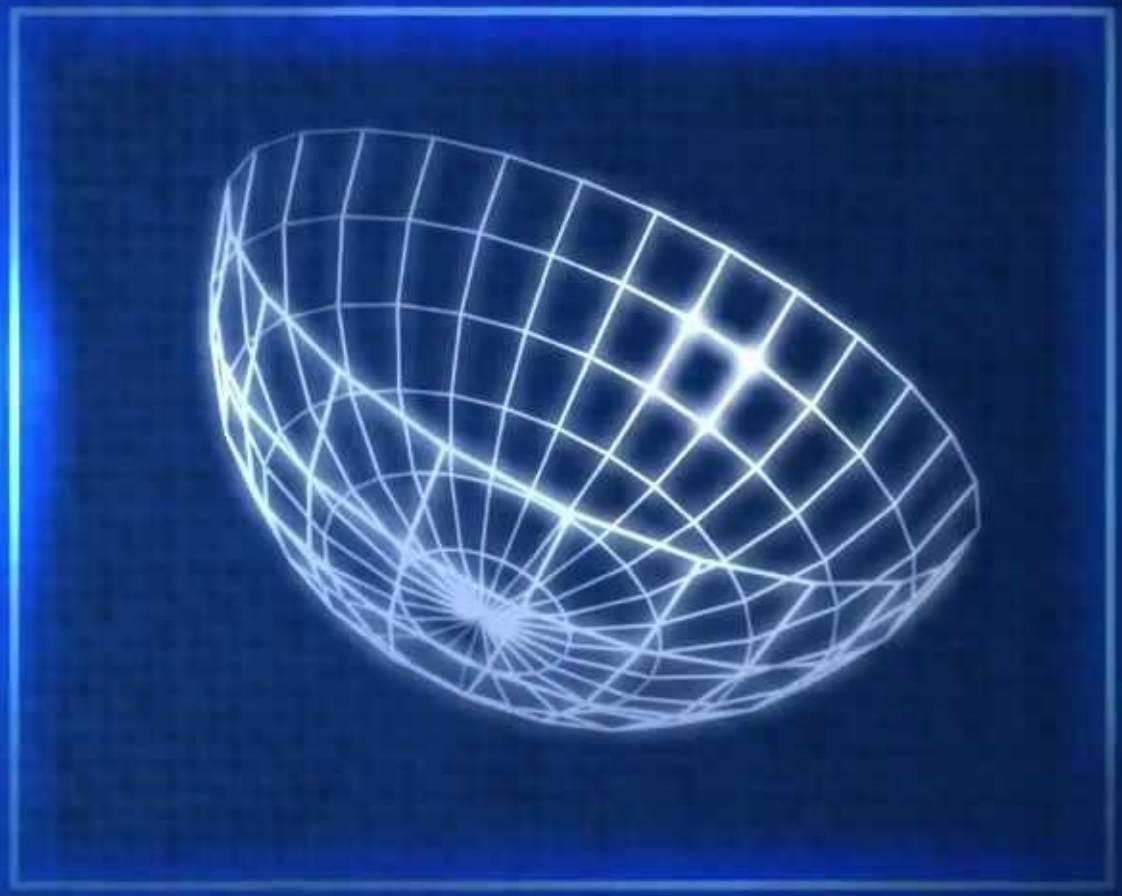

1
00:00:00,010 --> 00:00:04,120
Narrator: If you wanted to learn more about the history of the Earth and other rocky

2
00:00:04,140 --> 00:00:08,250
planets in the solar system, where would you look? For years, scientists have turned to

3
00:00:08,270 --> 00:00:12,360
one of the solar system's most common features: Impact craters. Left over

4
00:00:12,380 --> 00:00:16,470
from earlier periods of our planet's history, these sometimes giant holes in the surface can

5
00:00:16,490 --> 00:00:20,550
teach us about the Earth based on how they've changed over time. However, since even the newest

6
00:00:20,570 --> 00:00:24,630
impact craters on the Earth have changed due to wind, rain, snow, and even

7
00:00:24,650 --> 00:00:28,690
lakes filling them, we need to compare them to a fresh crater that still looks like it did when it was

8
00:00:28,710 --> 00:00:32,730
first created. So where exactly can scientists find a crater like this? Certainly

9
00:00:32,750 --> 00:00:36,770
not on Earth, but there's one on the Moon that's just about perfect. The Linné Crater,

10
00:00:36,790 --> 00:00:40,800
a small impact crater located in the western Mare Serenitatis, is extremely young,

11
00:00:40,820 --> 00:00:44,940
and scientists have always thought that it might be a great example to use to compare with other craters.

12
00:00:44,960 --> 00:00:49,090
Now, thanks to high-resolution, three-dimensional data generated from NASA's

13
00:00:49,110 --> 00:00:53,190

Lunar Reconnaissance Orbiter, scientists are sure of it. So why use a crater

14
00:00:53,210 --> 00:00:57,290
on the Moon, and why this specific example? Unlike craters on Earth--and even

15
00:00:57,310 --> 00:01:01,400
Mars--many Moon craters are well-preserved because they erode much more slowly.

16
00:01:01,420 --> 00:01:05,490
However, despite that, not all Moon craters are ideal for comparison.

17
00:01:05,510 --> 00:01:09,560
After a crater is first formed, it can be impacted again and again by other objects,

18
00:01:09,580 --> 00:01:13,640
which modify its original shape. This is why scientists have been looking for a crater

19
00:01:13,660 --> 00:01:17,710
that's not so beaten up, and one that preserves all the telltale signs of how impact cratering

20
00:01:17,730 --> 00:01:21,750
works. The Linné Crater fits the bill perfectly. By looking at

21
00:01:21,770 --> 00:01:25,780
data from LRO's LROC instrument, scientists have confirmed that it has remained largely

22
00:01:25,800 --> 00:01:29,810
untouched aside from normal wear and tear, which is what makes it so perfect for comparison.

23
00:01:29,830 --> 00:01:33,970
They've also discovered some interesting and unexpected things. For decades,

24
00:01:33,990 --> 00:01:38,110
lunar scientists counted on the simplest craters, like Linné, as being bowl-shaped.

25
00:01:38,130 --> 00:01:42,230
However, thanks to the new data, scientists have discovered that they actually resemble

26
00:01:42,250 --> 00:01:46,360
an upside-down cone. This, along with other findings, sheds new light not

27
00:01:46,380 --> 00:01:50,480
only on Linné Crater, but also on the evolution of similar craters on the Earth, Moon,

28
00:01:50,500 --> 00:01:54,540
and other planets, allowing us to get a better picture of our own history. In fact,

29
00:01:54,560 --> 00:01:58,610
the simple shape of Linné, and the way large boulders are strewn around its rim, are

30
00:01:58,630 --> 00:02:02,680
the basic tools of "forensic geology" that allow scientists to understand how craters started

31
00:02:02,700 --> 00:02:06,740
out on the Earth and Mars before water and wind wear them away. Without craters

32
00:02:06,760 --> 00:02:10,780
like Linné on the Moon, we wouldn't know how landforms evolve over time in the presence of weather,

33
00:02:10,800 --> 00:02:14,820
climate change, and other factors. And all by looking at what initially

34
00:02:14,840 --> 00:02:18,830
appears to be just another hole in the ground.

35
00:02:18,850 --> 00:02:22,970
[beeping]

36
00:02:22,990 --> 00:02:27,080
[beeping, silence]