1
00:00:19,029 --> 00:00:16,870
imagine flying aboard the space shuttle

2
00:00:21,349 --> 00:00:19,039
the main engines fire then with a

3
00:00:24,230 --> 00:00:21,359
powerful jolt the solid rocket motors

4
00:00:29,189 --> 00:00:26,310
the acceleration and intense pull of

5
00:00:31,349 --> 00:00:29,199
gravity during ascent is tremendous

6
00:00:33,670 --> 00:00:31,359
but when the main engines cut off and

7
00:00:36,709 --> 00:00:33,680
the shuttle reaches low earth orbit the

8
00:00:40,310 --> 00:00:36,719
crew enters a totally new environment

9
00:00:42,790 --> 00:00:40,320
everything floats there is no up or down

10
00:00:44,950 --> 00:00:42,800
and for 70 percent of first-time space

11
00:00:47,590 --> 00:00:44,960
fares the initial couple of days in

12
00:00:49,830 --> 00:00:47,600
orbit means they will feel ill

13
00:00:52,549 --> 00:00:49,840

microgravity disturbs the workings of

14
00:00:55,830 --> 00:00:52,559
the inner ear much the way car or air

15
00:00:58,229 --> 00:00:55,840
travel can affect people on earth

16
00:01:00,630 --> 00:00:58,239
responding to this need scientists have

17
00:01:03,270 --> 00:01:00,640
been developing a pre-flight adaptation

18
00:01:04,469 --> 00:01:03,280
trainer for astronauts to use before

19
00:01:06,950 --> 00:01:04,479
they fly

20
00:01:09,270 --> 00:01:06,960
the neurosciences laboratory at nasa's

21
00:01:11,510 --> 00:01:09,280
johnson space center is responsible for

22
00:01:16,070 --> 00:01:11,520
studying the human body's condition in

23
00:01:21,270 --> 00:01:18,710
understanding gait posture and other

24
00:01:24,950 --> 00:01:21,280
adaptable functions help scientists stay

25
00:01:27,270 --> 00:01:24,960
in touch with human space travel needs

26
00:01:30,149 --> 00:01:27,280
shuttle missions typically last up to 10

27
00:01:32,870 --> 00:01:30,159
days but future space station visits and

28
00:01:35,270 --> 00:01:32,880
long-range lunar or martian outposts

29
00:01:36,149 --> 00:01:35,280
will mean months or maybe years of space

30
00:01:38,630 --> 00:01:36,159
living

31
00:01:41,590 --> 00:01:38,640
neuroscientist dr deborah harm what

32
00:01:44,469 --> 00:01:41,600
we're trying to do here is to develop

33
00:01:46,710 --> 00:01:44,479
equipment and hardware and software that

34
00:01:49,510 --> 00:01:46,720
will allow us to present

35
00:01:52,310 --> 00:01:49,520
potential space travelers with a set of

36
00:01:54,630 --> 00:01:52,320
sensory conditions as similar to what

37
00:01:55,590 --> 00:01:54,640
they will experience in flight as we can

38
00:01:57,590 --> 00:01:55,600

get them

39
00:01:59,270 --> 00:01:57,600
the subject is strapped inside a

40
00:02:01,429 --> 00:01:59,280
spherical trainer

41
00:02:03,830 --> 00:02:01,439
large overhead projectors display a

42
00:02:06,310 --> 00:02:03,840
montage of computer-generated patterns

43
00:02:08,150 --> 00:02:06,320
that fill the person's field of view

44
00:02:10,229 --> 00:02:08,160
it is the movement of these patterns

45
00:02:11,830 --> 00:02:10,239
that eventually fools the subject into

46
00:02:13,430 --> 00:02:11,840
thinking that he is

47
00:02:15,589 --> 00:02:13,440
not the visual

48
00:02:17,350 --> 00:02:15,599
so the scene is not moving at all

49
00:02:19,589 --> 00:02:17,360
two-way communication allows them to

50
00:02:22,630 --> 00:02:19,599
describe their experience and for dr

51
00:02:24,470 --> 00:02:22,640
harm to request different

52
00:02:27,350 --> 00:02:24,480
once exposed to a variety of

53
00:02:29,910 --> 00:02:27,360
pre-programmed visual cues the brain

54
00:02:32,229 --> 00:02:29,920
recalibrates itself to accept what is

55
00:02:33,910 --> 00:02:32,239
similar to a weightless environment

56
00:02:36,710 --> 00:02:33,920
training in the pre-flight adaptation

57
00:02:38,869 --> 00:02:36,720
trainer will reduce the intensity and

58
00:02:40,869 --> 00:02:38,879
the time that it takes them to adapt to

59
00:02:42,630 --> 00:02:40,879
microgravity and then reduce the

60
00:02:45,589 --> 00:02:42,640
intensity and the duration of the

61
00:02:48,309 --> 00:02:45,599
symptoms motion sickness symptoms

62
00:02:50,309 --> 00:02:48,319
the human body is essentially plastic

63
00:02:53,190 --> 00:02:50,319

meaning that it is capable of conforming

64
00:02:55,350 --> 00:02:53,200
to any environment even space

65
00:02:57,110 --> 00:02:55,360
when members of the skylab 4 crew

66
00:02:59,589 --> 00:02:57,120
returned to earth after nearly three

67
00:03:01,430 --> 00:02:59,599
months in orbit their first steps were

68
00:03:04,550 --> 00:03:01,440
tenuous

69
00:03:06,710 --> 00:03:04,560
they did re-adapt but it took time

70
00:03:09,350 --> 00:03:06,720
today many astronauts coming back from

71
00:03:11,670 --> 00:03:09,360
space undergo evaluations so that

72
00:03:12,949 --> 00:03:11,680
researchers can better understand this

73
00:03:15,270 --> 00:03:12,959
process

74
00:03:17,910 --> 00:03:15,280
in the next decade this research will be