



1
00:00:05,829 --> 00:00:03,909
hey well uh welcome into mission control

2
00:00:07,990 --> 00:00:05,839
houston victory lakes intermediate

3
00:00:09,589 --> 00:00:08,000
school uh you're joining me

4
00:00:12,070 --> 00:00:09,599
again mission control houston where

5
00:00:13,990 --> 00:00:12,080
we're uh controlling all the systems on

6
00:00:15,990 --> 00:00:14,000
board the international space station

7
00:00:18,150 --> 00:00:16,000
and i'm joined today by glenda brown

8
00:00:20,470 --> 00:00:18,160
who's one of our eva operations

9
00:00:22,150 --> 00:00:20,480
specialists she's responsible for

10
00:00:23,509 --> 00:00:22,160
training the crews and making sure that

11
00:00:24,950 --> 00:00:23,519
everything goes smoothly and probably

12
00:00:26,790 --> 00:00:24,960
one of the most exciting things that our

13
00:00:29,189 --> 00:00:26,800

astronauts do in that spacewalk so it's

14

00:00:30,870 --> 00:00:29,199

really exciting stuff

15

00:00:32,470 --> 00:00:30,880

glenda thanks for being here i know i'm

16

00:00:33,510 --> 00:00:32,480

excited to have you on i hope they are

17

00:00:35,430 --> 00:00:33,520

too

18

00:00:36,470 --> 00:00:35,440

sure i'm really happy to be here and

19

00:00:37,830 --> 00:00:36,480

looking forward to all your great

20

00:00:39,110 --> 00:00:37,840

question questions

21

00:00:40,389 --> 00:00:39,120

all right well why don't we go ahead and

22

00:00:56,470 --> 00:00:40,399

get started you guys can go ahead and

23

00:01:00,150 --> 00:00:58,630

why did the president stop the space

24

00:01:01,750 --> 00:01:00,160

shuttle missions

25

00:01:04,310 --> 00:01:01,760

why did the president stop the space

26
00:01:07,109 --> 00:01:04,320
shuttle missions well you know that one

27
00:01:09,109 --> 00:01:07,119
is a tough one so here's the deal um

28
00:01:11,830 --> 00:01:09,119
president bush um

29
00:01:14,310 --> 00:01:11,840
put out a request for a report got a

30
00:01:16,870 --> 00:01:14,320
bunch of experts together on all things

31
00:01:19,270 --> 00:01:16,880
having to do with nasa so that's the

32
00:01:21,510 --> 00:01:19,280
interplanetary work that we do all of

33
00:01:23,190 --> 00:01:21,520
the mission to earth stuff which is like

34
00:01:25,190 --> 00:01:23,200
the satellites that look back at the

35
00:01:29,429 --> 00:01:25,200
weather on earth

36
00:01:30,870 --> 00:01:29,439
um all the programs having to do with um

37
00:01:32,230 --> 00:01:30,880
any of the exploration that we do

38
00:01:33,350 --> 00:01:32,240

including the manned space flight

39

00:01:35,590 --> 00:01:33,360

program

40

00:01:37,670 --> 00:01:35,600

and he commissioned this report to be

41

00:01:39,670 --> 00:01:37,680

done to see how much each thing cost and

42

00:01:41,270 --> 00:01:39,680

then how much benefit we get back from

43

00:01:42,149 --> 00:01:41,280

each of the things

44

00:01:44,710 --> 00:01:42,159

and

45

00:01:47,510 --> 00:01:44,720

what the results of that report were was

46

00:01:49,109 --> 00:01:47,520

that in order to do our exploration of

47

00:01:49,990 --> 00:01:49,119

sending people on

48

00:01:55,590 --> 00:01:50,000

to

49

00:01:57,590 --> 00:01:55,600

the moon or mars or an asteroid in order

50

00:01:59,590 --> 00:01:57,600

to have enough money to do that we would

51
00:02:01,590 --> 00:01:59,600
have to cut back on something else they

52
00:02:03,270 --> 00:02:01,600
looked around at all of the cost of all

53
00:02:04,950 --> 00:02:03,280
of the projects and it turns out that

54
00:02:06,709 --> 00:02:04,960
the space shuttle program was costing a

55
00:02:07,990 --> 00:02:06,719
lot of money more and more each year

56
00:02:09,510 --> 00:02:08,000
because the shuttles were getting pretty

57
00:02:10,389 --> 00:02:09,520
old and we were having to refurbish

58
00:02:12,309 --> 00:02:10,399
those

59
00:02:14,470 --> 00:02:12,319
so in order to come up with enough money

60
00:02:16,229 --> 00:02:14,480
that we could go on and do exploration

61
00:02:17,110 --> 00:02:16,239
they decided to cut the space shuttle

62
00:02:18,790 --> 00:02:17,120
program

63
00:02:20,150 --> 00:02:18,800

and in order to do that they had to make

64

00:02:22,309 --> 00:02:20,160

sure we had another way to get to the

65

00:02:24,070 --> 00:02:22,319

international space station because we

66

00:02:25,910 --> 00:02:24,080

have international partners now all

67

00:02:27,750 --> 00:02:25,920

around the world we could ask the

68

00:02:29,350 --> 00:02:27,760

russians if they would be willing to

69

00:02:31,350 --> 00:02:29,360

take us to the space station and

70

00:02:33,350 --> 00:02:31,360

certainly for a certain cost they would

71

00:02:35,190 --> 00:02:33,360

be able to provide that service to us

72

00:02:37,830 --> 00:02:35,200

and at the same time we were able to

73

00:02:40,630 --> 00:02:37,840

turn on all the exploration money to

74

00:02:42,949 --> 00:02:40,640

start working on producing our own way

75

00:02:44,550 --> 00:02:42,959

to get back to the stars and we've

76

00:02:46,869 --> 00:02:44,560

commissioned several commercial

77

00:02:48,790 --> 00:02:46,879

companies to go and build

78

00:02:50,390 --> 00:02:48,800

another vehicle that'll take us back to

79

00:02:52,390 --> 00:02:50,400

the international space station

80

00:02:54,710 --> 00:02:52,400

and then take that same vehicle and

81

00:02:56,070 --> 00:02:54,720

launch it off further to the next prog

82

00:02:57,990 --> 00:02:56,080

project that we're going to do it's

83

00:02:59,589 --> 00:02:58,000

really the shuttle you know designed

84

00:03:00,710 --> 00:02:59,599

only to be in low earth orbit so just a

85

00:03:02,550 --> 00:03:00,720

few hundred miles off the earth's

86

00:03:04,470 --> 00:03:02,560

surface we want to go tens and hundreds

87

00:03:05,990 --> 00:03:04,480

of thousands and millions of miles away

88

00:03:07,750 --> 00:03:06,000

so we need a new vehicle and we couldn't

89

00:03:10,229 --> 00:03:07,760

do that while we still have the shuttle

90

00:03:16,550 --> 00:03:10,239

does that make sense

91

00:03:20,390 --> 00:03:18,390

is there a certain plant that can

92

00:03:21,910 --> 00:03:20,400

sustain life in space

93

00:03:23,750 --> 00:03:21,920

can you speak up just a little bit i

94

00:03:25,670 --> 00:03:23,760

just couldn't hear that

95

00:03:27,990 --> 00:03:25,680

you haven't talked really well is there

96

00:03:29,830 --> 00:03:28,000

a certain type of plant that can sustain

97

00:03:30,789 --> 00:03:29,840

life in space

98

00:03:33,030 --> 00:03:30,799

um

99

00:03:36,149 --> 00:03:33,040

well so uh on the international space

100

00:03:39,589 --> 00:03:36,159

station we are already doing all kinds

101
00:03:41,830 --> 00:03:39,599
of uh plant growth experiments to see

102
00:03:43,830 --> 00:03:41,840
what grows in zero gravity and it turns

103
00:03:46,390 --> 00:03:43,840
out almost all kinds of plants will grow

104
00:03:49,030 --> 00:03:46,400
in zero gravity as long as they have an

105
00:03:50,949 --> 00:03:49,040
environment and a subsequent substrate

106
00:03:52,470 --> 00:03:50,959
to grow on meaning some dirt or

107
00:03:54,149 --> 00:03:52,480
something that they can you can plant

108
00:03:56,309 --> 00:03:54,159
the seed in and then it can grow and it

109
00:03:58,869 --> 00:03:56,319
just needs light and water like here on

110
00:04:00,630 --> 00:03:58,879
earth and it'll grow just fine i know

111
00:04:02,309 --> 00:04:00,640
don pettit right now is growing quite a

112
00:04:04,070 --> 00:04:02,319
few plants he's got a cucumber and a

113
00:04:06,070 --> 00:04:04,080

broccoli and i think some sunflowers

114

00:04:07,589 --> 00:04:06,080

growing on board the station right now

115

00:04:08,869 --> 00:04:07,599

and uh he's been doing a pretty funny

116

00:04:11,270 --> 00:04:08,879

blog where he's talking from the

117

00:04:12,949 --> 00:04:11,280

perspective of the cucumber as it uh

118

00:04:15,190 --> 00:04:12,959

goes on as a crew member on board the

119

00:04:16,710 --> 00:04:15,200

international space station so yeah i

120

00:04:18,870 --> 00:04:16,720

mean quite a diverse plant life can

121

00:04:24,150 --> 00:04:18,880

actually exist in space

122

00:04:31,590 --> 00:04:27,189

how long can a person live in space

123

00:04:33,590 --> 00:04:31,600

now i'm going to assume that you

124

00:04:37,270 --> 00:04:33,600

understand that you have to have an

125

00:04:39,430 --> 00:04:37,280

environment in space so you have to have

126
00:04:40,710 --> 00:04:39,440
air around you in a pressurized

127
00:04:43,030 --> 00:04:40,720
environment

128
00:04:44,469 --> 00:04:43,040
and as long as you have that

129
00:04:46,629 --> 00:04:44,479
we think that you can live as long as

130
00:04:48,629 --> 00:04:46,639
you can here on earth but there you have

131
00:04:50,390 --> 00:04:48,639
to take some preventative measures you

132
00:04:52,310 --> 00:04:50,400
have to make sure that you're exercising

133
00:04:54,150 --> 00:04:52,320
because the ground the earth isn't

134
00:04:55,990 --> 00:04:54,160
pulling on your system it's not

135
00:04:58,310 --> 00:04:56,000
compressing your bones the way it is

136
00:05:01,110 --> 00:04:58,320
here on earth and so what we see on

137
00:05:03,350 --> 00:05:01,120
orbit is a loss of bone mass in the

138
00:05:04,790 --> 00:05:03,360

bones

139

00:05:06,550 --> 00:05:04,800

and we can measure that when crew

140

00:05:09,749 --> 00:05:06,560

members come back from space so we've

141

00:05:11,909 --> 00:05:09,759

implemented an exercise program with a

142

00:05:14,469 --> 00:05:11,919

resistive exercise program that

143

00:05:16,790 --> 00:05:14,479

basically looks like a

144

00:05:18,629 --> 00:05:16,800

a weight lift system on

145

00:05:20,790 --> 00:05:18,639

on steroids

146

00:05:22,550 --> 00:05:20,800

so they put it on a little

147

00:05:24,390 --> 00:05:22,560

i think it's a hydraulic kind of system

148

00:05:25,430 --> 00:05:24,400

or maybe a spring kind of system

149

00:05:28,310 --> 00:05:25,440

that

150

00:05:31,110 --> 00:05:28,320

pushes down on the crew member on on his

151

00:05:33,029 --> 00:05:31,120

uh arms and shoulders while he's also

152

00:05:35,350 --> 00:05:33,039

pushing away on his feet and that

153

00:05:36,870 --> 00:05:35,360

creates some uh effective gravity and

154

00:05:38,469 --> 00:05:36,880

that's what keeps their bones strong and

155

00:05:39,749 --> 00:05:38,479

we're finding some great success with

156

00:05:41,670 --> 00:05:39,759

that

157

00:05:43,590 --> 00:05:41,680

yep i've heard i mean the astronauts are

158

00:05:45,510 --> 00:05:43,600

exercising like two hours a day every

159

00:05:46,710 --> 00:05:45,520

single day of the week so some of them

160

00:05:48,950 --> 00:05:46,720

are actually saying they're coming down

161

00:05:49,990 --> 00:05:48,960

and was stronger yeah that's absolutely

162

00:05:53,590 --> 00:05:50,000

true

163

00:05:55,670 --> 00:05:53,600

all right next question guys

164

00:05:57,670 --> 00:05:55,680

what do people do at mission control now

165

00:05:58,710 --> 00:05:57,680

that the shuttle program is no longer

166

00:06:00,550 --> 00:05:58,720

running

167

00:06:02,469 --> 00:06:00,560

i'm sorry oh what to what are we doing

168

00:06:03,909 --> 00:06:02,479

mission control now oh well we still

169

00:06:06,150 --> 00:06:03,919

have the international space station

170

00:06:07,430 --> 00:06:06,160

which is uh beyond world-class we'll

171

00:06:08,790 --> 00:06:07,440

call it a uniqllo

172

00:06:11,029 --> 00:06:08,800

universe class

173

00:06:13,830 --> 00:06:11,039

science platform we can do all kinds of

174

00:06:16,230 --> 00:06:13,840

laboratory experiments up there

175

00:06:18,710 --> 00:06:16,240

and in order to maintain that laboratory

176

00:06:20,790 --> 00:06:18,720

system we have to maintain

177

00:06:22,950 --> 00:06:20,800

the electricity coming in so we have to

178

00:06:24,629 --> 00:06:22,960

manage all the power systems

179

00:06:27,189 --> 00:06:24,639

we have to provide an environment for

180

00:06:29,510 --> 00:06:27,199

the crew members so we have to monitor

181

00:06:31,990 --> 00:06:29,520

the temperature and the

182

00:06:33,909 --> 00:06:32,000

the pressure inside the vehicle as well

183

00:06:35,749 --> 00:06:33,919

as the oxygen balance you need to have a

184

00:06:37,590 --> 00:06:35,759

good balance of oxygen just like here on

185

00:06:39,430 --> 00:06:37,600

the ground

186

00:06:41,110 --> 00:06:39,440

so we have to monitor all of those and

187

00:06:43,590 --> 00:06:41,120

then we have to maintain all of those

188

00:06:45,350 --> 00:06:43,600

systems as well so

189

00:06:48,150 --> 00:06:45,360

we keep really busy maintaining the

190

00:06:50,390 --> 00:06:48,160

spacesuits so that we can go outside and

191

00:06:52,870 --> 00:06:50,400

either take a science experiment outside

192

00:06:55,830 --> 00:06:52,880

bring it back in or maintain the system

193

00:06:57,830 --> 00:06:55,840

so for example if the big batteries

194

00:06:59,749 --> 00:06:57,840

that are powered by the solar arrays if

195

00:07:02,150 --> 00:06:59,759

those were to fail

196

00:07:05,270 --> 00:07:02,160

we would have to go outside and change

197

00:07:07,350 --> 00:07:05,280

out the big box that was broken and in

198

00:07:10,790 --> 00:07:07,360

order to do that we have to maintain our

199

00:07:12,710 --> 00:07:10,800

spacesuits and be ready all times

200

00:07:14,070 --> 00:07:12,720

so that's what's keeping me really busy

201
00:07:16,390 --> 00:07:14,080
there's a lot of maintenance that has to

202
00:07:17,589 --> 00:07:16,400
be done on the spacesuits to get ready

203
00:07:19,350 --> 00:07:17,599
as well as training all of the

204
00:07:21,189 --> 00:07:19,360
astronauts to be ready to do that here

205
00:07:23,430 --> 00:07:21,199
on the ground so we're really busy here

206
00:07:25,830 --> 00:07:23,440
at uh johnson space center taking care

207
00:07:28,469 --> 00:07:25,840
of all those things at the same time all

208
00:07:31,029 --> 00:07:28,479
around the the entire

209
00:07:34,070 --> 00:07:31,039
nation we've got people that are working

210
00:07:35,830 --> 00:07:34,080
on planetary exploration mission to

211
00:07:37,270 --> 00:07:35,840
planet earth stuff trying to figure out

212
00:07:40,230 --> 00:07:37,280
how we're going to get more data about

213
00:07:41,670 --> 00:07:40,240

the earth and um and then planning the

214

00:07:44,390 --> 00:07:41,680

next um

215

00:07:46,790 --> 00:07:44,400

manned space flights um on to

216

00:07:48,710 --> 00:07:46,800

mars and beyond and in terms of just you

217

00:07:50,629 --> 00:07:48,720

know mission control here which is where

218

00:07:51,990 --> 00:07:50,639

again we're sitting right now all the

219

00:07:53,830 --> 00:07:52,000

men and women in this room are actually

220

00:07:55,110 --> 00:07:53,840

controlling the majority the systems on

221

00:07:57,189 --> 00:07:55,120

board the station it's kind of like a

222

00:07:59,749 --> 00:07:57,199

big remote control vehicle so even

223

00:08:02,150 --> 00:07:59,759

though it's you know 240 miles away at

224

00:08:04,309 --> 00:08:02,160

any one time and traveling at 17 000

225

00:08:05,350 --> 00:08:04,319

miles an hour people at these computer

226

00:08:07,990 --> 00:08:05,360

systems are actually what are

227

00:08:10,230 --> 00:08:08,000

controlling it and kind of flying it so

228

00:08:12,469 --> 00:08:10,240

yeah mission control is still manned 24

229

00:08:13,830 --> 00:08:12,479

7 365 so there's still a lot of work

230

00:08:18,070 --> 00:08:13,840

being done here

231

00:08:22,150 --> 00:08:20,070

do astronauts get sick the first time

232

00:08:23,430 --> 00:08:22,160

going up into space or does this happen

233

00:08:25,270 --> 00:08:23,440

often

234

00:08:28,390 --> 00:08:25,280

do astronauts get sick when they go to

235

00:08:30,550 --> 00:08:28,400

space well the answer to that is yes

236

00:08:32,870 --> 00:08:30,560

mostly and but it only happens right at

237

00:08:35,589 --> 00:08:32,880

the beginning um have you guys studied

238

00:08:37,269 --> 00:08:35,599

about the vestibular system and and how

239

00:08:39,269 --> 00:08:37,279

we have a little

240

00:08:40,709 --> 00:08:39,279

organ in our ears that helps keep our

241

00:08:42,949 --> 00:08:40,719

balance

242

00:08:45,269 --> 00:08:42,959

the way that works is they're i think of

243

00:08:47,269 --> 00:08:45,279

them as little hairs that are inside

244

00:08:49,190 --> 00:08:47,279

that your vestibular inside your inner

245

00:08:50,710 --> 00:08:49,200

ear and there's some fluid in there and

246

00:08:53,430 --> 00:08:50,720

it is always

247

00:08:54,389 --> 00:08:53,440

testing how how straight we're standing

248

00:08:57,590 --> 00:08:54,399

up

249

00:08:59,350 --> 00:08:57,600

well that fluid needs gravity to work

250

00:09:01,990 --> 00:08:59,360

and when you get to space it doesn't

251
00:09:04,470 --> 00:09:02,000
have that anymore so your brain thinks

252
00:09:06,150 --> 00:09:04,480
it doesn't know where you are and just

253
00:09:07,590 --> 00:09:06,160
like when you're on a crazy roller

254
00:09:09,590 --> 00:09:07,600
coaster ride

255
00:09:11,430 --> 00:09:09,600
you've been up there way too long doing

256
00:09:12,630 --> 00:09:11,440
them over and over and over again you

257
00:09:15,190 --> 00:09:12,640
start to feel sick because your

258
00:09:16,630 --> 00:09:15,200
vestibular system isn't working and on

259
00:09:17,990 --> 00:09:16,640
the opposite side of that i was just

260
00:09:20,230 --> 00:09:18,000
talking to one of the astronauts that

261
00:09:21,590 --> 00:09:20,240
came back from a mission not long ago

262
00:09:22,470 --> 00:09:21,600
and he said

263
00:09:26,470 --> 00:09:22,480

that

264

00:09:30,310 --> 00:09:26,480

quickly it kind of turns off those

265

00:09:31,910 --> 00:09:30,320

senses and so after a few hours um maybe

266

00:09:33,829 --> 00:09:31,920

just a few minutes you start to feel

267

00:09:35,350 --> 00:09:33,839

better maybe it takes a couple of days

268

00:09:37,590 --> 00:09:35,360

but then on the other side of it when

269

00:09:40,389 --> 00:09:37,600

you come back from space your brain has

270

00:09:41,910 --> 00:09:40,399

to relearn that so going for a bike ride

271

00:09:43,590 --> 00:09:41,920

that first day is right out because

272

00:09:45,509 --> 00:09:43,600

you'd fall right over because your brain

273

00:09:47,190 --> 00:09:45,519

hasn't relearned how to balance i've

274

00:09:48,790 --> 00:09:47,200

heard stories of astronauts come down

275

00:09:50,230 --> 00:09:48,800

and they fall asleep and they get up to

276

00:09:51,190 --> 00:09:50,240

maybe get a drink of water and they get

277

00:09:52,790 --> 00:09:51,200

out of bed and they think they're just

278

00:09:54,070 --> 00:09:52,800

going to float away and then they

279

00:09:55,829 --> 00:09:54,080

realize oh i'm not floating they just

280

00:09:57,509 --> 00:09:55,839

kind of fall to the ground so it can be

281

00:09:58,949 --> 00:09:57,519

a bit of an adjustment yeah yeah and

282

00:10:00,710 --> 00:09:58,959

that's all that microgravity that

283

00:10:02,069 --> 00:10:00,720

they're exposed to

284

00:10:03,670 --> 00:10:02,079

lots of fun for them but a little

285

00:10:04,630 --> 00:10:03,680

difficult sometimes yeah really good

286

00:10:10,069 --> 00:10:04,640

question

287

00:10:11,190 --> 00:10:10,079

how heavy are spacesuits on earth and on

288

00:10:13,590 --> 00:10:11,200

the moon

289

00:10:15,030 --> 00:10:13,600

how much do our spacesuits wear wait

290

00:10:17,670 --> 00:10:15,040

okay well i'm going to answer that in a

291

00:10:20,470 --> 00:10:17,680

couple of different ways um let's just

292

00:10:22,150 --> 00:10:20,480

to give you um so overall by the time

293

00:10:24,550 --> 00:10:22,160

you put the spacesuit on and you have

294

00:10:26,790 --> 00:10:24,560

the person inside and you have all of

295

00:10:28,310 --> 00:10:26,800

the tools that they need for their job

296

00:10:31,350 --> 00:10:28,320

um

297

00:10:33,910 --> 00:10:31,360

they weigh about 800 pounds here on the

298

00:10:36,150 --> 00:10:33,920

ground so you can imagine there's no way

299

00:10:37,829 --> 00:10:36,160

that a person could carry that much

300

00:10:39,750 --> 00:10:37,839

weight around so when we're doing

301
00:10:41,670 --> 00:10:39,760
training here on the ground we'll go out

302
00:10:43,750 --> 00:10:41,680
to the neutral buoyancy laboratory so

303
00:10:45,190 --> 00:10:43,760
that they can float and do the work in

304
00:10:46,389 --> 00:10:45,200
the water just like they would be doing

305
00:10:49,190 --> 00:10:46,399
it in space

306
00:10:51,590 --> 00:10:49,200
so that's how we create that negative

307
00:10:52,710 --> 00:10:51,600
weight or that neutral weight so like

308
00:10:54,310 --> 00:10:52,720
you would be in space you'd be

309
00:10:56,949 --> 00:10:54,320
weightless that's how we demonstrate

310
00:10:59,269 --> 00:10:56,959
that in the neutral buoyancy laboratory

311
00:11:01,750 --> 00:10:59,279
so then when you take that 800 pounds to

312
00:11:04,069 --> 00:11:01,760
space we'll talk about that first

313
00:11:06,389 --> 00:11:04,079

there's very very little gravity in

314

00:11:07,829 --> 00:11:06,399

space microgravity is what we call it

315

00:11:09,670 --> 00:11:07,839

and it's not enough that you really

316

00:11:12,870 --> 00:11:09,680

weigh anything at all

317

00:11:15,030 --> 00:11:12,880

and then when you go on to the moon the

318

00:11:17,670 --> 00:11:15,040

moon is a lot smaller than the earth it

319

00:11:20,150 --> 00:11:17,680

has a smaller mass so what that means is

320

00:11:23,030 --> 00:11:20,160

gravity is a lot less on the moon it's

321

00:11:24,470 --> 00:11:23,040

about one-sixth that amount of earth

322

00:11:26,949 --> 00:11:24,480

so can you guys do the math in your

323

00:11:28,389 --> 00:11:26,959

heads real quick what is one-sixth of

324

00:11:30,310 --> 00:11:28,399

eight hundred

325

00:11:32,630 --> 00:11:30,320

is everybody doing it

326

00:11:35,990 --> 00:11:32,640

anybody know

327

00:11:38,069 --> 00:11:36,000

the answer is about 133 pounds

328

00:11:39,190 --> 00:11:38,079

and um

329

00:11:40,150 --> 00:11:39,200

of that

330

00:11:42,069 --> 00:11:40,160

um

331

00:11:44,550 --> 00:11:42,079

the crew member weighs about we we just

332

00:11:46,389 --> 00:11:44,560

averaged about 200 pounds and so the

333

00:11:48,790 --> 00:11:46,399

spacesuit without the crew member in it

334

00:11:50,790 --> 00:11:48,800

would weigh 600 pounds so

335

00:11:53,190 --> 00:11:50,800

on the moon it would only weigh 100

336

00:11:56,150 --> 00:11:53,200

pounds so a person or at least two

337

00:11:58,710 --> 00:11:56,160

people together could pick it up very

338

00:12:00,230 --> 00:11:58,720

fascinating stuff it's amazing like the

339

00:12:01,190 --> 00:12:00,240

the size of the objects they can move

340

00:12:03,110 --> 00:12:01,200

when they're up there on the space

341

00:12:04,629 --> 00:12:03,120

station i mean you can see them rotating

342

00:12:06,389 --> 00:12:04,639

racks that weigh hundreds or even

343

00:12:07,750 --> 00:12:06,399

thousands of pounds down here on earth

344

00:12:10,629 --> 00:12:07,760

and they can just kind of toss them

345

00:12:12,230 --> 00:12:10,639

around and it's no problem at all very

346

00:12:15,110 --> 00:12:12,240

very good very good question excellent

347

00:12:19,269 --> 00:12:17,190

what type of job does a person have to

348

00:12:20,870 --> 00:12:19,279

have to become an astronaut

349

00:12:22,550 --> 00:12:20,880

i'm sorry i didn't hear that what type

350

00:12:25,269 --> 00:12:22,560

of job does a person have to have before

351

00:12:27,350 --> 00:12:25,279

they become an astronaut oh okay

352

00:12:29,430 --> 00:12:27,360

almost any kind of job you'll want to

353

00:12:32,230 --> 00:12:29,440

have a good background in math and

354

00:12:34,230 --> 00:12:32,240

science that is most important for

355

00:12:36,790 --> 00:12:34,240

gosh so many jobs

356

00:12:41,430 --> 00:12:39,430

science engineering building and that's

357

00:12:42,629 --> 00:12:41,440

what we need for astronauts they have to

358

00:12:45,030 --> 00:12:42,639

be able to perform the science

359

00:12:47,670 --> 00:12:45,040

experiments they need to be able to run

360

00:12:49,430 --> 00:12:47,680

their is their systems for their you

361

00:12:51,829 --> 00:12:49,440

know all the breathing air and stuff

362

00:12:53,430 --> 00:12:51,839

that they need all the power systems so

363

00:12:55,350 --> 00:12:53,440

they have to understand some mechanical

364

00:12:56,949 --> 00:12:55,360

stuff and then they also have to

365

00:12:58,389 --> 00:12:56,959

understand how to take care of each

366

00:12:59,590 --> 00:12:58,399

other because they don't have doctor up

367

00:13:01,269 --> 00:12:59,600

there so they have to be their own

368

00:13:02,870 --> 00:13:01,279

doctor so they have to understand some

369

00:13:03,750 --> 00:13:02,880

medical stuff too

370

00:13:05,910 --> 00:13:03,760

so

371

00:13:08,389 --> 00:13:05,920

not everybody has to do every single

372

00:13:11,110 --> 00:13:08,399

thing they do divide the work there so

373

00:13:13,350 --> 00:13:11,120

as long as you get a good education in

374

00:13:16,470 --> 00:13:13,360

any one of those areas and then start to

375

00:13:18,470 --> 00:13:16,480

work in one of those areas for a while

376

00:13:19,350 --> 00:13:18,480

then you can apply to be an astronaut

377

00:13:21,190 --> 00:13:19,360

and

378

00:13:23,190 --> 00:13:21,200

they select astronauts every couple

379

00:13:24,870 --> 00:13:23,200

years and there's a

380

00:13:26,710 --> 00:13:24,880

many thousands of people apply and then

381

00:13:28,870 --> 00:13:26,720

they they kind of break that down they

382

00:13:31,110 --> 00:13:28,880

find that the hundred or so that they

383

00:13:34,310 --> 00:13:31,120

think have all the right stuff all the

384

00:13:36,230 --> 00:13:34,320

math science and and um medical

385

00:13:37,990 --> 00:13:36,240

background that that they uh they're

386

00:13:39,829 --> 00:13:38,000

going to need if they need this if

387

00:13:41,430 --> 00:13:39,839

they're short on doctors they might take

388

00:13:43,269 --> 00:13:41,440

more from the medical field doesn't

389

00:13:45,430 --> 00:13:43,279

necessarily mean that they are doctors

390

00:13:47,509 --> 00:13:45,440

but maybe they've done research in the

391

00:13:49,829 --> 00:13:47,519

laboratory on uh

392

00:13:51,189 --> 00:13:49,839

drugs pharmaceuticals or something like

393

00:13:56,150 --> 00:13:51,199

that

394

00:13:58,629 --> 00:13:56,160

the background we've even had a

395

00:14:00,870 --> 00:13:58,639

veterinarian before

396

00:14:03,110 --> 00:14:00,880

let's see we've had lots of different

397

00:14:05,829 --> 00:14:03,120

pilots that have come from the military

398

00:14:08,230 --> 00:14:05,839

and all of them have studied engineering

399

00:14:09,990 --> 00:14:08,240

and a lot of math and science so

400

00:14:11,750 --> 00:14:10,000

definitely all walks of life but with a

401
00:14:13,990 --> 00:14:11,760
focus on that math and science

402
00:14:16,389 --> 00:14:14,000
background yep math science and medical

403
00:14:18,550 --> 00:14:16,399
so any you future astronaut hopefuls

404
00:14:20,389 --> 00:14:18,560
make sure you stick with it if you want

405
00:14:21,910 --> 00:14:20,399
to be an astronaut someday really focus

406
00:14:23,509 --> 00:14:21,920
on your math and science classes

407
00:14:25,030 --> 00:14:23,519
especially in college and your job and

408
00:14:28,150 --> 00:14:25,040
things like that

409
00:14:32,870 --> 00:14:30,230
what happens if somebody like goes crazy

410
00:14:36,790 --> 00:14:34,710
oh i'm just having trouble hearing you

411
00:14:38,870 --> 00:14:36,800
our microphone must not be very good

412
00:14:40,629 --> 00:14:38,880
one more time what happened somebody

413
00:14:43,110 --> 00:14:40,639

goes crazy

414

00:14:46,790 --> 00:14:43,120

what happened

415

00:14:48,710 --> 00:14:46,800

up in space oh okay um well you know i

416

00:14:51,269 --> 00:14:48,720

suppose that's possible just like it is

417

00:14:53,430 --> 00:14:51,279

here on the ground um but the doctors

418

00:14:55,110 --> 00:14:53,440

here on the ground um go through and

419

00:14:56,949 --> 00:14:55,120

there's a selection process where they

420

00:14:59,509 --> 00:14:56,959

kind of look at the psychological

421

00:15:01,350 --> 00:14:59,519

background of the person each individual

422

00:15:04,629 --> 00:15:01,360

person

423

00:15:06,710 --> 00:15:04,639

and they look at family history and then

424

00:15:09,110 --> 00:15:06,720

their history from how they've performed

425

00:15:11,189 --> 00:15:09,120

in their job and so on and how they

426

00:15:14,550 --> 00:15:11,199

handle stressful situations they do a

427

00:15:16,550 --> 00:15:14,560

lot of that kind of testing and

428

00:15:17,990 --> 00:15:16,560

so you're pretty much pre-selected to

429

00:15:20,230 --> 00:15:18,000

have a group of people that aren't going

430

00:15:21,829 --> 00:15:20,240

to have a tendency toward

431

00:15:23,910 --> 00:15:21,839

mental health issues

432

00:15:26,230 --> 00:15:23,920

but say for example you did have someone

433

00:15:27,350 --> 00:15:26,240

because that's possible in any in any

434

00:15:29,670 --> 00:15:27,360

field

435

00:15:31,829 --> 00:15:29,680

they also have they have a kind of a

436

00:15:33,829 --> 00:15:31,839

think of it as a medicine cabinet on

437

00:15:36,069 --> 00:15:33,839

board the international space station

438

00:15:37,590 --> 00:15:36,079

and it has different kinds of drugs that

439

00:15:40,710 --> 00:15:37,600

can treat any different kinds of

440

00:15:42,310 --> 00:15:40,720

situations so the medical officer on

441

00:15:44,870 --> 00:15:42,320

board or the one that's trained most in

442

00:15:47,590 --> 00:15:44,880

that would talk to the surgeons on the

443

00:15:49,430 --> 00:15:47,600

ground the flight surgeons and then

444

00:15:51,910 --> 00:15:49,440

they'd select the medication that would

445

00:15:53,829 --> 00:15:51,920

be applicable for the situation

446

00:15:55,990 --> 00:15:53,839

but i mean these astronauts spend almost

447

00:15:57,590 --> 00:15:56,000

two years together training often in

448

00:15:59,030 --> 00:15:57,600

close quarters and things like that even

449

00:16:01,030 --> 00:15:59,040

before they fly to the international

450

00:16:02,310 --> 00:16:01,040

space station so by the time they get up

451

00:16:04,389 --> 00:16:02,320

there it's almost like their family

452

00:16:05,829 --> 00:16:04,399

already so i mean you might pick them

453

00:16:07,749 --> 00:16:05,839

with your brothers and sisters every

454

00:16:09,189 --> 00:16:07,759

once in a while but you know they're

455

00:16:10,389 --> 00:16:09,199

they're really close by the time they

456

00:16:11,910 --> 00:16:10,399

get up there

457

00:16:14,389 --> 00:16:11,920

yeah we have an excellent group of

458

00:16:16,949 --> 00:16:14,399

astronauts boy i would be uh friends

459

00:16:19,509 --> 00:16:16,959

with any of them any day and as a matter

460

00:16:22,550 --> 00:16:19,519

of fact i'm friends with several of them

461

00:16:24,389 --> 00:16:22,560

all right next question guys

462

00:16:26,949 --> 00:16:24,399

how do astronauts communicate with

463

00:16:29,509 --> 00:16:26,959

family and friends and father in space

464

00:16:31,110 --> 00:16:29,519

oh wow that was a great lead-in wow two

465

00:16:32,470 --> 00:16:31,120

questions that lead right into each

466

00:16:34,710 --> 00:16:32,480

other well you know i mentioned the

467

00:16:36,389 --> 00:16:34,720

flight surgeons they talk to them

468

00:16:38,230 --> 00:16:36,399

almost every day to

469

00:16:39,749 --> 00:16:38,240

see about their health and so on but we

470

00:16:42,150 --> 00:16:39,759

also schedule

471

00:16:43,829 --> 00:16:42,160

family conferences think of it as

472

00:16:45,990 --> 00:16:43,839

skyping so they have a little video

473

00:16:48,870 --> 00:16:46,000

camera up on board and then they have a

474

00:16:50,550 --> 00:16:48,880

two-way link and they can talk to their

475

00:16:53,269 --> 00:16:50,560

families they usually schedule those on

476

00:16:56,150 --> 00:16:53,279

saturdays so that

477

00:16:58,389 --> 00:16:56,160

you know dads can talk to their kids or

478

00:17:00,470 --> 00:16:58,399

husbands can talk to their wives wives

479

00:17:02,150 --> 00:17:00,480

can talk to their husbands

480

00:17:04,390 --> 00:17:02,160

anybody can talk to their parents or

481

00:17:06,630 --> 00:17:04,400

wherever you get it set up so they could

482

00:17:07,829 --> 00:17:06,640

talk to you if you were in their family

483

00:17:09,750 --> 00:17:07,839

you just not right there on your home

484

00:17:11,990 --> 00:17:09,760

computer with the little com the little

485

00:17:14,789 --> 00:17:12,000

uh television that's on or the little

486

00:17:16,630 --> 00:17:14,799

camera yeah the webcam exactly and uh

487

00:17:19,189 --> 00:17:16,640

just exactly like if you were skypeing

488

00:17:21,110 --> 00:17:19,199

have all you guys been skypeing before if

489

00:17:22,789 --> 00:17:21,120

not you should really check it out set

490

00:17:25,270 --> 00:17:22,799

up a link with your grandparents or

491

00:17:45,590 --> 00:17:25,280

something it's really fun

492

00:17:49,029 --> 00:17:46,950

i'm sorry could he ask that again we

493

00:17:51,029 --> 00:17:49,039

couldn't quite hear

494

00:17:53,510 --> 00:17:51,039

uh i saw that there was a map in the

495

00:17:55,110 --> 00:17:53,520

background of the world

496

00:17:57,909 --> 00:17:55,120

what is that used for

497

00:17:59,669 --> 00:17:57,919

oh you're talking about the world map

498

00:18:01,990 --> 00:17:59,679

well we like to know where the crew is

499

00:18:04,230 --> 00:18:02,000

at all times and so i don't know if you

500

00:18:07,029 --> 00:18:04,240

can quite see it way out there over the

501
00:18:08,870 --> 00:18:07,039
pacific ocean you see that little

502
00:18:10,549 --> 00:18:08,880
let me see

503
00:18:12,549 --> 00:18:10,559
um

504
00:18:14,390 --> 00:18:12,559
yeah there it is way out over the

505
00:18:16,630 --> 00:18:14,400
pacific ocean you can see where the

506
00:18:18,630 --> 00:18:16,640
international space station is right now

507
00:18:21,110 --> 00:18:18,640
and those little wavy lines that are on

508
00:18:23,990 --> 00:18:21,120
there that represents the track

509
00:18:25,990 --> 00:18:24,000
uh on the ground where the space station

510
00:18:28,549 --> 00:18:26,000
is flying over so if people out in the

511
00:18:29,750 --> 00:18:28,559
south pacific we'll look up in the sky

512
00:18:32,470 --> 00:18:29,760
right now

513
00:18:33,750 --> 00:18:32,480

uh oh it's after it's after daylight so

514

00:18:36,310 --> 00:18:33,760

they probably can't see it because the

515

00:18:38,950 --> 00:18:36,320

sun's too bright but if you're just

516

00:18:41,270 --> 00:18:38,960

before or just after what we call the

517

00:18:43,590 --> 00:18:41,280

terminator that's where it goes from a

518

00:18:45,350 --> 00:18:43,600

darker color to the lighter color

519

00:18:46,630 --> 00:18:45,360

the sun is shining brightly off the

520

00:18:48,710 --> 00:18:46,640

space station

521

00:18:51,590 --> 00:18:48,720

and you can see it up in this in the

522

00:18:53,510 --> 00:18:51,600

early morning sky or the early evening

523

00:18:54,870 --> 00:18:53,520

sky

524

00:18:56,710 --> 00:18:54,880

so that's where the earth is and then

525

00:18:59,830 --> 00:18:56,720

there's some other circles on there the

526

00:19:02,310 --> 00:18:59,840

other circles represent

527

00:19:03,750 --> 00:19:02,320

different ground stations where we can

528

00:19:06,070 --> 00:19:03,760

talk to the crew from so you see the

529

00:19:08,070 --> 00:19:06,080

ones over russia those are all the ones

530

00:19:10,630 --> 00:19:08,080

where the russian communications system

531

00:19:13,830 --> 00:19:10,640

can talk to the crew and then there are

532

00:19:15,750 --> 00:19:13,840

some bigger squig bigger lines there's

533

00:19:18,549 --> 00:19:15,760

one that kind of

534

00:19:21,270 --> 00:19:18,559

circles over the white line that goes

535

00:19:23,990 --> 00:19:21,280

way around the united you know the north

536

00:19:25,590 --> 00:19:24,000

america south america all of that area

537

00:19:28,950 --> 00:19:25,600

and then there's a yellow one off to the

538

00:19:33,110 --> 00:19:28,960

other side those are where um

539

00:19:35,190 --> 00:19:33,120

uh the tdrs satellite the tracking data

540

00:19:36,870 --> 00:19:35,200

relays the satellite

541

00:19:38,470 --> 00:19:36,880

we bounce signals off of that think of

542

00:19:41,190 --> 00:19:38,480

it like a um

543

00:19:43,110 --> 00:19:41,200

a radio tower for your cell phone it's

544

00:19:46,070 --> 00:19:43,120

the same kind of thing in space there's

545

00:19:47,909 --> 00:19:46,080

a big satellite that we can bounce the

546

00:19:50,830 --> 00:19:47,919

signals off to of and then we can talk

547

00:19:53,990 --> 00:19:50,840

to the crew through that system

548

00:19:54,710 --> 00:19:54,000

yep so

549

00:19:57,110 --> 00:19:54,720

just

550

00:19:59,190 --> 00:19:57,120

pretty much a tracking uh system so we

551
00:20:01,750 --> 00:19:59,200
can see where the uh the crew and the

552
00:20:02,950 --> 00:20:01,760
international space station always are

553
00:20:06,710 --> 00:20:02,960
um

554
00:20:09,190 --> 00:20:06,720
all right any more questions guys

555
00:20:11,510 --> 00:20:09,200
questions you said that

556
00:20:14,230 --> 00:20:11,520
there was a pilot that's gotten from the

557
00:20:16,950 --> 00:20:14,240
military into an astronaut do they have

558
00:20:18,710 --> 00:20:16,960
to be a pilot from the military to go be

559
00:20:20,310 --> 00:20:18,720
an astronaut

560
00:20:22,070 --> 00:20:20,320
do you have to be a pilot to be an

561
00:20:24,149 --> 00:20:22,080
astronaut if you're in the military or

562
00:20:26,230 --> 00:20:24,159
not and the answer to that is no you

563
00:20:28,710 --> 00:20:26,240

don't have to be a pilot it is something

564

00:20:30,470 --> 00:20:28,720

that helps because you know the nasa is

565

00:20:32,070 --> 00:20:30,480

looking for the top candidate so they

566

00:20:35,669 --> 00:20:32,080

want to know that you can operate

567

00:20:37,669 --> 00:20:35,679

complicated equipment so that might be a

568

00:20:39,430 --> 00:20:37,679

plane which is very complicated you have

569

00:20:40,870 --> 00:20:39,440

to know how to follow a checklist

570

00:20:42,470 --> 00:20:40,880

operate it

571

00:20:44,310 --> 00:20:42,480

or it could be

572

00:20:47,350 --> 00:20:44,320

could be stuff in the lab you could be

573

00:20:49,190 --> 00:20:47,360

working in a science lab and

574

00:20:51,110 --> 00:20:49,200

that would show that you can work on

575

00:20:53,590 --> 00:20:51,120

complicated things so it doesn't

576

00:20:55,270 --> 00:20:53,600

necessarily have to be a pilot but

577

00:20:57,830 --> 00:20:55,280

somebody who can demonstrate that they

578

00:20:59,590 --> 00:20:57,840

can do complicated operations

579

00:21:01,350 --> 00:20:59,600

i know a lot of our early astronauts

580

00:21:03,029 --> 00:21:01,360

were test pilots and things like that

581

00:21:04,549 --> 00:21:03,039

but a lot of that was because you know

582

00:21:05,990 --> 00:21:04,559

the stuff they were doing it was very

583

00:21:08,230 --> 00:21:06,000

new it was very dangerous and that's

584

00:21:09,990 --> 00:21:08,240

what test pilots are known for doing

585

00:21:12,149 --> 00:21:10,000

so a lot of your early astronauts were

586

00:21:14,470 --> 00:21:12,159

test pilots and a lot of astronauts even

587

00:21:16,230 --> 00:21:14,480

now still come from the military but you

588

00:21:18,149 --> 00:21:16,240

know since the advent of shuttle and

589

00:21:19,669 --> 00:21:18,159

station and all the experiment work and

590

00:21:22,149 --> 00:21:19,679

the science and the engineering we've

591

00:21:24,149 --> 00:21:22,159

been doing we now have astronauts from

592

00:21:26,149 --> 00:21:24,159

all walks of life so you don't have to

593

00:21:27,430 --> 00:21:26,159

be a test pilot it could help though now

594

00:21:29,510 --> 00:21:27,440

if you're interested in going into the

595

00:21:31,830 --> 00:21:29,520

military though it really will prepare

596

00:21:33,669 --> 00:21:31,840

you for all kinds of things in life so

597

00:21:35,430 --> 00:21:33,679

think about that if you think that you

598

00:21:37,990 --> 00:21:35,440

might want to move on to be an astronaut

599

00:21:40,230 --> 00:21:38,000

or a doctor they'll pay for your school

600

00:21:41,909 --> 00:21:40,240

um anything like that and it's a good

601
00:21:44,789 --> 00:21:41,919
way to serve your country before you get

602
00:21:46,710 --> 00:21:44,799
out there and live the rest of of your

603
00:21:49,270 --> 00:21:46,720
life in whatever career you choose you

604
00:21:53,190 --> 00:21:49,280
can even stay in the military

605
00:21:56,789 --> 00:21:55,270
anybody have a question

606
00:21:58,710 --> 00:21:56,799
do you guys know when your next mission

607
00:22:00,549 --> 00:21:58,720
is going to be do you know where the

608
00:22:02,630 --> 00:22:00,559
next mission will be when the next

609
00:22:04,070 --> 00:22:02,640
mission will be well we're still doing

610
00:22:05,430 --> 00:22:04,080
missions to the international space

611
00:22:07,190 --> 00:22:05,440
station all the time they're actually

612
00:22:09,909 --> 00:22:07,200
going to launch another crew in just

613
00:22:11,350 --> 00:22:09,919

about two weeks from now

614

00:22:12,870 --> 00:22:11,360

so the

615

00:22:14,870 --> 00:22:12,880

international space station missions are

616

00:22:16,789 --> 00:22:14,880

going you know console we've had people

617

00:22:19,110 --> 00:22:16,799

flying in space

618

00:22:20,710 --> 00:22:19,120

for over for more than a decade

619

00:22:23,110 --> 00:22:20,720

continuously you know since the early

620

00:22:25,750 --> 00:22:23,120

2000s we call the mission that's going

621

00:22:28,230 --> 00:22:25,760

on right now increment

622

00:22:29,830 --> 00:22:28,240

it means it's the 31st group of people

623

00:22:31,270 --> 00:22:29,840

to stay on the international space

624

00:22:34,710 --> 00:22:31,280

station we've been manning it

625

00:22:35,750 --> 00:22:34,720

continuously for 31 different crews that

626

00:22:38,630 --> 00:22:35,760

have come and gone from the

627

00:22:40,870 --> 00:22:38,640

international space station so the the

628

00:22:42,310 --> 00:22:40,880

next mission is increment 32 and that's

629

00:22:44,390 --> 00:22:42,320

the one that joe acaba is going to

630

00:22:45,990 --> 00:22:44,400

launch uh on a soyuz vehicle here in

631

00:22:47,350 --> 00:22:46,000

just a couple of weeks

632

00:22:50,789 --> 00:22:47,360

so we're going to keep having lots and

633

00:22:53,830 --> 00:22:50,799

lots of science missions yep

634

00:22:55,110 --> 00:22:53,840

but not there for

635

00:22:56,870 --> 00:22:55,120

that is basically going to be the

636

00:22:58,789 --> 00:22:56,880

international space station oh we're

637

00:23:00,390 --> 00:22:58,799

flying around in space

638

00:23:02,230 --> 00:23:00,400

if there's a question we can't hear it

639

00:23:03,909 --> 00:23:02,240

can you try to speak real loud into the

640

00:23:05,270 --> 00:23:03,919

microphone

641

00:23:11,909 --> 00:23:05,280

another question

642

00:23:16,390 --> 00:23:13,909

is there an age limit to be an astronaut

643

00:23:17,909 --> 00:23:16,400

um not not really basically as long as

644

00:23:20,230 --> 00:23:17,919

you're in you know good physical shape

645

00:23:22,710 --> 00:23:20,240

you can do it i know john glenn famously

646

00:23:25,430 --> 00:23:22,720

flew on the shuttle uh back when he was

647

00:23:27,190 --> 00:23:25,440

i think he was in his late 70s i i

648

00:23:28,710 --> 00:23:27,200

believe and they did um something like

649

00:23:31,110 --> 00:23:28,720

that something like that and they did a

650

00:23:32,789 --> 00:23:31,120

lot of testing on aging and things like

651
00:23:34,789 --> 00:23:32,799
that so there's not really an age limit

652
00:23:37,190 --> 00:23:34,799
to it as long as you're still you know

653
00:23:39,909 --> 00:23:37,200
in a good physical condition you can

654
00:23:41,590 --> 00:23:39,919
withstand the rigors of space flight

655
00:23:42,870 --> 00:23:41,600
well i think that's about all the time

656
00:23:44,470 --> 00:23:42,880
we're going to have for questions today

657
00:23:45,750 --> 00:23:44,480
there are some great questions guys i

658
00:23:47,350 --> 00:23:45,760
hope you enjoyed your time here in

659
00:23:49,029 --> 00:23:47,360
mission control and you were able to

660
00:23:51,110 --> 00:23:49,039
learn a little bit more about what we're

661
00:23:53,029 --> 00:23:51,120
doing here at nasa so again thanks for

662
00:23:54,950 --> 00:23:53,039
your questions thank you for being here

663
00:23:57,269 --> 00:23:54,960

and joining me today it was very

664

00:23:58,950 --> 00:23:57,279

exciting stuff oh i loved it anytime

665

00:24:00,789 --> 00:23:58,960

just give me a call if i can take a

666

00:24:02,230 --> 00:24:00,799

break out from helping the astronauts