

NASA



1
00:00:07,700 --> 00:00:12,789
>> EFPTOZL.

2
00:00:12,789 --> 00:00:13,789
>> WHAT ARE YOU UP TO?

3
00:00:13,789 --> 00:00:16,320
>> I AM TESTING MY EYESIGHT.

4
00:00:16,320 --> 00:00:17,320
>> WHY?

5
00:00:17,320 --> 00:00:20,720
>> WELL, THE HUMAN EYE IS
SOMETHING THAT NASA KEEPS AN EYE

6
00:00:20,720 --> 00:00:21,720
ON.

7
00:00:21,720 --> 00:00:23,780
>> I SEE WHAT YOU DID.

8
00:00:23,780 --> 00:00:27,560
>> SINCE THE EARLY DAYS JOHN
GLEN WAS THE FIRST TO ORBIT THE

9
00:00:27,560 --> 00:00:32,820
EARTH AND IN HIS CAPSULE HE HAD
EYE CHARTS AND HE WOULD HAVE TO

10
00:00:32,820 --> 00:00:33,820
TEST HIS EYESIGHT.

11
00:00:33,820 --> 00:00:38,540
WHAT THEY ARE FINDING TODAY IS
ASTRONAUTS SOME OF THEM, WHO

12
00:00:38,540 --> 00:00:42,910

SPEND MORE THAN SIX MONTH IN
SPACE SOME OF THEIR ICE CHANGE

13

00:00:42,910 --> 00:00:44,710

SHAPE.

14

00:00:44,710 --> 00:00:47,870

NASA IS STUDYING THIS TO SEE IF
TELL AFFECT LONG-TERM SPACE

15

00:00:47,870 --> 00:00:48,870

FLIGHT.

16

00:00:48,870 --> 00:00:50,670

>> CAN I TRY?

17

00:00:50,670 --> 00:00:51,670

>> SURE.

18

00:00:51,670 --> 00:01:04,140

TRY LINE A.

>> THIS IS "STEM IN 30" THAT'S,

19

00:01:04,140 --> 00:01:08,080

OH!

THIS IS "STEM IN 30"

20

00:01:08,080 --> 00:01:09,630

>> I'M READY TO BE AN
ASTRONAUT.

21

00:01:09,630 --> 00:01:12,869

>> WELL IS MORE TO IT, HAVE A
SEAT.

22

00:01:12,869 --> 00:01:18,579

SOMETIMES AS AN ASTRONAUT, YOU
HAVE TO DRAW YOUR OWN BLOOD.

23

00:01:18,579 --> 00:01:28,399
>> I'M†-- NOT SUCH A BIG FAN
OF†--

24
00:01:28,399 --> 00:01:30,079
>> YOU WANT TO BE AN ASTRONAUT?

25
00:01:32,520 --> 00:01:31,299
MARTY?

26
00:01:32,520 --> 00:01:37,360
OKAY, SHOW ME.

27
00:01:37,360 --> 00:02:01,489
[MUSIC] THIS IS "STEM IN 30" HI.

28
00:02:01,489 --> 00:02:08,379
I'M MARTY.

29
00:02:08,379 --> 00:02:20,750
>> I'M BETH WE'RE LIVE TODAY
FROM THE MOVING BEYOND EARTH

30
00:02:20,750 --> 00:02:25,090
GALLERY AT THE NATIONAL AARON
SPACE MUSEUM IN WASHINGTON, D.C.

31
00:02:25,090 --> 00:02:28,970
>> WELCOME OUR ONLINE VIEWERS
AND THOSE WATCHING ON TV AND YOU

32
00:02:28,970 --> 00:02:32,820
CAN SUBMIT QUESTIONS TODAY AND
SOME WE WILL USE ON THE SHOW.

33
00:02:32,820 --> 00:02:35,330
IF YOU LOOK ON THIS SIDE OF THE
SCREEN YOU WILL SEE A BOX WHERE

34

00:02:35,330 --> 00:02:40,260
YOU CAN SUBMIT QUESTIONS AND WE
HAVE ADDITIONAL CONTENT WE ADD

35
00:02:40,260 --> 00:02:43,860
OVER THERE INCLUDING IMAGES AND
PICTURES THAT REALLY SUPPLEMENT

36
00:02:43,860 --> 00:02:45,120
THE SHOW.

37
00:02:45,120 --> 00:02:48,370
>> NOW†-- WE HAVE A VERY LARGE
AUDIENCE TODAY.

38
00:02:48,370 --> 00:02:53,310
WE HAVE STUDENTS FROM SCHOOLS IN
MARYLAND, VIRGINIA AND DC.

39
00:02:53,310 --> 00:02:55,640
WE ARE SO GLAD YOU ARE ALL HERE.

40
00:02:55,640 --> 00:02:59,910
AND MARTY, IF YOU WILL GATHER
THE AUDIENCE THERE IS SOMEONE†--

41
00:02:59,910 --> 00:03:04,160
>> ONE THAT DOES NOT QUITE LOOK
LIKE THEY ARE A MIDDLE SCHOOL

42
00:03:04,160 --> 00:03:05,160
STUDENT.

43
00:03:05,160 --> 00:03:06,629
WHAT'S GOING ON THERE?

44
00:03:06,629 --> 00:03:09,680
>> TODAY WE HAVE A SPECIAL
GUEST WE HAVE NASA ASTRONAUT

45

00:03:09,680 --> 00:03:11,640

ANNA FISHER WITH US.

46

00:03:11,640 --> 00:03:16,000

THANK YOU FOR BEING WITH US.

47

00:03:16,000 --> 00:03:19,750

ARE YOU READY TO TAKE QUESTIONS?

48

00:03:19,750 --> 00:03:21,530

>> I'M READY, BETH.

49

00:03:21,530 --> 00:03:23,900

>> YOU HAVE A QUESTION.

50

00:03:23,900 --> 00:03:26,610

Q: HOW DID YOU FEEL WHEN YOU
LEFT EARTH'S ATMOSPHERE AND SAW

51

00:03:26,610 --> 00:03:29,850

SPACE FOR THE FIRST TIME IN YOUR
OWN EYES.

52

00:03:29,850 --> 00:03:33,050

A: THAT WAS AN AMAZING
EXPERIENCE.

53

00:03:33,050 --> 00:03:39,650

LAUNCHING AND GOING TO 7, 500
MILES PER HOUR IN EIGHT AND A

54

00:03:39,650 --> 00:03:42,760

HALF MINUTES IS QUITE A RIDE.

55

00:03:42,760 --> 00:03:46,850

THAT WAS JUST FUN THEN ONCE YOU
GET UP ON ORBIT AND LOOK AT THE

56

00:03:46,850 --> 00:03:51,740
BEAUTIFUL PLAN END OF OURS AND
YOU FLOAT T. IS THE MOST AMAZING

57
00:03:51,740 --> 00:03:54,510
FEELING YOU COULD IMAGINE.

58
00:03:54,510 --> 00:03:57,010
LET'S SEE CAROLINE?

59
00:03:57,010 --> 00:04:00,030
Q: NUTRITIONAL NEEDS DIFFERENT
IN SPACE?

60
00:04:00,030 --> 00:04:04,011
A: YOU KNOW THE NUTRITIONAL
NEEDS IN SPACE ARE NOT DIFFERENT

61
00:04:04,011 --> 00:04:06,090
FROM ON THE GROUND.

62
00:04:06,090 --> 00:04:09,600
THE FOOD THAT WE FLY ON BOARD
THE SHUTTLE AND ON BOARD SPACE

63
00:04:09,600 --> 00:04:12,760
STATION AND PRETTY MUCH ANY
SPACE VEHICLE IS LIKE BACK

64
00:04:12,760 --> 00:04:13,760
PACKING FOOD.

65
00:04:13,760 --> 00:04:16,470
IF YOU BACK PACK OR CAMP?

66
00:04:16,470 --> 00:04:18,590
AND IT IS REALLY GOOD.

67
00:04:18,590 --> 00:04:23,939

WE HAVE TO BE CAREFUL ABOUT SALT
INTAKE ON ORBIT SO THAT-- IT

68
00:04:23,939 --> 00:04:27,130
DOES NOT AFFECT YOUR METABOLISM.

69
00:04:27,130 --> 00:04:30,969
AND THE OTHER THING THAT HAPPENS
IN SPACE FOR A LONG TIME IS YOU

70
00:04:30,969 --> 00:04:32,400
LOSE YOUR TASTE FOR THINGS.

71
00:04:32,400 --> 00:04:34,810
PEOPLE WANT IT TO BE SPICY.

72
00:04:34,810 --> 00:04:39,830
IN TERMS OF NUTRITIONAL NEEDS,
IT IS NOT THAT DIFFERENT THAN

73
00:04:39,830 --> 00:04:41,560
HERE ON THE GROUND.

74
00:04:41,560 --> 00:04:43,060
Q: OKAY.

75
00:04:43,060 --> 00:04:44,330
>> YOU HAVE A QUESTION?

76
00:04:44,330 --> 00:04:47,441
Q: WHAT IS IN THE GREATEST
SCIENTIFIC DISCOVERIES THAT HAVE

77
00:04:47,441 --> 00:04:50,650
BEEN FOUND BY EXPERIMENTING IN
SPACE?

78
00:04:50,650 --> 00:04:54,110
A: WE FOUND A LOT OF THINGS

SINCE THE BEGINNING OF THE SPACE

79

00:04:54,110 --> 00:04:55,110
PROGRAM.

80

00:04:55,110 --> 00:04:59,939
MANY THINGS WE TAKE FOR GRANTED
THE MINIATURIZATION OF

81

00:04:59,939 --> 00:05:01,680
COMPUTERS.

82

00:05:01,680 --> 00:05:06,279
HAVING TELEMETRY LIKE THE
PARAMEDICS WHEN THEY PICK UP

83

00:05:06,279 --> 00:05:11,569
PEOPLE AND ON BOARD SPACE
STATION, WE DO HUNDREDS OF

84

00:05:11,569 --> 00:05:12,569
EXPERIMENTS.

85

00:05:12,569 --> 00:05:15,710
LEARN TO GROW PROTEINS IN SPACE.

86

00:05:15,710 --> 00:05:19,229
LEARNING HOW FLAMES PROPAGATE IN
SPACE.

87

00:05:19,229 --> 00:05:24,400
STUDYING HOW FISH AND ANTES AND
ANIMALS AND INSECTS ADAPT IN

88

00:05:24,400 --> 00:05:25,400
SPACE.

89

00:05:25,400 --> 00:05:32,199
SO, WE ARE DOING MANY THINGS ONE

NEAT THING ABOUT SCIENCE IS YOU

90

00:05:32,199 --> 00:05:34,099

NEVER KNOW WHAT YOU WILL FIND
OUT.

91

00:05:34,099 --> 00:05:36,509

YOU MAY START THINKING ONE THING
AND FIND OUT SOMETHING

92

00:05:36,509 --> 00:05:37,509

DIFFERENT.

93

00:05:37,509 --> 00:05:41,789

IT IS FUN TO USE YOUR MATH AND
SCIENCE, TOO TO MAKE NEW

94

00:05:41,789 --> 00:05:42,789

DISCOVERIES.

95

00:05:42,789 --> 00:05:47,020

>> SINCE THE BEGINNING WE ARE
GOING TO HAVE MORE QUESTIONS AS

96

00:05:47,020 --> 00:05:49,059

WE GO ALONG TODAY.

97

00:05:49,059 --> 00:05:50,729

AND ANN WILL ANSWER THEM.

98

00:05:50,729 --> 00:05:53,479

NOW WE WILL BE TALKING ABOUT
SCIENCE AND SPACE.

99

00:05:53,479 --> 00:05:59,099

MARTY, YOU LEARNED THAT SCIENCE
IN SPACE STARTS ON EARTH?

100

00:05:59,099 --> 00:06:00,099

IT DOES.

101

00:06:00,099 --> 00:06:02,080

BETH SAID YOU NEED TO GO TO THIS
GREEN HOUSE.

102

00:06:02,080 --> 00:06:06,100

I WAS NOT WILD ABOUT THAT.

103

00:06:06,100 --> 00:06:08,559

LET US HEAD TO THE GREEN HOUSE.

104

00:06:08,559 --> 00:06:11,970

>> I'M AT THE SMITHSONIAN
GARDEN GREEN HOUSE I'M GOING TO

105

00:06:11,970 --> 00:06:15,199

TALK TO BRETT MC NISH, A
HORTICULTURIST.

106

00:06:15,199 --> 00:06:17,669

YOU WILL DIG THIS.

107

00:06:17,669 --> 00:06:20,919

>> HOW IS IT GOING?

108

00:06:20,919 --> 00:06:22,550

>> HEY, MARTY.

109

00:06:22,550 --> 00:06:25,589

WELCOME TO THE SMITHSONIAN GREEN
HOUSE.

110

00:06:25,589 --> 00:06:30,399

>> THIS PLACE IS INCREDIBLE
THIS IS FUNNY LOOKING.

111

00:06:30,399 --> 00:06:32,789

>> YOU NOTICED THIS.

112

00:06:32,789 --> 00:06:38,110

THIS PLANT HERE IS AMERANTH IT
IS A SEMIANNUAL WE GROW IN OUR

113

00:06:38,110 --> 00:06:40,610

GARDENS.

114

00:06:40,610 --> 00:06:47,189

WE DECIDED TO HAVE FUN TO SHOW
FOLKS AN EXAMPLE OF GEOTROPISM.

115

00:06:47,189 --> 00:06:48,189

>> WHAT IS THAT?

116

00:06:48,189 --> 00:06:53,150

>> GEOTROPISM IS THE PLANTS
RESPONSE TO GRAVITY.

117

00:06:53,150 --> 00:06:57,199

WE KNOW PLANTS WANT TO GROW UP
TOWARD THE SUP TO GET THAT

118

00:06:57,199 --> 00:06:58,199

SUNLIGHT.

119

00:06:58,199 --> 00:07:01,159

AND THEY ALSO WANT TO SEND ROOTS
DOWN IN THE SOIL WHERE THERE IS

120

00:07:01,159 --> 00:07:03,249

NUTRIENTS AND WATER.

121

00:07:03,249 --> 00:07:08,309

DOWN HERE WE HAVE AN EXPERIMENTS
WHERE WE HAVE TAKEN A PLANT AND

122

00:07:08,309 --> 00:07:09,879

GROWN IT UPSIDE DOWN.

123

00:07:09,879 --> 00:07:14,189

AND NOW THIS PLANT IS TRYING TO
GROW UP TOWARD THE SUN.

124

00:07:14,189 --> 00:07:16,569

AND IT IS DONE A NICE CURVE
HERE.

125

00:07:16,569 --> 00:07:19,099

LOOKS LIKE A COUP LADLE.

126

00:07:19,099 --> 00:07:22,139

>> GROWING PLANTS IN SPACE THIS
SHOWS IT IS NOT EASY.

127

00:07:22,139 --> 00:07:23,139

>> RIGHT.

128

00:07:23,139 --> 00:07:26,319

IN SPACE YOU HAVE A LOWER OR
ZERO GRAVITY ENVIRONMENT.

129

00:07:26,319 --> 00:07:29,139

PLANT WILL GET CONFUSED.

130

00:07:29,139 --> 00:07:32,599

THEY RUN EXPERIMENTS LIKE THIS
IN SPACE AND SEE THE ROOTS AND

131

00:07:32,599 --> 00:07:37,410

CHUTES GROW IN THE SAME CRAZY
DIRECTIONS.

132

00:07:37,410 --> 00:07:38,610

CONFUSED.

133

00:07:38,610 --> 00:07:41,659

>> THERE HAS BEEN AN EXPERIMENT

ON THE INTERNATIONAL SPACE

134

00:07:41,659 --> 00:07:43,849
STATION CALLED, VEGGIE?

135

00:07:43,849 --> 00:07:48,210
>> VEGGIE YOU ARE TALKING ABOUT
GROWING SALAD GREEN IN SPACE.

136

00:07:48,210 --> 00:07:52,759
OUTRAGEOUS IS THE NAME THEY
ENJOYED UP THERE.

137

00:07:52,759 --> 00:07:54,879
PLANTS REQUIRE THINGS TO GROW.

138

00:07:54,879 --> 00:07:55,990
THEY NEED NUTRIENTS.

139

00:07:55,990 --> 00:07:58,999
THEY WILL GET THROUGH SOIL.

140

00:07:58,999 --> 00:08:00,479
OR GROWING MEDIUM.

141

00:08:00,479 --> 00:08:01,589
THEY NEED WATER.

142

00:08:01,589 --> 00:08:03,329
THEY NEED CZ2 AND SUNLIGHT.

143

00:08:03,329 --> 00:08:09,369
>> LIKE A GREEN HOUSE.

144

00:08:09,369 --> 00:08:11,030
>> EXACTLY A CONTROLLED
ENVIRONMENT.

145

00:08:11,030 --> 00:08:16,300
>> I GOT A CHANCE TO TALK TO
KJEL LINDGREN WHEN THEY

146
00:08:16,300 --> 00:08:22,889
HARVESTED THE FIRST CROP OF
LETTUCE AND IF IS BEYOND GETTING

147
00:08:22,889 --> 00:08:24,709
A CHANCE TO EAT THEM.

148
00:08:24,709 --> 00:08:29,009
>> AN ADDITIONAL BENEFIT THAT
WAS POWERFUL THE PSYCHOLOGICAL

149
00:08:29,009 --> 00:08:30,009
ASPECT.

150
00:08:30,009 --> 00:08:33,610
WE GARDEN ON EARTH BECAUSE IT IS
FUN.

151
00:08:33,610 --> 00:08:38,250
AND I HAPPENING THE IT IS†-- THE
SAME ON STATION AS WELL.

152
00:08:38,250 --> 00:08:42,130
TO BE TAKING TARE CARE OF A
LIVING THING DAILY TO WATCH IT

153
00:08:42,130 --> 00:08:46,220
GROW AND SEE THIS GREEN LIVING
THING IN AN OTHERWISE WHITE AND

154
00:08:46,220 --> 00:08:50,570
STAINLESS STERILE ENVIRONMENT OF
THE SPACE STATION WAS

155
00:08:50,570 --> 00:08:52,980
PSYCHOLOGICALLY HELPFUL.

156

00:08:52,980 --> 00:08:57,440

>> ANA YOU HAVE A GREAT STORY
ABOUT THAT EXPERIMENT.

157

00:08:57,440 --> 00:08:59,480

TELL US A BIT ABOUT IT.

158

00:08:59,480 --> 00:09:00,480

>> YES.

159

00:09:00,480 --> 00:09:04,580

ONE OF MY COLLEAGUES WAS ON THAT
SAME EXPEDITION GROWING LETTUCE

160

00:09:04,580 --> 00:09:09,840

IN SPACE AND TOLD US A STORY HOW
HIS FATHER IS FROM JAPAN AND

161

00:09:09,840 --> 00:09:14,080

FIRST GENERATION SON WANTED HIS
SON TO CONTINUE AND BE A FARMER

162

00:09:14,080 --> 00:09:15,260

AS WELL.

163

00:09:15,260 --> 00:09:16,490

KENYA HAD OTHER IDEAS.

164

00:09:16,490 --> 00:09:20,650

HE WANT TO BE A PILOT AND BECAME
AN ASTRONAUT.

165

00:09:20,650 --> 00:09:24,440

WHEN HE WAS ON THE SPACE STATION
AND GREW THE LETTUCE AND ATE IT

166

00:09:24,440 --> 00:09:28,180

WHEN HE GOT BACK TO EARTH HIS

DAD ASKED WHICH LUES WAS BETTER

167

00:09:28,180 --> 00:09:32,160

THE LETTUCE ON THE FARM OR IN
SPACE.

168

00:09:32,160 --> 00:09:35,980

BEING THE DIPLOMATIC PERSON
HEED, IT WAS HIS DADS.

169

00:09:35,980 --> 00:09:38,530

>> HE GOT TO FARM JUST NOT ON
EARTH.

170

00:09:38,530 --> 00:09:42,840

>> THEY EACH PURSUED THEIR
DREAMS AND HE PURSUED HIS

171

00:09:42,840 --> 00:09:47,060

FARTHER'S DREAMS WE FOLLOW
NOTHING HIS FOOTSTEPS, SORT OF.

172

00:09:47,060 --> 00:09:50,840

>> YOU WERE THE FIRST CLASS OF
ASTRONAUTS THAT INCLUDED WOMEN

173

00:09:50,840 --> 00:09:53,580

AND THE FIRST MOTHER IN SPACE.

174

00:09:53,580 --> 00:09:57,380

WILL YOU TELL US ABOUT THOUGH
EXPERIENCE.

175

00:09:57,380 --> 00:10:03,340

GI WAS HONORED TO BE IN THE
FIRST GROUP OF WOMEN SELECT IN

176

00:10:03,340 --> 00:10:04,340

THE 1978.

177

00:10:04,340 --> 00:10:08,430

IT WAS A TIME NASA WAS PREPARED
AND READY AND WELCOMING WOMEN.

178

00:10:08,430 --> 00:10:12,330

IT WAS A WONDERFUL EXPERIENCE
AND GETTING A CHANCE TO BE THE

179

00:10:12,330 --> 00:10:13,770

FIRST MOM TO GO IN SPACE.

180

00:10:13,770 --> 00:10:17,260

MY DAUGHTER SAYS I OWE IT ALL TO
HER.

181

00:10:17,260 --> 00:10:18,890

IT WAS A VERY CHALLENGING TIME.

182

00:10:18,890 --> 00:10:22,640

BUT AT SAME TIME BOTH WERE
EQUALLY IMPORTANT TO ME.

183

00:10:22,640 --> 00:10:27,830

IT WAS REALLY A SPECIAL BUT
JUGGLING THE TWO WAS THE

184

00:10:27,830 --> 00:10:28,830

CHALLENGE.

185

00:10:28,830 --> 00:10:29,830

>> I IMAGINE IT WAS.

186

00:10:29,830 --> 00:10:32,720

THERE IS A LOT OF TRAINING THAT
GOES INTO IT.

187

00:10:32,720 --> 00:10:36,270

>> A LOT OF TRAINING AND ALSO
YOU KNOW, BEING A 50 TIME MOM

188

00:10:36,270 --> 00:10:40,700

LEARNING ALL THAT, TOO, IT WAS
CHALLENGING BUT PROBABLY THE

189

00:10:40,700 --> 00:10:41,890

BEST YEARS OF MY LIFE.

190

00:10:41,890 --> 00:10:44,070

>> SHALL WE TAKE QUESTIONS?

191

00:10:44,070 --> 00:10:45,310

>> SOUNDS GREAT.

192

00:10:45,310 --> 00:10:46,840

>> START WITH A VIDEO QUESTION.

193

00:10:46,840 --> 00:10:53,200

Q: I WAS WONDERING IF
[INAUDIBLE]

194

00:10:53,200 --> 00:10:59,220

A: WELL IS NO DISADVANTAGE THAT
I CAN THINK OF OTHER THAN SOME

195

00:10:59,220 --> 00:11:02,820

OF US THAT ARE ON THE SMALL ARE
SIDE WE DID NOT FIT IN THE SPACE

196

00:11:02,820 --> 00:11:03,820

SUIT.

197

00:11:03,820 --> 00:11:06,361

WE WERE NOT ABLE TO DO SPACE
WALKS BUT WE ARE WORKING TO

198

00:11:06,361 --> 00:11:12,160

DESIGN A SUIT THAT THE FIT THE
ENTIRE RANGE.

199

00:11:12,160 --> 00:11:16,530

WE HAVE PERHAPS ONE SLIGHT
ADVANTAGE IN THAT WE HAD SOME

200

00:11:16,530 --> 00:11:19,920

ASTRONAUTS COME BACK WITH
CHANGES TO THEIR VISION.

201

00:11:19,920 --> 00:11:24,180

A LOT OF THEORIES TO WHY THAT
HAPPENS SO FAR AND IT IS NOT

202

00:11:24,180 --> 00:11:28,420

SIGNIFICANT, NONE OF THE WOMEN
HAD THAT PROBLEM.

203

00:11:28,420 --> 00:11:30,340

MAY BE THERE IS A SLIGHT
ADVANTAGE.

204

00:11:30,340 --> 00:11:34,340

BUT REALISTICALLY MALES AND
FEMALES ALL DO THE SAME JOB AND

205

00:11:34,340 --> 00:11:38,060

SAME TRAINING AND THERE IS NOT
AN ADVANTAGE OR DISADVANTAGE.

206

00:11:38,060 --> 00:11:40,360

>> WE HAVE AN ONLINE QUESTION.

207

00:11:40,360 --> 00:11:45,670

Q: HOW DO YOU CONDUCT SCIENCE ON
THE SPACE STATION WITH THE

208

00:11:45,670 --> 00:11:47,560

LIMITED WORKING SPACE?

209

00:11:47,560 --> 00:11:52,410

A: WELL, IT IS REALLY NOT THAT LIMITED.

210

00:11:52,410 --> 00:11:56,670

I MEAN THE SIZE OF THE SPACE STATION IS QUITE BIG, IT IS THE

211

00:11:56,670 --> 00:12:02,540

SIZE OF A FIVE BEDROOM HOUSE AND THE LAVATORY WOULD BE THREE OF

212

00:12:02,540 --> 00:12:07,610

THE BEDROOMS KIND OF EUROPEAN MODEL, JAPANESE AND U.S.

213

00:12:07,610 --> 00:12:08,870

LABORATORY.

214

00:12:08,870 --> 00:12:13,840

AND WEIGHTLESSNESS THE THING THAT IS UNIQUE IN ADDITION TO

215

00:12:13,840 --> 00:12:18,720

BEING ZERO GRAVITY IS THE FACT YOU CAN USE THAT ENTIRE VOLUME.

216

00:12:18,720 --> 00:12:21,880

WHERE AS HERE YOU ARE LIMITED TO BEING ABLE TO PUT THING ON THE

217

00:12:21,880 --> 00:12:24,120

GROUND YOU CAN USE THAT FULL DIMENSION.

218

00:12:24,120 --> 00:12:27,560

IT WINDS UP WORK OUT FINE.

219

00:12:27,560 --> 00:12:29,260

>> AND MARTY HAS AN AUDIENCE

QUESTION.

220

00:12:29,260 --> 00:12:31,790

Q: HOW DO YOU STAY IN SHAPE IN SPACE.

221

00:12:31,790 --> 00:12:37,970

A: GOOD QUESTION IT IS IMPORTANT PARTICULARLY ON LONG MISSIONS TO

222

00:12:37,970 --> 00:12:41,280

TRY TO STAY IN SHAPE AND MAKE SURE YOU DON'T HAVE BONE LOSS

223

00:12:41,280 --> 00:12:42,780

AND MUSCLE LOSS.

224

00:12:42,780 --> 00:12:46,450

WE HAVE SEVERAL EXERCISE DEVICES ON BOARD.

225

00:12:46,450 --> 00:12:48,010

WE HAD A ROLLING MACHINE.

226

00:12:48,010 --> 00:12:49,010

A BICYCLE.

227

00:12:49,010 --> 00:12:56,060

IT IS IN THE RUSSIAN SEGMENT AND WE HAVE A TREADMILL AND A

228

00:12:56,060 --> 00:12:57,780

RESISTANT EXERCISE DEVICE.

229

00:12:57,780 --> 00:13:02,480

EVERY ASTRONAUT IS SCHEDULED FOR 2-1/2 HOURS OF EXERCISE A DAY AN

230

00:13:02,480 --> 00:13:06,520

HOUR OF AEROBICS AND AN HOUR OF
RESISTANCE TRAINING.

231

00:13:06,520 --> 00:13:11,440

PEOPLE ARE COMING BACK IN BETTER
SHAPE FROM A SIX MONTH MISSION

232

00:13:11,440 --> 00:13:15,050

THAN FROM SHUTTLE MISSIONS WHERE
WE DID NOT HAVE THAT EQUIPMENT

233

00:13:15,050 --> 00:13:16,510

ON BOARD.

234

00:13:16,510 --> 00:13:19,850

>> A VIDEO QUESTION.

235

00:13:19,850 --> 00:13:24,420

Q: MY QUESTION IS, HOW IS THE
VIEW FROM SPACE?

236

00:13:24,420 --> 00:13:27,860

A: THE VIEW FROM SPACE IS
SPECTACULAR AS YOU COULD

237

00:13:27,860 --> 00:13:30,000

POSSIBLY IMAGINE.

238

00:13:30,000 --> 00:13:33,470

ONE OF THE THINGS WE DID ON OUR
FLIGHT IS AFTER WE TOOK THE

239

00:13:33,470 --> 00:13:37,820

NIGHT TO MISSION CONTROL WE TAKE
AN HOUR IN OUR SLEEP PERIOD AND

240

00:13:37,820 --> 00:13:41,990

GO SIT OUT BY A WINDOW AND LOOK
OUT AND WATCH THAT VIEW.

241

00:13:41,990 --> 00:13:45,560

ONE OF MY FAVORITE VIEWS WAS
LOOKING AT THE SNOW CAPS

242

00:13:45,560 --> 00:13:49,820

HIMALAYIAS WITH THE FULL MOON IT
IS ABSOLUTELY AMAZING.

243

00:13:49,820 --> 00:13:54,870

AND YOU REALIZE AS YOU LOOK TO
THE VAST DARKNESS OF SPACE WE

244

00:13:54,870 --> 00:13:58,010

ALL ARE ON THIS BEAUTIFUL,
WONDERFUL PLANET WITH A THIN

245

00:13:58,010 --> 00:14:01,900

SLIVER OF ATMOSPHERE AND NEED TO
TAKE CARE OF THIS PLANET.

246

00:14:01,900 --> 00:14:05,540

IT WAS ABSOLUTELY AMAZINGLY
BEAUTIFUL.

247

00:14:05,540 --> 00:14:07,640

>> MARTY HAS AN AUDIENCE
QUESTION.

248

00:14:07,640 --> 00:14:11,450

Q: HOW DOES BEING BACK ON EARTH
FEEL AFTER A MISSION.

249

00:14:11,450 --> 00:14:14,740

DOES THE BODY REACT DIFFERENTLY
AFTER BEING WEIGHTLESSNESS FOR

250

00:14:14,740 --> 00:14:15,740

AWHILE?

251

00:14:15,740 --> 00:14:20,780

A: IT TAKES AWHY TO ADJUST GOING
INTO SPACE AND WHEN YOU COME

252

00:14:20,780 --> 00:14:28,100

BACK IT TAKES A DAY OR TWO FOR A
SHORTER MISSION AND LONGER FOR A

253

00:14:28,100 --> 00:14:29,940

SIC MONTH MISSION.

254

00:14:29,940 --> 00:14:35,910

WHEN WE LANDED I FELT LIKE AN
800 POUND GORILLA.

255

00:14:35,910 --> 00:14:38,820

I WAS IN SPACE FOR EIGHT DAYS.

256

00:14:38,820 --> 00:14:41,690

AND I HAD SWITCHES I HAD TO
THROW UP ON THE OVER HEAD PANEL

257

00:14:41,690 --> 00:14:47,150

AND IN THE SIMULATOR I DID IT IN
15-20 SECONDS IT TOOK ME SEVERAL

258

00:14:47,150 --> 00:14:52,280

SECTS TO LIFT MY ARM UP.

259

00:14:52,280 --> 00:14:53,970

WITHIN A DAY YOU ADAPT.

260

00:14:53,970 --> 00:14:58,610

I REMEMBER GOING TO BED AND I
KEPT FEELING LIKE MY FEET WERE

261

00:14:58,610 --> 00:15:03,550

FLOATING AND I HAD TO OPEN MY
EYES TO MAKE SURE I WAS IN

262
00:15:03,550 --> 00:15:04,730
GRAVITY.

263
00:15:04,730 --> 00:15:05,850
YOU ADAP.

264
00:15:05,850 --> 00:15:09,910
FOR A DAY YOU ARE WOBBLY AND
UNCERTAIN.

265
00:15:09,910 --> 00:15:13,290
>> WE HAVE TALKED TO A LOT OF
ASTRONAUTS ABOUT THEIR

266
00:15:13,290 --> 00:15:18,060
EXPERIENCES OF DOING FLIGHTS ONE
WAS STEPHANIE WILSON.

267
00:15:18,060 --> 00:15:21,020
>> I'M JOINED BY STEPHANIE
WILSON A VETERAN OF 3 SPACE

268
00:15:21,020 --> 00:15:23,430
SHUTTLE FLIGHTS YOU SPENT 42
DAYS IN SPACE.

269
00:15:23,430 --> 00:15:25,490
THANK YOU FOR JOINING US.

270
00:15:25,490 --> 00:15:26,490
>> THANK YOU.

271
00:15:26,490 --> 00:15:29,810
>> TELL ME ABOUT THE SCIENCE
THAT GUESS ON IN SPACE.

272
00:15:29,810 --> 00:15:33,300
>> WE HAVE SEVERAL AREAS WE
CONDUCT RESEARCH ON THE

273

00:15:33,300 --> 00:15:37,450

INTERNATIONAL SPACE STATION
INCLUDES EARTH OBSERVATION.

274

00:15:37,450 --> 00:15:43,290

PHYSICAL SCIENCE OF HUMAN
PHYSIOLOGY AND BIOLOGY IN SOME

275

00:15:43,290 --> 00:15:47,430

OF THE AREAS FOR EARTH SCIENCE
WE ARE LOOKING BACK AT EARTH TO

276

00:15:47,430 --> 00:15:50,730

SEE CHANGES IN EARTH BEFORE
STATION AND SEE HOW WE CAN

277

00:15:50,730 --> 00:15:54,290

BETTER PREDICT STORMS AND
WEATHER PATTERNS FOR THE

278

00:15:54,290 --> 00:15:57,420

PHYSICAL SCIENCES WE HAVE
MATERIALS THAT ARE BEING EXPOSED

279

00:15:57,420 --> 00:16:01,270

TO THE VACUUM OF SPACE TO LEARN
MORE ABOUT IMPROVEMENTS IN

280

00:16:01,270 --> 00:16:02,270

MATERIALS.

281

00:16:02,270 --> 00:16:06,330

WE HAVE A COMBUSTION FACILITY WE
LEARN ABOUT BURNING MATERIALS

282

00:16:06,330 --> 00:16:10,900

AND FIRE SUPPRESSION ON BOARD
THE INTERNATIONAL SPACE STATION.

283

00:16:10,900 --> 00:16:13,530

MUCH WORK IS GOING ON IN THE
AREA OF SCIENCE ON THE SPACE

284

00:16:13,530 --> 00:16:16,120

STATION.

285

00:16:16,120 --> 00:16:19,529

>> NOW AS A MISSION SPECIALIST
ONE THING YOU HAD TO DO WAS

286

00:16:19,529 --> 00:16:22,650

CONTROL THE ROBOTIC ARM TO
RETRIEVE A SATELLITE.

287

00:16:22,650 --> 00:16:25,899

THAT IS NOT EASY, IS IT?

288

00:16:25,899 --> 00:16:31,120

>> IT IS DEFINITELY NOT EASY IT
TOOK TRAINING AND PLANNING AND

289

00:16:31,120 --> 00:16:33,680

THINKING AHEAD OF TIME HOW WE
WOULD DO THAT.

290

00:16:33,680 --> 00:16:36,950

BECAUSE THAT SATELLITE IS ABOUT
THE SIZE OF A SCHOOL BUS ON THE

291

00:16:36,950 --> 00:16:38,380

GROUND.

292

00:16:38,380 --> 00:16:41,920

>> AND YOU WERE SUCCESSFUL IN
THAT AND EVERYBODY GOT THE

293

00:16:41,920 --> 00:16:43,540

SATELLITE BACK?

294

00:16:43,540 --> 00:16:46,740

>> WE BROUGHT IT BACK AND TWO
OF THEM, AS A MATTER OF FACT.

295

00:16:46,740 --> 00:16:50,900

AND ABLE TO RELAUNCH THEM THREE
YEARS LATER.

296

00:16:50,900 --> 00:16:52,350

>> OKAY.

297

00:16:52,350 --> 00:16:55,270

ONE OF THE THINGS THAT
SATELLITES HAVE TO HAVE TO STAY

298

00:16:55,270 --> 00:17:00,310

ON TRACK ON IN THE RIGHT O BIT
ARE DRIVER SCOPES.

299

00:17:00,310 --> 00:17:03,520

MARTY DO YOU WANT TO TELL US
ABOUT WHAT YOU ARE DOING.

300

00:17:03,520 --> 00:17:07,289

>> YES, HE HAS A BICYCLE WHEEL
HE IS HOLDING WITH HANDLES AND

301

00:17:07,289 --> 00:17:13,370

HE IS ON A PLATFORM THAT MOVES
EASILY WITH NO MOTORS IN IT.

302

00:17:13,370 --> 00:17:15,439

THERE HAS TO BE A FORCE OF LIFE
TO IT.

303

00:17:15,439 --> 00:17:19,360

AND WE WILL LOOK AT NEWTON'S
THIRD LAW.

304

00:17:19,360 --> 00:17:23,860

NEWTON'S THIRD LAW IS REACTION
THERE IS AN EQUAL AND OPPOSITE

305

00:17:23,860 --> 00:17:24,860

REACTION.

306

00:17:24,860 --> 00:17:27,189

>> NICE JOB, GUISE.

307

00:17:27,189 --> 00:17:31,270

WE WILL PUT THAT IN PLACE WHILE
WE ARE LOOKING AT SCOPES TODAY.

308

00:17:31,270 --> 00:17:37,540

I WILL HAVE YOU HOLD THIS AND I
WILL SPIN THIS REAL FAST.

309

00:17:37,540 --> 00:17:40,540

>> HANG ON.

310

00:17:40,540 --> 00:17:43,179

>> ALL RIGHT NOW TILT IT TO THE
LEFT.

311

00:17:43,179 --> 00:17:45,710

>> NOT BACK TO THE RIGHT.

312

00:17:45,710 --> 00:17:47,570

OH , TILT IT BACK THE OTHER WAY.

313

00:17:47,570 --> 00:17:48,620

ALL RIGHT.

314

00:17:48,620 --> 00:17:53,420

WHAT IS HAPPENING HERE IS WE
APPLIED A FORCE IN ONE DIRECTION

315

00:17:53,420 --> 00:17:57,640
AND WHEN HE TILT TODAY WHEN HE
TILTS THE WHEEL THE OPPOSITE

316
00:17:57,640 --> 00:18:00,270
REACTION PUSHES HIM BACK THE
OTHER WAY.

317
00:18:00,270 --> 00:18:03,520
NOW HOW DID YOU FEEL WHILE THAT
WAS HAPPENING?

318
00:18:03,520 --> 00:18:07,870
>> I WAS FEELING PUSHED OR
FORCED TO THE SIDE I OF ON.

319
00:18:07,870 --> 00:18:09,690
>> DID IT FEEL WEIRD?

320
00:18:09,690 --> 00:18:10,690
>> YES.

321
00:18:10,690 --> 00:18:13,600
>> ALL RIGHT THIS IS A GREAT
EXAMPLE OF NEWTON'S THIRD LAW IN

322
00:18:13,600 --> 00:18:18,120
ACTION AS WELL AS A SCOPE THE
SCOPES ARE IMPORTANT FOR

323
00:18:18,120 --> 00:18:21,590
GUIDANCE ON SATELLITES
>> WHEN THE GUIDANCE SYSTEMS

324
00:18:21,590 --> 00:18:25,190
DON'T WORK WE HAVE ASTRONAUTS
RETRIEVE THEM.

325
00:18:25,190 --> 00:18:26,190
>> EXACTLY.

326

00:18:26,190 --> 00:18:29,900

>> NOW YOU STUDIED TO BECOME A
MEDICAL DOCTOR.

327

00:18:29,900 --> 00:18:36,090

HOW DID THAT EXPERIENCE HELP YOU
FOR YOUR CAREER AS AN ASTRONAUT?

328

00:18:36,090 --> 00:18:39,160

>> ONE OF THE THINGS THAT JUST
REALLY ANY SCIENTIFIC DEVELOP

329

00:18:39,160 --> 00:18:44,980

HELPS TO YOU BECOME AN ASTRONAUT
WITH IMMEDIATE I WAS ABLE TO

330

00:18:44,980 --> 00:18:49,490

HELP ON BOARD MY FLIGHT AS THE
CREW MEDICAL OFFICER AND

331

00:18:49,490 --> 00:18:52,080

DEVELOPING THE EQUIPMENT FOR THE
SPACE STATION.

332

00:18:52,080 --> 00:18:55,040

THE NUMBER ONE WAY IT HELPED ME
IS LEARN TO LIVE WITHOUT A LOT

333

00:18:55,040 --> 00:18:58,410

OF SLEEP.

334

00:18:58,410 --> 00:19:01,910

WHEN I CAME TO NASA AND I SAW
THAT ON THE FLIGHT PLAN YOU HAD

335

00:19:01,910 --> 00:19:05,380

EIGHT HOURS OF SLEEP THEY
THOUGHT YOU NEEDED SLEEP TO DO A

336

00:19:05,380 --> 00:19:07,890

GOOD JOB THAT WAS WELCOMED.

337

00:19:07,890 --> 00:19:12,480

>> NOW, WE HAVE BEEN STUDYING
ASTRONAUTS SINCE THE BEGINNING

338

00:19:12,480 --> 00:19:16,559

OF THE PROGRAM AND GOT A CHANCE
TO TALK TO APOLLO 11 ASTRONAUT

339

00:19:16,559 --> 00:19:20,610

MICHAEL COLLINS ABOUT HIS
EXPERIENCES.

340

00:19:20,610 --> 00:19:23,380

>> I'M JOINED BY MICHAEL
COLENCHE WHO THROUGH ON GEMINI 10

341

00:19:23,380 --> 00:19:24,650

AND APOLO 11.

342

00:19:24,650 --> 00:19:26,240

THANK YOU.

343

00:19:26,240 --> 00:19:29,539

>> DELIGHTED BE HERE.

344

00:19:29,539 --> 00:19:32,460

>> YOU WERE PART OF THE SPACE
PROGRAM WHEN REALLY IT WAS IN

345

00:19:32,460 --> 00:19:35,350

INFANCY AND THERE WERE
EXPERIMENTS GOING ON?

346

00:19:35,350 --> 00:19:38,870

DID YOU FEEL LIKE A GUINEA PIG
FLYING AROUND?

347

00:19:38,870 --> 00:19:41,780

>> FREQUENTLY, YES, YES.

348

00:19:41,780 --> 00:19:46,680

OF COURSE, GUINEA PIGS ARE
GETTING INJECTED AND SUBJECTING

349

00:19:46,680 --> 00:19:50,690

THEMSELVES TO THE LATEST MEDICAL
ADVANCES.

350

00:19:50,690 --> 00:19:56,600

AND WE HAD A FAIRLY STRONG BUT
FRIENDLY AND COMPETENT MEDICAL

351

00:19:56,600 --> 00:19:58,030

COMPONENT TO TRAINING.

352

00:19:58,030 --> 00:20:02,030

>> WHAT DID WE LEARN THAT HELPS
US WITH LONG-TERM SPACE FLIGHT?

353

00:20:02,030 --> 00:20:06,600

>> THERE ARE A NUMBER OF
THINGS.

354

00:20:06,600 --> 00:20:09,850

MANY OF WHICH I HAVE JUST READ
ABOUT.

355

00:20:09,850 --> 00:20:13,780

AFFECTS ON THE BLOOD SUPPLY TO
YOUR EYE.

356

00:20:13,780 --> 00:20:16,950

WHICH CHANGES IN WEIGHTLESSNESS.

357

00:20:16,950 --> 00:20:19,700

OF COURSE WE FELT STRETCHED OUT.

358

00:20:19,700 --> 00:20:24,170

WE WERE A BIT TALLER BECAUSE THE
SPACE BETWEEN YOUR VERTEBRA

359

00:20:24,170 --> 00:20:25,740

EXTENDS.

360

00:20:25,740 --> 00:20:31,360

THESE THINGS ARE NOT IMPORTANT
AT ALL FOR THE WORK WE WERE

361

00:20:31,360 --> 00:20:32,360

DOING.

362

00:20:32,360 --> 00:20:36,340

YOU KNOW TO THE MOON AND BACK
AND EIGHT DAYS, NOT A MEDICAL

363

00:20:36,340 --> 00:20:37,650

CHALLENGE IN THAT.

364

00:20:37,650 --> 00:20:42,370

BUT IF YOU ARE TALKING ABOUT
SEVERAL YEARS TO MARS AND BACK

365

00:20:42,370 --> 00:20:46,691

THE MEDICAL CONSIDERATIONS
BECOME EXTREMELY IMPORTANT FOR

366

00:20:46,691 --> 00:20:49,210

PERHAPS PARAMOUNT TO SUCH A
TRIP.

367

00:20:49,210 --> 00:20:55,690

>> ONE OF THE NICE THINGS
HAVING ASTRONAUTS ON IS THAT YOU

368

00:20:55,690 --> 00:20:59,500
HAVE CONVERSATION WITH THEM
PRIOR TO THE SHOW.

369
00:20:59,500 --> 00:21:02,490
AND YOU HAVE A REALLY GREAT
STORY ABOUT YOUR NECKLACE TELL

370
00:21:02,490 --> 00:21:03,790
US ABOUT THAT.

371
00:21:03,790 --> 00:21:08,429
>> THIS MY HUSBAND HAD THIS
MADE FOR ME BEFORE MY FLIGHT AND

372
00:21:08,429 --> 00:21:12,010
IT HAS A STAR IN HOUSTON AND A
STAR IN ORBIT.

373
00:21:12,010 --> 00:21:17,030
AND ALSO HAD TWO MADE FOR MY TWO
DAUGHTERS I EVENTUALLY HAD.

374
00:21:17,030 --> 00:21:19,740
IT WAS REALLY FUN TO WEAR IN.

375
00:21:19,740 --> 00:21:22,870
YOU LOOK AT THE VIDEO YOU SEE
THE NECKLACE FLOATING.

376
00:21:22,870 --> 00:21:25,909
>> YOU TAKE UP A LOT OF PERSONAL
STUFF?

377
00:21:25,909 --> 00:21:28,390
>> WE DON'T GET TO TAKE A LOT.

378
00:21:28,390 --> 00:21:31,890
FOR THE SHUTTLE PROGRAM I WAS
REMEMBERING YOU GOT TO TAKE 10

379

00:21:31,890 --> 00:21:36,500

OR 20 ITEMS AND THEY HAD TO BE
SMALL THINGS.

380

00:21:36,500 --> 00:21:40,300

AND SO YOU GOT TO HAVE A FEW
PERSONAL THINGS WHICH WAS FUN.

381

00:21:40,300 --> 00:21:45,030

OTHER THING YOU GOT TO DO I
ENJOYED WAS WE GOT TO FLY

382

00:21:45,030 --> 00:21:51,330

THROUGH THE UCLA I FLEW A BANNER
UCLA BANNER AND MY MEDICAL

383

00:21:51,330 --> 00:21:56,840

SCHOOL UCLA I FLEW A BOOK FROM
THE 1800 WITH THE HIPPOCRATIC

384

00:21:56,840 --> 00:21:57,840

OATH IN IT.

385

00:21:57,840 --> 00:22:01,150

IT IS A WAY OF GIVING BACK AND
SHARING THE EXPERIENCE WITH

386

00:22:01,150 --> 00:22:03,610

PEOPLE WHO HELPED YOU ALONG THAT
PATH WAY.

387

00:22:03,610 --> 00:22:08,100

>> AND TO WORK FOR NASA TELL US
ABOUT WHAT YOU ARE WORKING ON

388

00:22:08,100 --> 00:22:09,100

NOW?

389

00:22:09,100 --> 00:22:13,320
>> YES, I'M WITH NAS AT LONGEST
SERVING ACTIVE ASTRONAUT.

390
00:22:13,320 --> 00:22:19,280
AND I WORK NOW ON O'RYAN AND THE
DISPLAYS WE ARE GOING TO

391
00:22:19,280 --> 00:22:23,900
ELECTRONIC PROCEDURES AND
CONTROL.

392
00:22:23,900 --> 00:22:25,350
THAT'S WHAT I'M WORKING ON.

393
00:22:25,350 --> 00:22:28,720
IT IS FUN.
>> AND DOES NASA STILL KEEP UP

394
00:22:28,720 --> 00:22:31,540
WITH YOUR HEALTH AFTER BEING AN
ASTRONAUT

395
00:22:31,540 --> 00:22:36,590
>> FOR THE REST OF OUR LIVES IF
YOU CHOOSE TO PARTICIPATE, WHICH

396
00:22:36,590 --> 00:22:39,150
I THINK LARGE NUMBER DO.

397
00:22:39,150 --> 00:22:42,460
CAN YOU COME BACK TO NASA FOR
ANNUAL PHYSICAL THEY ARE LOOKING

398
00:22:42,460 --> 00:22:47,320
AT ALL THE ASTRONAUTS FROM BACK
IN THE MERCURY DAYS ALL THE WAY

399
00:22:47,320 --> 00:22:52,360
TO NOW AND VARIOUS LENGTHS OF

TIME IN ORBIT TO SEE IF THERE IS

400

00:22:52,360 --> 00:22:56,610

AN IMPACT FROM WEIGHTLESSNESS
AND RADIATION AND ANYTHING WE

401

00:22:56,610 --> 00:23:00,870

CAN LEARN TO HELP FUTURE
EXPLORATION LIKE MARS.

402

00:23:00,870 --> 00:23:02,670

>> MORE QUESTIONS?

403

00:23:02,670 --> 00:23:06,550

>> START WITH A VIDEO QUESTION.

404

00:23:06,550 --> 00:23:11,710

Q: I'M FROM SOUTH VALLEY I WAS
WONDERING HOW LONG DID IT TAKE

405

00:23:11,710 --> 00:23:14,120

FOR TO YOU GET USED TO ZERO
GRAVITY?

406

00:23:14,120 --> 00:23:21,130

A: GETTING USED TO ZERO GRAVITY
IS A PRETTY QUICK PROCESS.

407

00:23:21,130 --> 00:23:25,750

MOST OR A LARGE PERCENTAGE OF
ASTRONAUTS HAVE SPACE ADAPTATION

408

00:23:25,750 --> 00:23:31,840

SYNDROME LIKE SEA SICKNESS IT
TAKES ONE-THREE DAYS TO GET OVER

409

00:23:31,840 --> 00:23:32,840

THAT.

410

00:23:32,840 --> 00:23:36,610
THE SYMPTOMS ARE LIKE DNC
SICKNESS BUT DUE TO THE FLUID

411
00:23:36,610 --> 00:23:40,490
SHIFTS AND THE FLECK OF WHAT
YOUR EYE IS SEEING AND WHAT YOUR

412
00:23:40,490 --> 00:23:42,640
INNER EAR IS DETECTING.

413
00:23:42,640 --> 00:23:47,580
ONCE YOU GET USED TO THAT YOU
ARE LIKE A BABY LEARNING TO

414
00:23:47,580 --> 00:23:48,580
WALK.

415
00:23:48,580 --> 00:23:50,330
YOU ARE MORE CLUMSY.

416
00:23:50,330 --> 00:23:53,820
IF YOU WATCH THE ASTRONAUTS ON
BOARD SPACE STATIONS FOR SIX

417
00:23:53,820 --> 00:23:57,230
MONTHS THEY GET TO BE REALLY
VERY COOL.

418
00:23:57,230 --> 00:24:01,370
THEY CAN SLIGHT MOVE AMS AND GET
THEMSELVES ORIENTED WHEN YOU

419
00:24:01,370 --> 00:24:05,710
COME ON BOARD YOU ARE NOT THAT
SKILLFUL AT WEIGHTLESSNESS, YOU

420
00:24:05,710 --> 00:24:07,910
ADAPT RAPIDLY.

421

00:24:07,910 --> 00:24:12,320

I WAS SURPRISED HOW QUICKLY YOU
ADAP TO A STRANGE ENVIRONMENT.

422

00:24:12,320 --> 00:24:14,679

>> ATTACK AN ONLINE QUESTION.

423

00:24:14,679 --> 00:24:20,299

WHAT WAS THE MOST CHALLENGING
TASK YOU HAD TO DO BEFORE

424

00:24:20,299 --> 00:24:21,809

BECOMING AN ASTRONAUT?

425

00:24:21,809 --> 00:24:28,299

A: I THINK THE MOST CHALLENGING
THING FOR ME WAS THE FACT

426

00:24:28,299 --> 00:24:31,230

THAT†-- I DIDN'T KNOW I WAS
GOING TO GET TO BE AN ASTRONAUT.

427

00:24:31,230 --> 00:24:34,870

I HAD FELT THAT IT HAD PASSED ME
BY.

428

00:24:34,870 --> 00:24:38,320

EVEN THOUGH I HAD THAT DREAM
SINCE I WAS 12.

429

00:24:38,320 --> 00:24:41,540

IT CAME ABOUT UNEXPECTEDLY.

430

00:24:41,540 --> 00:24:45,360

I'M ONE OF THE PEOPLE WHO IS
CONCERNED WHEN SOMETHING SO

431

00:24:45,360 --> 00:24:48,429

MAJOR HAPPENS.

432

00:24:48,429 --> 00:24:53,740

BUT I THINK THE HARDEST THING
ABOUT BECOMING AN ASTRONAUT THE

433

00:24:53,740 --> 00:24:56,559

MOST CHALLENGING IS EVERYTHING
YOU HAVE TO DO.

434

00:24:56,559 --> 00:25:00,170

YOU EITHER HAVE TO BECOME A
PILOT AND GO TO THE MILITARY AND

435

00:25:00,170 --> 00:25:04,100

GET THOUSANDS OF HOURS AND GO TO
TEST PILOT SCHOOL WHICH IS

436

00:25:04,100 --> 00:25:07,480

CHALLENGING FROM LISTEN TO MY
COLLEAGUES AND THE OTHER IF YOU

437

00:25:07,480 --> 00:25:09,570

CHOSE TO BE A MISSION
SPECIALIST.

438

00:25:09,570 --> 00:25:13,990

WHATEVER AREA YOU DECIDE A
DOCTOR, PHD THERE IS WORK THAT

439

00:25:13,990 --> 00:25:15,920

GOES TO EITHER ONE OF THOSE.

440

00:25:15,920 --> 00:25:19,480

THAT'S AND THEN ALL THE OTHER
THINGS THAT NASA LOOKS FOR

441

00:25:19,480 --> 00:25:23,690

LIKE†-- WHETHER YOU ARE A
PRIVATE PILOT OR SCUBA DIVER AND

442

00:25:23,690 --> 00:25:29,140

MOUNTAIN CLIMBING GETTING THAT
TOGETHER.

443

00:25:29,140 --> 00:25:31,520

>> YOU HAVE AN AUDIENCE
QUESTION FOR US?

444

00:25:31,520 --> 00:25:35,760

Q: CAN YOU EXPERIMENT WITH
SPIDERS IN SPACE?

445

00:25:35,760 --> 00:25:40,841

[LAUGHTER]

A: I'M NOT A FAN, EITHER, BUT I

446

00:25:40,841 --> 00:25:45,530

DON'T KNOW THAT WE HAD SPIDERS
IN SPACE.

447

00:25:45,530 --> 00:25:47,160

I KNOW WE HAD FERV.

448

00:25:47,160 --> 00:25:48,900

I KNOW WE HADDANTS.

449

00:25:48,900 --> 00:25:55,460

WE HAD SPIDER PROBABLY, YES, WE
PROBABLY DO BUT THERE IS NOTHING

450

00:25:55,460 --> 00:26:01,960

THAT YOU CAN TAKE UP IN SPACE
WITH YOU THAT ISN'T APPROVED.

451

00:26:01,960 --> 00:26:06,490

YOU CAN'T LIKE†-- FLIP A SPIED
NEVER A ZIP LOCK AND TAKE IT

452

00:26:06,490 --> 00:26:08,559

WITH YOU TO DO YOUR OWN
EXPERIMENT.

453

00:26:08,559 --> 00:26:11,450
IT HAS TO BE THOUGHT OUT.

454

00:26:11,450 --> 00:26:15,370
THEY HAVE TO DECIDE IF IT SAFE
AND A DANGER TO YOURSELF OR

455

00:26:15,370 --> 00:26:16,370
OTHERS.

456

00:26:16,370 --> 00:26:18,360
IT GOES THROUGH A REVIEW
PROCESS.

457

00:26:18,360 --> 00:26:22,290
OTHERWISE I WOULD HAVE LOVEED
TAKE DIFFERENT THINGS TO ME IN

458

00:26:22,290 --> 00:26:24,390
SPACE AND HAVE FUN WITH IT.

459

00:26:24,390 --> 00:26:26,111
>> I THINK WE HAVE ANOTHER
VIDEO QUESTION.

460

00:26:26,111 --> 00:26:35,790
Q: MY QUESTION IS†-- WHAT
INSPIRED TO YOU COME BACK?

461

00:26:35,790 --> 00:26:43,460
A: WHAT INSPIRED ME TO BE AN
ASTRONAUT IS WHEN I WAS OF AGE I

462

00:26:43,460 --> 00:26:48,140
LISTENED ALLEN SHEPHERDS ONE
MORNING AND LISTEND AND KNEW AT

463

00:26:48,140 --> 00:26:50,929

THAT MOMENT THAT'S WHEN I WANTED
TO DO.

464

00:26:50,929 --> 00:26:53,850

AND I NEVER FORGOT THAT AND
NEVER LOST SIGHT OF THAT DREAM.

465

00:26:53,850 --> 00:26:57,360

EVEN THOUGH IT DID NOT SEEM
POSSIBLE.

466

00:26:57,360 --> 00:27:01,150

THAT'S ONE THING IF YOU HAVE A
DREAM GO AFTER IT.

467

00:27:01,150 --> 00:27:04,500

>> WE TALKED TO ONE MORE
ASTRONAUT ABOUT HIS EXPERIENCES

468

00:27:04,500 --> 00:27:07,489

ON THE SPACE STATION.

469

00:27:07,489 --> 00:27:11,010

>> I'M JOINED BY FILM KOPRA YOU
SPENT 243 DAYS IN SPACE.

470

00:27:11,010 --> 00:27:14,410

THANK YOU FOR TALKING WITH US
WHEN YOU WERE IN SPACE THERE

471

00:27:14,410 --> 00:27:17,340

WERE A LOT OF EXPERIMENTS?

472

00:27:17,340 --> 00:27:19,690

WHY IS THAT IMPORTANT?

473

00:27:19,690 --> 00:27:22,799

>> THE SPACE STATION IS A WORLD

CLASS LABORATORY.

474

00:27:22,799 --> 00:27:25,730
WE'RE DOING AN ARARE OF
EXPERIMENTS SOME IS BASIC

475

00:27:25,730 --> 00:27:30,600
SCIENCE AND A LOT IS ZERO
GRAVITY.

476

00:27:30,600 --> 00:27:35,140
WE NEED TO UNDERSTAND THESE
DIFFERENT AFFECTS WHICH ARE

477

00:27:35,140 --> 00:27:36,220
NEGATIVE.

478

00:27:36,220 --> 00:27:37,580
WE LOSE BONE DENSITY.

479

00:27:37,580 --> 00:27:39,700
MUSCLE MASS AND PROBLEMS WITH
ICE.

480

00:27:39,700 --> 00:27:43,179
WE ARE LEARN BURGLAR THAT AND
THAT'S WHAT WE DID ON BOARD THE

481

00:27:43,179 --> 00:27:45,389
SPACE STATION WITH OUR
INVESTIGATIONS.

482

00:27:45,389 --> 00:27:48,080
>> WERE YOU THE GUINEA PIG
WHILE YOU WERE UP?

483

00:27:48,080 --> 00:27:51,740
>> YOU KNOW WE ARE LIKE
SCIENTISTS WE ARE EITHER THE

484

00:27:51,740 --> 00:27:55,010

TECHNICIAN OR WE JUST MOP TORTHE
EXPERIMENT.

485

00:27:55,010 --> 00:27:56,780

OFTENTIMES WE ARE THE
EXPERIMENT.

486

00:27:56,780 --> 00:27:58,490

WE ARE TAKING SAMPLES.

487

00:27:58,490 --> 00:27:59,620

WE ARE LOOKING AT ICE.

488

00:27:59,620 --> 00:28:01,840

WE HAVE WORLD CLASS EQUIPMENT.

489

00:28:01,840 --> 00:28:07,500

LOOKS LIKE AN OPTOMETRY CLINIC.

490

00:28:07,500 --> 00:28:09,090

>> THOSE THINGS YOU ARE
STUDYING ARE GOING TOWARD A

491

00:28:09,090 --> 00:28:10,880

FUTURE TRIP TO MARS?

492

00:28:10,880 --> 00:28:16,110

>> WE HOPE TO GO TO MARS, IT
WILL BE CHALLENGING WE CAN GET

493

00:28:16,110 --> 00:28:20,560

PROBES TO MARS BUT TO GET HUMANS
TO MARS TELL BE A CHALLENGE AND

494

00:28:20,560 --> 00:28:22,960

WE NEED TO UNDERSTAND THE AFFECT
EVEREFFECTS.

495

00:28:22,960 --> 00:28:25,370

>> THANK YOU.

496

00:28:25,370 --> 00:28:27,780

>> SURE.

497

00:28:27,780 --> 00:28:31,290

>> THAT'S ALL THE TIME WE HAVE
AND THANK YOU FOR JOINING US.

498

00:28:31,290 --> 00:28:34,440

WE WANT TO THANK OUR SPONSOR,
NASA.

499

00:28:34,440 --> 00:28:40,809

NEXT MONTH WE WILL LOOK AT THE
WRIGHT BROTHERS, CHECK THIS OUT.

500

00:28:40,809 --> 00:28:44,200

>> THIS IS A WRIGHT BAT SIMILAR
TO WHAT THE WRIGHT BROTHER'S

501

00:28:44,200 --> 00:28:47,480

FATHER GAVE THEM THAT SPARKED
THEIR INTEREST IN AVIATION THAT

502

00:28:47,480 --> 00:28:49,990

LEAD THEM TO INVENT THIS.

503

00:28:49,990 --> 00:28:56,429

THE WRIGHT FLYER NOT JUST THAT
SPARK IT WAS A LOT OF DESIGN AND

504

00:28:56,429 --> 00:28:57,720

A LOT OF MATH.

505

00:28:57,720 --> 00:29:01,250

THEY DID A LOT OF AERODYNAMIC
TESTING AND REFINEMENT OF THE

506

00:29:01,250 --> 00:29:05,440

WIND TUNNEL THOO THAT LEAD THEM
TO THIS INVENTION.

507

00:29:05,440 --> 00:29:10,809

IF YOU WANT TO LEARN ABOUT IT
CHECK OUT.

508

00:29:10,809 --> 00:29:16,840

"STEM IN 30".

509

00:29:16,840 --> 00:29:17,840

>> THANKS FOR JOINING US.

510

00:29:17,840 --> 00:29:21,179

WE WILL BE AROUND FOR A COUPLE
MORE MINUTES PUWANT TO JOIN US

511

00:29:21,179 --> 00:29:23,880

AFTER THE PROGRAM AND HERE TO
ANSWER QUESTIONS.