



1  
00:00:06,150 --> 00:00:09,260  
TODAY'S EPISODE OF S.T.E.M.  
IN 30 IS ALL ABOUT THE

2  
00:00:09,260 --> 00:00:13,280  
INTERNATIONAL SPACE STATION.  
>> SPECIFICALLY, 15 YEARS OF

3  
00:00:13,280 --> 00:00:15,960  
HUMAN PRESENCE ON THE SPACE  
STATION.

4  
00:00:15,960 --> 00:00:19,630  
>> TO KICK THINGS OFF, WE HAVE  
15 FACTS ABOUT THE INTERNATIONAL

5  
00:00:19,630 --> 00:00:23,039  
SPACE STATION BROUGHT TO YOU BY  
OUR FRIENDS HERE AT THE NATIONAL

6  
00:00:23,039 --> 00:00:26,039  
AIR AND SPACE MUSEUM.  
>> FACT NUMBER 15†--

7  
00:00:26,039 --> 00:00:29,320  
>> THE INTERNATIONAL SPACE  
STATION COMPLETES 15†1/2 ORBITS

8  
00:00:29,320 --> 00:00:32,009  
PER DAY AND AN ORBIT EVERY 90  
MINUTES.

9  
00:00:32,009 --> 00:00:36,090  
THIS MEANS THEY SEE 16 SUNRISES  
AND SUNSETS EVERY DAY.

10  
00:00:36,090 --> 00:00:39,000  
>> FACT NUMBER 14†--  
>> TWO MEMBERS OF THE CREW,

11  
00:00:39,000 --> 00:00:43,680  
SCOTT KELLY, ARE IN THE MIDDLE  
OF SPENDING AN ENTIRE YEAR IN

12  
00:00:43,680 --> 00:00:45,469  
SPACE.  
>> NUMBER 13†--

13  
00:00:45,469 --> 00:00:47,840  
>> THE INTERNATIONAL SPACE  
STATION IS VISIBLE FROM YOUR

14  
00:00:47,840 --> 00:00:50,100  
BACKYARD.  
IF YOU KNOW WHERE TO LOOK.

15  
00:00:50,100 --> 00:00:52,710  
>> 12†--  
>> THE ISS IS ALMOST THE SIZE OF

16  
00:00:52,710 --> 00:00:54,980  
A FOOTBALL FIELD.  
>> NUMBER 11†--

17  
00:00:54,980 --> 00:00:58,379  
>> THE SOLAR PANELS ON THE  
INTERNATIONAL SPACE STATION

18  
00:00:58,379 --> 00:01:03,670  
PROVIDE OVER 75 KILOWATTS OF  
POWER, ARE OVER EIGHT ACRES IN

19  
00:01:03,670 --> 00:01:06,490  
SIZE.  
>> NUMBER TEN†--

20  
00:01:06,490 --> 00:01:09,700  
>> THE INTERNATIONAL SPACE  
STATION ORBITS APPROXIMATELY 250

21

00:01:09,700 --> 00:01:12,930

MILES ABOVE THE EARTH.

>> NUMBER NINE†--

22

00:01:12,930 --> 00:01:16,759

>> THERE ARE TWO TOILETS ON THE  
INTERNATIONAL SPACE STATION.

23

00:01:16,759 --> 00:01:19,380

ASTRONAUTS HAVE TO STRAP  
THEMSELVES IN TO USE THEM.

24

00:01:19,380 --> 00:01:22,900

>> NUMBER EIGHT†--

>> SOME OF THE MODULES OF THE

25

00:01:22,900 --> 00:01:28,170

INTERNATIONAL SPACE STATION ARE  
CALLED UNITY, ZARIA, DESTINY,

26

00:01:28,170 --> 00:01:33,780

AND HARMONY.

THE RUSSIAN MODULES MEAN STAR

27

00:01:33,780 --> 00:01:37,009

AND SUNRISE, RESPECTIVELY.

>> NUMBER SEVEN†--

28

00:01:37,009 --> 00:01:40,799

>> THERE ARE 52 COMPUTERS ON THE  
ISS.

29

00:01:40,799 --> 00:01:43,741

>> NUMBER SIX†--

>> 26 COUNTRIES PARTICIPATE IN

30

00:01:43,741 --> 00:01:45,860

THE OPERATION OF THE  
INTERNATIONAL SPACE STATION.

31  
00:01:45,860 --> 00:01:50,280  
>> NUMBER FIVE†--  
>> THE ISS WEIGHS OVER 450 TONS.

32  
00:01:50,280 --> 00:01:53,500  
THAT'S ALMOST 1 MILLION POUNDS.  
>> NUMBER FOUR†--

33  
00:01:53,500 --> 00:01:56,399  
>> 220 DIFFERENT PEOPLE HAVE  
VISITED THE INTERNATIONAL SPACE

34  
00:01:56,399 --> 00:02:00,659  
STATION, INCLUDING ASTRONAUTS  
FROM 17 COUNTRIES, 33 WOMEN, 7

35  
00:02:00,659 --> 00:02:05,149  
TOURISTS, 79 DOUBLE, 28 TRIPS,  
AND 6 QUADRUPLE FLYERS.

36  
00:02:05,149 --> 00:02:07,729  
>> NUMBER THREE†--  
>> THE INTERNATIONAL SPACE

37  
00:02:07,729 --> 00:02:12,800  
STATION HAS BEEN CONTINUOUSLY  
OCCUPIED SINCE NOVEMBER OF 2000.

38  
00:02:12,800 --> 00:02:15,910  
THAT MEANS FOR THE LAST 15  
YEARS, THERE HAS NOT BEEN A

39  
00:02:15,910 --> 00:02:19,840  
SINGLE DAY WITHOUT AN ASTRONAUT  
IN ORBIT AROUND THE EARTH.

40  
00:02:19,840 --> 00:02:22,330  
>> NUMBER TWO†--  
>> EQUIPMENT ON BOARD THE

41  
00:02:22,330 --> 00:02:26,180  
INTERNATIONAL SPACE STATION HAS  
INCLUDED AN ESPRESSO MACHINE, A

42  
00:02:26,180 --> 00:02:29,700  
3D PRINTER, AND A TREADMILL  
NAMED AFTER STEPHEN COLBERT.

43  
00:02:29,700 --> 00:02:34,260  
>> AND THE NUMBER ONE FUN FACT  
ABOUT 15 YEARS ON THE

44  
00:02:34,260 --> 00:02:37,420  
INTERNATIONAL SPACE STATION†--  
>> THE INTERNATIONAL SPACE

45  
00:02:37,420 --> 00:02:42,640  
STATION TRAVELS AT A MINIMUM  
SPEED OF 17,500 MILES AN HOUR.

46  
00:02:42,640 --> 00:02:46,300  
THAT'S WHAT WE CALL SMOKING.  
>> I HAVE ANOTHER FUN FACT FOR

47  
00:02:46,300 --> 00:02:48,209  
YOU.  
15 TIMES TWO IS†--

48  
00:02:48,209 --> 00:02:52,970  
>> I SEE WHERE YOU'RE GOING.  
>> WAIT, WAIT, WAIT.

49  
00:02:52,970 --> 00:02:55,700  
WE HAVE SOME FRIENDS WHO ARE  
ASTRONAUTS WHO HAVE ACTUALLY

50  
00:02:55,700 --> 00:02:57,629  
BEEN ON THE INTERNATIONAL SPACE  
STATION.

51  
00:02:57,629 --> 00:03:00,080  
WHY DON'T WE LET THEM INTRODUCE.  
\\MM

52  
00:03:43,209 --> 00:03:06,440  
>> THIS IS S.T.E.M. IN 30.  
\\MM

53  
00:03:43,209 --> 00:03:53,500  
>> HI, I'M MARTY.  
>> AND I'M BETH.

54  
00:03:53,500 --> 00:03:55,980  
>> WE'RE COMING TO YOU LIVE  
TODAY FROM THE NATIONAL AIR AND

55  
00:03:55,980 --> 00:04:01,799  
SPACE MUSEUM IN WASHINGTON, D.C.  
>> AS YOU SAW, OUR SHOW TODAY IS

56  
00:04:01,799 --> 00:04:04,330  
ABOUT THE INTERNATIONAL SPACE  
STATION, BUT THE INTERNATIONAL

57  
00:04:04,330 --> 00:04:09,099  
SPACE STATION IS NOT THE FIRST  
STATION IN SPACE.

58  
00:04:09,099 --> 00:04:12,360  
>> THE INTERNATIONAL SPACE  
STATION IS NOT THE HUMAN RACE'S

59  
00:04:12,360 --> 00:04:15,319  
FIRST SPACE STATION.  
THE IDEA OF A SPACE STATION HAS

60  
00:04:15,319 --> 00:04:19,070  
BEEN AROUND FOR 150 YEARS.  
AN AMERICAN NOVELIST WROTE A

61  
00:04:19,070 --> 00:04:21,870  
STORY ABOUT A GIANT MOON UP IN  
THE HEAVENS.

62  
00:04:21,870 --> 00:04:26,759  
LATER, A PHYSICIST COINED THE  
TERM SPACE STATION.

63  
00:04:26,759 --> 00:04:32,180  
65 YEARS AGO, AN ARTICLE WAS  
PUBLISHED ABOUT A SPACE STATION

64  
00:04:32,180 --> 00:04:35,110  
THAT COULD SERVE AS A JUMPING  
OFF PLACE TO MARS.

65  
00:04:35,110 --> 00:04:37,740  
NOT LONG AFTER THAT, THE SOVIETS  
AND THE UNITED STATES HAD A

66  
00:04:37,740 --> 00:04:41,300  
15-YEAR RACE TO THE MOON.  
AFTER THE U.S. LANDED ON THE

67  
00:04:41,300 --> 00:04:44,250  
MOON, THE SOVIETS REFOCUSED  
THEIR EFFORTS INTO CREATING A

68  
00:04:44,250 --> 00:04:52,250  
LOW-EARTH ORBIT SPACE STATION.  
SKY LAB WAS LAUNCHED BY THE

69  
00:04:52,250 --> 00:04:55,419  
UNITED STATES, BECOMING  
AMERICA'S FIRST SPACE STATION.

70  
00:04:55,419 --> 00:04:58,880  
ASTRONAUTS WERE ABLE TO SPEND A  
TOTAL OF 84 DAYS ON BOARD.

71  
00:04:58,880 --> 00:05:01,509  
WITH THE APOLLO TEST PROJECT,  
THE UNITED STATES AND THE

72  
00:05:01,509 --> 00:05:03,770  
SOVIETS WORKED TOGETHER FOR THE  
FIRST TIME.

73  
00:05:03,770 --> 00:05:07,360  
TWO SPACESHIPS WERE LAUNCHED.  
FROM THE U.S. AND FROM THE USSR.

74  
00:05:07,360 --> 00:05:10,039  
THESE TWO SPACESHIPS DOCKED IN  
SPACE.

75  
00:05:10,039 --> 00:05:13,160  
AFTER LAUNCHING SIX MORE  
MISSIONS, THE SOVIETS BEGAN

76  
00:05:13,160 --> 00:05:15,900  
CONSTRUCTION OF THE SPACE  
STATION MIR, WHICH STAYED IN

77  
00:05:15,900 --> 00:05:19,820  
ORBIT FOR 15 YEARS.  
AT THE TIME, IT SHATTERED ALL

78  
00:05:19,820 --> 00:05:21,770  
THE LONG-DURATION SPACE FLIGHT  
RECORDS.

79  
00:05:21,770 --> 00:05:24,990  
IT ALSO SHOWED COOPERATION  
BETWEEN THE FORMER SOVIETS, NOW

80  
00:05:24,990 --> 00:05:28,500  
RUSSIA, THE UNITED STATES, AND  
COUNTRIES THROUGHOUT THE WORLD.

81  
00:05:28,500 --> 00:05:32,060  
THE MIR WAS THE FIRST TRULY  
MODULAR SPACE STATION, AND ITS

82  
00:05:32,060 --> 00:05:34,650  
DESIGN WAS A STEPPINGSTONE  
TOWARDS OUR CURRENT

83  
00:05:34,650 --> 00:05:41,340  
INTERNATIONAL SPACE STATION.  
>> WELL, LET'S START BY

84  
00:05:41,340 --> 00:05:46,050  
WELCOMING OUR AUDIENCE.  
WE HAVE POTOMAC PREP WITH US.

85  
00:05:46,050 --> 00:05:49,949  
ALSO ONLINE, CHRIST THE KING IN  
RUTLEDGE, VERMONT.

86  
00:05:49,949 --> 00:05:51,750  
THEY'LL HAVE A COUPLE QUESTIONS  
FOR US LATER.

87  
00:05:51,750 --> 00:05:54,789  
>> WE'D ALSO LIKE TO THANK OUR  
ONLINE VIEWERS AND THOSE

88  
00:05:54,789 --> 00:05:57,860  
WATCHING ON NASA TV TODAY AND  
REMINDE YOU THAT YOU CAN SUBMIT

89  
00:05:57,860 --> 00:06:00,389  
QUESTIONS.  
WE HAVE AN EXPERT STANDING BY

90  
00:06:00,389 --> 00:06:03,680  
READY TO ANSWER THOSE QUESTIONS,  
AND SOME OF THEM WE'LL ACTUALLY

91  
00:06:03,680 --> 00:06:07,389  
USE ON THE SHOW TODAY.  
>> TODAY WE ARE CELEBRATING 15

92  
00:06:07,389 --> 00:06:10,620  
YEARS OF CONTINUING HUMAN  
PRESENCE ON THE INTERNATIONAL

93  
00:06:10,620 --> 00:06:12,240  
SPACE STATION.  
>> TO GET US STARTED, LET'S GO

94  
00:06:12,240 --> 00:06:16,590  
TO SAMANTHA, WHO SPENT 200 DAYS  
ON BOARD THE INTERNATIONAL SPACE

95  
00:06:16,590 --> 00:06:28,710  
STATION.  
>>

96  
00:06:28,710 --> 00:06:31,610  
THE INTERNATIONAL SPACE  
STATION, WHAT I LIKE TO CALL

97  
00:06:31,610 --> 00:06:36,460  
HUMANITY'S OUTPOST IN SPACE, HAS  
BEEN PERMANENTLY INHABITED SINCE

98  
00:06:36,460 --> 00:06:40,370  
NOVEMBER 2000.  
SO HAPPY 15th ANNIVERSARY,

99  
00:06:40,370 --> 00:06:46,520  
INTERNATIONAL SPACE STATION.  
>> SO EARLIER, WE ASKED SOME

100  
00:06:46,520 --> 00:06:50,830  
STUDENTS WHAT WORDS DESCRIBE THE  
INTERNATIONAL SPACE STATION.

101

00:06:50,830 --> 00:06:57,849

450 STUDENTS REPLIED.

WE MADE A WORD CLOUD.

102

00:06:57,849 --> 00:07:01,470

A WORD CLOUD TAKES THE WORDS  
THAT WERE MOST USED AND MAKES

103

00:07:01,470 --> 00:07:04,710

THEM THE LARGEST ON THE SCREEN.  
SO AS YOU GUYS CAN SEE, SPACE IS

104

00:07:04,710 --> 00:07:06,860

THE LARGEST ON THE SCREEN,  
RIGHT.

105

00:07:06,860 --> 00:07:10,889

WHAT ARE SOME OTHER WORDS THAT  
YOU THINK SHOULD BE UP THERE?

106

00:07:10,889 --> 00:07:13,669

I THINK YOU HAD A REALLY GOOD  
IDEA, DIDN'T YOU?

107

00:07:13,669 --> 00:07:15,840

WHAT'S THE WORD YOU WANTED TO  
PUT UP THERE AND WHY?

108

00:07:15,840 --> 00:07:19,840

>> THE WORD I WANTED TO PUT UP  
THERE WAS WONDERFUL BECAUSE THE

109

00:07:19,840 --> 00:07:24,180

UNIVERSE IS REALLY BIG, AND IT  
SEEMS LIKE IT SHOULD BE↑-- IT

110

00:07:24,180 --> 00:07:26,460

SEEMS LIKE IT'S WONDERFUL.  
>> OKAY.

111

00:07:26,460 --> 00:07:29,919

SO WONDERFUL WOULD BE A WORD  
THAT YOU WOULD ADD.

112

00:07:29,919 --> 00:07:32,840

LET'S SEE WHAT KATHY AND MARTY  
MIGHT ADD TO OUR WORD CLOUD.

113

00:07:32,840 --> 00:07:35,539

>> I'M JOINED TODAY BY KATHY  
LEWIS, THE CURATOR FOR

114

00:07:35,539 --> 00:07:39,020

INTERNATIONAL SPACE STUDIES HERE  
AT THE NATIONAL AIR AND SPACE

115

00:07:39,020 --> 00:07:40,870

MUSEUM.  
WERE THERE ANY WORDS ON THAT

116

00:07:40,870 --> 00:07:43,099

WORD CLOUD YOU THINK MAYBE WE  
MISSED?

117

00:07:43,099 --> 00:07:44,949

>> THERE'S ONE WORD I DIDN'T  
SEE.

118

00:07:44,949 --> 00:07:46,410

IT'S FALLING.

>> FALLING?

119

00:07:46,410 --> 00:07:49,770

>> YES, BECAUSE THE ASTRONAUTS  
ARE, IN FACT, FALLING AS THEY

120

00:07:49,770 --> 00:07:52,750

ORBIT THE EARTH.  
THEY'RE TRAVELING AT 17,500

121

00:07:52,750 --> 00:07:56,370

MILES AN HOUR.

THEY'RE FALLING TOWARDS EARTH.

122

00:07:56,370 --> 00:07:57,370

THEY JUST KEEP MISSING IT.

>> TODAY WE'RE TALKING ABOUT THE

123

00:07:57,370 --> 00:07:58,370

INTERNATIONAL SPACE STATION.

IT REALLY IS AN INTERNATIONAL

124

00:07:58,370 --> 00:07:59,370

COLLABORATION.

>> YES, IT IS.

125

00:07:59,370 --> 00:08:00,370

IT IS A COLLABORATION BETWEEN

THE UNITED STATES, JAPAN,

126

00:08:00,370 --> 00:08:01,370

RUSSIA, OF COURSE, THE EUROPEAN

SPACE AGENCY, AND CANADA.

127

00:08:01,370 --> 00:08:02,370

SO THERE ARE 15 MEMBER STATES

THAT ARE PARTICIPATING IN IT.

128

00:08:02,370 --> 00:08:03,370

>> AWESOME.

NOW, SOME OF THE RESEARCH GOING

129

00:08:03,370 --> 00:08:04,370

ON RIGHT NOW INVOLVES A COUPLE

OF THE CREW MEMBERS.

130

00:08:04,370 --> 00:08:05,370

IT'S KIND OF A LITTLE DIFFERENT

THAN WHAT WE'VE DONE UP THERE

131

00:08:05,370 --> 00:08:06,370

BEFORE.

>> YES, THEY'RE DOING A REALLY

132

00:08:06,370 --> 00:08:07,370

NEW EXPERIMENT.

THEY HAVE A ONE YEAR IN SPACE

133

00:08:07,370 --> 00:08:08,370

PROGRAM JOINTLY BETWEEN THE  
UNITED STATES AND RUSSIANS.

134

00:08:08,370 --> 00:08:09,370

THEY'RE WORKING WITH THE  
EUROPEANS AS WELL.

135

00:08:09,370 --> 00:08:10,370

THEY HAVE AN AMERICAN ASTRONAUT,  
SCOTT KELLY, AND A RUSSIAN

136

00:08:10,370 --> 00:08:11,370

COSMONAUT.

THEY'RE BOTH GOING TO STAY IN

137

00:08:11,370 --> 00:08:12,370

SPACE FOR A YEAR.

>> NOW, SCOTT KELLY, THERE'S

138

00:08:12,370 --> 00:08:13,370

SOMETHING INTERESTING ABOUT HIM  
TOO.

139

00:08:13,370 --> 00:08:14,370

>> YES, THIS IS AN ADD-ON FOR  
THIS.

140

00:08:14,370 --> 00:08:15,370

SCOTT KELLY, AS YOU MIGHT KNOW,  
IS A TWIN.

141

00:08:15,370 --> 00:08:16,370

HE HAS A TWIN, MARK KELLY.  
MARK IS STAYING HERE ON THE

142

00:08:16,370 --> 00:08:17,370

GROUND.  
THEY'RE BOTH BEING TESTED, AND

143

00:08:17,370 --> 00:08:18,370

THEY'RE GOING TO BE ABLE TO HAVE  
A CONTROL FOR THE FIRST TIME

144

00:08:18,370 --> 00:08:19,370

EVER.  
THEY'VE GOT A TWIN.

145

00:08:19,370 --> 00:08:20,370

THEY KNOW THEY STARTED OUT THE  
SAME.

146

00:08:20,370 --> 00:08:21,370

WE'LL FIND OUT IF THEY CHANGE IN  
ANY WAY.

147

00:08:21,370 --> 00:08:22,370

>> SO ONE OF THE THINGS THAT  
HAPPENS TO ASTRONAUTS IN SPACE

148

00:08:22,370 --> 00:09:17,230

IS A FLUID SHIFT.  
SOMETIMES WE CALL THE THAT PUFFY

149

00:09:17,230 --> 00:10:24,480

HEAD BIRD LEGS.  
CAN YOU TELL US ABOUT THAT?

150

00:10:24,480 --> 00:10:47,117

>> IT'S SOMETHING WE DON'T THINK  
ABOUT A LOT HERE ON EARTH.

151

00:10:47,117 --> 00:10:48,117

WE HERE ON EARTH IN ZERO  
GRAVITY, AND ALL OF OUR FLUIDS

152

00:10:48,117 --> 00:10:49,117

ARE BEING CONSTANTLY PULLED  
DOWN.

153

00:10:49,117 --> 00:10:50,117

SO IF YOU GET AN INJURY OR YOU  
SIT FOR A LONG TIME, YOU'LL

154

00:10:50,117 --> 00:10:51,117

NOTICE THAT YOUR LEGS WILL START  
TO SWELL.

155

00:10:51,117 --> 00:10:52,117

YOU USE THOSE MUSCLES, YOUR CALF  
MUSCLES, LEG MUSCLES TO PUMP THE

156

00:10:52,117 --> 00:10:53,117

FLUIDS BACK UP.  
WELL, THE ASTRONAUTS DON'T HAVE

157

00:10:53,117 --> 00:10:54,117

THE GRAVITY PULLING THAT FLUID  
DOWN.

158

00:10:54,117 --> 00:10:55,117

SO THE FLUID STAYS PRETTY CLOSE  
AROUND IN THEIR CHEST AND FACES

159

00:10:55,117 --> 00:10:56,117

BECAUSE THEY DON'T HAVE ANY  
GRAVITY.

160

00:10:56,117 --> 00:10:57,117

SO THEY GET SORT OF CONGESTED.  
>> SO WHEN WE SEE THE IMAGES OF

161

00:10:57,117 --> 00:10:58,117

THESE ARE-- THE ASTRONAUTS IN  
SPACE, THEIR HEADS LOOK

162

00:10:58,117 --> 00:10:59,117

SIGNIFICANTLY BIGGER.

>> YES, IT'S LIKE HAVING A HEAD

163

00:10:59,117 --> 00:11:00,117

COLD.

>> ASTRONAUTS AND COSMONAUTS

164

00:11:00,117 --> 00:11:01,117

AREN'T THE ONLY ONES WHO HAVE  
BEEN THERE.

165

00:11:01,117 --> 00:11:02,117

>> YES, THERE ARE TOURISTS.

THEY LIKE TO BE CALLED

166

00:11:02,117 --> 00:11:03,117

SELF-FINANCED SPACE TRAVELERS.

WE HAVE HERE IN THE MUSEUM ON

167

00:11:03,117 --> 00:11:04,117

EXHIBIT THE SPACE SUIT THAT

DENNIS TIDO, THE FIRST

168

00:11:04,117 --> 00:11:05,117

SELF-FINANCED SPACE TRAVELER,

WORE IN SPACE.

169

00:11:05,117 --> 00:11:06,117

IN FACT, THERE HAVE BEEN MANY

WHO HAVE DONE THAT.

170

00:11:06,117 --> 00:11:07,117

THEY'VE PAID THE MONEY, DONE

TRAINING FOR SIX MONTHS, AND

171

00:11:07,117 --> 00:11:08,117

THERE WAS ONE WHO USED TO WORK  
FOR MICROSOFT WHO WENT UP NOT

172

00:11:08,117 --> 00:11:09,117

ONCE BUT TWICE.  
HE PAID TWICE TO GO TO THE SPACE

173

00:11:09,117 --> 00:11:10,117

STATION.  
>> WOW.

174

00:11:10,117 --> 00:11:11,117

YOU READY TO TAKE SOME  
QUESTIONS?

175

00:11:11,117 --> 00:11:12,117

>> YES, ABSOLUTELY.  
>> ALL RIGHT.

176

00:11:12,117 --> 00:11:13,117

OUR FIRST QUESTION IS FROM SOFIA  
FROM CHRIST THE KING IN VERMONT.

177

00:11:13,117 --> 00:11:14,117

>> HOW DO ASTRONAUTS PREPARE FOR  
THE LONG STAY ON THE

178

00:11:14,117 --> 00:11:15,117

INTERNATIONAL SPACE STATION?  
>> REALLY GOOD QUESTION.

179

00:11:15,117 --> 00:11:16,117

THE ASTRONAUTS PREPARE BY  
GETTING IN THE BEST PHYSICAL

180

00:11:16,117 --> 00:11:17,117

SHAPE POSSIBLE.  
THEY ALSO REHEARSE WHAT THEY'RE

181

00:11:17,117 --> 00:11:18,117

GOING TO BE DOING IN THE NEUTRAL  
BUOYANCY LAB IN THE UNDERWATER

182

00:11:18,117 --> 00:11:19,117

TANK AND DOING SPACE WALKS.  
THEY ALSO PRACTICE ON WORKING

183

00:11:19,117 --> 00:11:20,117

ALL THE EQUIPMENT THEY'RE GOING  
TO BE WORKING ON.

184

00:11:20,117 --> 00:11:21,117

AFTER YEARS AND YEARS OF BEING  
SPECIALISTS AS SCIENTISTS AND

185

00:11:21,117 --> 00:11:22,117

ENGINEERS AND PILOTS, THEY ALSO  
HAVE TO LEARN TO BE GENERALISTS.

186

00:11:22,117 --> 00:11:23,117

THEY HAVE TO BE PLUMBERS AND  
COOKS AND ELECTRICIANS SO THEY

187

00:11:23,117 --> 00:11:25,850

CAN MAINTAIN THE SPACE STATION  
AND KEEP IT OPERATING AT FULL

188

00:11:25,850 --> 00:11:26,920

FUNCTION.

>> AWESOME.

189

00:11:26,920 --> 00:11:31,579

WE HAVE AN ONLINE QUESTION NEXT.  
WHAT IS THE MOST ASKED FOR FOOD

190

00:11:31,579 --> 00:11:34,980

ON THE SPACE STATION?

>> WELL, THAT IS A DIFFICULT

191

00:11:34,980 --> 00:11:40,519

ANSWER.

EACH PERSON HAS A DIFFERENT IDEA

192

00:11:40,519 --> 00:11:44,050

OF WHAT THEY WANT TO EAT.

WHAT I'VE HEARD IS THAT THE

193

00:11:44,050 --> 00:11:48,079

ASTRONAUTS PREFER SPICY FOODS

JUST BECAUSE WITH THAT PUFFY

194

00:11:48,079 --> 00:11:51,921

FACE, THEY'RE CONGESTED, LOSE

SENSE OF SMELL, SO THEY WANT TO

195

00:11:51,921 --> 00:11:55,480

HAVE SOMETHING VERY SPICY AND

TASTY, BUT THEY ALSO LONG FOR

196

00:11:55,480 --> 00:11:58,079

SOMETHING FROM THEIR CHILDHOOD

OR SOMETHING THEY REMEMBER THAT

197

00:11:58,079 --> 00:12:02,600

REMINDS THEM OF HOME.

ASTRONAUT ANITA WILLIAMS HAD

198

00:12:02,600 --> 00:12:06,139

SLOVENIAN SAUSAGES BROUGHT UP

FOR HER.

199

00:12:06,139 --> 00:12:10,089

SHE GREW UP IN CLEVELAND IN THE

SLOVENIAN COMMUNITY.

200

00:12:10,089 --> 00:12:12,240

THAT WAS SOMETHING THAT REMINDED

HER OF HOME.

201  
00:12:12,240 --> 00:12:13,829  
>> AWESOME.  
WE HAVE AN AUDIENCE QUESTION.

202  
00:12:13,829 --> 00:12:20,740  
>> HI, MY NAME IS McKAYLA.  
MY QUESTION IS, DOES TIME MOVE

203  
00:12:20,740 --> 00:12:24,100  
FASTER OR SLOWER IN SPACE?  
>> DOES TIME MOVE FASTER OR

204  
00:12:24,100 --> 00:12:27,220  
SLOWER IN SPACE?  
>> SHE MUST BE REALLY SMART.

205  
00:12:27,220 --> 00:12:31,680  
I THINK SHE KNOWS PHYSICS.  
YES, TIME MOVES†-- SCOTT KELLY

206  
00:12:31,680 --> 00:12:36,760  
WILL BE EXPERIENCING TIME  
SLIGHTLY SLOWER THAN HIS BROTHER

207  
00:12:36,760 --> 00:12:39,250  
MARK.  
SO IF THERE WAS ANY TIME

208  
00:12:39,250 --> 00:12:42,029  
DIFFERENCE BETWEEN WHEN THEY  
WERE BORN, HE WILL ACTUALLY GAIN

209  
00:12:42,029 --> 00:12:45,100  
ON HIS BROTHER AND BE A LITTLE  
BIT YOUNGER.

210  
00:12:45,100 --> 00:12:49,190  
NOT A WHOLE LOT.  
NOT A YEAR, NOT MINUTES, BUT

211  
00:12:49,190 --> 00:12:51,480  
MILISECONDS.  
>> AWESOME.

212  
00:12:51,480 --> 00:12:54,040  
WELL, ONE OF THE THINGS THAT'S  
REALLY IMPORTANT TO ASTRONAUTS

213  
00:12:54,040 --> 00:12:56,200  
ARE THE PATCHES THEY WEAR ON  
THEIR SLEEVE THAT REPRESENT

214  
00:12:56,200 --> 00:12:58,720  
THEIR MISSION.  
>> YEAH, THAT'S TRUE.

215  
00:12:58,720 --> 00:13:02,360  
I UNDERSTAND THAT YOU HAD A  
CHANCE TO TALK TO ASTRONAUT

216  
00:13:02,360 --> 00:13:07,029  
RANDY, AND MAYBE WE CAN HAVE HIM  
TELL US ABOUT PATCHES.

217  
00:13:07,029 --> 00:13:10,100  
>> SOUNDS GOOD.  
>> I'VE GOT YOUR MISSION PATCH

218  
00:13:10,100 --> 00:13:11,480  
HERE.  
CAN YOU TELL US A LITTLE BIT

219  
00:13:11,480 --> 00:13:14,620  
ABOUT THE WORK THAT GOES INTO  
THIS AND SOME OF THE SYMBOLISM

220  
00:13:14,620 --> 00:13:16,089  
THAT'S THERE?  
>> THE NEAT PART ABOUT MISSION

221

00:13:16,089 --> 00:13:20,350

PATCHES IS THEY TRY AND CAPTURE  
THE ESSENCE OR PERSONALITY OF

222

00:13:20,350 --> 00:13:22,550

THE CREW.  
OUR PARTICULAR MISSION PATCH,

223

00:13:22,550 --> 00:13:26,870

AND WE HAD SIX AMERICANS ON THE  
CREW, WHICH WAS UNUSUAL BECAUSE

224

00:13:26,870 --> 00:13:28,050

WE HAD SO MANY INTERNATIONAL  
PARTNERS.

225

00:13:28,050 --> 00:13:33,720

SO THE ASTRONAUT SYMBOL YOU SEE  
ARE THE THREE RAYS GOING UP TO

226

00:13:33,720 --> 00:13:36,579

THE STAR WITH THE LITTLE HALO.  
THE ASTRONAUT SYMBOL IS ALWAYS

227

00:13:36,579 --> 00:13:39,339

GOLD.  
BEING AN ALL-AMERICAN CREW, WE

228

00:13:39,339 --> 00:13:45,449

PUT THE RED, WHITE, AND BLUE.  
ANOTHER NEAT PART ABOUT OUR

229

00:13:45,449 --> 00:13:49,100

PATCHES, WE HAVE LITTLE STARS IN  
THE BACKGROUND ABOVE THE EARTH.

230

00:13:49,100 --> 00:13:52,420

SO THE PLAN WAS TO HAVE A STAR  
FOR EACH ONE OF THE KIDS,

231

00:13:52,420 --> 00:13:54,990

REPRESENTING ALL THE KIDS WHO  
WERE IN THE FAMILIES OF OUR

232

00:13:54,990 --> 00:13:57,930

CREW.  
SO WE STARTED OUT WITH 12.

233

00:13:57,930 --> 00:13:59,880

ABOUT FOUR MONTHS INTO IT, AS  
THE PATCH WAS GETTING FINALIZED,

234

00:13:59,880 --> 00:14:02,029

WE FOUND OUT MY WIFE WAS  
PREGNANT.

235

00:14:02,029 --> 00:14:05,620

WE ENDED UP PUTTING A 13th STAR  
ON IT.

236

00:14:05,620 --> 00:14:09,029

OF COURSE, THE STORY GOES, MY  
WIFE ENDED UP GIVING BIRTH

237

00:14:09,029 --> 00:14:11,560

HALFWAY THROUGH OUR MISSION DOWN  
HERE ON EARTH WHILE I WAS OUT

238

00:14:11,560 --> 00:14:15,949

DOING SPACE WALKS IN SPACE.  
ONLY THE SECOND TIME THAT'S EVER

239

00:14:15,949 --> 00:14:17,680

HAPPENED.  
>> PRETTY COOL.

240

00:14:17,680 --> 00:14:19,220

THANKS SO MUCH FOR SHARING THAT  
WITH US.

241  
00:14:19,220 --> 00:14:21,191  
>> KATHY, YOU WERE TELLING ME  
YESTERDAY ABOUT A COUPLE MISSION

242  
00:14:21,191 --> 00:14:22,191  
PATCHES THAT HAVE SYMBOLISM NOT  
ONLY WITHIN THE PATCH BUT ACROSS

243  
00:14:22,191 --> 00:14:28,730  
TWO PATCHES.  
>> IT'S A REALLY INTERESTING

244  
00:14:28,730 --> 00:14:32,240  
INTERNATIONAL STORY.  
THE COMMANDER OF THE MISSION

245  
00:14:32,240 --> 00:14:38,360  
THAT TOOK MARK KELLY TO THE  
SPACE STATION GREW UP IN RUSSIA.

246  
00:14:38,360 --> 00:14:42,279  
HE REMEMBERS WITNESSING THE  
FINAL MISSION TO APOLLO.

247  
00:14:42,279 --> 00:14:47,160  
SO HE DESIGNED HIS PATCH TO SORT  
OF MATCH AND MIMIC THE SYMBOLISM

248  
00:14:47,160 --> 00:14:49,810  
FROM THE APOLLO MISSION.  
YOU CAN SEE THEY LOOK VERY

249  
00:14:49,810 --> 00:14:52,329  
SIMILAR.  
THEY SUBSTITUTED SOME PICTURES

250  
00:14:52,329 --> 00:14:55,130  
AND IMAGES FOR OTHERS.  
BUT THERE'S A REALLY NICE

251

00:14:55,130 --> 00:14:56,529

CROSSOVER.

>> THAT'S REALLY COOL.

252

00:14:56,529 --> 00:15:00,420

NOW, WE HAVE SOMETHING WE WANT  
YOU GUYS TO DO.

253

00:15:00,420 --> 00:15:02,690

WE WANT TO SEE YOUR MISSION  
PATCHES.

254

00:15:02,690 --> 00:15:05,910

WE WANT YOU TO GO BACK TO YOUR  
CLASSROOM, WE WANT YOU TO DESIGN

255

00:15:05,910 --> 00:15:09,010

A MISSION PATCH EITHER FOR YOUR  
CLASS OR SMALL GROUP, OR EVEN

256

00:15:09,010 --> 00:15:10,949

YOUR FAMILY.  
THINK ABOUT ALL OF THAT

257

00:15:10,949 --> 00:15:13,889

SYMBOLISM.  
WE WANT TO SEE PICTURES OF YOUR

258

00:15:13,889 --> 00:15:15,600

PATCHES.  
YOU CAN HAVE A PARENT OR A

259

00:15:15,600 --> 00:15:18,529

TEACHER HELP YOU TWEET THEM TO  
S.T.E.M. IN 30 OR PUT THEM ON

260

00:15:18,529 --> 00:15:21,010

OUR FACEBOOK PAGE OR E-MAIL THEM  
TO US.

261

00:15:21,010 --> 00:15:27,990

NOW, ONE OF THE REALLY EXCITING  
THINGS FOR ME IS YOU GUYS CAN

262

00:15:27,990 --> 00:15:31,410

ACTUALLY GO OUTSIDE TONIGHT,  
LOOK UP IN THE SKY FROM YOUR

263

00:15:31,410 --> 00:15:34,589

BACKYARD, AND SEE THE  
INTERNATIONAL SPACE STATION PASS

264

00:15:34,589 --> 00:15:36,360

OVER.  
HAVE YOU EVER DONE THIS BEFORE?

265

00:15:36,360 --> 00:15:38,639

>> YES, I HAVE.  
>> IT'S INCREDIBLY COOL.

266

00:15:38,639 --> 00:15:40,509

I ALWAYS WAVE.  
I DON'T KNOW IF THEY CAN SEE ME

267

00:15:40,509 --> 00:15:41,940

OR NOT.  
>> I DON'T THINK SO.

268

00:15:41,940 --> 00:15:44,880

>> BUT IT IS REALLY COOL.  
HERE'S HOW YOU CAN GO OUT INTO

269

00:15:44,880 --> 00:15:47,620

YOUR BACKYARD AND SEE THE  
INTERNATIONAL SPACE STATION.

270

00:15:47,620 --> 00:15:54,620

>> WE CAN SPOT THE INTERNATIONAL  
SPACE STATION FROM OUR BACKYARD,

271

00:15:54,620 --> 00:15:57,610

AND ALL THAT WE NEED TO KNOW IS  
WHEN AND WHERE TO LOOK.

272

00:15:57,610 --> 00:16:02,829

LET'S START BY GOING TO THE NASA  
WEBSITE SPOTTHESTATION.NASA.GOV.

273

00:16:02,829 --> 00:16:05,579

THIS WILL GIVE US ALL THE  
INFORMATION WE NEED.

274

00:16:05,579 --> 00:16:10,519

NOW, LET'S TRY TO SPOT THE  
STATION.

275

00:16:10,519 --> 00:16:13,660

WE SEE ON THIS PASS, THE STATION  
WILL BECOME VISIBLE AT

276

00:16:13,660 --> 00:16:18,620

NORTH-NORTHWEST AT 8:32 P.M.  
LET'S BE SURE WE ARE ON TIME

277

00:16:18,620 --> 00:16:20,660

BECAUSE THE SPACE STATION WON'T  
WAIT.

278

00:16:20,660 --> 00:16:25,389

FIRST, LET'S USE OUR COMPASS TO  
FIND WEST.

279

00:16:25,389 --> 00:16:30,740

NOW FIND NORTH.  
NORTHWEST IS BETWEEN NORTH AND

280

00:16:30,740 --> 00:16:34,759

WEST.  
NORTH-NORTHWEST IS BETWEEN

281  
00:16:34,759 --> 00:16:39,389  
NORTHWEST AND NORTH.  
OKAY.

282  
00:16:39,389 --> 00:16:42,170  
GOT IT.  
NEXT, WE SEE IT'S GOING TO

283  
00:16:42,170 --> 00:16:49,370  
DISAPPEAR IN THE EAST.  
GOT THAT LOCATION.

284  
00:16:49,370 --> 00:16:55,410  
THE ENTIRE VISIBLE PASS WILL  
HAPPEN BETWEEN THOSE TWO AREAS.

285  
00:16:55,410 --> 00:16:58,589  
NOW WE HAVE TO DETERMINE HOW  
HIGH IT'S GOING TO BE.

286  
00:16:58,589 --> 00:17:01,411  
HEIGHT IS MEASURED IN DEGREES.  
THERE'S A SIMPLE WAY TO

287  
00:17:01,411 --> 00:17:04,350  
DETERMINE THIS HEIGHT.  
HOLD YOUR HAND OUT AWAY FROM

288  
00:17:04,350 --> 00:17:07,959  
YOUR BODY AND MAKE A FIST.  
IF YOU PLACE THE BOTTOM OF YOUR

289  
00:17:07,959 --> 00:17:12,699  
FIST ON THE HORIZON, THAT LINE  
WHERE THE SKY MEETS THE GROUND,

290  
00:17:12,699 --> 00:17:16,370  
THE TOP OF YOUR FIST WILL BE  
APPROXIMATELY TEN DEGREES.

291  
00:17:16,370 --> 00:17:20,410  
YOU CAN THEN STACK YOUR FISTS ON  
TOP OF EACH OTHER TO REACH 20,

292  
00:17:20,410 --> 00:17:26,039  
30, 40 DEGREES OR HIGHER.  
TONIGHT THE SPACE STATION WILL

293  
00:17:26,039 --> 00:17:28,740  
APPEAR AT TEN DEGREES  
NORTH-NORTHWEST.

294  
00:17:28,740 --> 00:17:31,549  
IF I PLACE ONE FIST IN FRONT OF  
ME WHILE LOOKING

295  
00:17:31,549 --> 00:17:36,289  
NORTH-NORTHWEST, THIS IS WHERE  
IT SHOULD FIRST BECOME VISIBLE.

296  
00:17:36,289 --> 00:17:39,440  
GOT IT.  
IT WILL DISAPPEAR AT 20 DEGREES

297  
00:17:39,440 --> 00:17:42,870  
EAST.  
RIGHT THERE.

298  
00:17:42,870 --> 00:17:49,480  
AT ITS HIGHEST POINT, IT WILL  
REACH 40 DEGREES.

299  
00:17:49,480 --> 00:17:52,900  
BINGO.  
WE NOW HAVE A GOOD IDEA OF THE

300  
00:17:52,900 --> 00:17:57,610  
APPROXIMATE PATH THAT THE SPACE  
STATION WILL BE TRAVELING ALONG.

301

00:17:57,610 --> 00:17:59,990

IT'S ALMOST TIME.

LET'S LOOK IN THE GENERAL

302

00:17:59,990 --> 00:18:02,940

DIRECTION OF WHERE THE PASS WILL  
BECOME VISIBLE.

303

00:18:02,940 --> 00:18:06,039

WE WILL SCAN A WIDER AREA IN  
CASE WE ARE A LITTLE OFF WITH

304

00:18:06,039 --> 00:18:09,090

OUR MEASUREMENTS.

THE STATION DOES NOT HAVE LIGHTS

305

00:18:09,090 --> 00:18:11,370

OUTSIDE THAT ARE VISIBLE FROM  
EARTH.

306

00:18:11,370 --> 00:18:14,620

WHEN WE SEE IT, WE ARE ACTUALLY  
SEEING THE SUN REFLECTING OFF OF

307

00:18:14,620 --> 00:18:16,690

IT.

ONCE THE STATION BECOMES

308

00:18:16,690 --> 00:18:20,049

VISIBLE, IT WILL TAKE ABOUT SIX  
MINUTES TO PASS ACROSS THE SKY.

309

00:18:20,049 --> 00:18:22,340

IT WILL NOT BLINK LIKE AN  
AIRPLANE.

310

00:18:22,340 --> 00:18:26,450

IT WILL LOOK LIKE A VERY BRIGHT  
STAR THAT IS TRAVELING VERY FAST

311

00:18:26,450 --> 00:18:29,650

ACROSS THE SKY.

HERE IT COMES.

312

00:18:29,650 --> 00:18:42,230

WAVE TO THE ASTRONAUTS.

>> KATHY, WE'VE TALKED A LOT

313

00:18:42,230 --> 00:18:44,030

ABOUT THE INTERNATIONAL SPACE

STATION TODAY.

314

00:18:44,030 --> 00:18:46,590

SEEMS LIKE MAYBE WE NEED TO TALK

TO SOMEBODY WHO'S ACTUALLY BEEN

315

00:18:46,590 --> 00:18:48,190

TO THE INTERNATIONAL SPACE

STATION.

316

00:18:48,190 --> 00:18:51,350

>> I UNDERSTAND YOU HAD A CHANCE

TO TALK WITH ASTRONAUT CLAY

317

00:18:51,350 --> 00:18:53,470

ANDERSON.

LET'S GET IN WITH SOMEONE WHO'S

318

00:18:53,470 --> 00:18:55,600

BEEN ON THE SPACE STATION FOR

FIVE MONTHS.

319

00:18:55,600 --> 00:18:59,039

>> I'M JOINED BY ASTRONAUT CLAY

ANDERSON.

320

00:18:59,039 --> 00:19:02,360

YOU'RE A VETERAN OF SPACE

FLIGHTS.

321

00:19:02,360 --> 00:19:07,789

TELL ME ABOUT WHAT IT'S LIKE ON  
THE INTERNATIONAL SPACE STATION.

322

00:19:07,789 --> 00:19:10,370

>> LIVING ON THE SPACE STATION  
IS A BLAST.

323

00:19:10,370 --> 00:19:13,740

I WAS SUPERMAN EVERY DAY.  
I FLEW TO BREAKFAST.

324

00:19:13,740 --> 00:19:16,240

I FLEW TO WORK.  
IF I WANTED TO TAKE A BREAK, I

325

00:19:16,240 --> 00:19:19,000

FLEW TO THE BATHROOM.  
I EVEN FLEW WHEN I WAS GOING TO

326

00:19:19,000 --> 00:19:21,590

THE BATHROOM.  
IT WAS AWESOME.

327

00:19:21,590 --> 00:19:24,630

>> WHAT WAS YOUR FAVORITE THING  
ON THE SPACE STATION?

328

00:19:24,630 --> 00:19:27,500

>> I THINK FOR MOST ASTRONAUTS,  
OR AT LEAST FOR ME, THE FAVORITE

329

00:19:27,500 --> 00:19:29,870

THING TO DO WAS FLOAT AROUND IN  
ZERO G, RIGHT.

330

00:19:29,870 --> 00:19:34,690

I COULD SPIN, FLIP UPSIDE DOWN,  
FLY LIKE SUPERMAN, BE FAST, BE

331

00:19:34,690 --> 00:19:36,570

SLOW.

IT WAS REALLY, REALLY COOL.

332

00:19:36,570 --> 00:19:40,360

THE SECOND BEST THING WOULD HAVE  
TO BE LOOKING OUT THE WINDOW AT

333

00:19:40,360 --> 00:19:42,700

THE VIEWS OF EARTH.

>> WHAT WAS YOUR LEAST FAVORITE

334

00:19:42,700 --> 00:19:44,470

THING?

>> OH, MAN.

335

00:19:44,470 --> 00:19:47,100

CLEANING THE TOILETS AND  
VACUUMING ON SATURDAYS.

336

00:19:47,100 --> 00:19:50,289

EVERY SATURDAY WE HAD TO DO  
WORK, JUST LIKE I WAS AT HOME.

337

00:19:50,289 --> 00:19:53,620

I HAD TO GET OUT THE VACUUM  
CLEANER, TAKE OUT THE WET WIPES,

338

00:19:53,620 --> 00:19:56,410

WIPE EVERYTHING DOWN.

THAT WAS A PAIN IN THE REAR END.

339

00:19:56,410 --> 00:19:57,960

>> AWESOME.

THANK YOU SO MUCH FOR TALKING

340

00:19:57,960 --> 00:19:59,280

WITH US TODAY.

>> MY PLEASURE.

341

00:19:59,280 --> 00:20:02,890

THANKS FOR HAVING ME.

>> HERE AT S.T.E.M. IN 30, WE

342

00:20:02,890 --> 00:20:06,240

HAVE OUR VERY OWN GAME SHOW.

LET'S GO TO BETH WITH S.T.E.M.

343

00:20:06,240 --> 00:20:12,390

IT TO WIN IT.

MM

344

00:20:12,390 --> 00:20:16,280

>> THANKS, MARTY.

I'M HERE WITH SOME FRIENDS FROM

345

00:20:16,280 --> 00:20:21,049

POTOMAC PREP.

THE NAME OF THE GAME IS THEN OR

346

00:20:21,049 --> 00:20:23,669

NOW.

I'M GOING TO READ YOU A QUESTION

347

00:20:23,669 --> 00:20:27,380

ABOUT THE INTERNATIONAL SPACE

STATION, AND YOU HIT THE BUZZER

348

00:20:27,380 --> 00:20:30,150

AND TELL ME WHETHER IT'S

HAPPENING NOW OR IF IT HAPPENED

349

00:20:30,150 --> 00:20:32,919

15 YEARS AGO.

ARE YOU ALL READY TO BEGIN?

350

00:20:32,919 --> 00:20:34,309

>> YES.

>> OKAY.

351

00:20:34,309 --> 00:20:38,220

THE FIRST STATEMENT IS,  
ASTRONAUTS ARE ABLE TO TWEET

352

00:20:38,220 --> 00:20:39,740

FROM SPACE.

>> NOW.

353

00:20:39,740 --> 00:20:41,799

OKAY, LET'S SEE WHAT THE

354

00:20:41,799 --> 00:20:48,250

IN-HOUSE AUDIENCE SAYS.

MOST OF THEM SAY NOW.

355

00:20:48,250 --> 00:20:52,980

A FEW THENS OUT THERE.

OUR ONLINE AUDIENCE SAYS NOW.

356

00:20:52,980 --> 00:20:57,419

LET'S HEAR FROM KATHY AND MARTY.

>> WERE ASTRONAUTS TWEETING FROM

357

00:20:57,419 --> 00:20:59,590

SPACE 15 YEARS AGO?

>> NO.

358

00:20:59,590 --> 00:21:01,789

THIS AUDIENCE IS MAKING ME FEEL

OLD.

359

00:21:01,789 --> 00:21:05,220

THERE WAS NO TWITTER BACK THEN,

15 YEARS AGO.

360

00:21:05,220 --> 00:21:07,240

SO NOW IS THE RIGHT ANSWER.

>> AWESOME.

361

00:21:07,240 --> 00:21:08,970  
ALL RIGHT, BETH, ANOTHER  
QUESTION?

362  
00:21:08,970 --> 00:21:11,140  
>> YES.  
OUR NEXT STATEMENT IS, THE SIZE

363  
00:21:11,140 --> 00:21:15,120  
OF THE CREW ON THE INTERNATIONAL  
SPACE STATION IS THREE.

364  
00:21:15,120 --> 00:21:16,860  
THEN OR NOW?  
>> THEN.

365  
00:21:16,860 --> 00:21:19,630  
>> THEN?  
LET'S SEE WHAT OUR IN-HOUSE

366  
00:21:19,630 --> 00:21:25,370  
AUDIENCE SAYS.  
AGAIN, OUR IN-HOUSE AUDIENCE IS

367  
00:21:25,370 --> 00:21:28,940  
REALLY DIVIDED.  
THE ONLINE AUDIENCE SAYS THEN.

368  
00:21:28,940 --> 00:21:31,940  
LET'S SEE.  
LET'S HEAR FROM KATHY AND MARTY.

369  
00:21:31,940 --> 00:21:34,700  
>> CREW ON THE SPACE STATION,  
SIZE OF THREE.

370  
00:21:34,700 --> 00:21:36,450  
THEN OR NOW?  
>> THAT WAS THEN.

371

00:21:36,450 --> 00:21:39,730

NOW WE HAVE SIX.

>> SO WE HAVE A MUCH LARGER CREW

372

00:21:39,730 --> 00:21:41,260

NOW.

BETH, ANOTHER QUESTION?

373

00:21:41,260 --> 00:21:43,890

>> YES, I DO.

OKAY.

374

00:21:43,890 --> 00:21:48,350

ARE YOU READY?

ASTRONAUTS RECYCLE URINE AND

375

00:21:48,350 --> 00:21:51,121

SWEAT INTO DRINKING WATER.

THEN OR NOW?

376

00:21:51,121 --> 00:21:52,750

>> NOW.

>> NOW?

377

00:21:52,750 --> 00:21:56,530

OKAY.

LET'S SEE WHAT OUR IN-HOUSE

378

00:21:56,530 --> 00:22:00,080

AUDIENCE SAYS.

LOOKS LIKE A LOT OF THEM ARE

379

00:22:00,080 --> 00:22:03,039

SAYING NOW.

THE ONLINE AUDIENCE SAYS NOW.

380

00:22:03,039 --> 00:22:05,640

LET'S HEAR WHAT KATHY AND MARTY

HAVE TO SAY.

381

00:22:05,640 --> 00:22:07,919  
>> ASTRONAUTS RECYCLING WATER ON  
THE SPACE STATION.

382  
00:22:07,919 --> 00:22:09,299  
THEN OR NOW?  
>> THAT IS NOW.

383  
00:22:09,299 --> 00:22:15,220  
IN FACT, SCOTT KELLY IS GOING TO  
DRINK 730 GALLONS OF RECYCLED

384  
00:22:15,220 --> 00:22:18,360  
URINE DURING THE COURSE OF HIS  
STAY ON THE ISS.

385  
00:22:18,360 --> 00:22:19,929  
>> WOW.  
THAT'S INCREDIBLY GROSS, BUT

386  
00:22:19,929 --> 00:22:21,710  
THAT'S REALLY COOL AS WELL.  
ALL RIGHT.

387  
00:22:21,710 --> 00:22:24,020  
BETH, DO YOU HAVE ANOTHER ONE?  
>> WE DO.

388  
00:22:24,020 --> 00:22:26,419  
OUR LAST QUESTION IS, ARE YOU  
READY?

389  
00:22:26,419 --> 00:22:28,600  
>> YES.  
>> ASTRONAUTS LOVE TAKING

390  
00:22:28,600 --> 00:22:30,241  
PICTURES FROM SPACE.  
THEN OR NOW?

391

00:22:30,241 --> 00:22:33,320

>> NOW.

>> NOW, OKAY.

392

00:22:33,320 --> 00:22:36,299

LET'S SEE WHAT OUR IN-HOUSE  
AUDIENCE SAYS.

393

00:22:36,299 --> 00:22:39,919

LOOKS LIKE THEN AND NOW FROM THE  
IN-HOUSE AUDIENCE.

394

00:22:39,919 --> 00:22:43,169

OUR ONLINE AUDIENCE SAYS NOW.  
LET'S SEE WHAT KATHY AND MARTY

395

00:22:43,169 --> 00:22:45,230

HAVE TO SAY.

>> TAKING PICTURES AND LOOKING

396

00:22:45,230 --> 00:22:46,720

AT EARTH FROM SPACE.

THEN OR NOW?

397

00:22:46,720 --> 00:22:49,090

>> TRICK QUESTION.

THEN AND NOW.

398

00:22:49,090 --> 00:22:51,909

THAT WAS THE FIRST THING  
ASTRONAUTS DID WHEN THEY FIRST

399

00:22:51,909 --> 00:22:56,340

ORBIT THE EARTH IN 1961, AND  
THEY STILL LOVE IT TO THIS DAY.

400

00:22:56,340 --> 00:22:58,900

>> IT'S REALLY COOL NOW THAT  
ASTRONAUTS ARE ABLE TO TWEET

401

00:22:58,900 --> 00:23:00,650  
FROM SPACE.  
THEY CAN SHARE THOSE IMAGES

402  
00:23:00,650 --> 00:23:03,929  
ALMOST REALTIME FROM US.  
>> YES, WE CAN SEE WHAT THEY'RE

403  
00:23:03,929 --> 00:23:06,740  
DOING AND WHEN THEY'RE DOING IT.  
>> THAT'S REALLY COOL.

404  
00:23:06,740 --> 00:23:08,370  
ALL RIGHT.  
READY FOR SOME QUESTIONS?

405  
00:23:08,370 --> 00:23:11,280  
>> YES.  
>> WE HAVE ANOTHER SOFIA FROM

406  
00:23:11,280 --> 00:23:14,980  
VERMONT WITH A QUESTION.  
>> HOW DOES UNDERWATER TRAINING

407  
00:23:14,980 --> 00:23:21,549  
HELP ASTRONAUTS IN SPACE?  
>> WELL, THE PROBLEM IS THAT IN

408  
00:23:21,549 --> 00:23:23,400  
OUTER SPACE, YOU DON'T HAVE  
GRAVITY.

409  
00:23:23,400 --> 00:23:27,260  
YOU DON'T HAVE AN ENVIRONMENT.  
UNDERWATER TRAINING IS ONE WAY

410  
00:23:27,260 --> 00:23:31,530  
WE CAN SIMULATE AS CLOSE AS  
POSSIBLE TO WHAT IT'S LIKE OUT

411

00:23:31,530 --> 00:23:34,669  
IN SPACE TO SPACE WALK.  
THE ASTRONAUTS CAN GO UP IN A

412  
00:23:34,669 --> 00:23:38,549  
SPACE SUIT THAT'S WEIGHTED DOWN.  
THEY HAVE SCUBA MEN GUIDING THEM

413  
00:23:38,549 --> 00:23:41,130  
ALONG.  
IT GIVES THEM A FEELING FOR THE

414  
00:23:41,130 --> 00:23:44,650  
PHYSICS OF WORKING OUT IN SPACE.  
IT'S NOT AN EXACT MATCH, BUT

415  
00:23:44,650 --> 00:23:46,990  
IT'S AS CLOSE AS WE CAN DO HERE  
ON EARTH.

416  
00:23:46,990 --> 00:23:48,799  
>> WE HAVE AN AUDIENCE QUESTION  
NEXT.

417  
00:23:48,799 --> 00:23:58,210  
>> MY QUESTION IS, ARE THERE  
ANIMALS IN THE SPACE STATION?

418  
00:23:58,210 --> 00:24:00,929  
>> ARE THERE ANIMALS ON THE  
SPACE STATION?

419  
00:24:00,929 --> 00:24:06,669  
>> THEY TAKE ANIMALS FOR VERY  
LIMITED EXPERIMENTS ON THE SPACE

420  
00:24:06,669 --> 00:24:10,159  
STATION, BUT THEY HAVEN'T HAD  
LARGE ANIMALS.

421

00:24:10,159 --> 00:24:13,330  
WE THINK OF DOGS IN SPACE OR  
MONKEYS, BUT THEY'VE NEVER GONE

422  
00:24:13,330 --> 00:24:16,830  
UP WITH HUMANS.  
THE KIND OF ANIMALS THEY TAKE,

423  
00:24:16,830 --> 00:24:22,409  
INSECTS.  
THEY'VE TAKEN SPIDERS TO SEE HOW

424  
00:24:22,409 --> 00:24:25,320  
THEY FUNCTION IN SPACE AND HOW  
THEY MOVE AROUND.

425  
00:24:25,320 --> 00:24:27,480  
THEY'RE VERY LIMITED AND HAVE TO  
BE ISOLATED.

426  
00:24:27,480 --> 00:24:30,350  
YOU DON'T WANT ANIMALS TO ESCAPE  
IN YOUR SPACE STATION.

427  
00:24:30,350 --> 00:24:31,970  
IT'S GOING TO BE A PRETTY BIG  
MESS.

428  
00:24:31,970 --> 00:24:34,080  
>> I WOULD NOT WANT SPIDERS  
RUNNING AROUND THE SPACE STATION

429  
00:24:34,080 --> 00:24:35,080  
AT ALL.  
ALL RIGHT.

430  
00:24:35,080 --> 00:24:38,250  
WE HAVE AN ONLINE QUESTION NEXT.  
HOW LONG WILL THE INTERNATIONAL

431

00:24:38,250 --> 00:24:41,880  
SPACE STATION STAY IN OPERATION?  
>> WELL, THAT'S A VERY GOOD

432  
00:24:41,880 --> 00:24:45,789  
QUESTION.  
IT'S A MATTER OF DIPLOMACY AND

433  
00:24:45,789 --> 00:24:49,140  
FUNDING.  
THE SPACE STATION IS SUPPOSED TO

434  
00:24:49,140 --> 00:24:54,100  
STAY IN OPERATION UNTIL 2025.  
THE UNITED STATES AND NASA HAVE

435  
00:24:54,100 --> 00:24:58,039  
BEEN TALKING ABOUT GETTING IT TO  
STAY UNTIL 2027.

436  
00:24:58,039 --> 00:25:01,049  
THEY HAVE TO WAIT TO SEE IF THE  
RUSSIANS AGREE.

437  
00:25:01,049 --> 00:25:04,049  
AND THEY ALSO HAVE TO WAIT TO  
SEE WHAT THE NEXT PLANS ARE.

438  
00:25:04,049 --> 00:25:07,880  
IF THEY'RE GOING TO DO A JOINT  
MISSION TO MARS, THEY MAY CUT IT

439  
00:25:07,880 --> 00:25:11,679  
SHORT, OR THEY MAY USE THE SPACE  
STATION AS A JUMPING OFF POINT

440  
00:25:11,679 --> 00:25:13,150  
FOR A MARS MISSION.  
>> ALL RIGHT.

441

00:25:13,150 --> 00:25:16,730  
ANOTHER ONLINE QUESTION.  
WHAT IS MICROGRAVITY?

442  
00:25:16,730 --> 00:25:22,309  
>> WELL, AS I WAS SAYING BEFORE,  
FALLING WAS MISSING IN THE WORD

443  
00:25:22,309 --> 00:25:24,659  
CLOUD.  
THAT'S WHAT MICROGRAVITY IS.

444  
00:25:24,659 --> 00:25:30,299  
IT'S THAT FALLING AT 17,500  
MILES AN HOUR, NEVER QUITE

445  
00:25:30,299 --> 00:25:33,120  
FALLING BACK TO EARTH, BUT STILL  
HAVING THAT FEELING OF FALLING.

446  
00:25:33,120 --> 00:25:36,990  
ASTRONAUTS DON'T REALLY FEEL IT  
INSIDE THE SPACE STATION BECAUSE

447  
00:25:36,990 --> 00:25:40,029  
THE WHOLE STATION IS FALLING.  
WHEN THEY REALLY FEEL IT IS WHEN

448  
00:25:40,029 --> 00:25:43,360  
THEY GO OUT TO TAKE A SPACE WALK  
AND THEY LOOK OUT AND ACTUALLY

449  
00:25:43,360 --> 00:25:47,070  
FEEL THAT SENSATION OF FALLING.  
SOMETIMES THEY SAY IT TAKES THEM

450  
00:25:47,070 --> 00:25:51,679  
A LITTLE WHILE TO LET GO OF THAT  
HANDLE BECAUSE THEY'RE STRAPPED

451

00:25:51,679 --> 00:25:54,559  
ON BUT FEEL THAT FALLING  
SENSATION.

452  
00:25:54,559 --> 00:25:59,029  
>> AND THEY'RE ACTUALLY FALLING  
AT THE SAME RATE AS THE SPACE

453  
00:25:59,029 --> 00:26:01,090  
STATION.  
>> THEY'RE JUST NOT AWARE OF IT

454  
00:26:01,090 --> 00:26:02,130  
UNTIL THEY'RE OUT THERE.  
>> ALL RIGHT.

455  
00:26:02,130 --> 00:26:06,549  
WE HAVE AN AUDIENCE QUESTION.  
>> MY QUESTION IS, HOW LONG DID

456  
00:26:06,549 --> 00:26:08,760  
IT TAKE TO BUILD THE  
INTERNATIONAL SPACE STATION?

457  
00:26:08,760 --> 00:26:11,539  
>> HOW LONG DID IT TAKE TO BUILD  
THE INTERNATIONAL SPACE STATION?

458  
00:26:11,539 --> 00:26:14,260  
>> WELL, THAT IS ANOTHER TRICK  
QUESTION.

459  
00:26:14,260 --> 00:26:17,309  
THEY'RE STILL BUILDING IT.  
THEY STARTED OUT WITH THE THREE

460  
00:26:17,309 --> 00:26:22,470  
UNITS IN 2000.  
THE FIRST ONE WAS LAUNCHED IN

461

00:26:22,470 --> 00:26:24,240

1998.

THEY FINALLY BOLTED THEM

462

00:26:24,240 --> 00:26:26,909

TOGETHER AND INHABITED IT IN  
2000.

463

00:26:26,909 --> 00:26:28,830

BUT THEY'RE STILL ADDING  
COMPONENTS.

464

00:26:28,830 --> 00:26:31,750

THERE ARE THREE COMPONENTS THAT  
ARE WAITING TO BE LAUNCHED TO BE

465

00:26:31,750 --> 00:26:35,000

BOLTED ON TO THE SPACE STATION.  
SO THEY'RE STILL BUILDING IT 15

466

00:26:35,000 --> 00:26:36,250

YEARS LATER.

>> AWESOME.

467

00:26:36,250 --> 00:26:38,350

KATHY, THANK YOU SO MUCH FOR  
JOINING US TODAY.

468

00:26:38,350 --> 00:26:40,789

I'D LIKE TO THANK ALL OF OUR  
ONLINE VIEWERS FOR WATCHING

469

00:26:40,789 --> 00:26:43,150

TODAY AND SUBMITTING SOME REALLY  
GOOD QUESTIONS.

470

00:26:43,150 --> 00:26:45,970

WE WANT TO ENCOURAGE YOU GUYS TO  
WATCH OUR NEXT SHOW, DECEMBER

471

00:26:45,970 --> 00:26:49,429  
17th, AS WE COME TO YOU FROM  
DEERBORNE, MICHIGAN, ON THE

472

00:26:49,429 --> 00:26:52,840  
ANNIVERSARY OF THE WRIGHT  
BROTHERS' FLIGHT.

473

00:26:52,840 --> 00:26:55,690  
HERE'S BETH WITH MORE  
INFORMATION.

474

00:26:55,690 --> 00:26:59,679  
>> HI.  
I'M BETH WILSON, ONE OF THE

475

00:26:59,679 --> 00:27:05,380  
HOSTS OF S.T.E.M. IN 30.  
TAKE A LOOK AT THIS.

476

00:27:05,380 --> 00:27:08,220  
THIS IS ORVILLE WRIGHT'S  
MANDOLIN.

477

00:27:08,220 --> 00:27:10,250  
>> HEY!  
HE WAS AN INVENTOR, NOT IN A

478

00:27:10,250 --> 00:27:12,700  
BAND.  
>> YES, OKAY.

479

00:27:12,700 --> 00:27:16,090  
ORVILLE AND HIS BROTHER DID  
INVENT THE AIRPLANE, BUT A LOT

480

00:27:16,090 --> 00:27:20,140  
OF SCIENTISTS AND ENGINEERS AND  
INVENTORS HAVE OTHER INTERESTS.

481

00:27:20,140 --> 00:27:23,980  
PAINTING, DRAWING, MUSIC, AND  
DANCE.

482  
00:27:23,980 --> 00:27:27,010  
BUT ACCORDING TO ORVILLE'S  
SISTER KATHERINE†--

483  
00:27:27,010 --> 00:27:31,799  
>> HE BEGAN LESSONS ON THE  
MANDOLIN, AND WE'RE GETTING EVEN

484  
00:27:31,799 --> 00:27:35,380  
WITH THE NEIGHBORHOOD FOR THE  
NOISE THEY HAVE MADE ON PIANOS.

485  
00:27:35,380 --> 00:27:39,130  
HE SITS AROUND AND PICKS THAT  
THING UNTIL I CAN HARDLY STAY IN

486  
00:27:39,130 --> 00:27:41,510  
THE HOUSE.  
>> WELL, HE MAY NOT HAVE BEEN

487  
00:27:41,510 --> 00:27:44,580  
THE BEST MANDOLIN PLAYER, BUT AT  
LEAST HE GAVE IT A TRY.

488  
00:27:44,580 --> 00:27:46,750  
IF YOU THINK THIS IS  
INTERESTING, BE SURE TO CHECK

489  
00:27:46,750 --> 00:27:56,720  
OUT OUR NEXT S.T.E.M. IN 30.  
>> WE HOPE TO SEE EVERYBODY NEXT