



1
00:00:08,070 --> 00:00:06,150
i do have

2
00:00:09,750 --> 00:00:08,080
northeast notaway elementary school in

3
00:00:16,070 --> 00:00:09,760
ravenwood missouri

4
00:00:21,349 --> 00:00:17,670
mission control

5
00:00:22,950 --> 00:00:21,359
how do you guys hear me

6
00:00:24,790 --> 00:00:22,960
we hear you very well we do have

7
00:00:26,470 --> 00:00:24,800
northeast elementary or northeast

8
00:00:29,109 --> 00:00:26,480
notaway elementary from ravenwood

9
00:00:30,870 --> 00:00:29,119
missouri with with us today and

10
00:00:32,310 --> 00:00:30,880
you are welcome to

11
00:00:34,310 --> 00:00:32,320
to take it from here they have some

12
00:00:36,389 --> 00:00:34,320
really cool questions for you okay

13
00:00:37,910 --> 00:00:36,399

thanks ryan and uh

14

00:00:40,069 --> 00:00:37,920

guys and girls welcome to you know

15

00:00:42,310 --> 00:00:40,079

mission control houston this is where we

16

00:00:43,990 --> 00:00:42,320

actually control all the systems and

17

00:00:46,389 --> 00:00:44,000

monitor everything on board the

18

00:00:48,869 --> 00:00:46,399

international space station uh joining

19

00:00:51,189 --> 00:00:48,879

me right now is todd kwasny he's one of

20

00:00:52,470 --> 00:00:51,199

our odin flight controllers uh todd what

21

00:00:53,910 --> 00:00:52,480

what are some of the systems you're

22

00:00:55,590 --> 00:00:53,920

responsible for

23

00:00:57,510 --> 00:00:55,600

so as a as a odin flight controller

24

00:00:59,270 --> 00:00:57,520

we're in charge of most of the

25

00:01:01,590 --> 00:00:59,280

the core computer systems on the space

26
00:01:03,430 --> 00:01:01,600
station so when i say corcoran's core

27
00:01:04,869 --> 00:01:03,440
system i mean something that actually

28
00:01:07,109 --> 00:01:04,879
flies the space station so something

29
00:01:09,350 --> 00:01:07,119
that you know talks to the the

30
00:01:10,710 --> 00:01:09,360
communication systems and make sure that

31
00:01:12,870 --> 00:01:10,720
we're pointing the right direction and

32
00:01:14,550 --> 00:01:12,880
we're tracking the sun things like that

33
00:01:17,670 --> 00:01:14,560
it's kind of like your outer space it

34
00:01:21,030 --> 00:01:17,680
guy too you got it i'm kind of like the

35
00:01:22,310 --> 00:01:21,040
i.t uh fix it guy okay well uh we're

36
00:01:23,510 --> 00:01:22,320
real excited to take some of your

37
00:01:38,149 --> 00:01:23,520
questions today why don't you give us

38
00:01:42,310 --> 00:01:39,749

i think the question was one day could

39

00:01:44,789 --> 00:01:42,320

mars be inhabitable

40

00:01:47,270 --> 00:01:44,799

well you know uh i i'm not sure we have

41

00:01:48,870 --> 00:01:47,280

a lot of people looking into that and uh

42

00:01:50,469 --> 00:01:48,880

i uh

43

00:01:51,670 --> 00:01:50,479

unfortunately i

44

00:01:54,630 --> 00:01:51,680

something that i don't work with

45

00:01:56,310 --> 00:01:54,640

directly so uh i i certainly hope so it

46

00:01:57,429 --> 00:01:56,320

seems like it'd be a great great thing

47

00:01:59,510 --> 00:01:57,439

to do if

48

00:02:00,789 --> 00:01:59,520

we could get there and inhabit mars we

49

00:02:02,550 --> 00:02:00,799

certainly yeah we certainly hope so i

50

00:02:04,149 --> 00:02:02,560

mean there are there are signs kind of

51
00:02:06,069 --> 00:02:04,159
that mars may have had a climate like

52
00:02:08,309 --> 00:02:06,079
ours you know many millions and millions

53
00:02:11,270 --> 00:02:08,319
and millions of years ago even billions

54
00:02:13,030 --> 00:02:11,280
uh so if some future civilization gets

55
00:02:15,670 --> 00:02:13,040
something like terraforming which any of

56
00:02:17,670 --> 00:02:15,680
you sci-fi people uh know is kind of

57
00:02:19,830 --> 00:02:17,680
like making a planet's atmosphere more

58
00:02:21,270 --> 00:02:19,840
like ours i know some of the methods

59
00:02:23,030 --> 00:02:21,280
that are you know everything's very

60
00:02:25,510 --> 00:02:23,040
hypothetical right now because that kind

61
00:02:27,350 --> 00:02:25,520
of technology just does not exist but

62
00:02:28,790 --> 00:02:27,360
who knows maybe a human civilization a

63
00:02:30,070 --> 00:02:28,800

million years from now will have the

64

00:02:31,750 --> 00:02:30,080

ability to

65

00:02:33,670 --> 00:02:31,760

make an atmosphere and turn mars

66

00:02:35,509 --> 00:02:33,680

habitable but i mean right now it's it's

67

00:02:37,509 --> 00:02:35,519

way too cold

68

00:02:39,670 --> 00:02:37,519

doesn't have you know earth's protective

69

00:02:41,509 --> 00:02:39,680

magnetosphere which protects us from all

70

00:02:43,350 --> 00:02:41,519

that dangerous radiation

71

00:02:44,869 --> 00:02:43,360

so i mean it would it would be a huge

72

00:02:46,710 --> 00:02:44,879

project and it's something we as a

73

00:02:48,830 --> 00:02:46,720

civilization couldn't tackle right now

74

00:02:54,710 --> 00:02:48,840

but maybe sometime in the future we

75

00:02:59,750 --> 00:02:57,430

um did you guys have anything to do with

76

00:03:02,070 --> 00:02:59,760

the angry birds thing the angry birds

77

00:03:04,949 --> 00:03:02,080

space

78

00:03:06,309 --> 00:03:04,959

wow well i i can tell you that uh i i've

79

00:03:08,790 --> 00:03:06,319

played a lot of angry birds space and

80

00:03:11,589 --> 00:03:08,800

i'm a big fan that's uh that's for sure

81

00:03:13,990 --> 00:03:11,599

it's always fun to uh to see um you know

82

00:03:15,910 --> 00:03:14,000

space applications like that and

83

00:03:17,670 --> 00:03:15,920

get to see uh something that's something

84

00:03:19,750 --> 00:03:17,680

you're not used to used to you know

85

00:03:21,430 --> 00:03:19,760

playing the original angry birds uh you

86

00:03:23,509 --> 00:03:21,440

know watching the birds fall just like

87

00:03:25,030 --> 00:03:23,519

they would here on earth but uh seeing

88

00:03:25,910 --> 00:03:25,040

what they were doing in spaces is a lot

89

00:03:27,990 --> 00:03:25,920

of fun

90

00:03:29,589 --> 00:03:28,000

and i i do know they talk to a few of

91

00:03:32,070 --> 00:03:29,599

our scientists you know help them get

92

00:03:34,390 --> 00:03:32,080

down things like uh the mechanics of

93

00:03:35,750 --> 00:03:34,400

actually moving through gravity like if

94

00:03:38,630 --> 00:03:35,760

i'm sure a bunch of you guys have been

95

00:03:40,390 --> 00:03:38,640

playing angry bird space uh when you're

96

00:03:42,710 --> 00:03:40,400

actually shooting into an atmosphere

97

00:03:44,789 --> 00:03:42,720

you'll you'll go into an orbit and

98

00:03:46,710 --> 00:03:44,799

uh that's they're actually pretty spot

99

00:03:48,470 --> 00:03:46,720

on i've heard with the mechanics of

100

00:03:51,190 --> 00:03:48,480

doing that and also just moving through

101
00:03:52,789 --> 00:03:51,200
the vacuum in angry bird space so we we

102
00:03:54,309 --> 00:03:52,799
did have a little bit to do with it but

103
00:03:55,750 --> 00:03:54,319
i mean we didn't we didn't create the

104
00:03:59,350 --> 00:03:55,760
game

105
00:04:02,390 --> 00:04:00,630
um

106
00:04:04,070 --> 00:04:02,400
whenever you're up in the international

107
00:04:06,949 --> 00:04:04,080
space station can you call from your

108
00:04:09,350 --> 00:04:06,959
cell phone if you have it

109
00:04:11,190 --> 00:04:09,360
that is a really good question so

110
00:04:12,550 --> 00:04:11,200
um that you know that that's a common

111
00:04:13,990 --> 00:04:12,560
thing that the astronauts want to do

112
00:04:15,110 --> 00:04:14,000
they're up there for a really long time

113
00:04:16,550 --> 00:04:15,120

and they uh

114

00:04:17,749 --> 00:04:16,560

they really like to keep in touch with

115

00:04:19,990 --> 00:04:17,759

what's going on

116

00:04:21,909 --> 00:04:20,000

on earth as much as possible so

117

00:04:23,990 --> 00:04:21,919

one of the things that we we give to

118

00:04:25,749 --> 00:04:24,000

them you know the ability is is a phone

119

00:04:27,350 --> 00:04:25,759

it's called the ip phone and it's it's

120

00:04:29,110 --> 00:04:27,360

very similar to the phone that you would

121

00:04:31,030 --> 00:04:29,120

have at your house where you can pick up

122

00:04:32,710 --> 00:04:31,040

the phone and and dial just about any

123

00:04:34,950 --> 00:04:32,720

number you want we can't call up to them

124

00:04:37,110 --> 00:04:34,960

that way but uh they're able to on their

125

00:04:38,629 --> 00:04:37,120

own time call call just about any any

126

00:04:40,790 --> 00:04:38,639

number they want they talk to a lot of

127

00:04:42,629 --> 00:04:40,800

their friends and family that way and it

128

00:04:45,110 --> 00:04:42,639

really helps them keep in touch with uh

129

00:04:46,710 --> 00:04:45,120

with what's going on um you know the

130

00:04:48,070 --> 00:04:46,720

outside of just what they can read in in

131

00:04:49,909 --> 00:04:48,080

news or email

132

00:04:51,430 --> 00:04:49,919

but no no cell phones on space so

133

00:04:52,710 --> 00:04:51,440

they're not texting back and forth all

134

00:04:55,350 --> 00:04:52,720

day while they're supposed to be working

135

00:04:56,870 --> 00:04:55,360

no no no no cell phones they um they we

136

00:04:58,390 --> 00:04:56,880

we keep them on a strict schedule during

137

00:05:00,070 --> 00:04:58,400

the day so uh

138

00:05:02,870 --> 00:05:00,080

they're not they get distracted too much

139

00:05:05,749 --> 00:05:02,880

by uh by text messages or phone calls or

140

00:05:15,110 --> 00:05:05,759

even playing angry birds

141

00:05:20,870 --> 00:05:18,629

um what time is it up there right now

142

00:05:22,870 --> 00:05:20,880

oh that is a great question

143

00:05:24,870 --> 00:05:22,880

so so time is something that we we kind

144

00:05:27,029 --> 00:05:24,880

of take for granted you know you look at

145

00:05:28,950 --> 00:05:27,039

a clock on the wall or or at your watch

146

00:05:30,629 --> 00:05:28,960

and you see what time it is but but the

147

00:05:32,629 --> 00:05:30,639

problem with uh time and space is the

148

00:05:35,029 --> 00:05:32,639

fact that the space station goes uh

149

00:05:37,830 --> 00:05:35,039

around the earth every 90 minutes

150

00:05:38,870 --> 00:05:37,840

so uh so you know at any given point you

151

00:05:40,390 --> 00:05:38,880

know it could be

152

00:05:42,550 --> 00:05:40,400

you know a number of different different

153

00:05:43,670 --> 00:05:42,560

times on on the ground whereas whereas

154

00:05:45,670 --> 00:05:43,680

in space they're they're going around

155

00:05:49,270 --> 00:05:45,680

really fast so what we do is we we

156

00:05:50,870 --> 00:05:49,280

adopted uh greenwich mean time so gmt

157

00:05:52,390 --> 00:05:50,880

so it's it's the the time that's

158

00:05:54,070 --> 00:05:52,400

actually in greenwich greenwich

159

00:05:56,309 --> 00:05:54,080

uh england right now

160

00:05:58,150 --> 00:05:56,319

and uh all the control centers from from

161

00:05:59,990 --> 00:05:58,160

around the country that uh that interact

162

00:06:01,909 --> 00:06:00,000

with the space station uh that we all

163

00:06:05,029 --> 00:06:01,919

use the same time to make sure that uh

164

00:06:06,950 --> 00:06:05,039

that we're all in sync and the the crew

165

00:06:09,510 --> 00:06:06,960

uses that on board as well i think

166

00:06:12,469 --> 00:06:09,520

according to our clock right now it's 16

167

00:06:13,909 --> 00:06:12,479

11 and 23 seconds greenwich mean time so

168

00:06:15,430 --> 00:06:13,919

it's that's what time it is up on

169

00:06:26,550 --> 00:06:15,440

station right now

170

00:06:31,110 --> 00:06:28,550

hey dan this is ryan schaefer at the dln

171

00:06:33,189 --> 00:06:31,120

i think we may have lost the

172

00:06:35,110 --> 00:06:33,199

school if we are patient we may be able

173

00:06:36,710 --> 00:06:35,120

to reestablish a connection okay ryan

174

00:06:38,469 --> 00:06:36,720

we'll be standing by

175

00:06:40,950 --> 00:06:38,479

waiting for your word

176

00:06:43,189 --> 00:06:40,960

we're back

177

00:06:45,110 --> 00:06:43,199

hi

178

00:06:47,350 --> 00:06:45,120

okay i'm glad to hear that mission

179

00:06:50,150 --> 00:06:47,360

control we do have northeast not away

180

00:06:53,990 --> 00:06:52,070

welcome back i apologize all right i

181

00:06:56,870 --> 00:06:54,000

hope everything is still okay on your

182

00:06:58,790 --> 00:06:56,880

end but i i i i'm hoping that dan and

183

00:07:00,790 --> 00:06:58,800

our guests today are still able to

184

00:07:03,189 --> 00:07:00,800

answer some questions yup we're still

185

00:07:04,230 --> 00:07:03,199

here ready to go ryan

186

00:07:05,670 --> 00:07:04,240

great

187

00:07:07,189 --> 00:07:05,680

then i'll let the kids ask more

188

00:07:08,550 --> 00:07:07,199

questions

189

00:07:09,830 --> 00:07:08,560

okay can we

190

00:07:11,270 --> 00:07:09,840

can we hear the answer to the last

191

00:07:13,909 --> 00:07:11,280

question about the time zone because we

192

00:07:16,550 --> 00:07:13,919

didn't get all of that oh yeah sure

193

00:07:17,990 --> 00:07:16,560

okay so again a really good question uh

194

00:07:19,749 --> 00:07:18,000

time and space is

195

00:07:21,189 --> 00:07:19,759

is a little bit difficult it's something

196

00:07:22,469 --> 00:07:21,199

we take for granted here here on the

197

00:07:24,550 --> 00:07:22,479

ground uh

198

00:07:26,469 --> 00:07:24,560

so the the space station is going around

199

00:07:28,469 --> 00:07:26,479

the earth every 90 minutes is going

200

00:07:30,230 --> 00:07:28,479

really really fast so it's it's not

201
00:07:31,430 --> 00:07:30,240
something like we can't keep time like

202
00:07:34,150 --> 00:07:31,440
we do

203
00:07:36,150 --> 00:07:34,160
do here on on on the planet because you

204
00:07:38,309 --> 00:07:36,160
know the sun sun rises and sets every 45

205
00:07:39,430 --> 00:07:38,319
minutes so what we've done is we've

206
00:07:41,990 --> 00:07:39,440
adopted

207
00:07:44,790 --> 00:07:42,000
a common time it's greenwich mean time

208
00:07:46,070 --> 00:07:44,800
so the time it's in in greenwich

209
00:07:47,909 --> 00:07:46,080
england right now

210
00:07:49,990 --> 00:07:47,919
and uh all the control centers that uh

211
00:07:52,390 --> 00:07:50,000
that talk and control the space station

212
00:07:54,390 --> 00:07:52,400
from from around the world all always

213
00:07:56,230 --> 00:07:54,400

the same time so that we use the same

214

00:07:58,230 --> 00:07:56,240

time as the space station

215

00:07:59,909 --> 00:07:58,240

um and uh and we're all doing the same

216

00:08:01,670 --> 00:07:59,919

things at the same time

217

00:08:03,270 --> 00:08:01,680

and looking at our clock right now it

218

00:08:06,390 --> 00:08:03,280

looks like it's

219

00:08:09,589 --> 00:08:06,400

16 15 and 21 seconds that's about you

220

00:08:13,110 --> 00:08:09,599

know 4 15 they use the military the 24

221

00:08:14,950 --> 00:08:13,120

hour times so right now yet 16 15 on

222

00:08:21,749 --> 00:08:14,960

board station

223

00:08:26,950 --> 00:08:23,830

do you think any

224

00:08:30,230 --> 00:08:26,960

living organisms could survive on any

225

00:08:33,750 --> 00:08:31,589

i think the question was do you think

226

00:08:36,230 --> 00:08:33,760

any living organisms could survive on

227

00:08:38,310 --> 00:08:36,240

other planets

228

00:08:40,389 --> 00:08:38,320

well i that that's a really big question

229

00:08:41,829 --> 00:08:40,399

and uh and another one of those that i

230

00:08:44,710 --> 00:08:41,839

know that we have a lot of people

231

00:08:46,070 --> 00:08:44,720

looking into it uh and and trying to do

232

00:08:48,710 --> 00:08:46,080

that that very same thing you know kind

233

00:08:49,990 --> 00:08:48,720

of goes back to you know our is mars

234

00:08:54,949 --> 00:08:50,000

inhabitable and

235

00:08:57,590 --> 00:08:54,959

things have to happen

236

00:08:58,949 --> 00:08:57,600

between now and now and then but uh i i

237

00:09:00,070 --> 00:08:58,959

certainly think that uh that that's

238

00:09:01,750 --> 00:09:00,080

something that

239

00:09:04,230 --> 00:09:01,760

it's a goal for a lot of people

240

00:09:07,190 --> 00:09:04,240

and i i agree i think it

241

00:09:08,949 --> 00:09:07,200

i think it is definitely possible um i

242

00:09:10,470 --> 00:09:08,959

mean a lot of the times we think if

243

00:09:13,269 --> 00:09:10,480

something's going to be alive it has to

244

00:09:15,590 --> 00:09:13,279

have things like sunlight and water

245

00:09:17,030 --> 00:09:15,600

but at the same time we found organisms

246

00:09:19,509 --> 00:09:17,040

in some of the deepest and most

247

00:09:20,470 --> 00:09:19,519

uninhabitable places on earth actually

248

00:09:22,710 --> 00:09:20,480

living

249

00:09:24,630 --> 00:09:22,720

so there could be any number of things

250

00:09:26,870 --> 00:09:24,640

out there that are surviving in ways we

251
00:09:28,550 --> 00:09:26,880
don't even understand that could very

252
00:09:30,150 --> 00:09:28,560
well be alive so it's it's definitely a

253
00:09:32,070 --> 00:09:30,160
possibility when there's

254
00:09:34,230 --> 00:09:32,080
as many stars and planets out there as

255
00:09:39,350 --> 00:09:34,240
there are you never know

256
00:09:47,190 --> 00:09:41,110
um

257
00:09:49,670 --> 00:09:47,200
what is r2 doing now

258
00:09:52,470 --> 00:09:49,680
so right now r2 is uh

259
00:09:53,509 --> 00:09:52,480
he's asleep if you will so uh um when

260
00:09:55,990 --> 00:09:53,519
when uh

261
00:09:58,070 --> 00:09:56,000
when he's not out and and activated then

262
00:10:00,310 --> 00:09:58,080
we keep him all all uh

263
00:10:02,230 --> 00:10:00,320

buttoned up and and kind of kind of

264

00:10:03,990 --> 00:10:02,240

sleeping in his own little uh cubby hole

265

00:10:05,430 --> 00:10:04,000

if you will

266

00:10:08,470 --> 00:10:05,440

so i i think that the crew isn't

267

00:10:10,470 --> 00:10:08,480

scheduled to to play with r2 today

268

00:10:12,230 --> 00:10:10,480

but uh i know coming out here pretty

269

00:10:13,670 --> 00:10:12,240

soon they'll pull them out for for some

270

00:10:16,310 --> 00:10:13,680

more tests and

271

00:10:17,990 --> 00:10:16,320

we'll get to to further expand and

272

00:10:20,310 --> 00:10:18,000

understand exactly everything that we

273

00:10:23,269 --> 00:10:20,320

can can use r2 for and so it's a

274

00:10:25,990 --> 00:10:23,279

wonderful wonderful tool and and a great

275

00:10:27,350 --> 00:10:26,000

uh asset for nasa yep and i mean some of

276

00:10:28,870 --> 00:10:27,360

the tests that they've been doing lately

277

00:10:30,630 --> 00:10:28,880

they've been kind of powering them on

278

00:10:32,310 --> 00:10:30,640

and moving his arms around and i think

279

00:10:34,470 --> 00:10:32,320

he might have done some sign language

280

00:10:36,470 --> 00:10:34,480

the other day yeah the other day i saw

281

00:10:37,829 --> 00:10:36,480

he he signed hello world american sign

282

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

language it was it was a really neat

283

00:10:41,350 --> 00:10:39,760

thing to see so just kind of putting him

284

00:10:43,190 --> 00:10:41,360

through his first paces and getting them

285

00:10:44,870 --> 00:10:43,200

ready for some more advanced stuff

286

00:10:49,030 --> 00:10:44,880

coming up

287

00:10:55,430 --> 00:10:52,310

this is maverick crossfit northeast

288

00:10:58,829 --> 00:10:55,440

does the clock go back and forth go

289

00:11:03,190 --> 00:11:01,430

space do you get that one

290

00:11:05,829 --> 00:11:03,200

i'm sorry could you ask the question one

291

00:11:13,430 --> 00:11:10,550

could the clock go backwards up in space

292

00:11:15,910 --> 00:11:13,440

does the clock go backwards up in space

293

00:11:18,870 --> 00:11:15,920

so um

294

00:11:20,790 --> 00:11:18,880

not not really the the the clocks clocks

295

00:11:22,150 --> 00:11:20,800

in space you know operate just like they

296

00:11:23,990 --> 00:11:22,160

they do here on the ground you know

297

00:11:25,430 --> 00:11:24,000

they'll they'll just uh measure how many

298

00:11:27,350 --> 00:11:25,440

seconds or how many minutes or hours are

299

00:11:28,949 --> 00:11:27,360

going by and they'll just kind of kind

300

00:11:30,949 --> 00:11:28,959

of take away we i'm not that i know that

301
00:11:32,310 --> 00:11:30,959
we've ever seen one one go backwards and

302
00:11:34,230 --> 00:11:32,320
unless we're we're setting the clock

303
00:11:35,990 --> 00:11:34,240
like uh like we would hear on the ground

304
00:11:37,590 --> 00:11:36,000
we haven't quite mastered time travel

305
00:11:39,750 --> 00:11:37,600
yet but you know we're all hoping

306
00:11:41,110 --> 00:11:39,760
sometime in the future uh one

307
00:11:43,269 --> 00:11:41,120
interesting thing that could happen in

308
00:11:45,430 --> 00:11:43,279
space flight and once you guys kind of

309
00:11:47,670 --> 00:11:45,440
get into some higher level science and

310
00:11:49,350 --> 00:11:47,680
math courses is the idea that if you're

311
00:11:52,470 --> 00:11:49,360
traveling really really fast time

312
00:11:54,949 --> 00:11:52,480
doesn't go backwards but it slows down

313
00:11:56,629 --> 00:11:54,959

and so there are

314

00:11:57,750 --> 00:11:56,639

studies being done with clocks that you

315

00:11:59,430 --> 00:11:57,760

know we send them out there and they

316

00:12:01,590 --> 00:11:59,440

travel at thousands and thousands and

317

00:12:03,670 --> 00:12:01,600

thousands of miles an hour and when you

318

00:12:05,350 --> 00:12:03,680

compare them to a clock here on earth i

319

00:12:07,350 --> 00:12:05,360

mean it's the time has progressed a

320

00:12:09,110 --> 00:12:07,360

little bit slower on those clocks but i

321

00:12:10,389 --> 00:12:09,120

mean it's such a such a small amount

322

00:12:13,350 --> 00:12:10,399

unless you're traveling the speed of

323

00:12:15,350 --> 00:12:13,360

light which we don't quite do yet

324

00:12:17,590 --> 00:12:15,360

it's not even noticeable so they don't

325

00:12:19,430 --> 00:12:17,600

go backwards but we may someday be able

326

00:12:32,710 --> 00:12:19,440

to slow time down

327

00:12:38,069 --> 00:12:34,949

astronauts have a favorite of what kind

328

00:12:42,310 --> 00:12:40,310

do astronauts have favorite foods

329

00:12:44,389 --> 00:12:42,320

uh you know they they do and then it's

330

00:12:45,910 --> 00:12:44,399

kind of a an individual taste just just

331

00:12:47,670 --> 00:12:45,920

like you would here on the ground you

332

00:12:49,350 --> 00:12:47,680

know sometimes you know you like a good

333

00:12:51,269 --> 00:12:49,360

you know hamburger hot dogs nice people

334

00:12:52,870 --> 00:12:51,279

like you know spaghetti or lasagna so

335

00:12:54,470 --> 00:12:52,880

it's it's the same thing for the for the

336

00:12:56,949 --> 00:12:54,480

astronauts on the space station they

337

00:12:57,750 --> 00:12:56,959

have a wide variety of food to choose

338

00:12:59,509 --> 00:12:57,760

from

339

00:13:01,110 --> 00:12:59,519

and uh they uh

340

00:13:02,310 --> 00:13:01,120

they they kind of their own favorites

341

00:13:03,910 --> 00:13:02,320

what i'm what i'm told a lot of them

342

00:13:05,910 --> 00:13:03,920

tell me uh after they come back is they

343

00:13:07,190 --> 00:13:05,920

really like spicy foods for for some

344

00:13:08,069 --> 00:13:07,200

reason you know when when they get into

345

00:13:09,829 --> 00:13:08,079

space

346

00:13:11,670 --> 00:13:09,839

something about spicy foods just a

347

00:13:13,829 --> 00:13:11,680

little bit more appealing to them so i

348

00:13:16,150 --> 00:13:13,839

hear the shrimp cocktail is to die for

349

00:13:18,710 --> 00:13:16,160

when you're in space quite a bit yeah so

350

00:13:20,550 --> 00:13:18,720

uh so um they they do have foods that

351

00:13:22,230 --> 00:13:20,560

they have a lot of different kinds is

352

00:13:24,870 --> 00:13:22,240

kind of a big thing to keep in mind so

353

00:13:26,550 --> 00:13:24,880

they they try a lot of different things

354

00:13:28,550 --> 00:13:26,560

so pretty much almost whatever you like

355

00:13:30,710 --> 00:13:28,560

on the ground you can have up in space

356

00:13:33,110 --> 00:13:30,720

just about to a degree and just about

357

00:13:34,710 --> 00:13:33,120

you can have a

358

00:13:35,750 --> 00:13:34,720

you know all kinds of different kinds of

359

00:13:39,189 --> 00:13:35,760

food

360

00:13:40,550 --> 00:13:39,199

all right next question guys

361

00:13:43,189 --> 00:13:40,560

well which

362

00:13:45,910 --> 00:13:43,199

where is the international space station

363

00:13:47,750 --> 00:13:45,920

over the earth right now

364

00:13:50,710 --> 00:13:47,760

oh wow where is the over the earth right

365

00:13:54,470 --> 00:13:50,720

now well it looks like we are tracking

366

00:13:55,670 --> 00:13:54,480

right over the northern pacific ocean

367

00:13:57,189 --> 00:13:55,680

uh it's

368

00:13:59,470 --> 00:13:57,199

so it's pretty much right in the middle

369

00:14:02,629 --> 00:13:59,480

of the ocean right now and it's about

370

00:14:04,550 --> 00:14:02,639

247 miles above the surface

371

00:14:07,030 --> 00:14:04,560

so and again it's moving at about i

372

00:14:08,310 --> 00:14:07,040

think 17 500 miles an hour that's

373

00:14:10,710 --> 00:14:08,320

correct so it's only going to be there

374

00:14:12,230 --> 00:14:10,720

for a little while pretty soon it'll be

375

00:14:14,550 --> 00:14:12,240

over a completely other part of the

376

00:14:15,670 --> 00:14:14,560

planet as it goes around in about 90

377

00:14:17,110 --> 00:14:15,680

minutes

378

00:14:18,629 --> 00:14:17,120

looks like it's coming up pretty here

379

00:14:21,590 --> 00:14:18,639

pretty soon on the southern part of

380

00:14:24,870 --> 00:14:21,600

south america and it'll fly up uh over

381

00:14:27,269 --> 00:14:24,880

europa and then uh then over uh

382

00:14:28,949 --> 00:14:27,279

uh go back over you know the pacific

383

00:14:32,230 --> 00:14:28,959

ocean again yep

384

00:14:38,470 --> 00:14:35,110

um does their food come in like packages

385

00:14:39,829 --> 00:14:38,480

like military food does

386

00:14:41,509 --> 00:14:39,839

oh that that's a good one to know you

387

00:14:42,550 --> 00:14:41,519

know i think that's something that uh

388

00:14:43,990 --> 00:14:42,560

that someone should ask before they

389

00:14:45,509 --> 00:14:44,000

become an astronaut is you know how

390

00:14:46,870 --> 00:14:45,519

how's the food come

391

00:14:49,269 --> 00:14:46,880

so like i said there there's a wide

392

00:14:50,949 --> 00:14:49,279

variety of food they get to eat a number

393

00:14:52,790 --> 00:14:50,959

of different kinds but they're they're

394

00:14:55,430 --> 00:14:52,800

kind of broken up in the into several

395

00:14:56,870 --> 00:14:55,440

categories so uh the military you know

396

00:15:00,230 --> 00:14:56,880

style food that you're talking about is

397

00:15:01,670 --> 00:15:00,240

uh you know mres meals ready to eat so

398

00:15:03,910 --> 00:15:01,680

it's kind of a

399

00:15:05,590 --> 00:15:03,920

you know a package where you can open

400

00:15:07,189 --> 00:15:05,600

and eat it right away

401
00:15:09,509 --> 00:15:07,199
and uh and and some astronauts really

402
00:15:11,110 --> 00:15:09,519
like the the mres to let them come from

403
00:15:13,030 --> 00:15:11,120
the military or a lot of you know

404
00:15:14,470 --> 00:15:13,040
camping and hiking backgrounds so uh

405
00:15:17,189 --> 00:15:14,480
that they're used to that kind of food

406
00:15:19,430 --> 00:15:17,199
and they eat a lot uh some food comes

407
00:15:21,590 --> 00:15:19,440
dehydrated so they have

408
00:15:23,350 --> 00:15:21,600
they have to and put water into it first

409
00:15:25,110 --> 00:15:23,360
so they they'll heat up with some water

410
00:15:27,430 --> 00:15:25,120
and make it warm and then

411
00:15:29,110 --> 00:15:27,440
inject it into into the food and it kind

412
00:15:30,470 --> 00:15:29,120
of comes to life if you will need that

413
00:15:31,269 --> 00:15:30,480

and then there's some some food that's

414

00:15:33,350 --> 00:15:31,279

uh

415

00:15:35,749 --> 00:15:33,360

that's a little bit more fresh and and

416

00:15:37,829 --> 00:15:35,759

and ready to eat but um that they don't

417

00:15:39,189 --> 00:15:37,839

get a whole lot of that so it's it's

418

00:15:41,110 --> 00:15:39,199

kind of a treat when they're able to eat

419

00:15:42,310 --> 00:15:41,120

some some fresh fruit vegetables yeah i

420

00:15:44,389 --> 00:15:42,320

know um

421

00:15:46,710 --> 00:15:44,399

on the cargo craft that just stocked one

422

00:15:48,310 --> 00:15:46,720

of the european ones i brought up some

423

00:15:49,749 --> 00:15:48,320

fresh fruit for the crew and they always

424

00:15:51,509 --> 00:15:49,759

look forward to that they get real

425

00:15:52,790 --> 00:15:51,519

excited because i mean pretty much

426

00:15:55,590 --> 00:15:52,800

pretty much the vast majority of the

427

00:15:57,829 --> 00:15:55,600

food it's kind of like these little

428

00:15:59,350 --> 00:15:57,839

dehydrated plastic packets where they

429

00:16:01,110 --> 00:15:59,360

have to put water in and like you said

430

00:16:02,389 --> 00:16:01,120

it kind of makes the food come to life

431

00:16:05,030 --> 00:16:02,399

after that

432

00:16:06,790 --> 00:16:05,040

yeah exactly and i know on the on the

433

00:16:08,470 --> 00:16:06,800

cargo vehicle just docked we make sure

434

00:16:09,910 --> 00:16:08,480

that we pack the food one of the last

435

00:16:10,710 --> 00:16:09,920

things to make sure they can get to it

436

00:16:12,150 --> 00:16:10,720

quick because they're really looking

437

00:16:14,150 --> 00:16:12,160

forward to that don't want to open it up

438

00:16:15,430 --> 00:16:14,160

and have all kinds of nasty smells

439

00:16:17,590 --> 00:16:15,440

coming out as soon as they open up that

440

00:16:28,870 --> 00:16:17,600

cargo vehicle all right next question

441

00:16:31,990 --> 00:16:30,389

what kind of training do they do to

442

00:16:34,790 --> 00:16:32,000

prepare for everything was that what i

443

00:16:38,949 --> 00:16:36,710

yes okay

444

00:16:40,710 --> 00:16:38,959

training well you know that that's a big

445

00:16:43,269 --> 00:16:40,720

uh it's a really really good question

446

00:16:45,189 --> 00:16:43,279

and very insightful um you know

447

00:16:46,949 --> 00:16:45,199

quite often you see astronauts on tv and

448

00:16:48,069 --> 00:16:46,959

you know watch nasa tv and and see them

449

00:16:49,670 --> 00:16:48,079

floating around doing all these really

450

00:16:51,110 --> 00:16:49,680

cool things you know it's cool you know

451
00:16:53,030 --> 00:16:51,120
science experiments and getting to play

452
00:16:54,790 --> 00:16:53,040
with r2 and all those types of things

453
00:16:56,790 --> 00:16:54,800
but what you don't see is the hours and

454
00:16:58,629 --> 00:16:56,800
hours and hours that the astronauts have

455
00:17:00,470 --> 00:16:58,639
to go through training they they do all

456
00:17:02,470 --> 00:17:00,480
kinds of training everything from you

457
00:17:03,749 --> 00:17:02,480
know learning about the the simpsons on

458
00:17:05,590 --> 00:17:03,759
systems on onboard the space station

459
00:17:07,350 --> 00:17:05,600
just in case something were to go wrong

460
00:17:09,189 --> 00:17:07,360
they they spend a lot of time uh with

461
00:17:10,870 --> 00:17:09,199
the uh the science developers the the

462
00:17:11,829 --> 00:17:10,880
science folks to sit down and make sure

463
00:17:13,029 --> 00:17:11,839

that they're doing all their science

464

00:17:14,150 --> 00:17:13,039

experiments correctly and they're

465

00:17:16,390 --> 00:17:14,160

they're getting all the all the good

466

00:17:17,669 --> 00:17:16,400

data back back to earth to be studied

467

00:17:19,510 --> 00:17:17,679

and analyzed

468

00:17:21,350 --> 00:17:19,520

and then they do a lot of training for

469

00:17:22,630 --> 00:17:21,360

specific tasks like a spacewalk so

470

00:17:24,710 --> 00:17:22,640

they'll go and go into the neutral

471

00:17:26,230 --> 00:17:24,720

buoyancy lab and go into the big pool

472

00:17:29,110 --> 00:17:26,240

get in their spacesuits and practice

473

00:17:30,630 --> 00:17:29,120

doing spacewalks so you know for for

474

00:17:32,230 --> 00:17:30,640

everything you see them do

475

00:17:34,150 --> 00:17:32,240

do all the cool stuff floating around

476

00:17:35,990 --> 00:17:34,160

the space station um there's many many

477

00:17:37,750 --> 00:17:36,000

hours behind the scenes where they they

478

00:17:39,590 --> 00:17:37,760

drive and learn how to do that how long

479

00:17:42,549 --> 00:17:39,600

do they train you know before they

480

00:17:43,669 --> 00:17:42,559

actually launch on these expeditions

481

00:17:47,909 --> 00:17:43,679

um

482

00:17:49,510 --> 00:17:47,919

it's on order of years so you know

483

00:17:51,510 --> 00:17:49,520

sometimes you know astronauts will train

484

00:17:52,950 --> 00:17:51,520

for you know two or two or three years

485

00:17:54,630 --> 00:17:52,960

before they they're able to go up on the

486

00:17:56,070 --> 00:17:54,640

space station to do all the various

487

00:17:57,830 --> 00:17:56,080

things they need to do so about two

488

00:17:59,430 --> 00:17:57,840

years of training for six months of

489

00:18:00,950 --> 00:17:59,440

actual space flight time so there's

490

00:18:02,950 --> 00:18:00,960

there's a lot of you know front end

491

00:18:04,710 --> 00:18:02,960

stuff involved before they actually get

492

00:18:06,630 --> 00:18:04,720

to go up there and do all the fun things

493

00:18:07,830 --> 00:18:06,640

you know absolutely when and even while

494

00:18:09,350 --> 00:18:07,840

they're up there we'll we'll do some

495

00:18:10,789 --> 00:18:09,360

training with them you know we'll you

496

00:18:11,830 --> 00:18:10,799

know we mention that some of the

497

00:18:13,590 --> 00:18:11,840

different types of ways we can

498

00:18:15,590 --> 00:18:13,600

communicate with the with astronauts

499

00:18:16,870 --> 00:18:15,600

well we'll sit down and and go through

500

00:18:18,230 --> 00:18:16,880

some additional training if maybe

501
00:18:19,750 --> 00:18:18,240
something coming up that they haven't

502
00:18:21,430 --> 00:18:19,760
quite seen before they need a refresher

503
00:18:22,789 --> 00:18:21,440
we'll sit down and train them while

504
00:18:24,870 --> 00:18:22,799
they're up there too so a lot of

505
00:18:26,630 --> 00:18:24,880
training a lot of school it and it never

506
00:18:28,549 --> 00:18:26,640
ends there's always learning to do never

507
00:18:31,669 --> 00:18:28,559
stop learning all right next question

508
00:18:35,110 --> 00:18:33,190
do they have to train whenever they get

509
00:18:39,590 --> 00:18:35,120
back

510
00:18:44,470 --> 00:18:41,750
they they do do a lot of work when they

511
00:18:45,909 --> 00:18:44,480
get back um you know post-mission them

512
00:18:47,510 --> 00:18:45,919
um one of the bigger things that they do

513
00:18:49,029 --> 00:18:47,520

is nicely receive a whole lot of

514

00:18:50,230 --> 00:18:49,039

training but they conduct a lot of

515

00:18:52,150 --> 00:18:50,240

training you know once you've been up

516

00:18:54,789 --> 00:18:52,160

there for six months you know you you

517

00:18:56,950 --> 00:18:54,799

are the are the expert on on on how to

518

00:18:58,789 --> 00:18:56,960

operate the space station and what to do

519

00:19:01,029 --> 00:18:58,799

so and we we really try to capitalize on

520

00:19:03,110 --> 00:19:01,039

a lot of their experience and knowledge

521

00:19:05,190 --> 00:19:03,120

when they come back to to teach the next

522

00:19:07,270 --> 00:19:05,200

generation of astronauts you know um you

523

00:19:09,350 --> 00:19:07,280

know just all the little ins and outs

524

00:19:10,789 --> 00:19:09,360

and tips and tricks of of of how to

525

00:19:12,950 --> 00:19:10,799

really maximize this this wonderful

526

00:19:14,150 --> 00:19:12,960

space station that we have so it's it's

527

00:19:15,830 --> 00:19:14,160

there there's not necessary training

528

00:19:17,669 --> 00:19:15,840

that they receive but they they do

529

00:19:21,990 --> 00:19:17,679

conduct a lot of training

530

00:19:27,669 --> 00:19:25,110

you astronauts exercise up in space

531

00:19:29,510 --> 00:19:27,679

oh boy do that in quite a bit yes so you

532

00:19:31,510 --> 00:19:29,520

know the the the environment of space is

533

00:19:32,230 --> 00:19:31,520

really hard on the human body you know

534

00:19:33,830 --> 00:19:32,240

um

535

00:19:35,990 --> 00:19:33,840

without without gravity you know the

536

00:19:37,510 --> 00:19:36,000

your muscles don't have to to to work as

537

00:19:39,430 --> 00:19:37,520

hard and you know the heart doesn't have

538

00:19:40,630 --> 00:19:39,440

to pump blood as as much and and the

539

00:19:42,070 --> 00:19:40,640

bones don't have to support your

540

00:19:42,789 --> 00:19:42,080

structure all that much

541

00:19:44,710 --> 00:19:42,799

so

542

00:19:46,710 --> 00:19:44,720

um one of the things we have to do to

543

00:19:49,270 --> 00:19:46,720

counteract all all the uh the effects of

544

00:19:50,950 --> 00:19:49,280

space on the human body is exercise so

545

00:19:52,470 --> 00:19:50,960

they usually extras about two hours a

546

00:19:54,390 --> 00:19:52,480

day so a good portion of their day is

547

00:19:56,390 --> 00:19:54,400

spent just exercising and they can do

548

00:19:58,150 --> 00:19:56,400

anything from running on a treadmill to

549

00:20:00,630 --> 00:19:58,160

uh you know riding on an exercise bike

550

00:20:02,390 --> 00:20:00,640

to to to doing some some things that

551
00:20:03,669 --> 00:20:02,400
kind of simulate uh you know doing some

552
00:20:06,549 --> 00:20:03,679
weight lifting it's kind of like like a

553
00:20:08,470 --> 00:20:06,559
giant bowflex so you know they they uh

554
00:20:09,750 --> 00:20:08,480
they do extensive amount of exercising

555
00:20:11,590 --> 00:20:09,760
you know to make sure that when they get

556
00:20:13,750 --> 00:20:11,600
back to the back to earth that uh their

557
00:20:15,669 --> 00:20:13,760
body still can can work in this this

558
00:20:17,669 --> 00:20:15,679
gravity environment and so that they can

559
00:20:19,110 --> 00:20:17,679
still walk and and move and lift things

560
00:20:20,710 --> 00:20:19,120
so it's it's very important to the

561
00:20:22,070 --> 00:20:20,720
astronauts to exercise we've actually

562
00:20:23,909 --> 00:20:22,080
heard some of them come back and they

563
00:20:25,350 --> 00:20:23,919

almost feel stronger just because of all

564

00:20:26,789 --> 00:20:25,360

that exercise they've been doing out

565

00:20:28,390 --> 00:20:26,799

there in space i mean two hours a day

566

00:20:30,070 --> 00:20:28,400

it's quite it's quite a bit

567

00:20:31,909 --> 00:20:30,080

yeah yeah they uh they they really work

568

00:20:33,669 --> 00:20:31,919

their muscles and and sets a lot of

569

00:20:35,190 --> 00:20:33,679

habits you know a lot of them become

570

00:20:36,149 --> 00:20:35,200

you know big exercise buffs afterwards

571

00:20:37,669 --> 00:20:36,159

because they're so used to doing it for

572

00:20:41,350 --> 00:20:37,679

two hours a day

573

00:20:48,470 --> 00:20:46,630

has anybody ever got hurt doing stuff

574

00:20:50,789 --> 00:20:48,480

has anyone ever gotten hurt doing things

575

00:20:52,070 --> 00:20:50,799

well you know just like like working you

576

00:20:53,669 --> 00:20:52,080

know uh

577

00:20:55,510 --> 00:20:53,679

here on earth you know there's some

578

00:20:56,870 --> 00:20:55,520

things to happen you know the

579

00:20:59,510 --> 00:20:56,880

uh you know you get a you know a little

580

00:21:01,590 --> 00:20:59,520

bumper or bruise but you know

581

00:21:04,070 --> 00:21:01,600

they do a lot of work making sure that

582

00:21:05,669 --> 00:21:04,080

everything the astronauts do in space is

583

00:21:07,909 --> 00:21:05,679

very safe you know it's something that

584

00:21:09,430 --> 00:21:07,919

we take very very seriously and indicate

585

00:21:11,270 --> 00:21:09,440

a lot of time and you know we talk about

586

00:21:13,110 --> 00:21:11,280

a lot of training uh training the crew

587

00:21:15,430 --> 00:21:13,120

does to make sure that everything every

588

00:21:19,029 --> 00:21:15,440

aspect of their job is is safe

589

00:21:20,070 --> 00:21:19,039

so uh you know you know we we uh

590

00:21:21,750 --> 00:21:20,080

to my knowledge i don't think an

591

00:21:23,110 --> 00:21:21,760

astronaut has ever actually been injured

592

00:21:25,430 --> 00:21:23,120

in any way

593

00:21:27,110 --> 00:21:25,440

i'm pretty sure and i mean even if they

594

00:21:28,630 --> 00:21:27,120

were there are a lot of flight surgeons

595

00:21:30,470 --> 00:21:28,640

and people here you know in mission

596

00:21:32,470 --> 00:21:30,480

control and all around

597

00:21:33,830 --> 00:21:32,480

the country that monitor all the

598

00:21:35,669 --> 00:21:33,840

astronauts health and everything like

599

00:21:37,830 --> 00:21:35,679

that while they're on board so if a

600

00:21:39,510 --> 00:21:37,840

problem ever did arose you know we'd

601
00:21:40,870 --> 00:21:39,520
have the people here to help them handle

602
00:21:41,909 --> 00:21:40,880
it

603
00:21:43,350 --> 00:21:41,919
absolutely

604
00:21:44,950 --> 00:21:43,360
all right i think we got about one

605
00:21:49,990 --> 00:21:44,960
minute left so let's do one last

606
00:21:52,710 --> 00:21:50,870
um

607
00:21:55,350 --> 00:21:52,720
what do they drink up in

608
00:21:57,909 --> 00:21:55,360
in the international space station

609
00:22:01,350 --> 00:21:57,919
what do they drink tang right tang tang

610
00:22:02,630 --> 00:22:01,360
is the drink of all astronauts um

611
00:22:04,390 --> 00:22:02,640
they they drink a number of different

612
00:22:05,110 --> 00:22:04,400
things they drink a lot of water you

613
00:22:08,789 --> 00:22:05,120

know

614

00:22:10,789 --> 00:22:08,799

really good for them and then they they

615

00:22:12,070 --> 00:22:10,799

drink as much of that as they can you

616

00:22:13,830 --> 00:22:12,080

know in the morning they like their

617

00:22:15,750 --> 00:22:13,840

morning cup of coffee so they'll drink

618

00:22:17,909 --> 00:22:15,760

some coffee they have you know tang or

619

00:22:19,510 --> 00:22:17,919

orange juice to to drink uh you know

620

00:22:21,830 --> 00:22:19,520

various juices some apple juice you know

621

00:22:23,830 --> 00:22:21,840

cranberry juice things like that so uh

622

00:22:26,470 --> 00:22:23,840

you know kind of like like the food a

623

00:22:28,630 --> 00:22:26,480

pretty wide variety of drinks and one of

624

00:22:31,590 --> 00:22:28,640

the one of the interesting things about

625

00:22:33,990 --> 00:22:31,600

their water is it's all recycled

626
00:22:35,669 --> 00:22:34,000
so some of the one of the funny quotes

627
00:22:37,830 --> 00:22:35,679
that we hear is uh sometimes you're

628
00:22:38,950 --> 00:22:37,840
drinking yesterday's coffee the morning

629
00:22:40,070 --> 00:22:38,960
of today

630
00:22:41,270 --> 00:22:40,080
so they actually i mean they have a

631
00:22:42,630 --> 00:22:41,280
recycling

632
00:22:45,750 --> 00:22:42,640
system on board the station that

633
00:22:47,350 --> 00:22:45,760
recycles human waste things like that

634
00:22:48,870 --> 00:22:47,360
expired water

635
00:22:51,110 --> 00:22:48,880
and then turns it back into potable

636
00:22:53,350 --> 00:22:51,120
drinking water so

637
00:22:54,710 --> 00:22:53,360
but yeah lots of water lots of again a

638
00:22:58,390 --> 00:22:54,720

lot like the food a lot of drinks that

639

00:22:59,830 --> 00:22:58,400

you'd find just down here on earth

640

00:23:01,750 --> 00:22:59,840

all right well i think that's about all

641

00:23:02,950 --> 00:23:01,760

the time we have i really want to thank

642

00:23:04,630 --> 00:23:02,960

you guys for your questions hope you

643

00:23:06,710 --> 00:23:04,640

learned a little bit and hope you

644

00:23:12,549 --> 00:23:06,720

enjoyed your visit and your stop here