



1
00:00:05,590 --> 00:00:02,470
station this is houston are you ready

2
00:00:10,870 --> 00:00:08,710
we are ready for the event

3
00:00:13,270 --> 00:00:10,880
south suburban college this is mission

4
00:00:15,589 --> 00:00:13,280
control houston please call station for

5
00:00:17,349 --> 00:00:15,599
a voice check

6
00:00:19,750 --> 00:00:17,359
station this is congresswoman robin

7
00:00:21,830 --> 00:00:19,760
kelly joined by senator dick durbin at

8
00:00:25,750 --> 00:00:21,840
south suburban college here with our

9
00:00:28,710 --> 00:00:27,269
we read you loud and clear we're very

10
00:00:31,029 --> 00:00:28,720
excited to talk with you and the

11
00:00:42,630 --> 00:00:31,039
students today

12
00:00:46,869 --> 00:00:44,790
fortune do you have any advice for the

13
00:00:51,110 --> 00:00:46,879

future generations of scientists and

14

00:00:56,790 --> 00:00:54,069

you know i think my advice to future

15

00:00:58,630 --> 00:00:56,800

engineers and astronauts is to work

16

00:01:00,869 --> 00:00:58,640

really hard and study hard just like

17

00:01:02,549 --> 00:01:00,879

your parents say because whenever you

18

00:01:04,310 --> 00:01:02,559

work hard and you put a lot of time into

19

00:01:05,990 --> 00:01:04,320

something you get better and it's like

20

00:01:08,070 --> 00:01:06,000

money in the bank and you can use that

21

00:01:10,390 --> 00:01:08,080

later the other thing i would give you

22

00:01:12,630 --> 00:01:10,400

as a piece of advice is that you should

23

00:01:14,390 --> 00:01:12,640

dream big because the bigger your dream

24

00:01:19,910 --> 00:01:14,400

the harder you work and the more you'll

25

00:01:24,630 --> 00:01:21,990

after spending six

26
00:01:31,030 --> 00:01:24,640
months in space what kind of problems do

27
00:01:35,190 --> 00:01:32,950
that's a great question because we're

28
00:01:37,670 --> 00:01:35,200
here in weightlessness we don't exercise

29
00:01:39,510 --> 00:01:37,680
our muscles even moving around

30
00:01:41,910 --> 00:01:39,520
the space station like we do on the

31
00:01:43,910 --> 00:01:41,920
ground when we walk and do all the

32
00:01:46,069 --> 00:01:43,920
things that we have to do to fight

33
00:01:48,310 --> 00:01:46,079
gravity when we're on the ground

34
00:01:50,389 --> 00:01:48,320
so if we didn't exercise up here our

35
00:01:52,870 --> 00:01:50,399
muscles would atrophy in fact our bones

36
00:01:55,670 --> 00:01:52,880
would atrophy and get weak as well

37
00:01:58,630 --> 00:01:55,680
so to keep our muscles strong and our

38
00:02:00,550 --> 00:01:58,640

bones strong we exercise every day we

39

00:02:02,709 --> 00:02:00,560

have a treadmill and we wear a harness

40

00:02:04,789 --> 00:02:02,719

that pulls us down into the into the

41

00:02:06,950 --> 00:02:04,799

treadmill to be able to run on it we

42

00:02:09,109 --> 00:02:06,960

have a cycle ergometer that kind of like

43

00:02:11,029 --> 00:02:09,119

a stationary bicycle

44

00:02:13,110 --> 00:02:11,039

and we use that also for exercise and

45

00:02:15,430 --> 00:02:13,120

then finally we have a machine we call

46

00:02:17,430 --> 00:02:15,440

it the resistive exercise device and

47

00:02:19,750 --> 00:02:17,440

it's the equivalent of lifting weights

48

00:02:21,589 --> 00:02:19,760

in the gym down on earth and we use all

49

00:02:24,309 --> 00:02:21,599

that equipment to keep our muscles and

50

00:02:28,869 --> 00:02:24,319

our bones strong and prepared to return

51

00:02:33,030 --> 00:02:30,309

or tim

52

00:02:38,550 --> 00:02:33,040

please tell me a little bit more about

53

00:02:41,350 --> 00:02:40,150

what did i eat today that's a good

54

00:02:43,589 --> 00:02:41,360

question you know because food's

55

00:02:45,190 --> 00:02:43,599

important right food is it tastes good

56

00:02:47,190 --> 00:02:45,200

and you know you sit around the table in

57

00:02:49,430 --> 00:02:47,200

our case we float around the table and

58

00:02:51,430 --> 00:02:49,440

and we have conversation so i had some

59

00:02:53,910 --> 00:02:51,440

tuna fish i didn't bring any tuna fish

60

00:02:55,270 --> 00:02:53,920

but i brought a package of tortillas and

61

00:02:57,110 --> 00:02:55,280

a lot of times we'll put food on

62

00:02:58,949 --> 00:02:57,120

tortillas just because it's easy to eat

63

00:02:59,910 --> 00:02:58,959

and it's it's tasty

64

00:03:01,990 --> 00:02:59,920

and

65

00:03:04,149 --> 00:03:02,000

you know a lot of our food comes in

66

00:03:05,670 --> 00:03:04,159

rehydratable containers like this and we

67

00:03:06,470 --> 00:03:05,680

plug it into

68

00:03:09,190 --> 00:03:06,480

um

69

00:03:10,949 --> 00:03:09,200

a water adapter and it fills it with hot

70

00:03:13,350 --> 00:03:10,959

water if you want hot water and then we

71

00:03:15,430 --> 00:03:13,360

can also fill up drink bags in fact i

72

00:03:17,430 --> 00:03:15,440

have a drink bag right here

73

00:03:19,509 --> 00:03:17,440

where we have our water dispenser and we

74

00:03:21,830 --> 00:03:19,519

can fill it up and have our drinks as

75

00:03:24,949 --> 00:03:21,840

well and then some of our food comes in

76

00:03:27,430 --> 00:03:24,959

packets like this and we put it into a

77

00:03:29,430 --> 00:03:27,440

little heater and after about 10 or 15

78

00:03:34,550 --> 00:03:29,440

minutes our food is hot so that's what

79

00:03:39,110 --> 00:03:36,789

for jeff how was your understanding of

80

00:03:42,630 --> 00:03:39,120

the universe change after seeing it from

81

00:03:46,470 --> 00:03:45,270

boy that's a very profound question i

82

00:03:48,390 --> 00:03:46,480

don't know if it's changed a whole lot

83

00:03:50,550 --> 00:03:48,400

about the whole universe but it but i

84

00:03:53,270 --> 00:03:50,560

suppose it has but in particular it has

85

00:03:55,270 --> 00:03:53,280

changed about uh my view of

86

00:03:58,390 --> 00:03:55,280

that part of creation we call earth

87

00:04:00,550 --> 00:03:58,400

which is our home and seeing the the

88

00:04:02,309 --> 00:04:00,560

resources on earth

89

00:04:04,390 --> 00:04:02,319

seeing the atmosphere on earth

90

00:04:07,910 --> 00:04:04,400

everything that provides

91

00:04:09,429 --> 00:04:07,920

for a habitable place for us to live

92

00:04:11,830 --> 00:04:09,439

i've grown to appreciate that

93

00:04:14,309 --> 00:04:11,840

significantly looking at the crops and

94

00:04:16,390 --> 00:04:14,319

the agriculture and the human activity

95

00:04:17,990 --> 00:04:16,400

around the globe as we circle the globe

96

00:04:22,390 --> 00:04:18,000

every 90 minutes

97

00:04:24,629 --> 00:04:22,400

i also appreciate the mathematical order

98

00:04:26,550 --> 00:04:24,639

in the universe the fact that we can fly

99

00:04:28,550 --> 00:04:26,560

in space and we can launch in a rocket

100

00:04:30,710 --> 00:04:28,560

and rendezvous with the space station

101
00:04:32,870 --> 00:04:30,720
is because there is precision in the

102
00:04:34,629 --> 00:04:32,880
order in the universe so those are just

103
00:04:36,870 --> 00:04:34,639
a couple of things that i've grown in my

104
00:04:38,469 --> 00:04:36,880
appreciation for

105
00:04:41,510 --> 00:04:38,479
spending time up here on the space

106
00:04:48,870 --> 00:04:44,070
for tim what happens to cargo ships once

107
00:04:52,550 --> 00:04:50,550
well it's a great question it depends on

108
00:04:54,870 --> 00:04:52,560
the cargo ship and right now we have two

109
00:04:57,030 --> 00:04:54,880
cargo ships docked to our space station

110
00:04:59,430 --> 00:04:57,040
we have a cygnus vehicle that's just

111
00:05:01,670 --> 00:04:59,440
behind us and it's still full of lots of

112
00:05:03,270 --> 00:05:01,680
equipment that we need to unload once

113
00:05:05,749 --> 00:05:03,280

we're done we'll pack it full of our

114

00:05:07,909 --> 00:05:05,759

trash and once it leaves station it

115

00:05:10,070 --> 00:05:07,919

burns up in the atmosphere in front of

116

00:05:12,469 --> 00:05:10,080

us we have a dragon vehicle and the

117

00:05:14,950 --> 00:05:12,479

dragon is getting packed up and all that

118

00:05:17,110 --> 00:05:14,960

equipment will land in the ocean it'll

119

00:05:19,189 --> 00:05:17,120

come down through the atmosphere and

120

00:05:21,270 --> 00:05:19,199

then a parachute will deploy and land

121

00:05:23,430 --> 00:05:21,280

softly in the ocean be retrieved and

122

00:05:28,070 --> 00:05:23,440

that equipment can be reused back on

123

00:05:32,230 --> 00:05:30,629

for jeff what is it like living in space

124

00:05:36,469 --> 00:05:32,240

what challenges do you face and what do

125

00:05:40,469 --> 00:05:38,390

well there's a lot to like about living

126

00:05:42,150 --> 00:05:40,479

in space of course you can do a lot of

127

00:05:43,990 --> 00:05:42,160

things in weightlessness that you can't

128

00:05:46,310 --> 00:05:44,000

do

129

00:05:48,790 --> 00:05:46,320

on the earth and we take advantage of

130

00:05:50,950 --> 00:05:48,800

that the view is great you never get

131

00:05:53,430 --> 00:05:50,960

tired of viewing the earth out the

132

00:05:55,189 --> 00:05:53,440

window we all up here are in the habit

133

00:05:57,670 --> 00:05:55,199

of taking lots of photography of the

134

00:05:59,510 --> 00:05:57,680

earth there's a never-ending variety of

135

00:06:00,870 --> 00:05:59,520

land forms ocean

136

00:06:04,070 --> 00:06:00,880

weather currents

137

00:06:05,990 --> 00:06:04,080

horizons sunsets sunrises moon sets moon

138

00:06:07,590 --> 00:06:06,000

rises just everything you can imagine

139

00:06:09,510 --> 00:06:07,600

and perhaps you've seen some of the

140

00:06:11,670 --> 00:06:09,520

photography that we've been able to take

141

00:06:13,670 --> 00:06:11,680

so so it's very interesting living up

142

00:06:15,510 --> 00:06:13,680

here some of the challenges are just

143

00:06:18,790 --> 00:06:15,520

practical

144

00:06:20,469 --> 00:06:18,800

it's hard to to manage things if you if

145

00:06:22,629 --> 00:06:20,479

you're trying to handle a few things and

146

00:06:24,790 --> 00:06:22,639

you let it go sometimes it'll drift away

147

00:06:26,950 --> 00:06:24,800

and you you lose sight of where it is so

148

00:06:29,510 --> 00:06:26,960

it's very easy to lose things so you you

149

00:06:31,830 --> 00:06:29,520

have to learn how to manage your stuff

150

00:06:34,070 --> 00:06:31,840

as you work up here but overall it's

151

00:06:35,749 --> 00:06:34,080

just it's a lot of fun to be here we all

152

00:06:37,350 --> 00:06:35,759

become kids again i think we love to

153

00:06:38,870 --> 00:06:37,360

play with our food

154

00:06:41,510 --> 00:06:38,880

tossing

155

00:06:44,309 --> 00:06:41,520

candy or whatever back and forth

156

00:06:45,909 --> 00:06:44,319

or eating uh or drinking a bubble of

157

00:06:49,830 --> 00:06:45,919

water that's floating in the air in

158

00:06:52,390 --> 00:06:49,840

front of you things like that

159

00:06:54,309 --> 00:06:52,400

for tim do you sometimes feel frustrated

160

00:06:57,990 --> 00:06:54,319

in space because you cannot move around

161

00:07:02,150 --> 00:06:59,510

no it's a great question i don't think

162

00:07:03,510 --> 00:07:02,160

i've ever felt frustrated but definitely

163

00:07:05,510 --> 00:07:03,520

when you first get here you're really

164

00:07:07,110 --> 00:07:05,520

uncoordinated you feel clumsy and

165

00:07:08,629 --> 00:07:07,120

awkward and what i've found is we've

166

00:07:09,589 --> 00:07:08,639

been here for a little bit over four

167

00:07:11,510 --> 00:07:09,599

months

168

00:07:13,350 --> 00:07:11,520

over time you become more and more

169

00:07:15,029 --> 00:07:13,360

adapted to your environment you move in

170

00:07:16,550 --> 00:07:15,039

a different way and you come become

171

00:07:18,870 --> 00:07:16,560

maybe a little bit more graceful you

172

00:07:20,390 --> 00:07:18,880

know you still bump into things but i

173

00:07:21,749 --> 00:07:20,400

wouldn't call it frustration i would

174

00:07:23,749 --> 00:07:21,759

just say that sometimes we're a little

175

00:07:27,749 --> 00:07:23,759

bit awkward up here and we have to get

176
00:07:34,230 --> 00:07:29,589
for jeff what do you miss the most from

177
00:07:38,390 --> 00:07:36,309
oh that the answer to that question

178
00:07:39,589 --> 00:07:38,400
should be obvious it's family friends

179
00:07:42,629 --> 00:07:39,599
and family

180
00:07:44,629 --> 00:07:42,639
that's what we miss the most and that is

181
00:07:45,990 --> 00:07:44,639
always the first and number one on the

182
00:07:48,309 --> 00:07:46,000
list

183
00:07:50,230 --> 00:07:48,319
it's a long time being up here we were

184
00:07:52,390 --> 00:07:50,240
in russia a couple months before launch

185
00:07:54,790 --> 00:07:52,400
so you even add that time to the time up

186
00:07:56,790 --> 00:07:54,800
here so it can be seven eight or nine

187
00:07:58,790 --> 00:07:56,800
months separation away from the family

188
00:08:00,869 --> 00:07:58,800

we have good connectivity we talk every

189

00:08:02,390 --> 00:08:00,879

day we have a video conference with our

190

00:08:04,150 --> 00:08:02,400

family once a week

191

00:08:05,909 --> 00:08:04,160

so it's good in that way but then

192

00:08:09,270 --> 00:08:05,919

there's some practical things you miss

193

00:08:12,150 --> 00:08:09,280

up here you miss the smells of nature of

194

00:08:14,309 --> 00:08:12,160

of the the sound of the breeze chirping

195

00:08:15,270 --> 00:08:14,319

birds things like that that we take for

196

00:08:17,110 --> 00:08:15,280

granted

197

00:08:19,830 --> 00:08:17,120

for we don't have any of that up here we

198

00:08:22,390 --> 00:08:19,840

live in a pretty sterile environment

199

00:08:24,309 --> 00:08:22,400

we we don't have a lot of quiet up here

200

00:08:26,309 --> 00:08:24,319

because fans and pumps are running

201
00:08:27,670 --> 00:08:26,319
continually so you can't get to a place

202
00:08:28,790 --> 00:08:27,680
that's quiet

203
00:08:30,710 --> 00:08:28,800
so those are

204
00:08:32,469 --> 00:08:30,720
on a practical

205
00:08:35,430 --> 00:08:32,479
level some of the things that i miss up

206
00:08:38,870 --> 00:08:37,430
for tim can you tell us about some of

207
00:08:42,949 --> 00:08:38,880
the experiments you are currently

208
00:08:47,030 --> 00:08:44,550
you know it's a great question because

209
00:08:49,190 --> 00:08:47,040
our main job up here is to uh to work

210
00:08:50,630 --> 00:08:49,200
really as an extension of the scientists

211
00:08:53,030 --> 00:08:50,640
on the ground because we have this

212
00:08:55,030 --> 00:08:53,040
amazing orbiting laboratory a lot of the

213
00:08:57,350 --> 00:08:55,040

experiments we do here on board are to

214

00:08:59,030 --> 00:08:57,360

understand the effects of zero gravity

215

00:09:01,350 --> 00:08:59,040

on the human body and so we have an

216

00:09:03,829 --> 00:09:01,360

ultrasound machine we have some very

217

00:09:05,910 --> 00:09:03,839

high speed scanners and photography for

218

00:09:07,750 --> 00:09:05,920

our eyes we can understand the impact of

219

00:09:09,509 --> 00:09:07,760

zero gravity but then there's really

220

00:09:11,829 --> 00:09:09,519

interesting science experiments as well

221

00:09:13,829 --> 00:09:11,839

i had the opportunity to work with uh

222

00:09:15,590 --> 00:09:13,839

combustion experiment here on space

223

00:09:17,590 --> 00:09:15,600

station so we were burning items so

224

00:09:19,990 --> 00:09:17,600

there's a full gamut of different kinds

225

00:09:22,310 --> 00:09:20,000

of experiments some to focus on on the

226

00:09:24,389 --> 00:09:22,320

human body some on physical science and

227

00:09:26,870 --> 00:09:24,399

then some on technology as well so it's

228

00:09:28,470 --> 00:09:26,880

a it's a huge variety pack of things for

229

00:09:33,670 --> 00:09:28,480

us to do and hopefully we can produce

230

00:09:36,470 --> 00:09:34,949

for jeff

231

00:09:38,550 --> 00:09:36,480

so what do you do

232

00:09:44,870 --> 00:09:38,560

for fun why are you in space can you

233

00:09:49,750 --> 00:09:47,670

uh well most of the fun that we have up

234

00:09:52,630 --> 00:09:49,760

here has to do with being in the space

235

00:09:54,790 --> 00:09:52,640

station and in a weightless environment

236

00:09:56,630 --> 00:09:54,800

personally i have kind of a rule where i

237

00:09:58,389 --> 00:09:56,640

don't spend a whole lot of time doing

238

00:10:01,030 --> 00:09:58,399

things that i can do

239

00:10:02,870 --> 00:10:01,040

uh on earth i want to i want to take

240

00:10:04,389 --> 00:10:02,880

advantage of the opportunity of being

241

00:10:06,310 --> 00:10:04,399

here so

242

00:10:07,910 --> 00:10:06,320

of course you know we have uh email and

243

00:10:09,190 --> 00:10:07,920

we communicate in other ways with

244

00:10:11,670 --> 00:10:09,200

friends and family on the ground so

245

00:10:13,670 --> 00:10:11,680

we'll spend time on that

246

00:10:14,630 --> 00:10:13,680

but most of our free time is spent in a

247

00:10:16,389 --> 00:10:14,640

window

248

00:10:18,790 --> 00:10:16,399

studying the earth and taking

249

00:10:22,150 --> 00:10:18,800

photographs of the earth or doing our

250

00:10:24,630 --> 00:10:22,160

own little experiments uh trying to to

251

00:10:26,470 --> 00:10:24,640

maybe take a videotape of how

252

00:10:29,190 --> 00:10:26,480

water floats around and how fluids

253

00:10:31,670 --> 00:10:29,200

behave in in space or objects behave in

254

00:10:33,910 --> 00:10:31,680

space like this so that we can try to

255

00:10:35,829 --> 00:10:33,920

demonstrate weightlessness but mostly

256

00:10:39,190 --> 00:10:35,839

it's just having fun in the weightless

257

00:10:46,470 --> 00:10:41,269

for tim how was the international space

258

00:10:49,350 --> 00:10:48,470

great question the space station was

259

00:10:51,990 --> 00:10:49,360

built

260

00:10:54,230 --> 00:10:52,000

mainly through uh rocket launches on the

261

00:10:56,310 --> 00:10:54,240

russian side and through items that were

262

00:10:58,790 --> 00:10:56,320

in the payload bay of the space shuttle

263

00:11:00,470 --> 00:10:58,800

and so it was built piece by piece this

264

00:11:03,030 --> 00:11:00,480

module that we're in right now the u.s

265

00:11:04,949 --> 00:11:03,040

lab went up on a space shuttle and

266

00:11:06,870 --> 00:11:04,959

little by little the space shuttles

267

00:11:09,030 --> 00:11:06,880

brought these up they were removed out

268

00:11:10,710 --> 00:11:09,040

of the payload bay with a robotic arm

269

00:11:12,949 --> 00:11:10,720

they were connected with a robotic arm

270

00:11:14,790 --> 00:11:12,959

and then assembled with space walkers

271

00:11:16,870 --> 00:11:14,800

out in space and so

272

00:11:18,150 --> 00:11:16,880

after many many dozens of flights

273

00:11:20,470 --> 00:11:18,160

actually we're able to have this

274

00:11:23,190 --> 00:11:20,480

tremendous station and it's been a very

275

00:11:25,110 --> 00:11:23,200

long and arduous process but uh we're

276

00:11:27,030 --> 00:11:25,120

very very proud of the work that the

277

00:11:31,910 --> 00:11:27,040

entire lineage of people that have

278

00:11:34,870 --> 00:11:33,269

for jeff

279

00:11:36,870 --> 00:11:34,880

how are you able to be

280

00:11:41,990 --> 00:11:36,880

how are you trying to know where

281

00:11:49,670 --> 00:11:45,430

are you trying to know where every body

282

00:11:53,829 --> 00:11:51,670

uh that's a great question because this

283

00:11:55,110 --> 00:11:53,839

is a huge space station it would be the

284

00:11:57,590 --> 00:11:55,120

size of a

285

00:12:00,389 --> 00:11:57,600

000 square foot house and there are

286

00:12:02,790 --> 00:12:00,399

buttons and controls and computers and

287

00:12:05,509 --> 00:12:02,800

instruments and other things all over it

288

00:12:07,910 --> 00:12:05,519

so we have this great ground team

289

00:12:10,470 --> 00:12:07,920

in mission controls centers around the

290

00:12:12,870 --> 00:12:10,480

world to include houston which is the of

291

00:12:13,670 --> 00:12:12,880

course the main mission control center

292

00:12:17,190 --> 00:12:13,680

for

293

00:12:19,430 --> 00:12:17,200

they a team of folks that do all the

294

00:12:21,110 --> 00:12:19,440

planning for every day's activity and

295

00:12:23,590 --> 00:12:21,120

part of that planning is precisely

296

00:12:25,750 --> 00:12:23,600

telling us what we need to do as we go

297

00:12:27,509 --> 00:12:25,760

through each procedure so that we have

298

00:12:31,750 --> 00:12:27,519

those

299

00:12:33,990 --> 00:12:31,760

to look at if we need to to find even to

300

00:12:35,430 --> 00:12:34,000

find stuff that's stowed away like in a

301

00:12:37,190 --> 00:12:35,440

closet somewhere

302

00:12:40,230 --> 00:12:37,200

we have to go collect up the equipment

303

00:12:42,230 --> 00:12:40,240

for an operation and then every switch

304

00:12:45,910 --> 00:12:42,240

throw every button push

305

00:12:48,069 --> 00:12:45,920

every computer action is specified in a

306

00:12:51,350 --> 00:12:48,079

procedure that that team on the ground

307

00:12:59,350 --> 00:12:53,990

for tim how much oxygen supply do you

308

00:13:02,389 --> 00:13:00,710

you know it's a great question because

309

00:13:04,310 --> 00:13:02,399

the environment in which we live is

310

00:13:06,710 --> 00:13:04,320

exactly what we bring up here or what we

311

00:13:08,870 --> 00:13:06,720

produce and so we keep a reserve of

312

00:13:11,269 --> 00:13:08,880

oxygen we have maybe you know four

313

00:13:14,230 --> 00:13:11,279

months or so of reserve oxygen here on

314

00:13:17,030 --> 00:13:14,240

board but we produce oxygen and

315

00:13:18,870 --> 00:13:17,040

there's air that comes up on some of the

316

00:13:20,870 --> 00:13:18,880

russian resupply vehicles and so we

317

00:13:23,509 --> 00:13:20,880

always keep a good supply up here we

318

00:13:26,069 --> 00:13:23,519

have some some tanks that we actually

319

00:13:27,670 --> 00:13:26,079

load oxygen outside our vehicle for

320

00:13:29,750 --> 00:13:27,680

spacewalks and we use that oxygen for

321

00:13:31,430 --> 00:13:29,760

certain things so we always keep a

322

00:13:33,670 --> 00:13:31,440

buffer and we actually have some

323

00:13:37,590 --> 00:13:33,680

emergency measures to produce oxygen if

324

00:13:41,590 --> 00:13:39,910

for jeff how did you adjust the earth's

325

00:13:48,150 --> 00:13:41,600

atmosphere after you came back from

326

00:13:53,189 --> 00:13:50,710

uh coming back from space is quite a

327

00:13:54,389 --> 00:13:53,199

shock to the system because we we're up

328

00:13:56,069 --> 00:13:54,399

here we're in that weightless

329

00:13:58,790 --> 00:13:56,079

environment so we're not experiencing

330

00:14:00,310 --> 00:13:58,800

the uh tremendous force of gravity while

331

00:14:02,389 --> 00:14:00,320

we're up here and after being here for

332

00:14:05,189 --> 00:14:02,399

six months it's quite a shock on the

333

00:14:07,670 --> 00:14:05,199

body uh to get back to earth and to uh

334

00:14:09,670 --> 00:14:07,680

to even to stand up for the first time

335

00:14:12,310 --> 00:14:09,680

maybe minutes after we get out of the

336

00:14:15,110 --> 00:14:12,320

the spacecraft uh the capsule in the

337

00:14:17,750 --> 00:14:15,120

middle of kazakhstan uh so we go through

338

00:14:20,389 --> 00:14:17,760

a re uh rehabilitation program we work

339

00:14:23,110 --> 00:14:20,399

with trainers in the gym every day

340

00:14:25,350 --> 00:14:23,120

for about 45 days or so

341

00:14:28,470 --> 00:14:25,360

doing weight lifting and stretching and

342

00:14:30,069 --> 00:14:28,480

and flexibility exercises to regain the

343

00:14:31,430 --> 00:14:30,079

strength that we weren't able to

344

00:14:33,030 --> 00:14:31,440

maintain

345

00:14:34,069 --> 00:14:33,040

on that equipment that i talked about

346

00:14:35,910 --> 00:14:34,079

earlier

347

00:14:39,590 --> 00:14:35,920

you also have a sense of balance that

348

00:14:42,790 --> 00:14:41,509

not regenerate but you have to regain

349

00:14:45,110 --> 00:14:42,800

your sense of balance because your

350

00:14:47,030 --> 00:14:45,120

vestibular system which provides your

351

00:14:49,269 --> 00:14:47,040

sense of balance doesn't work up here

352

00:14:51,670 --> 00:14:49,279

because it depends on gravity so that

353

00:14:53,590 --> 00:14:51,680

can take a few days before you you get

354

00:14:56,470 --> 00:14:53,600

over your your dizziness or your

355

00:14:57,829 --> 00:14:56,480

awkwardness in terms of sense of balance

356

00:14:59,430 --> 00:14:57,839

and then the final way that you're

357

00:15:02,069 --> 00:14:59,440

affected the major way that you're

358

00:15:03,670 --> 00:15:02,079

affected is a potential for bone loss i

359

00:15:05,350 --> 00:15:03,680

mentioned your muscles get weak and your

360

00:15:07,990 --> 00:15:05,360

bones also get weak

361

00:15:08,790 --> 00:15:08,000

uh if you don't exercise effectively up

362

00:15:12,629 --> 00:15:08,800

here

363

00:15:14,710 --> 00:15:12,639

than we used to have so we don't have

364

00:15:16,470 --> 00:15:14,720

this uh problem as much as we used to

365

00:15:19,030 --> 00:15:16,480

have but we used to have suffered bone

366

00:15:22,870 --> 00:15:19,040

loss which could take up to oh a year

367

00:15:30,870 --> 00:15:25,269

this is for tim how do you mentally

368

00:15:34,790 --> 00:15:32,949

you know it's a great question we have a

369

00:15:36,550 --> 00:15:34,800

great training program that actually

370

00:15:39,829 --> 00:15:36,560

starts from the very beginning when you

371

00:15:41,269 --> 00:15:39,839

become an astronaut and we focus on on

372

00:15:43,030 --> 00:15:41,279

making sure that we're technically

373

00:15:44,710 --> 00:15:43,040

competent so that we know exactly what

374

00:15:47,430 --> 00:15:44,720

our job is and if you know what you're

375

00:15:48,389 --> 00:15:47,440

doing if you feel competent and

376

00:15:49,910 --> 00:15:48,399

you have

377

00:15:52,150 --> 00:15:49,920

confidence in what you're going to do i

378

00:15:54,389 --> 00:15:52,160

think that reduces the stress but in

379

00:15:56,629 --> 00:15:54,399

terms of the the long-term

380

00:15:58,550 --> 00:15:56,639

time we spend up here and away from

381

00:16:00,550 --> 00:15:58,560

training it's really a step-by-step

382

00:16:03,030 --> 00:16:00,560

process because uh you know both jeff

383

00:16:04,870 --> 00:16:03,040

and i spent a lot of time away from home

384

00:16:07,189 --> 00:16:04,880

in training and so maybe a month at a

385

00:16:09,269 --> 00:16:07,199

time and frankly that actually prepares

386

00:16:11,030 --> 00:16:09,279

you for separation from family because

387

00:16:12,230 --> 00:16:11,040

you're used to that even though it's not

388

00:16:14,150 --> 00:16:12,240

comfortable and you don't like to be

389

00:16:16,150 --> 00:16:14,160

away from your family you get used to it

390

00:16:17,110 --> 00:16:16,160

to a certain extent and then we also

391

00:16:19,590 --> 00:16:17,120

train

392

00:16:21,509 --> 00:16:19,600

as a crew we've spent we've both spent

393

00:16:22,470 --> 00:16:21,519

time underwater for over a week at a

394

00:16:24,870 --> 00:16:22,480

time

395

00:16:26,790 --> 00:16:24,880

working with a small crew in a very

396

00:16:29,189 --> 00:16:26,800

intense kind of mission we've been on

397

00:16:31,350 --> 00:16:29,199

camping trips with small groups with

398

00:16:33,590 --> 00:16:31,360

very challenging scenarios and so all

399

00:16:35,430 --> 00:16:33,600

those things piece together to make us

400

00:16:37,110 --> 00:16:35,440

well prepared to be away from home and

401
00:16:40,230 --> 00:16:37,120
to work up here for a long period of

402
00:16:46,470 --> 00:16:42,230
what happens if there is a medical

403
00:16:51,189 --> 00:16:48,870
that's a great question because

404
00:16:52,949 --> 00:16:51,199
only occasionally do we have a medical

405
00:16:55,350 --> 00:16:52,959
doctor on the crew because there are a

406
00:16:58,870 --> 00:16:55,360
few astronauts that are medical doctors

407
00:17:01,350 --> 00:16:58,880
most of the time we do not though so

408
00:17:03,269 --> 00:17:01,360
most of us and tim and i both have gone

409
00:17:05,350 --> 00:17:03,279
through extensive training on the ground

410
00:17:07,189 --> 00:17:05,360
in the medical field we've spent time in

411
00:17:09,669 --> 00:17:07,199
emergency rooms

412
00:17:12,789 --> 00:17:09,679
working in real hospitals with real

413
00:17:15,270 --> 00:17:12,799

cases we've got a staff of trainers

414

00:17:17,350 --> 00:17:15,280

at nasa in houston at johnson space

415

00:17:19,510 --> 00:17:17,360

center that train us on all the medical

416

00:17:21,429 --> 00:17:19,520

procedures then we have a staff of

417

00:17:23,350 --> 00:17:21,439

doctors and medical technicians in

418

00:17:25,029 --> 00:17:23,360

houston that serve in the mission

419

00:17:26,230 --> 00:17:25,039

control center and they're always on

420

00:17:27,510 --> 00:17:26,240

council

421

00:17:29,990 --> 00:17:27,520

and if we have

422

00:17:32,870 --> 00:17:30,000

something occur on board here we can do

423

00:17:34,390 --> 00:17:32,880

the immediate response for an emergency

424

00:17:36,390 --> 00:17:34,400

helping each other out we're well

425

00:17:38,789 --> 00:17:36,400

equipped we we're equipped like a small

426
00:17:41,029 --> 00:17:38,799
emergency room here on board the space

427
00:17:42,630 --> 00:17:41,039
station so we have all the equipment and

428
00:17:44,310 --> 00:17:42,640
then we would have that team on the

429
00:17:46,549 --> 00:17:44,320
ground help us

430
00:17:49,510 --> 00:17:46,559
through any procedures or further

431
00:17:54,710 --> 00:17:49,520
response that we need to uh to do in in

432
00:17:57,750 --> 00:17:55,909
for tim

433
00:18:02,549 --> 00:17:57,760
what personal belongings can an

434
00:18:05,590 --> 00:18:03,830
it's a great question because you want

435
00:18:07,669 --> 00:18:05,600
to bring things that remind you of home

436
00:18:09,669 --> 00:18:07,679
and uh and sort of give you that mental

437
00:18:11,270 --> 00:18:09,679
comfort i think all of us bring lots of

438
00:18:13,190 --> 00:18:11,280

photographs of our family and our

439

00:18:15,029 --> 00:18:13,200

friends and maybe some of our favorite

440

00:18:16,870 --> 00:18:15,039

places we're actually not very

441

00:18:18,789 --> 00:18:16,880

constrained on what we can bring up it's

442

00:18:20,870 --> 00:18:18,799

really about the volume and the weight

443

00:18:22,789 --> 00:18:20,880

of what we bring up and so a lot of us

444

00:18:25,510 --> 00:18:22,799

bring some of our favorite books maybe

445

00:18:28,150 --> 00:18:25,520

some some t-shirts from your university

446

00:18:29,669 --> 00:18:28,160

or something that you're very fond of

447

00:18:32,390 --> 00:18:29,679

and so it's just things that remind you

448

00:18:34,390 --> 00:18:32,400

of home and then one nice thing is that

449

00:18:35,990 --> 00:18:34,400

oftentimes we'll have

450

00:18:38,230 --> 00:18:36,000

crew care packages that come up on our

451

00:18:40,310 --> 00:18:38,240

visiting vehicles and so like just today

452

00:18:42,789 --> 00:18:40,320

i opened a letter from my wife that she

453

00:18:44,549 --> 00:18:42,799

had sent up before and i have a ball cap

454

00:18:46,390 --> 00:18:44,559

from a university of my hometown

455

00:18:48,470 --> 00:18:46,400

university of texas so those kind of

456

00:18:50,470 --> 00:18:48,480

things they really they add to the

457

00:18:53,830 --> 00:18:50,480

experience and remind you of home and

458

00:18:57,590 --> 00:18:55,750

tim and jeff this is senator dick durbin

459

00:19:00,390 --> 00:18:57,600

we want to thank you but i have one last

460

00:19:02,230 --> 00:19:00,400

question that wasn't on the script i saw

461

00:19:04,070 --> 00:19:02,240

the movie gravity

462

00:19:06,710 --> 00:19:04,080

and since i saw that movie i've been

463

00:19:08,390 --> 00:19:06,720

concerned about space trash

464

00:19:10,470 --> 00:19:08,400

and i want to know if you have any

465

00:19:12,549 --> 00:19:10,480

concerns or there's any danger

466

00:19:16,710 --> 00:19:12,559

with trash that's flying through space

467

00:19:19,909 --> 00:19:19,029

we know sir it is a great question and

468

00:19:21,909 --> 00:19:19,919

uh

469

00:19:24,710 --> 00:19:21,919

you know this is not without risk you

470

00:19:26,470 --> 00:19:24,720

know one of the great things about nasa

471

00:19:29,590 --> 00:19:26,480

and the work that we do is everything we

472

00:19:31,750 --> 00:19:29,600

do is focused on risk mitigation and so

473

00:19:33,350 --> 00:19:31,760

i think we have good confidence that we

474

00:19:36,070 --> 00:19:33,360

know where all the items are that are

475

00:19:37,750 --> 00:19:36,080

bigger than a softball for example our

476

00:19:40,470 --> 00:19:37,760

station can protect us for everything

477

00:19:42,070 --> 00:19:40,480

that's about a large marble and smaller

478

00:19:43,909 --> 00:19:42,080

so there's that middle category that

479

00:19:46,150 --> 00:19:43,919

actually is you know we're exposed to

480

00:19:48,230 --> 00:19:46,160

because we have very good technology we

481

00:19:50,789 --> 00:19:48,240

understand a lot about our universe

482

00:19:53,510 --> 00:19:50,799

about our planet and everything that's

483

00:19:55,190 --> 00:19:53,520

in between but we don't know everything

484

00:19:57,510 --> 00:19:55,200

and so one of the things we do here on

485

00:19:59,350 --> 00:19:57,520

board is we train for emergencies and

486

00:20:01,990 --> 00:19:59,360

one of those emergencies would be a

487

00:20:03,750 --> 00:20:02,000

rapid depressurization in which case we

488

00:20:05,830 --> 00:20:03,760

know exactly what to do we're very well

489

00:20:08,149 --> 00:20:05,840

trained and we have a sequence of events

490

00:20:10,470 --> 00:20:08,159

so even though we're exposed to risk up

491

00:20:12,470 --> 00:20:10,480

here uh we mitigate it as best we can

492

00:20:14,549 --> 00:20:12,480

and we recognize there's risk but we

493

00:20:16,310 --> 00:20:14,559

know that the benefit from our space

494

00:20:18,950 --> 00:20:16,320

program especially our human space

495

00:20:21,830 --> 00:20:18,960

program is exceeds any kind of risk that

496

00:20:23,830 --> 00:20:21,840

we may be exposed to

497

00:20:25,350 --> 00:20:23,840

well tim and jeff uh i think you'll

498

00:20:27,270 --> 00:20:25,360

agree that we've had some extraordinary

499

00:20:28,230 --> 00:20:27,280

questions from our students

500

00:20:30,390 --> 00:20:28,240

today

501
00:20:33,190 --> 00:20:30,400
and we are so proud of what they've

502
00:20:34,950 --> 00:20:33,200
asked you but we're even prouder of what

503
00:20:36,630 --> 00:20:34,960
you are doing to represent the united

504
00:20:38,950 --> 00:20:36,640
states of america at the international

505
00:20:40,710 --> 00:20:38,960
space station you are inspiring these

506
00:20:43,909 --> 00:20:40,720
young people and many more just like

507
00:20:46,710 --> 00:20:43,919
them to follow their dream for science

508
00:20:48,549 --> 00:20:46,720
technology engineering and math thank

509
00:20:52,630 --> 00:20:48,559
you so much for sharing your day with us

510
00:20:52,640 --> 00:21:00,470
thank you so much sir

511
00:21:17,909 --> 00:21:02,149
station this is houston acr that

512
00:21:22,070 --> 00:21:19,909
thank you to all participants and guests

513
00:21:23,830 --> 00:21:22,080

at south suburban college station we are