



SPACE TO GROUND

1
00:00:00,600 --> 00:00:02,620
"HOUSTON, STATION
ON SPACE TO GROUND."

2
00:00:03,300 --> 00:00:05,180
WELCOME TO SPACE TO
GROUND, I'M GARY JORDAN.

3
00:00:05,436 --> 00:00:07,706
WE'RE CONTINUING OUR SUMMER
ROAD TRIP, SHOWING OFF SOME

4
00:00:07,706 --> 00:00:09,696
OF THE SIGHTS AT THE NASA
JOHNSON SPACE CENTER.

5
00:00:10,116 --> 00:00:11,816
TODAY WE'RE IN THE
COLUMBIA CENTER.

6
00:00:12,776 --> 00:00:14,866
THIS FACILITY IS USED
FOR ENHANCING THE HEALTH

7
00:00:14,866 --> 00:00:17,126
AND WELL-BEING OF
ASTRONAUTS PREPARING FOR,

8
00:00:17,126 --> 00:00:18,846
OR RETURNING FROM SPACE FLIGHT.

9
00:00:20,180 --> 00:00:21,700
ON BOARD STATION THIS WEEK,

10
00:00:21,700 --> 00:00:24,140
THE CREWMEMBERS CRANKED THEIR
WORKOUT ROUTINE TO ELEVEN

11
00:00:24,140 --> 00:00:25,640

IN THE NAME OF SCIENCE.

12

00:00:25,966 --> 00:00:28,236

JACK FISCHER TOOK PART
IN THE SPRINT EXPERIMENT.

13

00:00:28,566 --> 00:00:29,906

THIS STUDY LOOKS AT THE BENEFITS

14

00:00:29,906 --> 00:00:32,256

OF USING HIGH INTENSITY
AEROBIC EXERCISE

15

00:00:32,256 --> 00:00:35,536

AND LOW VOLUME RESISTANCE
EXERCISE TO MINIMIZE MUSCLE

16

00:00:35,536 --> 00:00:37,706

AND BONE LOSS DURING
LONG STAYS IN SPACE.

17

00:00:38,276 --> 00:00:41,116

ON WEDNESDAY, FISCHER PUT HIS
WORKOUT ROUTINE TO THE TEST

18

00:00:41,120 --> 00:00:43,860

ON THE STATIONARY
BICYCLE GOING FULL SPEED,

19

00:00:43,860 --> 00:00:47,080

THEN HIT THE ADVANCED RESISTIVE
EXERCISE DEVICE, OR ARED,

20

00:00:47,080 --> 00:00:48,640

FOR HIS SECOND WORKOUT
OF THE DAY.

21

00:00:49,216 --> 00:00:50,306

ARED IS THE MACHINE

22

00:00:50,306 --> 00:00:52,186

THAT SIMULATES WEIGHTLIFTING
ON THE STATION.

23

00:00:52,776 --> 00:00:53,966

FISCHER WILL BE PARTICIPATING

24

00:00:53,966 --> 00:00:55,956

IN THIS STUDY THROUGHOUT
HIS STAY ONBOARD.

25

00:00:56,800 --> 00:00:59,920

PEGGY WHITSON WAS WORKING AT
A MICROSCOPIC SCALE THIS WEEK,

26

00:00:59,920 --> 00:01:02,520

MANIPULATING CELL
CULTURES IN 3 DIMENSIONS.

27

00:01:03,200 --> 00:01:05,220

WHITSON TESTED SOME
SAMPLES THIS WEEK

28

00:01:05,220 --> 00:01:07,860

FOR THE MAGNETIC 3D CELL
CULTURING EXPERIMENT.

29

00:01:08,240 --> 00:01:10,380

IN THE WEIGHTLESS ENVIRONMENT
OF THE SPACE STATION,

30

00:01:10,380 --> 00:01:13,380

CELL CULTURES SPONTANEOUSLY
GROW IN 3 DIMENSIONS AS OPPOSED

31

00:01:13,380 --> 00:01:15,600

TO THE TYPICAL 2
DIMENSIONS ON EARTH,

32

00:01:15,600 --> 00:01:16,620
BUT THEY'RE HARD TO CONTROL.

33
00:01:17,240 --> 00:01:19,800
THIS EXPERIMENT USES
MAGNETIZED CELLS AND TOOLS

34
00:01:19,800 --> 00:01:22,740
TO MAKE IT EASIER TO HANDLE
THESE MICROSCOPIC SAMPLES

35
00:01:22,740 --> 00:01:23,860
AND STUDY THEM ROUTINELY.

36
00:01:24,606 --> 00:01:27,606
WHITSON TESTED OUT TECHNIQUES,
LITERALLY LEVITATING THEM

37
00:01:27,606 --> 00:01:29,206
AND CONTROLLING THEM
WITH MAGNETS.

38
00:01:30,266 --> 00:01:32,446
THIS WEEK'S QUESTION
COMES FROM JAMIE WHO WANTS

39
00:01:32,446 --> 00:01:33,146
TO KNOW HOW LIVING

40
00:01:33,146 --> 00:01:35,696
ON THE INTERNATIONAL SPACE
STATION CAN AFFECT ONE'S SLEEP

41
00:01:35,696 --> 00:01:37,856
AND IF THEY SLEEP BASED
ON ANY TIME ZONES.

42
00:01:38,226 --> 00:01:42,236
WELL, AS YOU MIGHT IMAGINE, WE
HAVE A FEW EXPERIMENTS FOR THAT.

43
00:01:42,240 --> 00:01:45,000
ASTRONAUTS AND COSMONAUTS ABOARD
THE INTERNATIONAL SPACE STATION

44
00:01:45,000 --> 00:01:47,220
OPERATE ON GREENWICH
MEAN TIME, OR GMT.

45
00:01:47,980 --> 00:01:50,220
THERE ARE MISSION CONTROL
CENTERS ALL OVER THE WORLD,

46
00:01:50,220 --> 00:01:53,280
SO INTERNATIONAL PARTNERS
COMPROMISED ON THIS TIME ZONE -

47
00:01:53,280 --> 00:01:54,340
A NICE SPOT IN THE MIDDLE.

48
00:01:54,976 --> 00:01:56,076
BUT BESIDES THE JET LAG

49
00:01:56,080 --> 00:01:58,840
FROM SWITCHING TIME ZONES
UPON ARRIVING AT THE STATION,

50
00:01:58,840 --> 00:02:01,140
THERE ARE MANY OTHER FACTORS
THAT COULD AFFECT SLEEP,

51
00:02:01,140 --> 00:02:02,176
LIKE THE FACT THAT ZOOMING

52
00:02:02,176 --> 00:02:05,306
AROUND THE EARTH EVERY 90
MINUTES MEANS 16 SUNRISES

53
00:02:05,306 --> 00:02:06,536

AND SUNSETS PER DAY.

54

00:02:07,216 --> 00:02:08,846
STUDIES LIKE CIRCADIAN RHYTHMS,

55

00:02:08,846 --> 00:02:11,980
WHICH MEASURES AN ASTRONAUT'S
BIOLOGICAL CLOCK OVER TIME,

56

00:02:11,980 --> 00:02:13,840
AS WELL AS THE LIGHTING
EFFECTS STUDY,

57

00:02:13,840 --> 00:02:16,396
WHICH LOOKS AT HOW LED LIGHTS
WITH ADJUSTABLE BRIGHTNESS

58

00:02:16,400 --> 00:02:19,280
AND COLOR COULD IMPROVE SLEEP
AND COGNITIVE PERFORMANCE,

59

00:02:19,300 --> 00:02:22,000
ALL HELP TO MAKE SURE ASTRONAUTS
ARE GETTING THE GOOD NIGHT'S

60

00:02:22,000 --> 00:02:23,160
REST THAT THEY DESERVE.

61

00:02:26,300 --> 00:02:28,100
KEEP SENDING YOUR
QUESTIONS USING THE HASHTAG