



**Space**to**Ground**

1

00:00:03,220 --> 00:00:06,379

Welcome to Space to Ground,  
I'm Isidro Reyna. The science continues

2

00:00:06,380 --> 00:00:08,580

onboard the International Space Station.

3

00:00:10,800 --> 00:00:14,520

Carbon Dioxide is one of the most important and long-lived greenhouse  
gases.

4

00:00:15,060 --> 00:00:21,320

In fact increases in atmospheric Carbon Dioxide both man-made and natural  
are responsible for about two-thirds of

5

00:00:21,320 --> 00:00:25,160

the total energy imbalance that is  
causing the Earth's temperature to rise.

6

00:00:25,680 --> 00:00:29,440

The Orbiting Carbon Observatory 3  
experiment which arrived the station May

7

00:00:29,450 --> 00:00:33,350

6, will give scientists the first  
opportunity to watch the earth breathe

8

00:00:33,350 --> 00:00:37,730

from space. We know that local carbon  
dioxide levels rise and fall during a

9

00:00:37,730 --> 00:00:41,900

day with changes in emissions and  
photosynthesis rates, but these changes

10

00:00:41,900 --> 00:00:45,800

are measured sparsely worldwide. The  
experiment will observe how carbon

11

00:00:45,800 --> 00:00:49,520  
dioxide concentrations change throughout  
the day in many parts of the globe.

12  
00:00:49,520 --> 00:00:53,690  
In both large industrialized cities and  
surrounding crop lands. This is another

13  
00:00:53,690 --> 00:00:58,190  
step toward monitoring emission hotspots,  
volcanic eruptions and other local

14  
00:00:58,190 --> 00:01:02,540  
carbon sources from space. Understanding  
carbon sources can aid in forecasting

15  
00:01:02,540 --> 00:01:05,980  
increased atmospheric heat retention and  
reduce its long-term risks.

16  
00:01:07,820 --> 00:01:12,120  
Serious medical conditions caused by poor kidney  
health can occur more often in space.

17  
00:01:13,820 --> 00:01:17,440  
The Kidney Cells experiment examines how  
kidney health is affected by

18  
00:01:17,450 --> 00:01:21,680  
microgravity and other factors of space  
travel including increased chemical

19  
00:01:21,680 --> 00:01:26,160  
exposure, water conservation and  
recycling, and altered dietary intake.

20  
00:01:26,520 --> 00:01:30,140  
Knowledge gain can help protect the  
health of astronauts and also contribute

21

00:01:30,140 --> 00:01:33,890  
to better treatments for kidney related  
conditions on earth. Learning the results

22  
00:01:33,890 --> 00:01:37,909  
of this research on the space station is  
critical as we look to send humans on

23  
00:01:37,909 --> 00:01:42,900  
longer space missions and set our sights  
on sending astronauts to the moon by 2024.

24  
00:01:43,920 --> 00:01:47,380  
This week's question comes from  
Bill, who asked why space is the place to

25  
00:01:47,390 --> 00:01:52,220  
perform many of these experiments versus  
Earth. Space is unique because it allows

26  
00:01:52,220 --> 00:01:56,240  
scientists to remove gravity from the  
equation giving them an entirely new

27  
00:01:56,240 --> 00:02:00,290  
environment to study everything from  
human health to physical processes only

28  
00:02:00,290 --> 00:02:04,850  
happening on extremely small scales. We  
may not know yet what will be the most

29  
00:02:04,850 --> 00:02:09,440  
important discovery gained from space  
station, but we already have some amazing breakthroughs.

30  
00:02:10,380 --> 00:02:11,620  
In the areas of human health,

31  
00:02:11,620 --> 00:02:16,270

telemedicine, education and observations  
of Earth from space, they're all already

32

00:02:16,270 --> 00:02:21,010

demonstrated benefits to human life.

Vaccine development research, station

33

00:02:21,010 --> 00:02:25,210

generated images that assist with

disaster relief in farming, and education

34

00:02:25,210 --> 00:02:29,650

programs that inspire future scientists,

engineers, and space explorers are just