1
00:00:14,290 --> 00:00:11,530
the Mars Reconnaissance Orbiter has seen

2
00:00:16,260 --> 00:00:14,300
many places on the planet one of the

3
00:00:18,960 --> 00:00:16,270
most interesting is

4
00:00:21,120 --> 00:00:18,970
canyon systems on Mars this is a branch

5
00:00:23,700 --> 00:00:21,130
of that Canyon system called candor

6
00:00:26,550 --> 00:00:23,710
chasma you can see the tortured ground

7
00:00:29,340 --> 00:00:26,560
that is there the layers the many buttes

8
00:00:31,109 --> 00:00:29,350
and mesas that poke up above this the

9
00:00:32,729 --> 00:00:31,119
scale of these things is such that we're

10
00:00:34,510 --> 00:00:32,739
looking across a couple of miles of

11
00:00:37,390 --> 00:00:34,520
territory

12
00:00:40,240 --> 00:00:37,400
there is no vertical exaggeration in the

13
00:00:43,900 --> 00:00:40,250

stereo image made by taking images at

14
00:00:46,270 --> 00:00:43,910
separate times on separate orbits some

15
00:00:49,450 --> 00:00:46,280
of these boots extend up a football

16
00:00:51,280 --> 00:00:49,460
field and size false systems that were

17
00:00:54,040 --> 00:00:51,290
produced by earthquakes in this case

18
00:00:56,320 --> 00:00:54,050
marsquakes give us clues as to whether

19
00:00:58,000 --> 00:00:56,330
this is material that was eroded away or

20
00:01:00,369 --> 00:00:58,010
actually whether it was deposited and

21
00:01:02,320 --> 00:01:00,379
then I wrote it later that stress

22
00:01:05,020 --> 00:01:02,330
pattern show us the canyon form first

23
00:01:07,330 --> 00:01:05,030
was filled with material and eroded away

24
00:01:09,490 --> 00:01:07,340
leaving these boots with the buttes

25
00:01:11,710 --> 00:01:09,500
being formed by more resistant rock at

26
00:01:20,620 --> 00:01:11,720
the top of the buttes darker in these

27
00:01:25,190 --> 00:01:23,030
one of the questions we have about Mars

28
00:01:27,050 --> 00:01:25,200
is where we see the effects of water on

29
00:01:29,000 --> 00:01:27,060
its surface how did that water get there

30
00:01:31,730 --> 00:01:29,010
it may have been different in different

31
00:01:34,460 --> 00:01:31,740
places did it erupt from underground

32
00:01:37,070 --> 00:01:34,470
that Springs for instance or did it fall

33
00:01:38,600 --> 00:01:37,080
from the sky and rainfall and it may

34
00:01:41,120 --> 00:01:38,610
have been associated with events like

35
00:01:43,610 --> 00:01:41,130
impact craters one of those impact

36
00:01:45,410 --> 00:01:43,620
craters is Mojave crater and here we're

37
00:01:48,200 --> 00:01:45,420
going to look at a perspective view that

38
00:01:51,770 --> 00:01:48,210

was formed from two images forming a

39
00:01:54,050 --> 00:01:51,780
stereo pair as you can see water ponded

40
00:01:56,360 --> 00:01:54,060
on the terraces and then it overflowed

41
00:01:58,010 --> 00:01:56,370
and ran down to the next terrace if you

42
00:02:00,440 --> 00:01:58,020
look at the rim of the crater you see

43
00:02:02,330 --> 00:02:00,450
channels that run right up to the top so

44
00:02:04,219 --> 00:02:02,340
these aren't Springs this must have been

45
00:02:10,809 --> 00:02:04,229
rainfall that carved this part of the

46
00:02:14,770 --> 00:02:13,119
the Mars Reconnaissance Orbiter is able

47
00:02:16,809 --> 00:02:14,780
to look at not only the structure of the

48
00:02:19,300 --> 00:02:16,819
surface its topography and shape but

49
00:02:22,479 --> 00:02:19,310
also its composition we're going to zoom

50
00:02:25,059 --> 00:02:22,489
into an area called Nellie Fosse that is

51
00:02:27,910 --> 00:02:25,069
very diverse and that's shown here in

52
00:02:30,459 --> 00:02:27,920
false color what we're looking at are

53
00:02:32,770 --> 00:02:30,469
the mineral signatures fingerprints that

54
00:02:34,089 --> 00:02:32,780
appear and reflected sunlight although

55
00:02:37,240 --> 00:02:34,099
it's at wavelengths that our eyes are

56
00:02:39,490 --> 00:02:37,250
not sensitive to straight edges are the

57
00:02:42,129 --> 00:02:39,500
edges of the images that were taken we

58
00:02:44,229 --> 00:02:42,139
don't have complete coverage what we're

59
00:02:46,690 --> 00:02:44,239
most interested in here are the areas

60
00:02:48,839 --> 00:02:46,700
that are colored green those are areas

61
00:02:51,339 --> 00:02:48,849
in which the carbonates are present

62
00:02:52,959 --> 00:02:51,349
carbonates indicate that here's an

63
00:02:55,869 --> 00:02:52,969

environment that could have been

64
00:02:57,879 --> 00:02:55,879
conducive to life and if not life today

65
00:02:59,610 --> 00:02:57,889
it could have preserved the signature of

66
00:03:02,800 --> 00:02:59,620
life that may have occurred in the past

67
00:03:04,390 --> 00:03:02,810
that is the organic molecules should

68
00:03:06,939 --> 00:03:04,400
also be preserved today if they were

69
00:03:09,640 --> 00:03:06,949
ever produced on its surface this very

70
00:03:12,550 --> 00:03:09,650
diverse area shows a complex mineral

71
00:03:13,929 --> 00:03:12,560
signature and also shows that there are

72
00:03:16,539 --> 00:03:13,939
many different kinds of water

73
00:03:18,520 --> 00:03:16,549
environments on the planet so water was

74
00:03:20,439 --> 00:03:18,530
not uniform in its activity it may

75
00:03:22,780 --> 00:03:20,449
persist it in some areas longer than in

76
00:03:25,270 --> 00:03:22,790
other areas and its interaction with the

77
00:03:33,280 --> 00:03:25,280
rock has left his clues about what that

78
00:03:37,270 --> 00:03:35,410
one of the early images taken by the

79
00:03:39,580 --> 00:03:37,280
Mars Reconnaissance Orbiter was a

80
00:03:41,589 --> 00:03:39,590
Victoria crater in order to help the

81
00:03:43,599 --> 00:03:41,599
opportunity rover figure out which way

82
00:03:46,330 --> 00:03:43,609
to move around the crater as it looked

83
00:03:48,459 --> 00:03:46,340
for a way to get down inside here you

84
00:03:51,520 --> 00:03:48,469
see that image taken from 180 miles

85
00:03:53,979 --> 00:03:51,530
above the surface of Mars we're going to

86
00:03:55,599 --> 00:03:53,989
use that image to zoom in and see what

87
00:03:58,059 --> 00:03:55,609
it would look like from the rover's

88
00:04:00,339 --> 00:03:58,069

point of view if it were on the edge of

89
00:04:01,780 --> 00:04:00,349
the crater looking out over it and then

90
00:04:03,369 --> 00:04:01,790
match that with an image that was