



1  
00:00:02,020 --> 00:00:09,040

[ music ]

2  
00:00:09,060 --> 00:00:16,070

On March 20th, 2015, the shadow of the Moon will cross the surface of the Earth and create a total solar eclipse.

3  
00:00:16,090 --> 00:00:20,100

By calculating the position of the Earth and the Sun on this date,

4  
00:00:20,120 --> 00:00:23,130

we can produce several visualizations of the shadow.

5  
00:00:23,150 --> 00:00:26,160

First we have the Moon's orbit leading up to the eclipse.

6  
00:00:26,180 --> 00:00:30,170

Here the Earth, Moon, shadows, and orbit are all to scale.

7  
00:00:30,190 --> 00:00:34,190

Now, what will the solar eclipse look like from space?

8  
00:00:34,210 --> 00:00:42,210

From well beyond the Moon's far side, the shadow appears circular.

9  
00:00:42,230 --> 00:00:50,230

Viewed from above the location on Earth where maximum eclipse will occur, the shadow would appear elongated.

10  
00:00:50,250 --> 00:00:58,270

It hits the Earth near a point south of Greenland and departs very near the North Pole.

11  
00:00:58,290 --> 00:01:03,310

The central black dot you see is the umbra, where the sun is completely covered by the Moon.

12  
00:01:03,330 --> 00:01:08,360

The fainter, much larger shadow is the penumbra, where the Sun is only partially obscured.

13  
00:01:08,380 --> 00:01:14,410

The Faroe Islands of Denmark and the Svalbard islands off Norway are in the path of the umbra,

14

00:01:14,430 --> 00:01:20,450

while the penumbra covers all of Europe, and extends to North Africa and Russia.

15

00:01:20,470 --> 00:01:26,480

Back in May 2012, the Lunar Reconnaissance Orbiter turned its camera away from the Moon and toward Earth