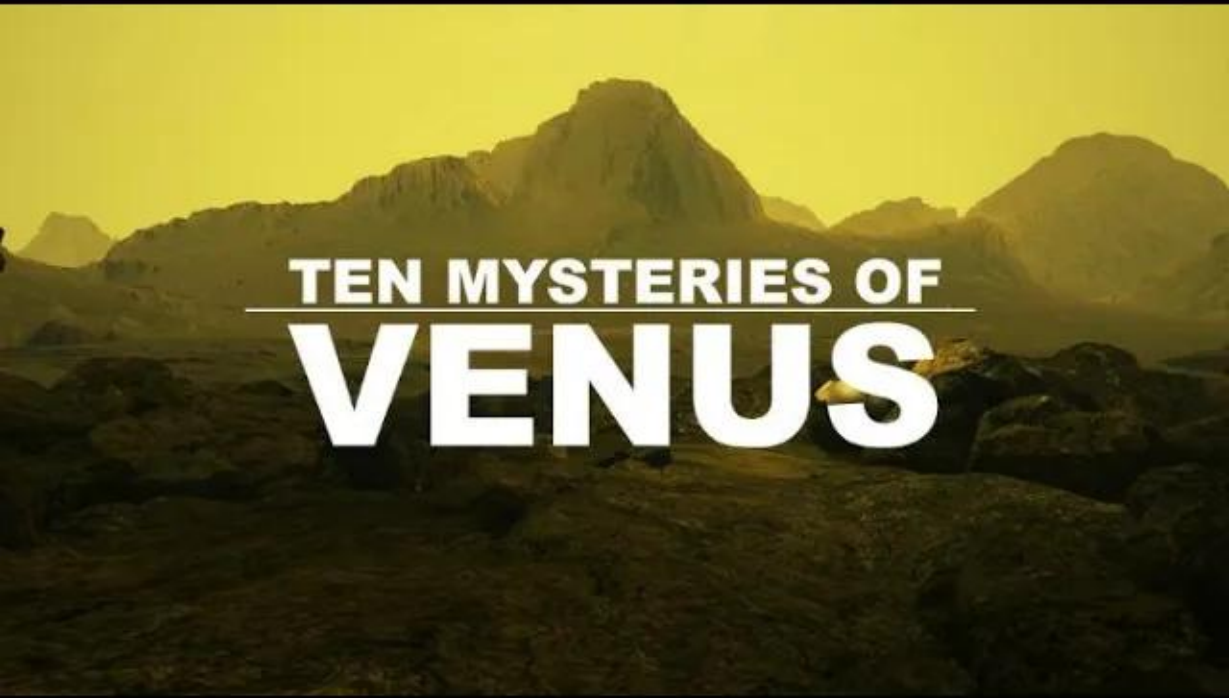
TEN MYSTERIES OF
VENUS

1
00:00:01,067 --> 00:00:05,605
The surface of Venus is
completely inhospitable for life, barren,

2
00:00:05,705 --> 00:00:10,543
dry, crushed under an atmosphere
about 90 times the pressure of Earth's

3
00:00:10,810 --> 00:00:13,913
and roasted by temperatures
two times hotter than an oven.

4
00:00:14,180 --> 00:00:16,182
But was it always that way?

5
00:00:16,182 --> 00:00:18,451
Could Venus once
have been a twin of Earth,

6
00:00:18,451 --> 00:00:21,087
a habitable world
with liquid water oceans?

7
00:00:22,022 --> 00:00:26,192
Here are 10 mysteries of Venus that NASA's
scientists are still grappling with.

8
00:00:31,064 --> 00:00:32,899
Did Venus ever host life?

9
00:00:32,899 --> 00:00:37,370
To answer this question, we first need to
understand the past environment on Venus.

10
00:00:37,670 --> 00:00:41,374
This involves studying the atmosphere,
geology and history of the planet.

11
00:00:41,641 --> 00:00:44,978

Something NASA's DAVINCI mission
plans on exploring in great detail.

12
00:00:46,046 --> 00:00:48,448
Why did Venus evolve
so differently than Earth?

13
00:00:48,748 --> 00:00:50,183
Venus and Earth are similar

14
00:00:50,183 --> 00:00:53,520
in size and density,
and yet they are strikingly different.

15
00:00:54,220 --> 00:00:57,624
Air pressure at the surface of
Venus is 90 times that of Earth.

16
00:00:57,891 --> 00:01:01,294
Venus rotates on its axis backwards
compared to the other planets

17
00:01:01,294 --> 00:01:04,631
in the solar system,
and the surface of Venus is over 900

18
00:01:04,631 --> 00:01:08,034
degrees Fahrenheit, making it
the hottest planet in our solar system.

19
00:01:08,234 --> 00:01:09,369
Hot enough to melt lead.

20
00:01:10,670 --> 00:01:12,605
Venus's evolution through time

21
00:01:12,605 --> 00:01:15,975
may help us understand
how habitability evolves over time

22
00:01:16,109 --> 00:01:19,379
and where we might find habitable planets
beyond our solar system.

23
00:01:20,713 --> 00:01:22,649
How did Venus form?

24
00:01:22,649 --> 00:01:25,785
It is still not known
if Venus was bombarded by comets

25
00:01:25,785 --> 00:01:27,387
and asteroids rich in water

26
00:01:27,387 --> 00:01:31,324
the way Earth was. Understanding
the delivery of water to Venus

27
00:01:31,324 --> 00:01:35,028
is important for evaluating its potential
to host oceans in the past.

28
00:01:37,464 --> 00:01:39,866
What is the atmosphere
composition at Venus?

29
00:01:40,633 --> 00:01:44,304
One of the biggest mysteries of Venus's atmosphere lies in the lower most

30
00:01:44,304 --> 00:01:48,408
or deep atmosphere where carbon dioxide
is heated and pressurized

31
00:01:48,675 --> 00:01:51,878
to the point where it acts
more like a hot liquid than a gas.

32
00:01:52,912 --> 00:01:56,749
The DAVINCI probe will measure chemistry,

pressure, temperature and dynamics

33
00:01:57,083 --> 00:02:01,855
at least every 200 meters as it descends
through Venus's atmosphere to the surface.

34
00:02:04,557 --> 00:02:07,360
How are the rocks of Venus formed?

35
00:02:07,360 --> 00:02:09,729
DAVINCI's high
resolution imaging beneath

36
00:02:09,729 --> 00:02:12,599
the clouds will test ideas
about the role of water

37
00:02:12,765 --> 00:02:17,403
in forming what may be ancient continental
crust on Venus at human scales.

38
00:02:18,104 --> 00:02:21,040
DAVINCI will study
one of these tesserae, Alpha Regio,

39
00:02:21,174 --> 00:02:25,245
To better understand its composition.
How much water did Venus have?

40
00:02:25,578 --> 00:02:27,881
Liquid water is essential for life.

41
00:02:27,881 --> 00:02:31,317
We cannot assess
Venus's past habitability without knowing

42
00:02:31,317 --> 00:02:35,155
how much water Venus may have had
and when and how it lost that water.

43
00:02:35,522 --> 00:02:39,192
Scientists will use measurements
of the atmosphere from The DAVINCI probe

44
00:02:39,359 --> 00:02:42,996
to explore clues of the story
of past water on our sister planet.

45
00:02:45,031 --> 00:02:47,300
What is the nature of surface
activity at Venus?

46
00:02:48,067 --> 00:02:51,271
Earth's crust hosts
a network of relatively thin plates

47
00:02:51,538 --> 00:02:54,874
jostling around on the planet's surface
in constant horizontal motion.

48
00:02:55,341 --> 00:02:57,644
If similar plate tectonics exist on Venus,

49
00:02:57,911 --> 00:03:01,047
the planet's crust must experience
continental drift like earth.

50
00:03:01,548 --> 00:03:04,384
Another key mystery
about the surface of Venus is volcanism.

51
00:03:04,984 --> 00:03:08,254
The two upcoming missions to Venus, DAVINCI and VERITAS

52
00:03:08,621 --> 00:03:11,491
aim to understand
the current volcanic activity at Venus.

53
00:03:13,092 --> 00:03:15,395

What did the mountains look like on Venus?

54
00:03:15,395 --> 00:03:19,032
Previous Venus Landers, Venera and Vega
have taken photographs

55
00:03:19,032 --> 00:03:23,102
of the Venetian plains from the surface,
but DAVINCI's cameras will snap the first

56
00:03:23,102 --> 00:03:27,407
ever high resolution aerial photos
of a mountainous Tessera surface

57
00:03:27,407 --> 00:03:30,710
as the probe descends over the rugged
Alpha Regio Highlands region.

58
00:03:32,045 --> 00:03:34,581
Are there Venus like planets
beyond our solar system?

59
00:03:35,281 --> 00:03:37,717
We will be able to relate
what we discover at Venus

60
00:03:37,817 --> 00:03:41,688
to Venus, like exoplanets observed
by the James Webb Space Telescope.

61
00:03:42,088 --> 00:03:44,357
If Venus shows signs
of previous habitability,

62
00:03:44,624 --> 00:03:47,327
that could mean these exoplanets
might be habitable as well.

63
00:03:48,228 --> 00:03:50,597
New mysteries we haven't thought of yet.

64
00:03:50,597 --> 00:03:53,166
There are many new mysteries
we can't even imagine right now

65
00:03:53,800 --> 00:03:56,069
with NASA's newest missions
to our sister planet.