00:33:56,570 --> 00:33:54,059
Dynamics Observatory

755
00:33:58,490 --> 00:33:56,580
um are able to get eclipses in their

756
00:34:00,710 --> 00:33:58,500
orbit as well but they don't normally

757
00:34:02,930 --> 00:34:00,720
coincide with the ones that uh that

758
00:34:04,490 --> 00:34:02,940
we're talking about here uh they because

759
00:34:07,009 --> 00:34:04,500
they're on a different orbit they have a

760
00:34:10,669 --> 00:34:07,019
different trajectory that that line up

761
00:34:12,129 --> 00:34:10,679
the spacecraft and the Moon and the Sun

762
00:34:14,810 --> 00:34:12,139
excellent

763
00:34:16,570 --> 00:34:14,820

our team behind the scenes got us an

764
00:34:21,710 --> 00:34:16,580
answer to the question about why today's

765
00:34:24,409 --> 00:34:21,720
annular eclipse is visible so

766
00:34:26,389 --> 00:34:24,419
or where today I'm sorry where Today's

767
00:34:28,790 --> 00:34:26,399
total solar eclipse is failure so the

768
00:34:31,070 --> 00:34:28,800
total eclipse is visible visible in

769
00:34:33,950 --> 00:34:31,080
Australia and Southeast Asia

770
00:34:35,990 --> 00:34:33,960
the annular eclipse is visible

771
00:34:38,930 --> 00:34:36,000
um over the Pacific and Indian oceans

772
00:34:42,290 --> 00:34:38,940
and a partial eclipse is visible from

773
00:34:44,389 --> 00:34:42,300
Australia southeast Asia and

774
00:34:45,589 --> 00:34:44,399
Antarctica

775
00:34:48,470 --> 00:34:45,599
so

776
00:34:51,649 --> 00:34:48,480
there's that thank you behind the scenes

777
00:34:57,170 --> 00:34:54,889
um Rebecca gergens says she is watching

778
00:34:58,550 --> 00:34:57,180
the live solar eclipse with her class in

779
00:35:02,450 --> 00:34:58,560
Macau

780
00:35:05,030 --> 00:35:02,460
and if it is daytime in Australia why

781
00:35:06,710 --> 00:35:05,040
does the telescope feed look like it's

782
00:35:09,530 --> 00:35:06,720
night time

783
00:35:11,630 --> 00:35:09,540
so why is it all dark why is it black

784
00:35:13,490 --> 00:35:11,640
well yeah that's interesting so they are

785
00:35:15,410 --> 00:35:13,500
looking um I think it has to do with the

786
00:35:16,970 --> 00:35:15,420
filter of the telescope

787
00:35:18,890 --> 00:35:16,980
um they're filtering out the light so

788
00:35:20,390 --> 00:35:18,900

that they can uh I think this is the H

789
00:35:22,730 --> 00:35:20,400
Alpha feed

790
00:35:24,890 --> 00:35:22,740
um which really focuses on a specific

791
00:35:26,329 --> 00:35:24,900
part of the light um so you get that

792
00:35:27,470 --> 00:35:26,339
heat from the Sun

793
00:35:29,150 --> 00:35:27,480
um because I'm starting to see a

794
00:35:33,349 --> 00:35:29,160
prominence appear

795
00:35:35,210 --> 00:35:33,359
um and the lower uh left hand corner so

796
00:35:36,950 --> 00:35:35,220
um just past there their little thing

797
00:35:39,050 --> 00:35:36,960
that's kind of shooting out

798
00:35:41,510 --> 00:35:39,060
um the prominence there

799
00:35:44,270 --> 00:35:41,520
um that uh that kind of indicates that

800
00:35:46,910 --> 00:35:44,280
that's the wavelength or the type of

801
00:35:49,609 --> 00:35:46,920
warmth of light that we're looking at

802
00:35:50,990 --> 00:35:49,619
um and uh so that's why it probably

803
00:35:54,170 --> 00:35:51,000
looks dark because nothing else out

804
00:35:56,630 --> 00:35:54,180
there is that warm uh but yes it is uh

805
00:35:58,910 --> 00:35:56,640
it is daytime in Australia

806
00:35:59,930 --> 00:35:58,920
um so uh but as there as the sun's

807
00:36:02,750 --> 00:35:59,940
covering up

808
00:36:05,510 --> 00:36:02,760
um more and more it will at least um in

809
00:36:07,849 --> 00:36:05,520
exmouth will uh will become darker and

810
00:36:12,050 --> 00:36:07,859
darker and again experience a false

811
00:36:13,730 --> 00:36:12,060
night for about a and minute

812
00:36:15,230 --> 00:36:13,740
excellent

813
00:36:17,030 --> 00:36:15,240

how you doing are we killing you with

814
00:36:20,270 --> 00:36:17,040
the questions they are coming they are

815
00:36:22,069 --> 00:36:20,280
great great these are great questions

816
00:36:25,010 --> 00:36:22,079
all right I have a really good one from

817
00:36:27,650 --> 00:36:25,020
Angel shinari she asks next year

818
00:36:30,170 --> 00:36:27,660
totality will be in Mexico so I'm

819
00:36:32,870 --> 00:36:30,180
assuming it's a total solar eclipse and

820
00:36:36,109 --> 00:36:32,880
she's wondering if you know how long

821
00:36:37,430 --> 00:36:36,119
will totality last then any ideas on

822
00:36:39,890 --> 00:36:37,440
that one

823
00:36:41,270 --> 00:36:39,900
so uh it's around four and a half

824
00:36:43,609 --> 00:36:41,280
minutes

825
00:36:45,470 --> 00:36:43,619
um and there are great resources online

826
00:36:48,109 --> 00:36:45,480
that you can find

827
00:36:49,790 --> 00:36:48,119
um your city and state and find the

828
00:36:51,349 --> 00:36:49,800
exact timing for that location and

829
00:36:54,410 --> 00:36:51,359
that's actually another important part

830
00:36:56,390 --> 00:36:54,420
of planning your Eclipse viewing is to

831
00:36:59,109 --> 00:36:56,400
go to those trusted

832
00:37:01,790 --> 00:36:59,119
um sites and find the list of the times

833
00:37:03,829 --> 00:37:01,800
that both the length of totality so that

834
00:37:06,470 --> 00:37:03,839
you can enjoy that Corona and soak up

835
00:37:08,810 --> 00:37:06,480
all of that beautiful uh solar wind and

836
00:37:10,849 --> 00:37:08,820
that uh and all the the magnetic fields

837
00:37:13,190 --> 00:37:10,859
that are moving things around

838
00:37:14,750 --> 00:37:13,200

um and that you'll be safe that you'll

839
00:37:16,370 --> 00:37:14,760
be able to know when you need to put

840
00:37:18,470 --> 00:37:16,380
your glasses on

841
00:37:20,089 --> 00:37:18,480
um and to plan to make sure to be there

842
00:37:22,130 --> 00:37:20,099
well ahead of time so that you don't

843
00:37:24,829 --> 00:37:22,140
miss it

844
00:37:27,849 --> 00:37:24,839
and will NASA have

845
00:37:31,190 --> 00:37:27,859
um resources that kind of help people

846
00:37:32,990 --> 00:37:31,200
find places and times and that kind of

847
00:37:35,329 --> 00:37:33,000
information

848
00:37:36,650 --> 00:37:35,339
definitely there are uh there are some

849
00:37:38,510 --> 00:37:36,660
resources

850
00:37:39,589 --> 00:37:38,520
um that will help with uh things like

851
00:37:41,990 --> 00:37:39,599
the map

852
00:37:44,150 --> 00:37:42,000
um we'll show you where uh where there

853
00:37:46,730 --> 00:37:44,160
is the path along the path of totality

854
00:37:48,950 --> 00:37:46,740
and what's uh cities and and states will

855
00:37:52,490 --> 00:37:48,960
experience totality and actually in turn

856
00:37:53,990 --> 00:37:52,500
contiguous U.S will um have a partial

857
00:37:56,810 --> 00:37:54,000
eclipse that day

858
00:37:59,510 --> 00:37:56,820
um so even if you're not um part of the

859
00:38:00,530 --> 00:37:59,520
uh line that goes from uh Mexico to

860
00:38:02,750 --> 00:38:00,540
Texas

861
00:38:05,690 --> 00:38:02,760
um up through Oklahoma Arkansas Missouri

862
00:38:08,270 --> 00:38:05,700
Illinois Indiana Ohio uh Pennsylvania

863
00:38:10,550 --> 00:38:08,280

New York Vermont uh New Hampshire now

864
00:38:12,349 --> 00:38:10,560
through Maine and then Nova Scotia

865
00:38:13,490 --> 00:38:12,359
um in Canada all of those all those

866
00:38:15,109 --> 00:38:13,500
places

867
00:38:16,849 --> 00:38:15,119
um you'll get a total solar eclipse but

868
00:38:18,170 --> 00:38:16,859
the entire continental United States

869
00:38:21,050 --> 00:38:18,180
will get

870
00:38:21,950 --> 00:38:21,060
um some type of uh partial eclipse as

871
00:38:23,870 --> 00:38:21,960
well

872
00:38:25,370 --> 00:38:23,880
um and then the other the other side of

873
00:38:28,730 --> 00:38:25,380
that on the left-hand side is the

874
00:38:30,770 --> 00:38:28,740
annular Eclipse that will happen in 23.

875
00:38:32,690 --> 00:38:30,780
that that is so cool and it kind of

876
00:38:34,430 --> 00:38:32,700
brings us back to like the heliophysics

877
00:38:37,130 --> 00:38:34,440
figure like the sun touches everything

878
00:38:38,990 --> 00:38:37,140
and in the U.S like that is such a

879
00:38:41,510 --> 00:38:39,000
unifying and just a beautiful moment

880
00:38:44,450 --> 00:38:41,520
when everybody will get at least some

881
00:38:46,250 --> 00:38:44,460
portion of an eclipse that's really cool

882
00:38:48,710 --> 00:38:46,260
um before we pop to the next question we

883
00:38:50,089 --> 00:38:48,720
want to thank time and date uh for this

884
00:38:51,770 --> 00:38:50,099
amazing

885
00:38:53,569 --> 00:38:51,780
um feed that we're watching and we're

886
00:38:56,630 --> 00:38:53,579
watching it live we're watching The

887
00:38:58,990 --> 00:38:56,640
Magic happen live I'm so excited

888
00:39:04,250 --> 00:38:59,000

um let's go to a next one uh

889
00:39:06,230 --> 00:39:04,260
mort730 on Twitter asks what changes the

890
00:39:08,450 --> 00:39:06,240
duration of totality so what makes it

891
00:39:11,270 --> 00:39:08,460
different

892
00:39:13,190 --> 00:39:11,280
right um again it's all about geometry

893
00:39:14,210 --> 00:39:13,200
so it's all about where your place in

894
00:39:16,190 --> 00:39:14,220
space

895
00:39:17,870 --> 00:39:16,200
um we all belong here and the place in

896
00:39:21,230 --> 00:39:17,880
space does matter

897
00:39:23,270 --> 00:39:21,240
um so uh depending on exactly in the

898
00:39:25,130 --> 00:39:23,280
orbit of the Earth and the Sun and the

899
00:39:27,829 --> 00:39:25,140
Moon and how they line up

900
00:39:29,030 --> 00:39:27,839
um is how long you will uh get totality

901
00:39:32,630 --> 00:39:29,040
for

902
00:39:34,609 --> 00:39:32,640
um so uh in this case uh how it lines up

903
00:39:36,710 --> 00:39:34,619
uh and because it's it's at a place

904
00:39:37,609 --> 00:39:36,720
where the the Moon Shadow is moving very

905
00:39:39,710 --> 00:39:37,619
quickly

906
00:39:41,510 --> 00:39:39,720
um it only lasts for around a minute

907
00:39:42,950 --> 00:39:41,520
um when you're closer to the equators it

908
00:39:46,069 --> 00:39:42,960
takes a little longer to move across

909
00:39:47,750 --> 00:39:46,079
that land so um so it goes a little bit

910
00:39:49,790 --> 00:39:47,760
um a little bit slower

911
00:39:51,710 --> 00:39:49,800
um you can get a little bit longer uh

912
00:39:53,089 --> 00:39:51,720
longer durations

913
00:39:55,310 --> 00:39:53,099

um and then again it's all about that

914
00:39:57,650 --> 00:39:55,320
that lineup between the Earth the moon

915
00:39:59,870 --> 00:39:57,660
in the center and the sun

916
00:40:01,490 --> 00:39:59,880
um and so as it goes around it will uh

917
00:40:03,609 --> 00:40:01,500
it will create you know different

918
00:40:06,589 --> 00:40:03,619
different lengths of time

919
00:40:08,089 --> 00:40:06,599
that makes sense yeah that's a great

920
00:40:11,270 --> 00:40:08,099
explanation

921
00:40:15,109 --> 00:40:11,280
um net a on YouTube asks

922
00:40:17,569 --> 00:40:15,119
um about eye safety so what happens or

923
00:40:19,490 --> 00:40:17,579
what could potentially happen if we look

924
00:40:22,069 --> 00:40:19,500
directly at a new clips or look directly

925
00:40:24,410 --> 00:40:22,079
at us at the Sun

926
00:40:26,329 --> 00:40:24,420
so looking at directly at the sun which

927
00:40:28,910 --> 00:40:26,339
you should never do

928
00:40:32,390 --> 00:40:28,920
um would cause the back of your eye to

929
00:40:34,970 --> 00:40:32,400
burn in uh the image of the sun

930
00:40:37,990 --> 00:40:34,980
um and so you would have a blind spot in

931
00:40:42,230 --> 00:40:38,000
the uh area where you had viewed the Sun

932
00:40:44,390 --> 00:40:42,240
so it is not advised to do this

933
00:40:46,190 --> 00:40:44,400
um so make sure that you have your

934
00:40:48,550 --> 00:40:46,200
safety glasses or an indirect viewing

935
00:40:50,630 --> 00:40:48,560
method if you don't have safety glasses

936
00:40:53,990 --> 00:40:50,640
in order to make sure that you can

937
00:40:58,250 --> 00:40:54,000
safely do this and safely see afterwards

938
00:41:01,490 --> 00:40:58,260

yes the takeaway is be safe

939
00:41:05,450 --> 00:41:01,500
got it got it love that

940
00:41:06,890 --> 00:41:05,460
um the plastic effect on YouTube asks a

941
00:41:10,550 --> 00:41:06,900
really good question

942
00:41:13,010 --> 00:41:10,560
um so our lunar eclipses or solar

943
00:41:15,290 --> 00:41:13,020
eclipses more common is one more common

944
00:41:17,569 --> 00:41:15,300
than the other

945
00:41:20,810 --> 00:41:17,579
oh that's a good question wow I've never

946
00:41:23,569 --> 00:41:20,820
thought of that but it's like you just

947
00:41:26,690 --> 00:41:23,579
put that on me um because I you know uh

948
00:41:30,589 --> 00:41:26,700
so you know a lunar eclipse happens when

949
00:41:33,170 --> 00:41:30,599
the earth is blocking the Sun from uh

950
00:41:35,270 --> 00:41:33,180
the from the Moon and so that is why

951
00:41:37,670 --> 00:41:35,280
you're getting that you're getting that

952
00:41:40,670 --> 00:41:37,680
Darkness or that Eclipse

953
00:41:43,069 --> 00:41:40,680
um is it more common I think it is but I

954
00:41:45,530 --> 00:41:43,079
my brain is not it's not function maybe

955
00:41:50,750 --> 00:41:45,540
we need some behind the scenes some of

956
00:41:59,210 --> 00:41:54,230
I love it the plastic effect you may

957
00:42:03,170 --> 00:42:01,490
um and I that just goes to show you like

958
00:42:05,210 --> 00:42:03,180
we don't know everything I think it's

959
00:42:07,010 --> 00:42:05,220
these are great questions we have Kelly

960
00:42:08,450 --> 00:42:07,020
on the spot she doesn't have any of

961
00:42:11,750 --> 00:42:08,460
these answers she's answering about

962
00:42:13,910 --> 00:42:11,760
you're doing an amazing job my friend

963
00:42:16,310 --> 00:42:13,920

I mean really that's what a scientist is

964
00:42:17,930 --> 00:42:16,320
it's a it's about you know figuring

965
00:42:20,150 --> 00:42:17,940
figuring out how to do it and finding

966
00:42:21,530 --> 00:42:20,160
the right source of information right

967
00:42:23,690 --> 00:42:21,540
um so it's not necessary that I know

968
00:42:27,349 --> 00:42:23,700
every fact and every Everything About

969
00:42:29,450 --> 00:42:27,359
You know the sun is about I know how to

970
00:42:31,250 --> 00:42:29,460
um examine the information and say oh

971
00:42:33,710 --> 00:42:31,260
hey like this person might know it

972
00:42:35,210 --> 00:42:33,720
better or um and then is that reasonable

973
00:42:37,550 --> 00:42:35,220
right if they suddenly told me like well

974
00:42:39,710 --> 00:42:37,560
the moon's made out of you know I'm like

975
00:42:41,750 --> 00:42:39,720
no that's not right

976
00:42:43,849 --> 00:42:41,760
um and you have to know need to know you

977
00:42:46,010 --> 00:42:43,859
know approximately what it is

978
00:42:48,230 --> 00:42:46,020
um but again you know not no no I don't

979
00:42:51,170 --> 00:42:48,240
necessarily know everything

980
00:42:52,910 --> 00:42:51,180
yeah and we specialize right like as a

981
00:42:54,470 --> 00:42:52,920
scientist you you're specializing in

982
00:42:56,329 --> 00:42:54,480
heliophysics and then we have people

983
00:42:59,089 --> 00:42:56,339
that specialize in planetary science or

984
00:43:01,550 --> 00:42:59,099
lunar science and so it makes sense I'm

985
00:43:06,050 --> 00:43:01,560
just messing with you I'm just joshing

986
00:43:08,750 --> 00:43:06,060
with you all right God is asking why

987
00:43:10,670 --> 00:43:08,760
does the moon change locations on screen

988
00:43:14,089 --> 00:43:10,680

when we see different time and dates

989
00:43:18,950 --> 00:43:16,910
um I think that that is uh just a uh

990
00:43:21,290 --> 00:43:18,960
orientation of their telescopes

991
00:43:22,970 --> 00:43:21,300
um because yeah I it might drift to like

992
00:43:24,530 --> 00:43:22,980
one side of the feed one side of the

993
00:43:25,849 --> 00:43:24,540
picture or the other

994
00:43:29,329 --> 00:43:25,859
um and that's just alignment of the

995
00:43:31,790 --> 00:43:29,339
telescope um it is uh it is it takes a

996
00:43:33,829 --> 00:43:31,800
lot of setup to learn how to do this

997
00:43:35,990 --> 00:43:33,839
type of imagery as what they're doing

998
00:43:37,790 --> 00:43:36,000
amazing at a time and date

999
00:43:41,089 --> 00:43:37,800
um and they have done amazing for

1000
00:43:42,890 --> 00:43:41,099
forever so but it takes a lot to get it

1001
00:43:45,170 --> 00:43:42,900
to look this good

1002
00:43:47,930 --> 00:43:45,180
um so that's actually why I I tell

1003
00:43:50,690 --> 00:43:47,940
people your first Eclipse let let the

1004
00:43:52,609 --> 00:43:50,700
experts do it and just experience it

1005
00:43:54,349 --> 00:43:52,619
um because you can it's a great hobby to

1006
00:43:57,109 --> 00:43:54,359
figure out how to you know how to do

1007
00:43:59,210 --> 00:43:57,119
this or you know and how to line up the

1008
00:44:00,770 --> 00:43:59,220
telescopes and do that but it's a lot of

1009
00:44:02,450 --> 00:44:00,780
work and so maybe the first one just

1010
00:44:04,910 --> 00:44:02,460
experience it

1011
00:44:08,150 --> 00:44:04,920
yeah yeah I am looking forward to my

1012
00:44:11,450 --> 00:44:08,160
first one no cameras no anything it's

1013
00:44:13,730 --> 00:44:11,460

just gonna be me and watching nature do

1014
00:44:15,410 --> 00:44:13,740
its thing I love it

1015
00:44:19,730 --> 00:44:15,420
um okay we have another kind of Moon

1016
00:44:22,550 --> 00:44:19,740
question for you a Ron Equus on Twitch

1017
00:44:24,670 --> 00:44:22,560
asks so there's a lot of talk about the

1018
00:44:27,650 --> 00:44:24,680
Sun during the solar eclipse of course

1019
00:44:29,630 --> 00:44:27,660
are there any unique properties of the

1020
00:44:30,650 --> 00:44:29,640
Moon that are only visible during an

1021
00:44:33,650 --> 00:44:30,660
eclipse

1022
00:44:36,290 --> 00:44:33,660
that you know of

1023
00:44:40,670 --> 00:44:36,300
that's a that's a good question

1024
00:44:43,130 --> 00:44:40,680
um the Moon is uh is Rocky and not quite

1025
00:44:44,750 --> 00:44:43,140
as smooth smooth and kind of you know it

1026
00:44:45,650 --> 00:44:44,760
looks like a beautiful ball when it's

1027
00:44:47,450 --> 00:44:45,660
full

1028
00:44:49,790 --> 00:44:47,460
um from the earth um but it actually has

1029
00:44:51,589 --> 00:44:49,800
craters and valleys so Peaks and valleys

1030
00:44:52,490 --> 00:44:51,599
and you can see some of those and that's

1031
00:44:54,770 --> 00:44:52,500
actually

1032
00:44:56,450 --> 00:44:54,780
um what we'll see coming up here uh with

1033
00:44:58,609 --> 00:44:56,460
the Bailey's beets

1034
00:45:00,650 --> 00:44:58,619
um is actually the last bits of the fact

1035
00:45:02,150 --> 00:45:00,660
that it's not perfectly smooth

1036
00:45:04,849 --> 00:45:02,160
um we're seeing little bits of sunlight

1037
00:45:06,950 --> 00:45:04,859
still kind of Escape until it completely

1038
00:45:09,230 --> 00:45:06,960

covers the face of the Sun so as you're

1039
00:45:11,089 --> 00:45:09,240
seeing in the um in the feed fright or

1040
00:45:12,530 --> 00:45:11,099
in the image right now is you'll see

1041
00:45:14,329 --> 00:45:12,540
those little beads and those are

1042
00:45:17,510 --> 00:45:14,339
actually telling us about the Peaks and

1043
00:45:22,550 --> 00:45:19,490
excellent okay so we have a really good

1044
00:45:25,609 --> 00:45:22,560
question from Heather Jarvis

1045
00:45:31,010 --> 00:45:25,619
um and the question is is it happening

1046
00:45:37,430 --> 00:45:33,829
it is it is happening

1047
00:45:39,650 --> 00:45:37,440
um so we have most of the uh most of the

1048
00:45:42,109 --> 00:45:39,660
disc covered right now

1049
00:45:44,450 --> 00:45:42,119
um and so the upper left

1050
00:45:46,849 --> 00:45:44,460
um is the moon that dark uh Circle or

1051
00:45:49,069 --> 00:45:46,859
semi-circle um is cutting out the little

1052
00:45:50,690 --> 00:45:49,079
crescent Sun that we're seeing

1053
00:45:52,849 --> 00:45:50,700
um and the prominence is still there on

1054
00:45:55,490 --> 00:45:52,859
the on the left hand side

1055
00:45:58,190 --> 00:45:55,500
um and so what is it was happening and

1056
00:46:01,309 --> 00:45:58,200
we're I think we're around uh 10 minutes

1057
00:46:03,170 --> 00:46:01,319
I think from you know 15 minutes from um

1058
00:46:05,870 --> 00:46:03,180
totality

1059
00:46:07,490 --> 00:46:05,880
um and uh so then we'll see those Bailey

1060
00:46:09,050 --> 00:46:07,500
beads that we just talked about uh

1061
00:46:10,190 --> 00:46:09,060
diamond ring you're the last one that

1062
00:46:12,290 --> 00:46:10,200
that comes out because it looks like

1063
00:46:13,309 --> 00:46:12,300

there's a great big diamond on the uh on

1064
00:46:14,750 --> 00:46:13,319
the sun

1065
00:46:17,870 --> 00:46:14,760
um and then that'll go off and then we

1066
00:46:19,309 --> 00:46:17,880
will see totality and uh that's that's

1067
00:46:22,609 --> 00:46:19,319
where we would take off our eclipse

1068
00:46:24,890 --> 00:46:22,619
glasses if we were there and uh get a

1069
00:46:28,190 --> 00:46:24,900
bask in the seeing the Corona and and

1070
00:46:30,050 --> 00:46:28,200
experiencing the whole thing and then

1071
00:46:32,630 --> 00:46:30,060
um after that minute's over we would put

1072
00:46:34,609 --> 00:46:32,640
on our glasses and we will then go

1073
00:46:37,190 --> 00:46:34,619
backwards and see the diamond ring the

1074
00:46:39,490 --> 00:46:37,200
Bailey's beads and then back to this

1075
00:46:41,870 --> 00:46:39,500
partial eclipse

1076
00:46:44,569 --> 00:46:41,880
so you kind of talked about this before

1077
00:46:47,390 --> 00:46:44,579
but Kaz on YouTube is asking is it

1078
00:46:50,990 --> 00:46:47,400
possible to never have an eclipse during

1079
00:46:55,730 --> 00:46:52,370
um since they happened about every 18

1080
00:46:59,329 --> 00:46:55,740
months it would be possible to not have

1081
00:47:04,069 --> 00:47:02,270
um and I'm assuming that just meant

1082
00:47:06,309 --> 00:47:04,079
solar eclipses

1083
00:47:10,370 --> 00:47:06,319
um that Kaz was asking about all right

1084
00:47:12,710 --> 00:47:10,380
very pezzy on YouTube asks is it

1085
00:47:16,309 --> 00:47:12,720
possible to see the eclipse using a

1086
00:47:20,990 --> 00:47:17,930
that's a good question

1087
00:47:23,630 --> 00:47:21,000
um so really there is you need to be in

1088
00:47:25,910 --> 00:47:23,640

the path of totality

1089
00:47:27,230 --> 00:47:25,920
um or a path of partial path of the

1090
00:47:29,930 --> 00:47:27,240
eclipse in general

1091
00:47:32,390 --> 00:47:29,940
um so either a partial eclipse or a uh a

1092
00:47:34,190 --> 00:47:32,400
total eclipse so it somewhat depends on

1093
00:47:37,010 --> 00:47:34,200
on where you live

1094
00:47:41,630 --> 00:47:37,020
um again if you're in the U.S

1095
00:47:43,250 --> 00:47:41,640
um you will see one in 2024 or 2023 so

1096
00:47:46,069 --> 00:47:43,260
um hopefully yes and then if somewhere

1097
00:47:48,410 --> 00:47:46,079
else we can find resources online uh to

1098
00:47:51,050 --> 00:47:48,420
see we're in the next eclipse is going

1099
00:47:54,050 --> 00:47:51,060
to be in your area

1100
00:47:56,089 --> 00:47:54,060
excellent uh are folks working in the

1101
00:47:58,609 --> 00:47:56,099
background you guys are geniuses so for

1102
00:48:00,650 --> 00:47:58,619
the question asking if lunar or solar

1103
00:48:01,970 --> 00:48:00,660
eclipses are more common we have a

1104
00:48:04,670 --> 00:48:01,980
little bit more information for you

1105
00:48:07,250 --> 00:48:04,680
lunar eclipses and solar eclipses are

1106
00:48:09,890 --> 00:48:07,260
about equally common they usually happen

1107
00:48:13,190 --> 00:48:09,900
in pairs so a lunar eclipse will usually

1108
00:48:16,370 --> 00:48:13,200
happen two weeks before or two weeks

1109
00:48:18,589 --> 00:48:16,380
after a solar eclipse however more of

1110
00:48:21,349 --> 00:48:18,599
the earth will be able to see a total

1111
00:48:25,370 --> 00:48:21,359
lunar eclipse than a total solar eclipse

1112
00:48:30,010 --> 00:48:25,380
so they may see more may seem more

1113
00:48:32,569 --> 00:48:30,020

common in one given location

1114
00:48:34,190 --> 00:48:32,579
so thanks for that

1115
00:48:35,630 --> 00:48:34,200
um yeah that's great because I think

1116
00:48:37,130 --> 00:48:35,640
that that's what I was thinking is it's

1117
00:48:39,290 --> 00:48:37,140
more common to be like oh yeah you can

1118
00:48:40,970 --> 00:48:39,300
see a lunar eclipse than a solar eclipse

1119
00:48:43,849 --> 00:48:40,980
is a much more Narrow Path because the

1120
00:48:45,589 --> 00:48:43,859
moon's Moon smaller yes

1121
00:48:47,150 --> 00:48:45,599
yes excellent yeah that was a really

1122
00:48:48,470 --> 00:48:47,160
good answer thanks for the clarity on

1123
00:48:51,589 --> 00:48:48,480
that

1124
00:48:53,390 --> 00:48:51,599
um Willie D on YouTube asks what kind of

1125
00:48:56,089 --> 00:48:53,400
gravitational pull

1126
00:48:58,970 --> 00:48:56,099
does this kind of event do to the life

1127
00:49:01,849 --> 00:48:58,980
on Earth with Celeste with Celestial

1128
00:49:06,950 --> 00:49:01,859
body alignments are they're animals and

1129
00:49:09,650 --> 00:49:06,960
plants that react to this event thanks

1130
00:49:12,829 --> 00:49:09,660
okay oh that's great so um animals and

1131
00:49:13,910 --> 00:49:12,839
plants do um respond to this event in

1132
00:49:16,430 --> 00:49:13,920
general

1133
00:49:18,650 --> 00:49:16,440
um again from what I understand is much

1134
00:49:22,730 --> 00:49:18,660
more from the actual

1135
00:49:24,170 --> 00:49:22,740
um visual or sensory of the darkness

1136
00:49:25,670 --> 00:49:24,180
um that they sense

1137
00:49:27,470 --> 00:49:25,680
um rather than maybe direct

1138
00:49:29,329 --> 00:49:27,480

gravitational pull but maybe that's a

1139
00:49:31,190 --> 00:49:29,339
study that you should propose that uh

1140
00:49:33,950 --> 00:49:31,200
what's the what's the effect

1141
00:49:36,410 --> 00:49:33,960
um on on animals uh for Gravity I think

1142
00:49:38,329 --> 00:49:36,420
it's my you know my sense is that it's

1143
00:49:39,770 --> 00:49:38,339
it's more from a visual sense than a

1144
00:49:41,569 --> 00:49:39,780
than a gravitational sense that there's

1145
00:49:44,210 --> 00:49:41,579
an effect on animals

1146
00:49:47,329 --> 00:49:44,220
gotcha okay that makes sense

1147
00:49:49,750 --> 00:49:47,339
um Susan stalker asks do solar flares

1148
00:49:52,970 --> 00:49:49,760
interfere with technology here on Earth

1149
00:49:54,290 --> 00:49:52,980
and is there cause for concern that's a

1150
00:49:56,569 --> 00:49:54,300
really good one

1151
00:49:59,450 --> 00:49:56,579
that's a really good question

1152
00:50:01,970 --> 00:49:59,460
um and uh yes solar flares do

1153
00:50:04,309 --> 00:50:01,980
potentially cause issues uh with our

1154
00:50:05,930 --> 00:50:04,319
technology here on Earth and all of our

1155
00:50:08,210 --> 00:50:05,940
space assets

1156
00:50:10,550 --> 00:50:08,220
um and so we are

1157
00:50:12,290 --> 00:50:10,560
um we at Nasa as well as in partnership

1158
00:50:14,450 --> 00:50:12,300
with with many different folks in

1159
00:50:16,849 --> 00:50:14,460
commercial as well as all within the

1160
00:50:17,870 --> 00:50:16,859
government NOAA NASA NSF all of all the

1161
00:50:20,030 --> 00:50:17,880
folks

1162
00:50:21,290 --> 00:50:20,040
um are working on this um it's a term

1163
00:50:23,630 --> 00:50:21,300

called space weather

1164
00:50:25,609 --> 00:50:23,640
um as the effect that the sun has on uh

1165
00:50:27,829 --> 00:50:25,619
the Earth and uh the the entire

1166
00:50:29,569 --> 00:50:27,839
environment the entire interplanetary

1167
00:50:31,250 --> 00:50:29,579
environment

1168
00:50:32,089 --> 00:50:31,260
um so we are looking to mitigate those

1169
00:50:35,390 --> 00:50:32,099
things

1170
00:50:38,450 --> 00:50:35,400
or

1171
00:50:39,950 --> 00:50:38,460
um inducing uh do a huge currents in the

1172
00:50:42,290 --> 00:50:39,960
earth things like that

1173
00:50:43,609 --> 00:50:42,300
um we are looking into that and uh and

1174
00:50:45,109 --> 00:50:43,619
making sure that those solar flares

1175
00:50:46,790 --> 00:50:45,119
don't uh don't get the best of our

1176
00:50:48,829 --> 00:50:46,800
technology

1177
00:50:52,010 --> 00:50:48,839
yeah and that's a big part of the helium

1178
00:50:53,030 --> 00:50:52,020
is here right so like at Nasa the helium

1179
00:50:56,569 --> 00:50:53,040
physics

1180
00:50:58,430 --> 00:50:56,579
um has a fleet of missions that are

1181
00:50:59,030 --> 00:50:58,440
working to study

1182
00:51:01,670 --> 00:50:59,040
um

1183
00:51:03,470 --> 00:51:01,680
the phenomena of space weather and the

1184
00:51:05,030 --> 00:51:03,480
sun's impact you know throughout our

1185
00:51:06,650 --> 00:51:05,040
universe

1186
00:51:08,210 --> 00:51:06,660
um particularly do you want to talk a

1187
00:51:10,690 --> 00:51:08,220
little bit about Parker solar probe

1188
00:51:13,730 --> 00:51:10,700

which has touched the sun

1189
00:51:15,589 --> 00:51:13,740
yeah so Parker solar probe um a little

1190
00:51:18,589 --> 00:51:15,599
near and dear to my heart

1191
00:51:21,230 --> 00:51:18,599
um is the spacecraft that has uh gone in

1192
00:51:22,790 --> 00:51:21,240
and actually touched uh this Corona that

1193
00:51:25,670 --> 00:51:22,800
we have seen

1194
00:51:29,030 --> 00:51:25,680
um and it is a spacecraft that uh goes

1195
00:51:32,870 --> 00:51:29,040
in and uh looks at the particles coming

1196
00:51:36,049 --> 00:51:32,880
off of the off of the sun both through

1197
00:51:38,150 --> 00:51:36,059
Imaging as well as scooping some up in

1198
00:51:40,250 --> 00:51:38,160
some of the detectors and setting the

1199
00:51:42,890 --> 00:51:40,260
magnetic fields of the Sun so

1200
00:51:45,710 --> 00:51:42,900
um that mission has successfully touched

1201
00:51:47,750 --> 00:51:45,720
that Corona and is continuing to study

1202
00:51:50,030 --> 00:51:47,760
it and to again help us understand that

1203
00:51:52,970 --> 00:51:50,040
space weather

1204
00:51:56,690 --> 00:51:52,980
excellent yeah um looking at this we're

1205
00:51:59,569 --> 00:51:56,700
getting closer we're getting closer

1206
00:52:04,309 --> 00:52:02,630
I know it looks like a great big smile a

1207
00:52:07,490 --> 00:52:04,319
screaming smile right now this one's

1208
00:52:11,450 --> 00:52:09,290
um okay back to the question so we have

1209
00:52:13,730 --> 00:52:11,460
two related questions David Gray on

1210
00:52:16,549 --> 00:52:13,740
YouTube asks what is the expected

1211
00:52:18,650 --> 00:52:16,559
temperature drop during a total solar

1212
00:52:20,990 --> 00:52:18,660
eclipse in Raymond de May on YouTube is

1213
00:52:23,210 --> 00:52:21,000

asking is there a measurable temperature

1214
00:52:26,089 --> 00:52:23,220
drop so are are people going to be able

1215
00:52:28,670 --> 00:52:26,099
to feel a difference

1216
00:52:30,170 --> 00:52:28,680
you can definitely feel a difference it

1217
00:52:31,790 --> 00:52:30,180
can be a couple degrees to tens of

1218
00:52:34,069 --> 00:52:31,800
degrees so like

1219
00:52:36,410 --> 00:52:34,079
um I for instance my last solar eclipse

1220
00:52:38,630 --> 00:52:36,420
I had to put on a down jacket I was in a

1221
00:52:42,290 --> 00:52:38,640
short sleeve polo and had to put on a

1222
00:52:43,849 --> 00:52:42,300
down jacket um I'm also cold so but it

1223
00:52:45,650 --> 00:52:43,859
was definitely noticeable that folks

1224
00:52:49,309 --> 00:52:45,660
were putting on jackets

1225
00:52:51,109 --> 00:52:49,319
um and so uh it it is a measurable

1226
00:52:52,790 --> 00:52:51,119
temperature and that is part of a

1227
00:52:55,190 --> 00:52:52,800
citizen science project is to actually

1228
00:52:57,290 --> 00:52:55,200
measure the temperature as you're going

1229
00:52:58,970 --> 00:52:57,300
um as this is is going along especially

1230
00:53:00,170 --> 00:52:58,980
with you know animal reactions is to

1231
00:53:02,809 --> 00:53:00,180
figure out what what they're actually

1232
00:53:05,030 --> 00:53:02,819
reacting to

1233
00:53:06,650 --> 00:53:05,040
uh he was a really good one uh kind of

1234
00:53:08,569 --> 00:53:06,660
based on the uh something you said

1235
00:53:11,089 --> 00:53:08,579
earlier Forrest what

1236
00:53:14,750 --> 00:53:11,099
Force Walker

1237
00:53:16,010 --> 00:53:14,760
um 111 on YouTube asks if a flare were

1238
00:53:18,290 --> 00:53:16,020

to happen

1239
00:53:20,030 --> 00:53:18,300
right now would it be visible

1240
00:53:22,370 --> 00:53:20,040
could we would we be able to see it

1241
00:53:23,930 --> 00:53:22,380
during this um during the eclipse that

1242
00:53:26,450 --> 00:53:23,940
we're watching

1243
00:53:28,490 --> 00:53:26,460
so if we were to be able to see a

1244
00:53:31,910 --> 00:53:28,500
visible light flare when the eclipse was

1245
00:53:34,069 --> 00:53:31,920
happening um that would be a big event

1246
00:53:35,870 --> 00:53:34,079
um so

1247
00:53:37,970 --> 00:53:35,880
um that would that would be related to

1248
00:53:40,130 --> 00:53:37,980
so for instance one of the most powerful

1249
00:53:42,470 --> 00:53:40,140
or the most powerful events that we kind

1250
00:53:43,370 --> 00:53:42,480
of have recorded is the 1859 Carrington

1251
00:53:45,530 --> 00:53:43,380
event

1252
00:53:47,630 --> 00:53:45,540
um where telephone Telegraph lines at

1253
00:53:49,970 --> 00:53:47,640
the Times caught on fire and were able

1254
00:53:51,589 --> 00:53:49,980
to work without batteries for days based

1255
00:53:53,809 --> 00:53:51,599
on the energy that was imparted from

1256
00:53:55,730 --> 00:53:53,819
that flare to the Earth

1257
00:53:57,170 --> 00:53:55,740
um so if we were to see some see an

1258
00:53:59,030 --> 00:53:57,180
actual flare

1259
00:54:01,130 --> 00:53:59,040
um in the visible light that is what

1260
00:54:04,250 --> 00:54:01,140
they that was seen associated with that

1261
00:54:06,710 --> 00:54:04,260
as well so that's a big storm

1262
00:54:08,750 --> 00:54:06,720
um so uh so it'd be super cool yet at

1263
00:54:11,089 --> 00:54:08,760

the same time it would be uh very

1264
00:54:12,650 --> 00:54:11,099
interesting to see what would go on most

1265
00:54:14,210 --> 00:54:12,660
of the flares we

1266
00:54:15,950 --> 00:54:14,220
um look at right now are done in the

1267
00:54:18,890 --> 00:54:15,960
extreme ultraviolet

1268
00:54:20,390 --> 00:54:18,900
um and uh that is how we we normally see

1269
00:54:22,910 --> 00:54:20,400
them which is unfortunately something we

1270
00:54:24,890 --> 00:54:22,920
can't see with our own eyes

1271
00:54:26,450 --> 00:54:24,900
so one thing you've mentioned a couple

1272
00:54:29,870 --> 00:54:26,460
of times and people are asking questions

1273
00:54:31,790 --> 00:54:29,880
about it is a prominence so what is a

1274
00:54:33,170 --> 00:54:31,800
promise is that a flare that we are

1275
00:54:34,849 --> 00:54:33,180
seeing on the left side of the Sun or

1276
00:54:36,829 --> 00:54:34,859
what what is what is a prominence what

1277
00:54:40,609 --> 00:54:36,839
are we seeing good question yeah so

1278
00:54:43,069 --> 00:54:40,619
prominence is a protrusion of some of

1279
00:54:46,670 --> 00:54:43,079
the gas of the sun along a magnetic

1280
00:54:48,829 --> 00:54:46,680
field line so the sun is a magnetic star

1281
00:54:50,690 --> 00:54:48,839
um and uh the the background image

1282
00:54:53,510 --> 00:54:50,700
you're actually seeing has kind of those

1283
00:54:55,970 --> 00:54:53,520
twisty magnetic fields and the the gas

1284
00:54:58,130 --> 00:54:55,980
or the plasma following those and that's

1285
00:55:00,770 --> 00:54:58,140
what a prominence is it's a sticking out

1286
00:55:03,109 --> 00:55:00,780
of one of those magnetic fields and then

1287
00:55:04,790 --> 00:55:03,119
the gas uh and plasma sticking with it

1288
00:55:07,309 --> 00:55:04,800

sticking with that magnetic field line

1289
00:55:09,170 --> 00:55:07,319
and protruding and so it can be a

1290
00:55:11,870 --> 00:55:09,180
precursor to a flare

1291
00:55:13,490 --> 00:55:11,880
um it could be a um it could be part of

1292
00:55:15,530 --> 00:55:13,500
a coronal mass ejection it could be

1293
00:55:18,230 --> 00:55:15,540
ejected from the Sun

1294
00:55:20,690 --> 00:55:18,240
um as as a mass um that comes through

1295
00:55:23,390 --> 00:55:20,700
through the solar system

1296
00:55:26,390 --> 00:55:23,400
um it's equivalent to 80 million school

1297
00:55:28,250 --> 00:55:26,400
buses in Mass hurling at us at a million

1298
00:55:30,109 --> 00:55:28,260
miles an hour when a coronal mass

1299
00:55:32,030 --> 00:55:30,119
ejection goes off and prominence can be

1300
00:55:33,230 --> 00:55:32,040
part of that

1301
00:55:36,170 --> 00:55:33,240
um so that's why it's just interesting

1302
00:55:37,549 --> 00:55:36,180
it is an active part and uh there was

1303
00:55:39,349 --> 00:55:37,559
some active regions rotating off the

1304
00:55:40,849 --> 00:55:39,359
disk and I think it was just about that

1305
00:55:42,710 --> 00:55:40,859
area

1306
00:55:45,170 --> 00:55:42,720
um so I was I was interested to see what

1307
00:55:46,670 --> 00:55:45,180
we would see once we got to totality so

1308
00:55:49,490 --> 00:55:46,680
and we're getting close we're getting

1309
00:55:52,549 --> 00:55:49,500
really close now I know it's so close

1310
00:55:54,829 --> 00:55:52,559
all right Sharia on Twitter asks are we

1311
00:55:56,569 --> 00:55:54,839
able to see sun spots during a solar

1312
00:55:59,750 --> 00:55:56,579
eclipse

1313
00:56:02,809 --> 00:55:59,760

we are actually able to see sun spots

1314
00:56:05,150 --> 00:56:02,819
um most days so which is which is great

1315
00:56:07,190 --> 00:56:05,160
um so when the sun leaves leaves again

1316
00:56:08,870 --> 00:56:07,200
or sorry when the moon leaves again and

1317
00:56:11,930 --> 00:56:08,880
we can see the sun

1318
00:56:14,089 --> 00:56:11,940
um we there were some uh darker features

1319
00:56:16,309 --> 00:56:14,099
on the sun little little spots and so

1320
00:56:18,589 --> 00:56:16,319
you are able to see sunspots um in the

1321
00:56:20,510 --> 00:56:18,599
visible light and um even with your

1322
00:56:22,490 --> 00:56:20,520
eclipse glasses you should be able to

1323
00:56:26,329 --> 00:56:22,500
see uh go out and see when there are

1324
00:56:28,790 --> 00:56:26,339
large sunspots on the um on the Sun

1325
00:56:31,910 --> 00:56:28,800
okay we've got another question on

1326
00:56:34,609 --> 00:56:31,920
safety Dobby 330 on Twitter asks is

1327
00:56:36,710 --> 00:56:34,619
there any part during an eclipse that is

1328
00:56:38,390 --> 00:56:36,720
safe to directly look at the sun without

1329
00:56:41,809 --> 00:56:38,400
glasses

1330
00:56:43,970 --> 00:56:41,819
yes and we are almost there so when that

1331
00:56:46,130 --> 00:56:43,980
moon is totally covering the disc of the

1332
00:56:49,130 --> 00:56:46,140
sun it is safe to take off your glasses

1333
00:56:50,510 --> 00:56:49,140
and to see the the solar Corona now

1334
00:56:52,309 --> 00:56:50,520
again we have to really make sure that

1335
00:56:54,049 --> 00:56:52,319
we're on the path and we know that there

1336
00:56:55,190 --> 00:56:54,059
is totality and that we can't see

1337
00:56:56,930 --> 00:56:55,200
anything

1338
00:56:58,970 --> 00:56:56,940

um and one good test is if you have your

1339
00:57:01,190 --> 00:56:58,980
glasses on and you're looking at the sun

1340
00:57:02,870 --> 00:57:01,200
and there is no nothing coming through

1341
00:57:04,670 --> 00:57:02,880
those glasses that is when you can take

1342
00:57:06,710 --> 00:57:04,680
it then you could take it off if you see

1343
00:57:07,670 --> 00:57:06,720
the littlest light in that glasses

1344
00:57:09,170 --> 00:57:07,680
um because they're really dark you're

1345
00:57:10,549 --> 00:57:09,180
not going to see you're not going to see

1346
00:57:12,710 --> 00:57:10,559
normal lights

1347
00:57:14,329 --> 00:57:12,720
um but you will see the sun through them

1348
00:57:19,069 --> 00:57:14,339
um but when you don't that's that's a

1349
00:57:23,930 --> 00:57:21,710
um we're close uh well let's let's do

1350
00:57:26,630 --> 00:57:23,940
another one Gabrielle codina on YouTube

1351
00:57:29,630 --> 00:57:26,640
asks is it possible to encounter an

1352
00:57:30,890 --> 00:57:29,640
eclipse and Northern Lights at the same

1353
00:57:33,230 --> 00:57:30,900
time

1354
00:57:34,370 --> 00:57:33,240
oh that would be like a really great

1355
00:57:37,190 --> 00:57:34,380
thing to do

1356
00:57:41,150 --> 00:57:37,200
um so yeah so we would just need to have

1357
00:57:42,770 --> 00:57:41,160
um an eclipse uh over you normally see

1358
00:57:44,630 --> 00:57:42,780
Aurora in the Northern or most southern

1359
00:57:45,890 --> 00:57:44,640
latitude latitudes Northern or Southern

1360
00:57:48,829 --> 00:57:45,900
Lights

1361
00:57:50,809 --> 00:57:48,839
um so if we were to have an uh an

1362
00:57:54,829 --> 00:57:50,819
eclipse that passed uh through say

1363
00:57:56,630 --> 00:57:54,839

Alaska or uh Greenland or Iceland

1364
00:57:59,710 --> 00:57:56,640
um you might be able to catch both the

1365
00:58:02,690 --> 00:57:59,720
eclipse and the Aurora

1366
00:58:04,250 --> 00:58:02,700
we're close all right let's let's see if

1367
00:58:06,290 --> 00:58:04,260
we can squeeze another one in this is a

1368
00:58:08,030 --> 00:58:06,300
really good one Shades McCoy on Twitch

1369
00:58:11,870 --> 00:58:08,040
is asking about

1370
00:58:14,630 --> 00:58:11,880
um have we discovered any planets that

1371
00:58:18,049 --> 00:58:14,640
experience total eclipses or Eclipses

1372
00:58:19,849 --> 00:58:18,059
like Earth does he uh it feels pretty

1373
00:58:23,270 --> 00:58:19,859
rare

1374
00:58:25,430 --> 00:58:23,280
it does and actually I my my colleague

1375
00:58:27,049 --> 00:58:25,440
Michael said this the other day that you

1376
00:58:29,210 --> 00:58:27,059
realize that this is the only place in

1377
00:58:31,250 --> 00:58:29,220
the solar system that this happens like

1378
00:58:33,049 --> 00:58:31,260
how special is that that we get to that

1379
00:58:34,910 --> 00:58:33,059
we get to be here

1380
00:58:36,710 --> 00:58:34,920
um and have a moon that blocks out the

1381
00:58:38,390 --> 00:58:36,720
sun like that's not it's not something

1382
00:58:40,670 --> 00:58:38,400
that's done every day

1383
00:58:42,049 --> 00:58:40,680
um or or anyplace else uh that we know

1384
00:58:44,809 --> 00:58:42,059
of so

1385
00:58:47,690 --> 00:58:44,819
um so this is very very amazing

1386
00:58:50,089 --> 00:58:47,700
um and we do use Eclipse like things to

1387
00:58:52,789 --> 00:58:50,099
measure um to actually find exoplanets

1388
00:58:55,549 --> 00:58:52,799

or other planets around other stars um

1389
00:58:57,710 --> 00:58:55,559
because as they pass by they weaken the

1390
00:58:59,870 --> 00:58:57,720
the light from the Star and we use that

1391
00:59:02,690 --> 00:58:59,880
to actually sense that they're there

1392
00:59:04,730 --> 00:59:02,700
um so we use an eclipse-like scenario

1393
00:59:06,490 --> 00:59:04,740
but we don't know of of really any of

1394
00:59:08,630 --> 00:59:06,500
our eclipses

1395
00:59:10,309 --> 00:59:08,640
interesting all right so it looks like

1396
00:59:13,190 --> 00:59:10,319
we're getting like really close to

1397
00:59:16,010 --> 00:59:13,200
totality so let's take a closer look at

1398
00:59:17,569 --> 00:59:16,020
the feeds coming in from Australia

1399
00:59:20,030 --> 00:59:17,579
um Kelly Do You Wanna

1400
00:59:21,710 --> 00:59:20,040
tell us what we're looking at and kind

1401
00:59:24,890 --> 00:59:21,720
of talk us through that through this yes

1402
00:59:29,150 --> 00:59:24,900
definitely so we're getting really close

1403
00:59:31,849 --> 00:59:29,160
um so the dark uh upper left hand side

1404
00:59:33,890 --> 00:59:31,859
um you see the moon and then the little

1405
00:59:36,710 --> 00:59:33,900
sliver is still the Sun and then the

1406
00:59:38,630 --> 00:59:36,720
prominence again that that uh little uh

1407
00:59:40,250 --> 00:59:38,640
stick out of magnetic fields and plasma

1408
00:59:42,890 --> 00:59:40,260
is that the left it looks like a little

1409
00:59:44,569 --> 00:59:42,900
jet maybe coming off of the Sun and as

1410
00:59:45,829 --> 00:59:44,579
we're getting closer again we're trying

1411
00:59:48,770 --> 00:59:45,839
to

1412
00:59:52,849 --> 00:59:48,780
um see those Bailey's bees which tells

1413
00:59:55,010 --> 00:59:52,859

us a little bit of of the surface of the

1414
00:59:57,470 --> 00:59:55,020
Moon and how its Peaks and valleys it's

1415
00:59:59,930 --> 00:59:57,480
not a perfect polished sphere

1416
01:00:02,750 --> 00:59:59,940
um it's uh it has a history

1417
01:00:04,730 --> 01:00:02,760
um and and we're gonna see that uh shown

1418
01:00:06,950 --> 01:00:04,740
through the uh shown through the

1419
01:00:10,309 --> 01:00:06,960
Bailey's beads and then uh eventually

1420
01:00:13,430 --> 01:00:10,319
just go to one uh diamond ring and then

1421
01:00:18,410 --> 01:00:13,440
we will go into totality so again we're

1422
01:00:24,170 --> 01:00:21,950
wow and you can still see the prominence

1423
01:00:26,270 --> 01:00:24,180
you can see the prominence more and more

1424
01:00:28,970 --> 01:00:26,280
and I'm actually seeing a little bit of

1425
01:00:30,410 --> 01:00:28,980
something also almost directly across

1426
01:00:33,410 --> 01:00:30,420
from it

1427
01:00:37,309 --> 01:00:33,420
um there's a kind of a band of activity

1428
01:00:39,289 --> 01:00:37,319
that uh that happens uh as these things

1429
01:00:41,230 --> 01:00:39,299
form and so it's it's kind of in that

1430
01:00:43,670 --> 01:00:41,240
same band so I think of it as almost

1431
01:00:46,069 --> 01:00:43,680
directly horizontal but we'll see as as

1432
01:00:47,030 --> 01:00:46,079
we get closer if if that comes out at

1433
01:00:49,250 --> 01:00:47,040
all

1434
01:00:49,910 --> 01:00:49,260
um and could see a little bit better

1435
01:00:51,950 --> 01:00:49,920
um

1436
01:00:54,049 --> 01:00:51,960
no we're really getting dark and so if

1437
01:00:56,150 --> 01:00:54,059
we're in Australia it's probably again

1438
01:00:58,309 --> 01:00:56,160

dropped in temperature a little um on

1439
01:01:00,049 --> 01:00:58,319
that beach that we saw Henry

1440
01:01:02,210 --> 01:01:00,059
um Henry was at

1441
01:01:04,069 --> 01:01:02,220
um and again any animals might start to

1442
01:01:07,490 --> 01:01:04,079
think that it's night time

1443
01:01:09,289 --> 01:01:07,500
um the air uh or the the light will

1444
01:01:12,470 --> 01:01:09,299
actually get really

1445
01:01:14,630 --> 01:01:12,480
um kind of it just feels Eerie

1446
01:01:16,130 --> 01:01:14,640
um and it's it's like your your brain

1447
01:01:18,170 --> 01:01:16,140
knows that something's just not quite

1448
01:01:19,730 --> 01:01:18,180
right like I I'm not sure about this you

1449
01:01:22,130 --> 01:01:19,740
know where did the sun go and why is it

1450
01:01:24,049 --> 01:01:22,140
in kind of a different color

1451
01:01:25,670 --> 01:01:24,059
um and it's getting really really close

1452
01:01:29,450 --> 01:01:25,680
and uh

1453
01:01:31,970 --> 01:01:29,460
and it's uh it's exciting to uh to

1454
01:01:35,990 --> 01:01:31,980
experience this live with y'all

1455
01:01:37,789 --> 01:01:36,000
yeah and we're still glasses on right we

1456
01:01:38,930 --> 01:01:37,799
are still glasses on at this point in

1457
01:01:40,370 --> 01:01:38,940
time

1458
01:01:41,270 --> 01:01:40,380
um and we'll still be able to see that

1459
01:01:43,510 --> 01:01:41,280
then

1460
01:01:47,230 --> 01:01:43,520
foreign

1461
01:01:47,240 --> 01:01:51,470
now it has gone dark

1462
01:01:54,829 --> 01:01:53,030
oh

1463
01:01:57,049 --> 01:01:54,839

that's still too bright we probably

1464
01:01:58,930 --> 01:01:57,059
should still have our glasses on uh but

1465
01:02:02,630 --> 01:01:58,940
those are the Bailey's beads

1466
01:02:05,630 --> 01:02:02,640
and we are going towards the speeds

1467
01:02:07,970 --> 01:02:05,640
diamond ring and there we go there is

1468
01:02:10,250 --> 01:02:07,980
your total total eclipse so glass is off

1469
01:02:12,049 --> 01:02:10,260
at this point in time experiencing this

1470
01:02:14,809 --> 01:02:12,059
beautiful Corona

1471
01:02:17,030 --> 01:02:14,819
um so that prominence is out there

1472
01:02:18,230 --> 01:02:17,040
um you see that you also see on the

1473
01:02:21,170 --> 01:02:18,240
other side

1474
01:02:24,470 --> 01:02:21,180
um almost like helmets or um triangular

1475
01:02:26,210 --> 01:02:24,480
shaped flows so the solar wind is uh

1476
01:02:28,970 --> 01:02:26,220
flowing out and so we're really

1477
01:02:30,650 --> 01:02:28,980
witnessing that Corona there

1478
01:02:33,589 --> 01:02:30,660
um and as they adjust

1479
01:02:35,930 --> 01:02:33,599
um adjust things wow there's just all

1480
01:02:37,849 --> 01:02:35,940
sorts of structure so it's not a simple

1481
01:02:41,870 --> 01:02:37,859
thing right it's a very complicated

1482
01:02:43,730 --> 01:02:41,880
Dynamic always churning always moving

1483
01:02:47,210 --> 01:02:43,740
um always evolving

1484
01:02:49,430 --> 01:02:47,220
um and you see so much structure out and

1485
01:02:51,829 --> 01:02:49,440
this is what hopefully that kite is um

1486
01:02:52,730 --> 01:02:51,839
is recording right now is all of these

1487
01:02:56,150 --> 01:02:52,740
different

1488
01:02:58,490 --> 01:02:56,160

um uh prominences and you almost see

1489
01:03:01,069 --> 01:02:58,500
Loops sometimes

1490
01:03:02,870 --> 01:03:01,079
um and uh and then again things that

1491
01:03:05,030 --> 01:03:02,880
look like they flow out of the out of

1492
01:03:06,829 --> 01:03:05,040
the um picture

1493
01:03:08,870 --> 01:03:06,839
um that's the solar wind and that's what

1494
01:03:09,890 --> 01:03:08,880
connects with our planet

1495
01:03:11,210 --> 01:03:09,900
um and now we're actually getting the

1496
01:03:14,930 --> 01:03:11,220
Bailey's bees back so this would be

1497
01:03:17,030 --> 01:03:14,940
glasses on again it was a very short but

1498
01:03:19,490 --> 01:03:17,040
amazing experience

1499
01:03:21,829 --> 01:03:19,500
um and again we're gonna have around uh

1500
01:03:25,010 --> 01:03:21,839
four and a half minutes in places in the

1501
01:03:26,930 --> 01:03:25,020
U.S uh in 2024 but that was beautiful so

1502
01:03:31,130 --> 01:03:26,940
yeah so the Bailey's beads are coming

1503
01:03:37,430 --> 01:03:31,140
back we're coming back now into what is

1504
01:03:40,549 --> 01:03:39,230
as you can still see a little bit of the

1505
01:03:41,809 --> 01:03:40,559
corona but again we would have our

1506
01:03:44,569 --> 01:03:41,819
glasses on at this point in time because

1507
01:03:46,849 --> 01:03:44,579
this is the safest uh the safe this or

1508
01:03:47,990 --> 01:03:46,859
or your glasses are the safest way to

1509
01:03:50,809 --> 01:03:48,000
view

1510
01:03:56,030 --> 01:03:50,819
um the solar eclipse

1511
01:04:02,510 --> 01:03:58,730
absolutely

1512
01:04:08,690 --> 01:04:05,750
wow how many clipses have you seen

1513
01:04:10,329 --> 01:04:08,700

so I have seen uh two total eclipses in

1514
01:04:12,049 --> 01:04:10,339
person

1515
01:04:15,770 --> 01:04:12,059
wow

1516
01:04:17,930 --> 01:04:15,780
yeah and and each one is this is magical

1517
01:04:20,089 --> 01:04:17,940
and there is just something about

1518
01:04:22,730 --> 01:04:20,099
experiencing it

1519
01:04:26,569 --> 01:04:22,740
um that is surreal

1520
01:04:29,450 --> 01:04:26,579
um oh wow yeah so there's the prominence

1521
01:04:30,890 --> 01:04:29,460
and all the other type of uh masks

1522
01:04:33,890 --> 01:04:30,900
that's just kind of hanging out there

1523
01:04:36,410 --> 01:04:33,900
and and um playing on the loops the

1524
01:04:37,690 --> 01:04:36,420
magnetic Loops of the Sun and

1525
01:04:40,849 --> 01:04:37,700
um

1526
01:04:44,450 --> 01:04:40,859
yeah it's beautiful

1527
01:04:46,670 --> 01:04:44,460
that is absolutely phenomenal

1528
01:04:49,430 --> 01:04:46,680
and and this activity kind of picks up

1529
01:04:51,829 --> 01:04:49,440
as we go towards solar Max and so

1530
01:04:54,950 --> 01:04:51,839
um with predictions right now solar Max

1531
01:04:57,170 --> 01:04:54,960
is somewhere between 2024 and 2025 so we

1532
01:04:59,690 --> 01:04:57,180
could have a very active

1533
01:05:03,289 --> 01:04:59,700
um and really structured and a lot of

1534
01:05:06,289 --> 01:05:03,299
different things on the Sun as we have

1535
01:05:09,170 --> 01:05:06,299
our total eclipse in 24 and our annular

1536
01:05:11,089 --> 01:05:09,180
eclipse in in 23.

1537
01:05:12,950 --> 01:05:11,099
so can you talk us through that a little

1538
01:05:15,349 --> 01:05:12,960

bit so you're talking about solar Max so

1539
01:05:16,609 --> 01:05:15,359
uh the sun has Cycles the solar Cycles

1540
01:05:18,230 --> 01:05:16,619
what's the difference and what does

1541
01:05:21,770 --> 01:05:18,240
solar Max mean in

1542
01:05:23,809 --> 01:05:21,780
yes yeah so the sun sun has Cycles in

1543
01:05:25,010 --> 01:05:23,819
its magnetic um energy

1544
01:05:26,569 --> 01:05:25,020
um what happens is basically the

1545
01:05:28,430 --> 01:05:26,579
magnetic fields get Twisted Twisted

1546
01:05:30,890 --> 01:05:28,440
Twisted Twisted and then suddenly they

1547
01:05:33,170 --> 01:05:30,900
they have to just break and relax

1548
01:05:35,569 --> 01:05:33,180
um and so the uh minimum is when they're

1549
01:05:36,890 --> 01:05:35,579
relaxed and the maximum is as they are

1550
01:05:40,490 --> 01:05:36,900
getting more and more twisted and more

1551
01:05:42,049 --> 01:05:40,500
energy uh to to blow off the steam uh

1552
01:05:44,089 --> 01:05:42,059
through coronal mass ejections those

1553
01:05:46,190 --> 01:05:44,099
again 80 million school buses racing

1554
01:05:48,049 --> 01:05:46,200
towards us at millions of miles an hour

1555
01:05:49,970 --> 01:05:48,059
um or the solar flares or the energetic

1556
01:05:51,890 --> 01:05:49,980
particles that the sun gives off

1557
01:05:54,170 --> 01:05:51,900
um and so this cycle that going from

1558
01:05:55,490 --> 01:05:54,180
that really relaxed magnetic field to

1559
01:05:58,670 --> 01:05:55,500
really tense

1560
01:06:01,789 --> 01:05:58,680
um it takes um 11 years to complete

1561
01:06:03,710 --> 01:06:01,799
um so you end up going uh around five to

1562
01:06:05,390 --> 01:06:03,720
six years to a

1563
01:06:06,349 --> 01:06:05,400

um to a maximum and then back to a

1564
01:06:08,390 --> 01:06:06,359
minimum

1565
01:06:12,049 --> 01:06:08,400
and back to a maximum began and we're

1566
01:06:14,089 --> 01:06:12,059
headed towards a maximum in 2020 uh 2024

1567
01:06:15,710 --> 01:06:14,099
2025

1568
01:06:18,289 --> 01:06:15,720
um and so that's again we're gonna have

1569
01:06:19,849 --> 01:06:18,299
a lot more activity more flares more

1570
01:06:22,430 --> 01:06:19,859
coronal mass ejections and those

1571
01:06:25,190 --> 01:06:22,440
energetic particles

1572
01:06:27,529 --> 01:06:25,200
okay so let's keep watching as we take a

1573
01:06:30,650 --> 01:06:27,539
few more um questions here's a really

1574
01:06:33,589 --> 01:06:30,660
good one Aaron Polito on YouTube asked

1575
01:06:36,049 --> 01:06:33,599
what useful data does NASA get and what

1576
01:06:38,870 --> 01:06:36,059
did they do with it from exert from

1577
01:06:41,029 --> 01:06:38,880
um observing eclipses

1578
01:06:43,849 --> 01:06:41,039
that's a great question

1579
01:06:46,490 --> 01:06:43,859
um and we take all sorts of different

1580
01:06:49,010 --> 01:06:46,500
um the data during eclipses

1581
01:06:50,690 --> 01:06:49,020
um there will be an announcement soon of

1582
01:06:52,970 --> 01:06:50,700
things that we're specifically doing for

1583
01:06:56,690 --> 01:06:52,980
the 24 but for instance for the kite

1584
01:06:58,730 --> 01:06:56,700
um that is flying in Australia uh today

1585
01:07:00,529 --> 01:06:58,740
um there will be a spectrometer so

1586
01:07:02,390 --> 01:07:00,539
there'll be there'll be data from that

1587
01:07:04,609 --> 01:07:02,400
and that will all have to go into an

1588
01:07:07,370 --> 01:07:04,619

archive for NASA and uh to make sure

1589
01:07:09,529 --> 01:07:07,380
that's open and available to to folks um

1590
01:07:11,630 --> 01:07:09,539
so any of the things uh any of the data

1591
01:07:14,990 --> 01:07:11,640
that is collected from uh from the NASA

1592
01:07:16,250 --> 01:07:15,000
Source will then be available to use for

1593
01:07:20,029 --> 01:07:16,260
anyone

1594
01:07:22,069 --> 01:07:20,039
um uh shortly after it is collected

1595
01:07:26,029 --> 01:07:22,079
oh wow

1596
01:07:28,309 --> 01:07:26,039
um okay and I've heard that

1597
01:07:31,309 --> 01:07:28,319
um eclipses provide kind of like a

1598
01:07:33,109 --> 01:07:31,319
perfect scientific environment

1599
01:07:34,309 --> 01:07:33,119
um for taking measurements if we're

1600
01:07:35,450 --> 01:07:34,319
trying to do certain types of

1601
01:07:37,150 --> 01:07:35,460
measurements

1602
01:07:40,910 --> 01:07:37,160
um why is that

1603
01:07:42,950 --> 01:07:40,920
it it is a really great environment in

1604
01:07:46,190 --> 01:07:42,960
terms of we don't normally get to turn

1605
01:07:47,990 --> 01:07:46,200
off the sun on things uh regularly

1606
01:07:50,029 --> 01:07:48,000
um that's a we don't get to snap our

1607
01:07:51,289 --> 01:07:50,039
fingers and just uh turn night to day or

1608
01:07:54,650 --> 01:07:51,299
day to night

1609
01:07:56,089 --> 01:07:54,660
um so for instance uh in 23 and 24 we

1610
01:07:58,670 --> 01:07:56,099
will launch

1611
01:08:01,549 --> 01:07:58,680
um Rockets into the eclipse and be able

1612
01:08:02,930 --> 01:08:01,559
to study our ionosphere which is a layer

1613
01:08:05,270 --> 01:08:02,940

of our atmosphere where a lot of our

1614
01:08:07,130 --> 01:08:05,280
communication signals go through

1615
01:08:09,289 --> 01:08:07,140
um and if that that gets Disturbed from

1616
01:08:11,990 --> 01:08:09,299
a data night transition we get to be

1617
01:08:13,910 --> 01:08:12,000
able to study it very easily during an

1618
01:08:15,890 --> 01:08:13,920
eclipse because that's again like a a

1619
01:08:17,749 --> 01:08:15,900
very specific time where we know it's

1620
01:08:21,410 --> 01:08:17,759
going to happen and we know it's

1621
01:08:23,809 --> 01:08:21,420
um and we can study those effects and uh

1622
01:08:26,030 --> 01:08:23,819
and that's a you know a very known time

1623
01:08:28,990 --> 01:08:26,040
to to do these things so it's it's great

1624
01:08:31,689 --> 01:08:29,000
to have as an as an experimental

1625
01:08:35,390 --> 01:08:31,699
laboratory for us

1626
01:08:37,070 --> 01:08:35,400
yeah that's so cool and I love that like

1627
01:08:39,050 --> 01:08:37,080
you we don't get to turn off the Sun

1628
01:08:41,570 --> 01:08:39,060
that is so true

1629
01:08:44,809 --> 01:08:41,580
um okay so an Arctic floof on YouTube

1630
01:08:46,490 --> 01:08:44,819
asks once totality has happened how long

1631
01:08:49,309 --> 01:08:46,500
will it take for the Sun and the Moon to

1632
01:08:52,370 --> 01:08:49,319
be back to their normal when I'm using

1633
01:08:54,289 --> 01:08:52,380
air quotes positions

1634
01:08:57,289 --> 01:08:54,299
um right so if this will take about

1635
01:09:00,470 --> 01:08:57,299
another hour or two uh to uh move the

1636
01:09:02,990 --> 01:09:00,480
moon uh off of the Sun or the uh what

1637
01:09:05,450 --> 01:09:03,000
will uh what will then be to look like

1638
01:09:06,950 --> 01:09:05,460

two separate things again

1639
01:09:09,650 --> 01:09:06,960
okay

1640
01:09:12,349 --> 01:09:09,660
um road called life on Twitter is asking

1641
01:09:15,829 --> 01:09:12,359
does totality last longer in the middle

1642
01:09:17,930 --> 01:09:15,839
of the path of totality than along the

1643
01:09:20,390 --> 01:09:17,940
edge of the path of totality or is it

1644
01:09:23,570 --> 01:09:20,400
the same same everywhere so like how

1645
01:09:26,269 --> 01:09:23,580
does that work how does yes that's a

1646
01:09:29,090 --> 01:09:26,279
great one yeah yeah

1647
01:09:31,789 --> 01:09:29,100
yeah and so in the very middle of the

1648
01:09:34,610 --> 01:09:31,799
middle of the track is where it will be

1649
01:09:36,530 --> 01:09:34,620
longest and then it will be shortest on

1650
01:09:38,689 --> 01:09:36,540
the outside of the track um so when we

1651
01:09:40,789 --> 01:09:38,699
were looking at the map earlier the very

1652
01:09:42,349 --> 01:09:40,799
center is where you're going to get the

1653
01:09:43,970 --> 01:09:42,359
longest totality

1654
01:09:45,050 --> 01:09:43,980
um the very center line and then as it

1655
01:09:47,749 --> 01:09:45,060
goes out

1656
01:09:51,050 --> 01:09:47,759
um you will get kind of less and less

1657
01:09:52,550 --> 01:09:51,060
um uh time in totality um and then once

1658
01:09:54,050 --> 01:09:52,560
you're out of the track completely

1659
01:09:55,669 --> 01:09:54,060
that's when you get a partial eclipse

1660
01:09:59,450 --> 01:09:55,679
like a 90

1661
01:10:04,430 --> 01:10:01,310
excellent well

1662
01:10:07,370 --> 01:10:04,440
Kelly that's all the time we have thank

1663
01:10:10,250 --> 01:10:07,380

you so much for joining us today

1664
01:10:13,490 --> 01:10:10,260
my pleasure anytime I'll watch a little

1665
01:10:16,070 --> 01:10:13,500
Eclipse anytime with you Denise

1666
01:10:18,050 --> 01:10:16,080
it's a date

1667
01:10:20,090 --> 01:10:18,060
all right you can keep watching the

1668
01:10:22,070 --> 01:10:20,100
remainder of the solar eclipse right

1669
01:10:24,950 --> 01:10:22,080
here on NASA TV or wherever you're

1670
01:10:27,850 --> 01:10:24,960
watching the stream from today uh if you

1671
01:10:30,709 --> 01:10:27,860
want to learn more about eclipses visit

1672
01:10:33,709 --> 01:10:30,719
solarsystem.nasa.gov eclipses and you

1673
01:10:36,169 --> 01:10:33,719
can also follow nasasan on Facebook and

1674
01:10:38,330 --> 01:10:36,179
Twitter to stay updated on the upcoming

1675
01:10:41,270 --> 01:10:38,340
Eclipse events and the latest Sun

1676
01:10:46,610 --> 01:10:41,280
science thank you all so much for

1677
01:10:52,130 --> 01:10:49,550
The heliophysics Big Year is a global

1678
01:10:54,590 --> 01:10:52,140
celebration of solar science and the

1679
01:10:57,229 --> 01:10:54,600
sun's influence on Earth and throughout

1680
01:10:59,390 --> 01:10:57,239
the solar system and we want you to be a

1681
01:11:01,130 --> 01:10:59,400
part of it we challenge you to

1682
01:11:03,709 --> 01:11:01,140
participate in as many Sun science

1683
01:11:06,770 --> 01:11:03,719
activities as possible beginning with

1684
01:11:08,570 --> 01:11:06,780
the annular eclipse in 2023 and ending

1685
01:11:12,470 --> 01:11:08,580
with Parker solar probe's closest

1686
01:11:14,930 --> 01:11:12,480
approach to the sun in December 2024.

1687
01:11:17,390 --> 01:11:14,940
space is increasingly part of the human

1688
01:11:19,250 --> 01:11:17,400

domain by studying the sun's influence

1689
01:11:21,590 --> 01:11:19,260
in space and its interactions with

1690
01:11:23,689 --> 01:11:21,600
planets we learn how to better protect

1691
01:11:25,970 --> 01:11:23,699
astronauts and robotic missions from

1692
01:11:28,250 --> 01:11:25,980
space weather and to develop technology

1693
01:11:30,410 --> 01:11:28,260
that protects the very infrastructure we

1694
01:11:33,169 --> 01:11:30,420
rely on here on Earth such as power

1695
01:11:36,110 --> 01:11:33,179
grids and GPS signals

1696
01:11:38,149 --> 01:11:36,120
NASA's heliophysics division studies the

1697
01:11:40,550 --> 01:11:38,159
sun's influence on everything in our

1698
01:11:43,070 --> 01:11:40,560
solar system from the very core of the

1699
01:11:45,890 --> 01:11:43,080
Sun to the very edge where the sun's

1700
01:11:48,050 --> 01:11:45,900
atmosphere meets Interstellar space

1701
01:11:50,209 --> 01:11:48,060
we have 20 heliophysics missions that

1702
01:11:51,530 --> 01:11:50,219
are operational and 14 more under

1703
01:11:53,510 --> 01:11:51,540
development

1704
01:11:55,070 --> 01:11:53,520
The heliophysics Big Year will highlight

1705
01:11:57,950 --> 01:11:55,080
the work that we're doing to understand

1706
01:12:00,350 --> 01:11:57,960
our star and to mitigate the effects of

1707
01:12:02,630 --> 01:12:00,360
space weather The Big Year is a concept

1708
01:12:05,030 --> 01:12:02,640
that originated with citizen scientists

1709
01:12:07,250 --> 01:12:05,040
in the bird watching Community during

1710
01:12:09,649 --> 01:12:07,260
their big year birders attempt to

1711
01:12:11,870 --> 01:12:09,659
observe and study as many species as

1712
01:12:14,090 --> 01:12:11,880
possible during a calendar year and we

1713
01:12:16,729 --> 01:12:14,100

are challenging you to do the same with

1714
01:12:18,229 --> 01:12:16,739
our sun during The heliophysics Big Year

1715
01:12:20,870 --> 01:12:18,239
you will have the opportunity to

1716
01:12:23,050 --> 01:12:20,880
participate in many solar science events

1717
01:12:26,270 --> 01:12:23,060
like watching solar eclipses

1718
01:12:28,550 --> 01:12:26,280
experiencing an aurora participating in

1719
01:12:31,490 --> 01:12:28,560
citizen science projects and lots of

1720
01:12:33,110 --> 01:12:31,500
other fun sun-related activities so

1721
01:12:35,209 --> 01:12:33,120
please be sure to look out for

1722
02:32:01,210 --> 01:12:35,219
opportunities to be part of our

1723
02:32:08,410 --> 02:32:06,230
imagine you are on the moon your job for

1724
02:32:10,690 --> 02:32:08,420
the next eight hours we'll be exploring

1725
02:32:14,090 --> 02:32:10,700
traversing up and down lunar Hills

1726
02:32:16,910 --> 02:32:14,100
sampling rocks and setting up equipment

1727
02:32:18,770 --> 02:32:16,920
temperatures can reach a blistering 250

1728
02:32:20,870 --> 02:32:18,780
degrees Fahrenheit

1729
02:32:24,110 --> 02:32:20,880
luckily you have a portable life support