1
00:00:13,580 --> 00:00:11,530
the Mars Reconnaissance Orbiter has seen

2
00:00:15,490 --> 00:00:13,590
many places on the planet

3
00:00:17,290 --> 00:00:15,500
one of the most interesting

4
00:00:19,870 --> 00:00:17,300
is one of the great canyon systems on

5
00:00:22,870 --> 00:00:19,880
Mars this is a branch of that Canyon

6
00:00:25,060 --> 00:00:22,880
system called candor casma you can see

7
00:00:27,429 --> 00:00:25,070
the tortured ground that is there the

8
00:00:29,950 --> 00:00:27,439
layers the many buttes and mesas that

9
00:00:31,540 --> 00:00:29,960
poke up above this the scale of these

10
00:00:34,480 --> 00:00:31,550
things is such that we're looking across

11
00:00:37,390 --> 00:00:34,490
a couple of miles of 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
00:00:46,480 --> 00:00:43,910
separate times on separate orbits some

15
00:00:49,480 --> 00:00:46,490
of these buttes extend up a football

16
00:00:51,280 --> 00:00:49,490
field and size false systems that were

17
00:00:54,100 --> 00:00:51,290
produced by earthquakes in this case

18
00:00:56,320 --> 00:00:54,110
Mars quakes give us clues as to whether

19
00:00:57,970 --> 00:00:56,330
this is material that was eroded away or

20
00:01:00,790 --> 00:00:57,980
actually whether it was deposited and

21
00:01:03,400 --> 00:01:00,800
then eroded later that stress pattern

22
00:01:05,560 --> 00:01:03,410
show us the canyon form first was filled

23
00:01:07,660 --> 00:01:05,570
with material and eroded away leaving

24
00:01:09,850 --> 00:01:07,670
these buttes with the buttes being

25
00:01:20,609 --> 00:01:09,860
formed by more resistant rock at the top

26
00:01:25,210 --> 00:01:23,020
one of the questions we have about Mars

27
00:01:27,070 --> 00:01:25,220
is where we see the effects of water on

28
00:01:28,990 --> 00:01:27,080
its surface how did that water get there

29
00:01:32,140 --> 00:01:29,000
it may have been different in different

30
00:01:34,510 --> 00:01:32,150
places did it from underground that

31
00:01:37,210 --> 00:01:34,520
Springs for instance or did it fall from

32
00:01:39,190 --> 00:01:37,220
the sky and rainfall and it may have

33
00:01:41,740 --> 00:01:39,200
been associated with events like impact

34
00:01:43,840 --> 00:01:41,750
craters one of those impact craters is

35
00:01:45,550 --> 00:01:43,850
Mojave Crater and here we're going to

36
00:01:48,580 --> 00:01:45,560
look at a perspective view that was

37
00:01:51,999 --> 00:01:48,590
formed from two images forming a stereo

38
00:01:54,430 --> 00:01:52,009

pair as you can see water pounded on the

39
00:01:56,650 --> 00:01:54,440
terraces and then it overflowed and ran

40
00:01:58,480 --> 00:01:56,660
down to the next Terrace if you look at

41
00:02:00,639 --> 00:01:58,490
the rim of the crater you see channels

42
00:02:02,320 --> 00:02:00,649
that run right up to the top so these

43
00:02:04,240 --> 00:02:02,330
aren't Springs this must have been

44
00:02:10,839 --> 00:02:04,250
rainfall that carved this part of the

45
00:02:14,770 --> 00:02:13,119
the Mars Reconnaissance Orbiter is able

46
00:02:16,809 --> 00:02:14,780
to look at not only the structure of the

47
00:02:19,300 --> 00:02:16,819
surface its topography and shape but

48
00:02:22,179 --> 00:02:19,310
also its composition we're going to zoom

49
00:02:25,059 --> 00:02:22,189
in to an area called Nellie Fosse that

50
00:02:27,879 --> 00:02:25,069
is very diverse and that's shown here in

51
00:02:30,459 --> 00:02:27,889
false color what we're looking at are

52
00:02:32,259 --> 00:02:30,469
the mineral signatures fingerprints that

53
00:02:34,330 --> 00:02:32,269
appear and reflected sunlight although

54
00:02:37,240 --> 00:02:34,340
it's at wavelengths that our eyes are

55
00:02:39,520 --> 00:02:37,250
not sensitive to straight edges are the

56
00:02:42,129 --> 00:02:39,530
edges of the images that were taken we

57
00:02:44,229 --> 00:02:42,139
don't have complete coverage what we're

58
00:02:46,690 --> 00:02:44,239
most interested in here are the areas

59
00:02:48,869 --> 00:02:46,700
that are colored green those are areas

60
00:02:51,339 --> 00:02:48,879
in which carbonates are present

61
00:02:52,990 --> 00:02:51,349
carbonates indicate that here's an

62
00:02:55,899 --> 00:02:53,000
environment that could have been

63
00:02:57,849 --> 00:02:55,909

conducive to life and if not life today

64
00:02:59,610 --> 00:02:57,859
it could have preserved the signature of

65
00:03:02,770 --> 00:02:59,620
life that may have occurred in the past

66
00:03:04,420 --> 00:03:02,780
that is the organic molecules should

67
00:03:06,939 --> 00:03:04,430
also be preserved today if they were

68
00:03:09,640 --> 00:03:06,949
ever produced on its surface this very

69
00:03:12,550 --> 00:03:09,650
diverse area shows a complex mineral

70
00:03:13,899 --> 00:03:12,560
signature and also shows that there are

71
00:03:16,509 --> 00:03:13,909
many different kinds of water

72
00:03:18,399 --> 00:03:16,519
environments on the planet so water was

73
00:03:20,469 --> 00:03:18,409
not uniform in its activity it may

74
00:03:22,689 --> 00:03:20,479
persist it in some areas longer than in

75
00:03:25,300 --> 00:03:22,699
other areas and its interaction with the

76
00:03:33,280 --> 00:03:25,310
rock has left us clues about what that

77
00:03:37,270 --> 00:03:35,410
one of the early images taken by the

78
00:03:39,580 --> 00:03:37,280
Mars Reconnaissance Orbiter was a

79
00:03:41,589 --> 00:03:39,590
Victoria crater in order to help the

80
00:03:43,600 --> 00:03:41,599
opportunity Rover figure out which way

81
00:03:46,330 --> 00:03:43,610
to move around the crater as it looked

82
00:03:48,490 --> 00:03:46,340
for a way to get down inside here you

83
00:03:51,520 --> 00:03:48,500
see that image taken from 180 miles

84
00:03:53,979 --> 00:03:51,530
above the surface of Mars we're going to

85
00:03:55,750 --> 00:03:53,989
use that image to zoom in and see what

86
00:03:58,059 --> 00:03:55,760
it would look like from the rover's

87
00:04:00,339 --> 00:03:58,069
point of view if it were on the edge of

88
00:04:01,839 --> 00:04:00,349

the crater looking out over it and then

89
00:04:03,399 --> 00:04:01,849
matched that with an image that was