



# SPACE TO GROUND

1  
00:00:00,606 --> 00:00:02,526  
"HOUSTON, STATION  
ON SPACE TO GROUND."

2  
00:00:02,856 --> 00:00:05,096  
WELCOME TO SPACE TO  
GROUND, I'M ISIDRO REYNA.

3  
00:00:05,286 --> 00:00:06,786  
THIS WEEK, THE SCIENCE CONTINUED

4  
00:00:06,786 --> 00:00:08,266  
ON THE INTERNATIONAL  
SPACE STATION.

5  
00:00:09,076 --> 00:00:11,666  
THE CREW WORKED ON THE GENES  
IN SPACE INVESTIGATION,

6  
00:00:11,846 --> 00:00:13,286  
A STUDENT-DESIGNED EXPERIMENT

7  
00:00:13,286 --> 00:00:16,066  
THAT TESTS WHETHER THE  
POLYMERASE CHAIN REACTION CAN BE

8  
00:00:16,066 --> 00:00:18,956  
USED TO STUDY DNA ALTERATIONS  
ONBOARD THE STATION.

9  
00:00:19,286 --> 00:00:22,106  
SPACEFLIGHT CAUSES MANY  
CHANGES TO THE HUMAN BODY,

10  
00:00:22,256 --> 00:00:25,696  
INCLUDING ALTERATIONS IN DNA  
AND A WEAKENED IMMUNE SYSTEM.

11  
00:00:26,056 --> 00:00:28,876

UNDERSTANDING WHETHER THESE  
TWO PROCESSES ARE LINKED IS

- 12  
00:00:28,876 --> 00:00:30,576  
IMPORTANT FOR SAFEGUARDING  
CREW HEALTH.
- 13  
00:00:31,226 --> 00:00:33,716  
FOR THE EXPERIMENT, THE  
CREW PROCESSED SAMPLES
- 14  
00:00:33,716 --> 00:00:35,646  
IN THE MINIATURE  
POLYMERASE CHAIN REACTION.
- 15  
00:00:36,036 --> 00:00:39,156  
DATA GATHERED MAY BE VALUABLE  
IN THE DEVELOPMENT OF PROCEDURES

16  
00:00:39,306 --> 00:00:42,066  
TO MAINTAIN ASTRONAUT HEALTH  
AND PREVENT AN INCREASED RISK

17  
00:00:42,116 --> 00:00:43,736  
OF CANCER ON DEEP  
SPACE MISSIONS.

18  
00:00:44,546 --> 00:00:46,736  
ALMOST EVERY PRODUCT WE  
USE HAS A SHELF LIFE.

19  
00:00:47,086 --> 00:00:49,696  
FROM MILK AND MEAT TO LAUNDRY  
DETERGENT AND BATTERIES,

20  
00:00:49,916 --> 00:00:52,066  
IT'S IMPORTANT TO KNOW WHEN  
IT'S SAFE TO USE A PRODUCT,

21  
00:00:52,186 --> 00:00:53,546

AND WHEN IT'S TIME  
TO REPLACE IT.

22

00:00:53,626 --> 00:00:55,976  
BUT WHAT ABOUT MATERIALS  
USED FOR SPACECRAFT?

23

00:00:56,776 --> 00:00:59,666  
THE NEW MATERIALS INTERNATIONAL  
SPACE STATION EXPERIMENT FLIGHT

24

00:00:59,666 --> 00:01:02,886  
FACILITY, OR MISSE-FF, WAS  
REMOVED FROM DRAGON'S TRUNK

25

00:01:02,886 --> 00:01:04,356  
AND INSTALLED ON  
STATION THIS WEEK

26

00:01:04,516 --> 00:01:06,456  
AS THE NEWEST ADDITION  
TO THE NATIONAL LAB.

27

00:01:06,906 --> 00:01:10,116  
DEVELOPED BY ALPHA SPACE, THE  
PLATFORM WILL HOST GOVERNMENT

28

00:01:10,116 --> 00:01:11,716  
AND COMMERCIAL PAYLOADS  
THAT WANT

29

00:01:11,716 --> 00:01:14,736  
TO EXPOSE DIFFERENT MATERIALS TO  
THE HARSH ENVIRONMENT OF SPACE.

30

00:01:15,266 --> 00:01:17,506  
JUST ABOUT ANYTHING THAT  
MAKES UP A SPACECRAFT,

31

00:01:17,826 --> 00:01:20,176

FROM METALS TO CIRCUITRY,  
CAMERAS

32

00:01:20,176 --> 00:01:22,916  
AND COMPUTER BOARDS CAN BE  
INSTALLED TO SEE HOW THEY STAND

33

00:01:22,916 --> 00:01:25,546  
UP TO THE EXTREME THERMAL  
AND VACUUM ENVIRONMENT.

34

00:01:26,086 --> 00:01:28,776  
THE FIRST BATCH OF MATERIALS  
ONBOARD WILL REMAIN OUTSIDE THE

35

00:01:28,836 --> 00:01:31,226  
STATION FOR ONE YEAR,  
TESTING POLYMERS

36

00:01:31,226 --> 00:01:33,886  
THAT COULD SHIELD MISSIONS  
FROM RADIATION, STUDYING HOW

37

00:01:33,886 --> 00:01:35,876  
TO WITHSTAND ATOMIC  
OXYGEN IN SPACE

38

00:01:36,096 --> 00:01:38,266  
AND EVALUATING 3-D  
PRINTED SAMPLES.

39

00:01:39,066 --> 00:01:40,796  
THIS WEEK'S QUESTIONS  
COMES FROM LEONARD.

40

00:01:40,996 --> 00:01:42,956  
HE WANTS TO KNOW HOW  
ASTRONAUTS SHOWER

41

00:01:43,006 --> 00:01:44,386

OR BATHE ON THE SPACE STATION?

42

00:01:45,066 --> 00:01:47,486  
WELL LEONARD, ASTRONAUTS  
HAVE BEEN LIVING FOR MORE

43

00:01:47,486 --> 00:01:49,096  
THAN A DECADE ABOARD  
THE SPACE STATION

44

00:01:49,296 --> 00:01:50,576  
AND HAVE DEVELOPED A FEW TRICKS

45

00:01:50,576 --> 00:01:52,566  
THAT MAKE THESE EVERYDAY  
TASKS EASIER.

46

00:01:52,916 --> 00:01:55,516  
ASTRONAUTS USE SPECIAL  
KINDS OF SOAP AND SHAMPOO.

47

00:01:56,086 --> 00:01:57,966  
THESE SOAPS DO NOT  
NEED WATER TO RINSE.

48

00:01:58,546 --> 00:02:00,906  
AND, ASTRONAUTS MUST  
USE THEM CAREFULLY,

49

00:02:00,906 --> 00:02:02,286  
SINCE THEY DON'T  
WANT SOAP BUBBLES

50

00:02:02,286 --> 00:02:03,236  
TO GO ALL OVER THE PLACE.

51

00:02:03,806 --> 00:02:06,216  
AFTER WASHING, THEY  
USE A TOWEL TO DRY OFF,

52

00:02:06,526 --> 00:02:07,726

BUT THEY DO NOT RINSE.

53

00:02:08,226 --> 00:02:11,186

THESE SPECIAL SOAPS AND  
SHAMPOOS WERE MADE FOR HOSPITALS

54

00:02:11,356 --> 00:02:13,086

FOR PATIENTS WHO  
CANNOT GET IN THE WATER.