

Google+



1
00:00:28,840 --> 00:00:27,130
good morning I'm Johnny Eric NASA social

2
00:00:31,480 --> 00:00:28,850
media manager with agencies office of

3
00:00:33,430 --> 00:00:31,490
communications welcome to NASA's first

4
00:00:35,100 --> 00:00:33,440
google+ hangout live with astronauts

5
00:00:37,540 --> 00:00:35,110
aboard the International Space Station

6
00:00:39,189 --> 00:00:37,550
this event connects NASA social media

7
00:00:40,780 --> 00:00:39,199
followers with astronauts here in the

8
00:00:43,210 --> 00:00:40,790
ground and those living and working

9
00:00:44,650 --> 00:00:43,220
aboard the space station orbiting 230

10
00:00:48,100 --> 00:00:44,660
miles above the earth and traveling

11
00:00:49,750 --> 00:00:48,110
about 17,500 miles per hour we'll be

12
00:00:51,189 --> 00:00:49,760
taking some select pre-recorded video

13
00:00:52,750 --> 00:00:51,199

questions submitted on YouTube and

14

00:00:56,709 --> 00:00:52,760

real-time questions using the hashtag

15

00:00:58,090 --> 00:00:56,719

ask Astro on google+ and twitter we've

16

00:00:59,290 --> 00:00:58,100

also opened a thread on the NASA

17

00:01:01,780 --> 00:00:59,300

Facebook page where you can post

18

00:01:03,880 --> 00:01:01,790

questions will be connecting with the

19

00:01:05,830 --> 00:01:03,890

space station about 30 minutes but first

20

00:01:08,560 --> 00:01:05,840

let me introduce those joining us on

21

00:01:10,960 --> 00:01:08,570

today's hangout we have with us nasa

22

00:01:14,020 --> 00:01:10,970

astronaut nicole stott who currently is

23

00:01:16,560 --> 00:01:14,030

in houston texas nicole lived and worked

24

00:01:20,350 --> 00:01:16,570

on space station during expedition 2021

25

00:01:22,480 --> 00:01:20,360

she also flew again on sts-133 the final

26

00:01:25,420 --> 00:01:22,490

mission to space shuttle discovery of

27

00:01:27,789 --> 00:01:25,430

spatial discovery also joining us on the

28

00:01:30,670 --> 00:01:27,799

Hangout is Ashna ron garan who currently

29

00:01:33,399 --> 00:01:30,680

is in San Diego California Ron flew on

30

00:01:35,080 --> 00:01:33,409

shell discoveries STS 124 mission he

31

00:01:38,499 --> 00:01:35,090

also lived and worked on space station

32

00:01:39,999 --> 00:01:38,509

during expedition 27 28 Ron and Nicole

33

00:01:41,800 --> 00:01:40,009

will be taking your questions and

34

00:01:44,190 --> 00:01:41,810

questions from to NASA Explorer schools

35

00:01:47,020 --> 00:01:44,200

on today's hangout we have with us

36

00:01:54,399 --> 00:01:47,030

University High School in orlando

37

00:02:01,060 --> 00:01:54,409

florida and mescalero apache school in

38

00:02:04,149 --> 00:02:01,070

new mexico also make a wish foundation

39

00:02:06,429 --> 00:02:04,159

selected Fred from Columbus Ohio to join

40

00:02:08,259 --> 00:02:06,439

us he is currently in Seattle Washington

41

00:02:12,610 --> 00:02:08,269

and we'll be asking Nicole and Ron a

42

00:02:13,780 --> 00:02:12,620

question we have lots of questions so

43

00:02:18,610 --> 00:02:13,790

let's get started with our first one

44

00:02:21,670 --> 00:02:18,620

from YouTube hi I'm Julie I'm in

45

00:02:23,830 --> 00:02:21,680

Maryland my question is what took you by

46

00:02:26,380 --> 00:02:23,840

surprise was there something that you

47

00:02:28,380 --> 00:02:26,390

experienced it nothing could have

48

00:02:34,270 --> 00:02:28,390

prepared you for did you have any

49

00:02:41,240 --> 00:02:36,290

I'm gonna go for that one first Ronnie

50

00:02:42,740 --> 00:02:41,250

sure okay um well you know I think I

51
00:02:44,690 --> 00:02:42,750
think you try to prepare yourself as

52
00:02:46,550 --> 00:02:44,700
best you can you know down here on earth

53
00:02:48,050 --> 00:02:46,560
and gravity and all of that I think you

54
00:02:50,240 --> 00:02:48,060
know there's going to be things that are

55
00:02:52,730 --> 00:02:50,250
surprising to you what it's like to

56
00:02:54,260 --> 00:02:52,740
float around and you know eat food in

57
00:02:55,910 --> 00:02:54,270
space and all that kind of thing but I

58
00:03:00,110 --> 00:02:55,920
really truly don't think there's

59
00:03:01,670 --> 00:03:00,120
anything that can prepare you for what

60
00:03:03,260 --> 00:03:01,680
it looks like out the window and that's

61
00:03:06,830 --> 00:03:03,270
everything from seeing other spacecraft

62
00:03:08,330 --> 00:03:06,840
to you know to our planet Earth and I

63
00:03:11,090 --> 00:03:08,340

think the most surprising thing is just

64

00:03:14,090 --> 00:03:11,100

how beautiful earth really is it makes a

65

00:03:17,720 --> 00:03:14,100

real impression on you I think crystal

66

00:03:21,280 --> 00:03:17,730

clear glowing planet and black blackness

67

00:03:25,160 --> 00:03:21,290

of space and you know things like

68

00:03:26,660 --> 00:03:25,170

shooting stars between you and any earth

69

00:03:28,640 --> 00:03:26,670

so you're looking down at them which is

70

00:03:30,260 --> 00:03:28,650

something that just doesn't seem right

71

00:03:32,930 --> 00:03:30,270

you know we're so used to looking up

72

00:03:35,480 --> 00:03:32,940

towards the sky for that and I you know

73

00:03:38,480 --> 00:03:35,490

I think the overall experiences is just

74

00:03:40,700 --> 00:03:38,490

generally surprising but that view and

75

00:03:44,270 --> 00:03:40,710

the show that you get out the window is

76

00:03:47,150 --> 00:03:44,280

probably the most surprising of all yeah

77

00:03:50,000 --> 00:03:47,160

I mean just to add on to that um you

78

00:03:51,950 --> 00:03:50,010

know I don't think I hadn't epiphany one

79

00:03:54,740 --> 00:03:51,960

that when I wanted to space for the

80

00:03:56,630 --> 00:03:54,750

first time I think having lived there

81

00:03:57,980 --> 00:03:56,640

and Nicole lived there for a number of

82

00:04:00,350 --> 00:03:57,990

months as well you know living there for

83

00:04:02,150 --> 00:04:00,360

a number of months it's kind of an

84

00:04:05,740 --> 00:04:02,160

epiphany in slow motion where you see

85

00:04:07,820 --> 00:04:05,750

the seasons change and you see the earth

86

00:04:09,650 --> 00:04:07,830

changing through the through the weeks

87

00:04:11,930 --> 00:04:09,660

and once that you're up there and it

88

00:04:13,430 --> 00:04:11,940

really gives you this this sense that

89

00:04:15,740 --> 00:04:13,440

the earth was this living breathing

90

00:04:18,670 --> 00:04:15,750

organism that were that were all on and

91

00:04:22,340 --> 00:04:18,680

I think that to me was it was really

92

00:04:23,990 --> 00:04:22,350

surprising not not in the sense that I

93

00:04:25,820 --> 00:04:24,000

didn't really expect that but in the

94

00:04:29,030 --> 00:04:25,830

sense of how profound that is and how

95

00:04:30,440 --> 00:04:29,040

how powerful it is to you know be able

96

00:04:32,570 --> 00:04:30,450

to see the earth in that way every day

97

00:04:37,910 --> 00:04:32,580

so and it's just a really really

98

00:04:39,230 --> 00:04:37,920

wonderful experience okay we're going to

99

00:04:41,780 --> 00:04:39,240

take our first question from social

100

00:04:43,640 --> 00:04:41,790

media on Twitter we have NASA Deb ass

101

00:04:45,409 --> 00:04:43,650

I'm trying to vote motivate my

102

00:04:46,880 --> 00:04:45,419

seventh-grade math students can you

103

00:04:49,450 --> 00:04:46,890

explain how important math and science

104

00:04:53,780 --> 00:04:49,460

are to the work you do

105

00:04:56,360 --> 00:04:53,790

um yeah sure I could I could start on

106

00:04:58,880 --> 00:04:56,370

that one I think math and science are

107

00:05:00,710 --> 00:04:58,890

critically important not just for space

108

00:05:02,930 --> 00:05:00,720

travel but for a lot of things you know

109

00:05:06,080 --> 00:05:02,940

we have a lot of challenges facing our

110

00:05:08,840 --> 00:05:06,090

planet and a lot of those challenges and

111

00:05:11,780 --> 00:05:08,850

problems have technological solutions

112

00:05:14,000 --> 00:05:11,790

and we have a shortage in the US and

113

00:05:15,890 --> 00:05:14,010

actually a shortage worldwide in people

114

00:05:17,330 --> 00:05:15,900

who are trained in math and science and

115

00:05:19,820 --> 00:05:17,340

technical fields and so there's a

116

00:05:22,370 --> 00:05:19,830

there's a great crisis in that respect

117

00:05:23,900 --> 00:05:22,380

because you know we don't have enough

118

00:05:26,990 --> 00:05:23,910

people that are going into those fields

119

00:05:28,910 --> 00:05:27,000

and so um the the good news though that

120

00:05:30,620 --> 00:05:28,920

I guess the good way to look at that for

121

00:05:32,630 --> 00:05:30,630

a young person is in school is that

122

00:05:34,250 --> 00:05:32,640

since since there is a shortage of

123

00:05:35,810 --> 00:05:34,260

people with those skills that means that

124

00:05:38,740 --> 00:05:35,820

there's a lot of job opportunities and

125

00:05:42,110 --> 00:05:38,750

so math and science engineering on

126

00:05:44,600 --> 00:05:42,120

technology all of those are critically

127

00:05:47,000 --> 00:05:44,610

important and particularly important in

128

00:05:49,400 --> 00:05:47,010

the space program obviously you know the

129

00:05:51,920 --> 00:05:49,410

spacecraft that we fly you know you need

130

00:05:53,600 --> 00:05:51,930

those kinds of skills to to not only fly

131

00:05:56,540 --> 00:05:53,610

them with to design them and control

132

00:05:58,340 --> 00:05:56,550

them and pretty much across the board in

133

00:06:01,370 --> 00:05:58,350

the space program it's it's it's a very

134

00:06:03,170 --> 00:06:01,380

very critical skill to have and and so

135

00:06:05,540 --> 00:06:03,180

um you know we need all the help we can

136

00:06:06,950 --> 00:06:05,550

get in the space program and so if

137

00:06:09,530 --> 00:06:06,960

there's a students out there watching

138

00:06:12,110 --> 00:06:09,540

you know really encourage them to just

139

00:06:14,000 --> 00:06:12,120

study hard to if you have an interest in

140

00:06:17,570 --> 00:06:14,010

math and science we hope you do to

141

00:06:19,730 --> 00:06:17,580

really pursue those fields as well and I

142

00:06:22,400 --> 00:06:19,740

if I can I just like to follow on a

143

00:06:24,080 --> 00:06:22,410

little bit i think you know i agree with

144

00:06:27,050 --> 00:06:24,090

everything Ron said and I think the

145

00:06:29,210 --> 00:06:27,060

opportunities really are pretty it just

146

00:06:30,560 --> 00:06:29,220

wide open out there because it's you

147

00:06:33,080 --> 00:06:30,570

know everywhere you look around you

148

00:06:36,320 --> 00:06:33,090

maths and science is the thing that kind

149

00:06:38,090 --> 00:06:36,330

of is what makes it possible and I think

150

00:06:39,890 --> 00:06:38,100

maybe for you know a seventh-grade class

151
00:06:41,540 --> 00:06:39,900
if you can look around you and see the

152
00:06:43,910 --> 00:06:41,550
the stuff that you think is cool like

153
00:06:47,030 --> 00:06:43,920
how computers work or how space ships

154
00:06:49,880 --> 00:06:47,040
fly or that video game that that you're

155
00:06:51,890 --> 00:06:49,890
playing or even things i remember in

156
00:06:54,830 --> 00:06:51,900
class the the way i really got

157
00:06:56,480 --> 00:06:54,840
interested and excited about a science

158
00:06:57,950 --> 00:06:56,490
especially like physics was a teacher

159
00:06:59,659 --> 00:06:57,960
who taught it based on how roller

160
00:07:01,129 --> 00:06:59,669
coasters work i mean we did our whole

161
00:07:03,830 --> 00:07:01,139
physics class on

162
00:07:05,869 --> 00:07:03,840
how roller coasters work and so it makes

163
00:07:07,790 --> 00:07:05,879

it not only something that you can think

164

00:07:09,050 --> 00:07:07,800

about in terms of what you might do in

165

00:07:11,450 --> 00:07:09,060

the future and how things work around

166

00:07:15,980 --> 00:07:11,460

you but it applies it as well to the

167

00:07:18,619 --> 00:07:15,990

stuff that you just think is fun great

168

00:07:28,550 --> 00:07:18,629

let's take our next question give it to

169

00:07:30,439 --> 00:07:28,560

Fred well Fred um fred has talked a lot

170

00:07:34,999 --> 00:07:30,449

about wanting to be the first kid in

171

00:07:42,830 --> 00:07:35,009

space and he is wondering can kids be in

172

00:07:46,939 --> 00:07:42,840

the nest program did you hear me yeah I

173

00:07:48,830 --> 00:07:46,949

got I got ya you know um I think this is

174

00:07:50,749 --> 00:07:48,840

one way Fred thanks great question

175

00:07:53,240 --> 00:07:50,759

because we're really happy to have you

176

00:07:55,850 --> 00:07:53,250

here today and it's nice to see on the

177

00:07:59,059 --> 00:07:55,860

screen and I think what you're doing

178

00:08:02,209 --> 00:07:59,069

right now I think it's this is very much

179

00:08:04,850 --> 00:08:02,219

a part of being or being a part of the

180

00:08:08,600 --> 00:08:04,860

space program having people like you

181

00:08:10,429 --> 00:08:08,610

kids especially that are you know on a

182

00:08:12,769 --> 00:08:10,439

daily basis kind of showing their

183

00:08:14,659 --> 00:08:12,779

excitement for the space program and

184

00:08:17,089 --> 00:08:14,669

their interest in sharing with that with

185

00:08:19,100 --> 00:08:17,099

their friends and family really is a big

186

00:08:20,869 --> 00:08:19,110

deal because that's what what we're

187

00:08:23,600 --> 00:08:20,879

trying to do right here and I think NASA

188

00:08:26,869 --> 00:08:23,610

public affairs and NASA as a program is

189

00:08:29,450 --> 00:08:26,879

trying very hard to make sure everybody

190

00:08:30,860 --> 00:08:29,460

shares that same excitement so really

191

00:08:33,230 --> 00:08:30,870

want to thank you for being here today

192

00:08:34,550 --> 00:08:33,240

because that's your doing just that

193

00:08:38,990 --> 00:08:34,560

you're being part of the space program

194

00:08:39,889 --> 00:08:39,000

by participating here today great why

195

00:08:42,949 --> 00:08:39,899

don't why don't we go to our next

196

00:08:45,530 --> 00:08:42,959

question on youtube i am daniel thomas

197

00:08:47,090 --> 00:08:45,540

from united kingdom i was just wondering

198

00:08:49,730 --> 00:08:47,100

if your dreams are effective on

199

00:08:53,090 --> 00:08:49,740

microgravity do you dream as if you were

200

00:09:01,699 --> 00:08:53,100

on earth or are you floating keep up the

201
00:09:05,509 --> 00:09:01,709
amazing work Reiner call ya started this

202
00:09:08,260 --> 00:09:05,519
run I had this dream once when I was in

203
00:09:10,660 --> 00:09:08,270
space that I would that out

204
00:09:12,310 --> 00:09:10,670
I I had this dream was that when I was a

205
00:09:14,350 --> 00:09:12,320
space that I was falling when I woke up

206
00:09:18,850 --> 00:09:14,360
I realized that actually was falling but

207
00:09:21,580 --> 00:09:18,860
I I think that it it's a you know it's

208
00:09:23,140 --> 00:09:21,590
interesting because sleep is a little

209
00:09:24,940 --> 00:09:23,150
bit different for me sleep was a little

210
00:09:33,490 --> 00:09:24,950
bit different in space first of all it

211
00:09:41,860 --> 00:09:33,500
took me a while bitching that my head

212
00:09:45,160 --> 00:09:41,870
would naturally black hahaha actually

213
00:09:48,310 --> 00:09:45,170

Ron wheelers drunken sleep but before

214

00:09:54,310 --> 00:09:48,320

you actually fall asleep on occasionally

215

00:09:57,070 --> 00:09:54,320

you'll see okay can you hear me now your

216

00:09:58,720 --> 00:09:57,080

little cuddle kind of me no coldy we

217

00:10:00,430 --> 00:09:58,730

want to just maybe pause your or cut out

218

00:10:03,970 --> 00:10:00,440

a little bit maybe Nicole could you you

219

00:10:05,410 --> 00:10:03,980

want to feel that question okay yeah

220

00:10:08,320 --> 00:10:05,420

sure Ron I think yeah you're just

221

00:10:09,940 --> 00:10:08,330

dropping off a little bit but I think

222

00:10:12,250 --> 00:10:09,950

one of the things ron was trying to pass

223

00:10:14,590 --> 00:10:12,260

on as far as dreaming it's think you

224

00:10:17,200 --> 00:10:14,600

know feeling like you're dreaming

225

00:10:19,330 --> 00:10:17,210

something as well like um in a dream

226

00:10:21,220 --> 00:10:19,340

where it feels like you're maybe

227

00:10:23,110 --> 00:10:21,230

floating or falling and in fact you

228

00:10:25,120 --> 00:10:23,120

really are kind of floating or falling

229

00:10:27,340 --> 00:10:25,130

where you are in with us in your crew

230

00:10:29,800 --> 00:10:27,350

compartment or as you're moving around

231

00:10:31,240 --> 00:10:29,810

the space station but one of the other

232

00:10:33,670 --> 00:10:31,250

things that I think interesting about

233

00:10:36,040 --> 00:10:33,680

dreams and it's it's that I felt like I

234

00:10:37,750 --> 00:10:36,050

had kind of this evolution of the way I

235

00:10:41,020 --> 00:10:37,760

was dreaming when I first got there I

236

00:10:44,200 --> 00:10:41,030

still very much dreams were about being

237

00:10:46,300 --> 00:10:44,210

on the earth in gravity and maybe you

238

00:10:48,100 --> 00:10:46,310

know training and that kind of thing but

239

00:10:51,100 --> 00:10:48,110

it kind of moved towards as I

240

00:10:52,330 --> 00:10:51,110

experienced that you know feeling of

241

00:10:53,830 --> 00:10:52,340

weightlessness and what it was like to

242

00:10:55,420 --> 00:10:53,840

be on the space station my dreams

243

00:10:57,190 --> 00:10:55,430

actually started to incorporate some of

244

00:10:59,410 --> 00:10:57,200

that as well and now even down here on

245

00:11:01,090 --> 00:10:59,420

earth I I think because I experienced it

246

00:11:06,010 --> 00:11:01,100

it's part of my dreams I have down here

247

00:11:08,950 --> 00:11:06,020

it continues that way too great when we

248

00:11:14,110 --> 00:11:08,960

take our next question from mescalero

249

00:11:18,280 --> 00:11:14,120

apache school in New Mexico miss da

250

00:11:20,110 --> 00:11:18,290

Goethe I'm Alex whoo yeah in our first

251

00:11:26,139 --> 00:11:20,120

question that we submitted is what

252

00:11:31,910 --> 00:11:29,060

Roger Katya there yeah I can you guys

253

00:11:33,680 --> 00:11:31,920

still hear me yeah yeah so what

254

00:11:36,290 --> 00:11:33,690

mysteries the space hold it there's a

255

00:11:38,060 --> 00:11:36,300

great deal histories you know there's a

256

00:11:39,710 --> 00:11:38,070

great deal that we understand about

257

00:11:41,240 --> 00:11:39,720

space but there's there's an awful lot

258

00:11:43,040 --> 00:11:41,250

that we don't understand as well so

259

00:11:46,629 --> 00:11:43,050

everything from the origins of the

260

00:11:48,650 --> 00:11:46,639

universe to how the human body reacts in

261

00:11:51,920 --> 00:11:48,660

extended periods of weightlessness and

262

00:11:53,660 --> 00:11:51,930

with the radiation no is there life on

263

00:11:57,259 --> 00:11:53,670

other planets has there ever been like

264

00:11:59,689 --> 00:11:57,269

one on the planet so there's the list is

265

00:12:02,720 --> 00:11:59,699

endless it's so endless that we don't

266

00:12:04,309 --> 00:12:02,730

even know that you know the things that

267

00:12:06,499 --> 00:12:04,319

we don't know at this point so if

268

00:12:08,120 --> 00:12:06,509

there's an awful lot to discover it's

269

00:12:10,280 --> 00:12:08,130

it's really important for us to see

270

00:12:12,470 --> 00:12:10,290

what's over that next hill and to UM

271

00:12:14,809 --> 00:12:12,480

keep exploring so it's some great

272

00:12:18,650 --> 00:12:14,819

question and we're trying to solve as

273

00:12:20,689 --> 00:12:18,660

many mysteries as we can great how about

274

00:12:23,660 --> 00:12:20,699

Nicole answer this next question it's

275

00:12:25,009 --> 00:12:23,670

from google plus max Tully ass what's

276

00:12:30,199 --> 00:12:25,019

the worst part about being in low

277

00:12:33,350 --> 00:12:30,209

gravity environment the worst part wow

278

00:12:35,180 --> 00:12:33,360

you know I am you know I thought the

279

00:12:37,540 --> 00:12:35,190

whole experience everything from

280

00:12:40,220 --> 00:12:37,550

cleaning the potty to work in a

281

00:12:43,460 --> 00:12:40,230

spacewalk and just being in that

282

00:12:45,019 --> 00:12:43,470

environment was awesome so I think that

283

00:12:46,460 --> 00:12:45,029

you know the experience itself there's

284

00:12:48,680 --> 00:12:46,470

not I don't think there's a worse part

285

00:12:50,300 --> 00:12:48,690

of that I for me it really and I think

286

00:12:51,740 --> 00:12:50,310

for a lot of others it's more just that

287

00:12:54,230 --> 00:12:51,750

you know you're not there with your

288

00:12:55,850 --> 00:12:54,240

family you have all those you know the

289

00:12:57,680 --> 00:12:55,860

people that you care about are still on

290

00:13:00,110 --> 00:12:57,690

earth and you're trying to share it with

291

00:13:01,730 --> 00:13:00,120

them as best you can through video

292

00:13:04,370 --> 00:13:01,740

conferencing and talking on the phone

293

00:13:06,319 --> 00:13:04,380

and that kind of thing but I really

294

00:13:08,720 --> 00:13:06,329

think you know that's probably the

295

00:13:10,100 --> 00:13:08,730

hardest part is just you know not having

296

00:13:10,970 --> 00:13:10,110

your family there with you especially if

297

00:13:14,530 --> 00:13:10,980

you know they'd like to be up there

298

00:13:16,759 --> 00:13:14,540

experience in that same thing as well

299

00:13:24,350 --> 00:13:16,769

Thanks why don't we take another

300

00:13:27,650 --> 00:13:24,360

question from YouTube I live in Franklin

301
00:13:29,449 --> 00:13:27,660
Tennessee my class is starting space and

302
00:13:32,000 --> 00:13:29,459
I would like to know how do you exercise

303
00:13:35,440 --> 00:13:32,010
to keep your body healthy in space thank

304
00:13:40,580 --> 00:13:38,150
so so happy exercise in space you know

305
00:13:42,980 --> 00:13:40,590
the human body is an amazing thing and

306
00:13:44,720 --> 00:13:42,990
it adapts really really quickly to any

307
00:13:46,610 --> 00:13:44,730
environment that we're in and

308
00:13:48,170 --> 00:13:46,620
unfortunately that's not always a good

309
00:13:50,360 --> 00:13:48,180
thing because as soon as you get the

310
00:13:51,680 --> 00:13:50,370
space your body starts to realize it

311
00:13:52,910 --> 00:13:51,690
doesn't need a skeleton anymore and it

312
00:13:55,280 --> 00:13:52,920
doesn't need muscles and your legs

313
00:13:58,160 --> 00:13:55,290

anymore because of the microgravity

314

00:14:01,160 --> 00:13:58,170

environment so we actually have to work

315

00:14:03,950 --> 00:14:01,170

out two hours a day every day and that

316

00:14:06,500 --> 00:14:03,960

turns out to be a really effective at

317

00:14:09,400 --> 00:14:06,510

keeping you your bone density keeping

318

00:14:12,320 --> 00:14:09,410

your muscle mass and it's it's really

319

00:14:13,940 --> 00:14:12,330

paying a lot of dividends and so we do

320

00:14:15,860 --> 00:14:13,950

about an hour of aerobics every day an

321

00:14:18,590 --> 00:14:15,870

hour of what's called weightlifting we

322

00:14:20,900 --> 00:14:18,600

have two treadmills on board we've got

323

00:14:24,200 --> 00:14:20,910

two stationary bikes and we had on

324

00:14:26,090 --> 00:14:24,210

special weight lifting equipment that

325

00:14:27,740 --> 00:14:26,100

you know you could do almost any type of

326

00:14:34,310 --> 00:14:27,750

exercise that we can do on the ground we

327

00:14:36,260 --> 00:14:34,320

could do in space great why don't we

328

00:14:42,410 --> 00:14:36,270

take next question from University High

329

00:14:44,210 --> 00:14:42,420

School in orlando right now in the ISS

330

00:14:46,930 --> 00:14:44,220

there are all men so do things change

331

00:14:51,080 --> 00:14:46,940

where I'm going to ask you out there too

332

00:14:54,830 --> 00:14:51,090

that's a good one for Nicole mm-hmm or

333

00:14:57,200 --> 00:14:54,840

maybe it's a good one for you um you

334

00:14:59,660 --> 00:14:57,210

know like everywhere I think things are

335

00:15:01,310 --> 00:14:59,670

better when there are women around and I

336

00:15:04,850 --> 00:15:01,320

think that's certainly true in space and

337

00:15:07,090 --> 00:15:04,860

i can tell you i sure enjoyed it um you

338

00:15:10,250 --> 00:15:07,100

know as somebody who went through school

339

00:15:12,410 --> 00:15:10,260

primarily with with other guys I was in

340

00:15:14,270 --> 00:15:12,420

engineering and so you get used to be

341

00:15:17,810 --> 00:15:14,280

and sometimes the only girl girl there

342

00:15:19,190 --> 00:15:17,820

but I did get the chance on my second

343

00:15:20,990 --> 00:15:19,200

flight to spend some time up there with

344

00:15:24,530 --> 00:15:21,000

cady coleman to she was up there and ron

345

00:15:26,960 --> 00:15:24,540

ron was there they overlapped as well on

346

00:15:29,750 --> 00:15:26,970

his second flight and you know i think

347

00:15:33,080 --> 00:15:29,760

in general it's just nice to have people

348

00:15:35,270 --> 00:15:33,090

up there and as you know as a woman that

349

00:15:37,400 --> 00:15:35,280

was there i really enjoyed it I think

350

00:15:39,530 --> 00:15:37,410

you know crew members in general you

351

00:15:41,630 --> 00:15:39,540

kind of your individuals so you're

352

00:15:43,520 --> 00:15:41,640

figuring out your own thing along the

353

00:15:45,680 --> 00:15:43,530

way whether you're a boy or a girl but I

354

00:15:48,319 --> 00:15:45,690

would have to say I think it's better up

355

00:15:50,900 --> 00:15:48,329

there with women I have to agree

356

00:15:52,609 --> 00:15:50,910

so although Nicole and I never got a

357

00:15:53,840 --> 00:15:52,619

chance to fly a space together we got to

358

00:15:55,609 --> 00:15:53,850

live on the bottom of the ocean for

359

00:15:58,150 --> 00:15:55,619

three weeks together and that's it's fun

360

00:16:00,889 --> 00:15:58,160

and you know we have an integrated team

361

00:16:03,009 --> 00:16:00,899

men and women and men and women of many

362

00:16:04,879 --> 00:16:03,019

different countries and cultures and

363

00:16:08,150 --> 00:16:04,889

when everybody is working together

364

00:16:10,039 --> 00:16:08,160

towards the same goal it's a you know it

365

00:16:12,309 --> 00:16:10,049

doesn't matter whether you're a man or a

366

00:16:18,019 --> 00:16:12,319

woman or what country you're from it's a

367

00:16:19,609 --> 00:16:18,029

just worth trying to work together great

368

00:16:23,629 --> 00:16:19,619

why don't we now take another question

369

00:16:26,869 --> 00:16:23,639

from YouTube Oh NASA this is Jim Cooper

370

00:16:30,340 --> 00:16:26,879

my question is what effect does zero

371

00:16:32,569 --> 00:16:30,350

gravity environment have own blood flow

372

00:16:34,549 --> 00:16:32,579

particularly on blood as it flows

373

00:16:39,979 --> 00:16:34,559

through the blood vessels and I'll sell

374

00:16:43,609 --> 00:16:39,989

in the heart thank you I can try that

375

00:16:46,929 --> 00:16:43,619

one run if you want sure I think there's

376

00:16:49,389 --> 00:16:46,939

a there's a general kind of

377

00:16:51,859 --> 00:16:49,399

physiological phenomenon that happens

378

00:16:53,389 --> 00:16:51,869

when you're in zero gravity and that's

379

00:16:56,869 --> 00:16:53,399

and you've probably seen it when you see

380

00:16:58,999 --> 00:16:56,879

astronauts first get to space you know

381

00:17:01,759 --> 00:16:59,009

face is kind of puff up and you know

382

00:17:03,470 --> 00:17:01,769

your eyes look a little thinner and but

383

00:17:05,600 --> 00:17:03,480

your head just kind of gets fuller and

384

00:17:06,980 --> 00:17:05,610

that's because the fluids not just the

385

00:17:09,590 --> 00:17:06,990

blood in your body but the fluids are

386

00:17:12,319 --> 00:17:09,600

shifting up towards your head because of

387

00:17:14,000 --> 00:17:12,329

that microgravity environment and for a

388

00:17:16,009 --> 00:17:14,010

lot of people that it seems to happen

389

00:17:17,480 --> 00:17:16,019

you know more significantly than others

390

00:17:18,919 --> 00:17:17,490

and I think that's kind of cool Ron said

391

00:17:21,949 --> 00:17:18,929

something about how quickly the body

392

00:17:24,189 --> 00:17:21,959

adapts and it really does it but it's a

393

00:17:26,449 --> 00:17:24,199

little bit different for everyone and

394

00:17:28,159 --> 00:17:26,459

some people's faces give puffier than

395

00:17:29,960 --> 00:17:28,169

others some people then because of that

396

00:17:33,799 --> 00:17:29,970

feel more congested kind of like you

397

00:17:36,799 --> 00:17:33,809

have a sinus infection or a cold you

398

00:17:38,810 --> 00:17:36,809

know a head cold so that happens in that

399

00:17:40,549 --> 00:17:38,820

kind of mellows out after a while but

400

00:17:42,799 --> 00:17:40,559

your fluids have still shifted and

401
00:17:44,690 --> 00:17:42,809
because of that your body manages it a

402
00:17:47,750 --> 00:17:44,700
little bit differently too and so your

403
00:17:50,240 --> 00:17:47,760
heart actually you know responds to that

404
00:17:52,100 --> 00:17:50,250
by you know over time would actually

405
00:17:55,700 --> 00:17:52,110
change size maybe gets smaller does it

406
00:17:57,169 --> 00:17:55,710
need to pump quite as much and so there

407
00:17:59,299 --> 00:17:57,179
are a lot of actually really cool

408
00:18:01,000 --> 00:17:59,309
studies going on to look at blood

409
00:18:04,460 --> 00:18:01,010
pressure and

410
00:18:07,340 --> 00:18:04,470
the pulse rate and what your heart is

411
00:18:09,380 --> 00:18:07,350
actually doing in space and but one of

412
00:18:10,760 --> 00:18:09,390
the things you'll see is puffy faces and

413
00:18:16,490 --> 00:18:10,770

little skinny legs because of the way

414

00:18:18,050 --> 00:18:16,500

the fluid shift okay thanks for those

415

00:18:20,210 --> 00:18:18,060

just tuning in remember if you want to

416

00:18:23,210 --> 00:18:20,220

ask a question please use the hashtag

417

00:18:25,130 --> 00:18:23,220

ask Astro on Twitter or Google+ and

418

00:18:26,630 --> 00:18:25,140

we'll try to get it if we can trying to

419

00:18:29,690 --> 00:18:26,640

feel as many questions as we can today

420

00:18:32,540 --> 00:18:29,700

the next one is on YouTube and it's from

421

00:18:34,490 --> 00:18:32,550

Andrew Rufus who asks so what protects

422

00:18:39,380 --> 00:18:34,500

you from radiation and you still even

423

00:18:42,680 --> 00:18:39,390

get any from what protects you um I can

424

00:18:44,170 --> 00:18:42,690

thank you take a stab at that um so the

425

00:18:46,250 --> 00:18:44,180

atmosphere honor at the atmosphere

426
00:18:47,810 --> 00:18:46,260
provides a great amount of protection

427
00:18:50,180 --> 00:18:47,820
for radiation but when we get outside

428
00:18:53,420 --> 00:18:50,190
the atmosphere we no longer have that

429
00:18:55,460 --> 00:18:53,430
protection we do not notice since the

430
00:18:57,650 --> 00:18:55,470
space station is in orbit around the

431
00:18:59,480 --> 00:18:57,660
earth and low Earth orbit there is still

432
00:19:02,300 --> 00:18:59,490
some protection being that that close to

433
00:19:03,440 --> 00:19:02,310
the earth but once you get a wave from

434
00:19:05,810 --> 00:19:03,450
the earth and you get outside a low

435
00:19:08,090 --> 00:19:05,820
Earth orbit and you're in open space if

436
00:19:09,620 --> 00:19:08,100
you will then you know radiation is a

437
00:19:12,200 --> 00:19:09,630
big problem so there's their shielding

438
00:19:15,620 --> 00:19:12,210

it turns out that water actually is a

439

00:19:17,600 --> 00:19:15,630

very good shield for radiation um we

440

00:19:20,090 --> 00:19:17,610

have the crew quarters that we sleep in

441

00:19:23,180 --> 00:19:20,100

have some radiation shielding on them as

442

00:19:25,700 --> 00:19:23,190

well or some radiation protection and so

443

00:19:27,200 --> 00:19:25,710

it is a big concern and we track how

444

00:19:30,440 --> 00:19:27,210

much radiation that we get while we're

445

00:19:32,930 --> 00:19:30,450

up there and you know over the life of

446

00:19:35,480 --> 00:19:32,940

your career um you know we have to limit

447

00:19:37,220 --> 00:19:35,490

that to a certain amount so it's

448

00:19:40,010 --> 00:19:37,230

something that we really watch carefully

449

00:19:41,720 --> 00:19:40,020

it's a major concern for you know what

450

00:19:43,370 --> 00:19:41,730

we need when we go to Mars or you know

451

00:19:45,260 --> 00:19:43,380

we start to explore the solar system

452

00:19:47,780 --> 00:19:45,270

we're going to have to devise better

453

00:19:51,980 --> 00:19:47,790

ways to to shield astronauts from

454

00:19:53,660 --> 00:19:51,990

radiation it's a great question great

455

00:19:58,940 --> 00:19:53,670

why don't we take one now from the

456

00:20:00,800 --> 00:19:58,950

school in Mescalero New Mexico my name

457

00:20:03,860 --> 00:20:00,810

is over and i want to ask the question

458

00:20:06,290 --> 00:20:03,870

about the bone density how do astronauts

459

00:20:10,690 --> 00:20:06,300

cook the bone density and owned a

460

00:20:16,130 --> 00:20:14,000

well one of the things we do and it's

461

00:20:17,930 --> 00:20:16,140

what Ron mentioned before with response

462

00:20:20,270 --> 00:20:17,940

to the exercise question I think it's

463

00:20:24,290 --> 00:20:20,280

the primary thing that we're doing now

464

00:20:25,820 --> 00:20:24,300

to maintain bone density as well as

465

00:20:28,240 --> 00:20:25,830

maintain muscle mass because you don't

466

00:20:30,440 --> 00:20:28,250

you don't want to lose that either and

467

00:20:32,780 --> 00:20:30,450

it's really cool i mean the exercise

468

00:20:34,610 --> 00:20:32,790

equipment we have now is great Ron

469

00:20:36,530 --> 00:20:34,620

mentioned the weightlifting we have this

470

00:20:39,650 --> 00:20:36,540

resistive exercise device that allows

471

00:20:41,240 --> 00:20:39,660

you to do the major muscle group like

472

00:20:42,980 --> 00:20:41,250

weight lifting exercise just like you

473

00:20:44,900 --> 00:20:42,990

would on the ground like squats and

474

00:20:48,230 --> 00:20:44,910

deadlifts and presses and all of those

475

00:20:51,290 --> 00:20:48,240

things and that is probably the main

476

00:20:54,830 --> 00:20:51,300

contributor to maintenance of bone

477

00:20:59,360 --> 00:20:54,840

density in addition to us watching the

478

00:21:01,549 --> 00:20:59,370

our diet and supplementing with vitamins

479

00:21:04,610 --> 00:21:01,559

like vitamin D to help to help maintain

480

00:21:06,320 --> 00:21:04,620

that as well and again there are lots of

481

00:21:08,630 --> 00:21:06,330

scientists and really smart people out

482

00:21:10,760 --> 00:21:08,640

there that are looking at how can we

483

00:21:12,560 --> 00:21:10,770

best do that because it is it is a very

484

00:21:13,970 --> 00:21:12,570

important thing Ron sent it to your body

485

00:21:17,360 --> 00:21:13,980

doesn't think it needs a skeleton up

486

00:21:19,310 --> 00:21:17,370

there so it will very quickly try to get

487

00:21:21,830 --> 00:21:19,320

rid of it or not pay attention to it

488

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

any more so the science that's going on

489

00:21:26,360 --> 00:21:23,850

there is is really really interesting

490

00:21:29,210 --> 00:21:26,370

and I really like that there's this

491

00:21:31,580 --> 00:21:29,220

approach with exercise versus always you

492

00:21:32,840 --> 00:21:31,590

know trying to take a you know an

493

00:21:35,480 --> 00:21:32,850

approach of using some kind of

494

00:21:39,680 --> 00:21:35,490

medication to help with things like that

495

00:21:41,990 --> 00:21:39,690

so so great question and lots of good

496

00:21:43,790 --> 00:21:42,000

signs going on there yeah and if i can

497

00:21:46,790 --> 00:21:43,800

add just one thing to that is you know

498

00:21:48,500 --> 00:21:46,800

we need to learn how to counteract this

499

00:21:50,990 --> 00:21:48,510

effect for astronauts in space but it

500

00:21:53,180 --> 00:21:51,000

also has incredible applications to

501
00:21:54,830 --> 00:21:53,190
things like osteoporosis here on earth

502
00:21:57,830 --> 00:21:54,840
and we're really learning a lot about

503
00:21:59,180 --> 00:21:57,840
how to combat osteoporosis e so it's a

504
00:22:02,960 --> 00:21:59,190
great benefit of the research that's

505
00:22:04,130 --> 00:22:02,970
that's been conducted thanks i think we

506
00:22:05,870 --> 00:22:04,140
have a time for a few more questions

507
00:22:07,310 --> 00:22:05,880
before we connect with international

508
00:22:09,539 --> 00:22:07,320
space station let's take another one

509
00:22:12,269 --> 00:22:09,549
from youtube

510
00:22:14,009 --> 00:22:12,279
this is mrs. Brennan mrs. fifth period

511
00:22:16,440 --> 00:22:14,019
earth and science class at the queer

512
00:22:18,600 --> 00:22:16,450
school located in tyrone pennsylvania in

513
00:22:20,220 --> 00:22:18,610

the united states right curious about

514

00:22:22,440 --> 00:22:20,230

the time you say this and will like to

515

00:22:24,029 --> 00:22:22,450

use this opportunity to ask how do you

516

00:22:26,009 --> 00:22:24,039

know when it's time to either sleep when

517

00:22:28,619 --> 00:22:26,019

there really isn't daytime or nighttime

518

00:22:30,509 --> 00:22:28,629

on the space station we appreciate what

519

00:22:36,840 --> 00:22:30,519

you do and wish you luck in your mission

520

00:22:39,989 --> 00:22:36,850

ah well you eat when you're hungry and

521

00:22:42,180 --> 00:22:39,999

your sleep when you're tired yeah so we

522

00:22:44,070 --> 00:22:42,190

have we have 16 sunrises and 16 sunsets

523

00:22:45,840 --> 00:22:44,080

every day so we can't really use the Sun

524

00:22:49,019 --> 00:22:45,850

to determine when to sleep and went to

525

00:22:51,239 --> 00:22:49,029

went to wake up but we just basically go

526

00:22:53,820 --> 00:22:51,249

off the clock and we keep track of the

527

00:22:56,159 --> 00:22:53,830

clock um some cream members will do

528

00:22:57,720 --> 00:22:56,169

things like you know not look out the

529

00:22:59,940 --> 00:22:57,730

window when it's when it's getting close

530

00:23:03,299 --> 00:22:59,950

to bedtime and lex are on the dark side

531

00:23:05,159 --> 00:23:03,309

of the orbit but we have crew quarters

532

00:23:07,590 --> 00:23:05,169

that we can block the light out and so

533

00:23:09,930 --> 00:23:07,600

after a while you get used to that and

534

00:23:13,349 --> 00:23:09,940

I'm Nichola Jeff anything you on the

535

00:23:16,049 --> 00:23:13,359

head well just that it's it is it's a

536

00:23:17,580 --> 00:23:16,059

really interesting thing because a lot

537

00:23:19,200 --> 00:23:17,590

of times it's like being you know like

538

00:23:21,299 --> 00:23:19,210

imagine yourself inside of a room

539

00:23:22,529 --> 00:23:21,309

without windows for you know for an

540

00:23:25,499 --> 00:23:22,539

extended period of time and how you

541

00:23:27,960 --> 00:23:25,509

manage it that way but the windows are a

542

00:23:30,119 --> 00:23:27,970

big deal and you know because our body

543

00:23:32,190 --> 00:23:30,129

has these kind of circadian rhythms or

544

00:23:35,609 --> 00:23:32,200

you know things that give it the cue to

545

00:23:38,220 --> 00:23:35,619

be tired or be awake they're doing

546

00:23:40,349 --> 00:23:38,230

things to try to help manage that for us

547

00:23:42,239 --> 00:23:40,359

in space two and one of the things we're

548

00:23:44,970 --> 00:23:42,249

starting to implement are these new new

549

00:23:46,229 --> 00:23:44,980

lights on board for the main part of

550

00:23:47,849 --> 00:23:46,239

the day you would have what we call

551
00:23:50,009 --> 00:23:47,859
general lighting on and it's got one

552
00:23:51,779 --> 00:23:50,019
kind of color associated with it and

553
00:23:53,580 --> 00:23:51,789
then when you're getting ready to go to

554
00:23:54,989 --> 00:23:53,590
bed they have this you know different

555
00:23:58,619 --> 00:23:54,999
color light I think it's more of an

556
00:24:01,049 --> 00:23:58,629
orange e color that is your kind of

557
00:24:02,399 --> 00:24:01,059
pre-sleep getting you ready to go to bed

558
00:24:03,899 --> 00:24:02,409
and then in the morning they're looking

559
00:24:06,330 --> 00:24:03,909
at you know spending some time with a

560
00:24:09,060 --> 00:24:06,340
bluer light that helps you phase shift

561
00:24:11,519 --> 00:24:09,070
and wake up so you know in addition to

562
00:24:13,080 --> 00:24:11,529
the clock like Ron mentioned which is

563
00:24:14,549 --> 00:24:13,090

really and truly the primary thing

564

00:24:16,680 --> 00:24:14,559

you've got this timeline telling you

565

00:24:18,210 --> 00:24:16,690

what to do and when they're really

566

00:24:22,889 --> 00:24:18,220

looking at how do we supplement it to

567

00:24:27,219 --> 00:24:25,209

okay why don't we try to take one more

568

00:24:34,599 --> 00:24:27,229

question from University High School in

569

00:24:36,369 --> 00:24:34,609

Orlando what scientists do you do and

570

00:24:42,399 --> 00:24:36,379

did you make any interesting discoveries

571

00:24:46,839 --> 00:24:42,409

during your time on the ISS okay she's

572

00:24:49,089 --> 00:24:46,849

pointing at me um you know it that

573

00:24:51,519 --> 00:24:49,099

question would depict a long time to

574

00:24:54,609 --> 00:24:51,529

answer because 24 hours a day seven days

575

00:24:56,139 --> 00:24:54,619

a week we are conducting all kinds of

576

00:24:58,779 --> 00:24:56,149

different experiments experiments to

577

00:25:00,309 --> 00:24:58,789

look at new materials new medicines a

578

00:25:01,899 --> 00:25:00,319

better understanding of the human body

579

00:25:05,169 --> 00:25:01,909

of understanding understanding at the

580

00:25:08,469 --> 00:25:05,179

earth of environmental factors new ways

581

00:25:10,930 --> 00:25:08,479

to make energy on there is a great deal

582

00:25:12,489 --> 00:25:10,940

of science going on we have the Japanese

583

00:25:14,829 --> 00:25:12,499

laboratory the European laboratory the

584

00:25:16,930 --> 00:25:14,839

u.s. laboratory laboratory facilities

585

00:25:19,509 --> 00:25:16,940

throughout the Russian part of the space

586

00:25:21,849 --> 00:25:19,519

station and all of these experiments

587

00:25:23,829 --> 00:25:21,859

what they all have in common is they

588

00:25:26,139 --> 00:25:23,839

they're trying to do two things one is

589

00:25:27,579 --> 00:25:26,149

they're trying to enable us to explore

590

00:25:30,599 --> 00:25:27,589

further and further into the solar

591

00:25:33,279 --> 00:25:30,609

system on with human exploration and

592

00:25:35,319 --> 00:25:33,289

robotic exploration but it's also as the

593

00:25:37,419 --> 00:25:35,329

goal of trying to make life better on

594

00:25:39,129 --> 00:25:37,429

planet earth and try and solve a lot of

595

00:25:41,079 --> 00:25:39,139

the problems and the reason why we have

596

00:25:42,789 --> 00:25:41,089

all these facilities up there is because

597

00:25:44,319 --> 00:25:42,799

the science that's being conducted on

598

00:25:45,759 --> 00:25:44,329

the International Space Station simply

599

00:25:48,029 --> 00:25:45,769

cannot be conducted anywhere else on

600

00:25:49,899 --> 00:25:48,039

earth it's a very very unique

601
00:25:53,229 --> 00:25:49,909
experimental environment the

602
00:25:56,619 --> 00:25:53,239
weightlessness that you have on it is

603
00:25:58,749 --> 00:25:56,629
really something that makes scientific

604
00:26:01,299 --> 00:25:58,759
results different than you would get on

605
00:26:03,219 --> 00:26:01,309
earth and sometimes it unlocks you know

606
00:26:05,199 --> 00:26:03,229
we talked about mysteries before we are

607
00:26:07,059 --> 00:26:05,209
are unlocking some of these mysteries

608
00:26:12,039 --> 00:26:07,069
because of the science that we're doing

609
00:26:13,989 --> 00:26:12,049
on board great let's say we have about

610
00:26:16,149 --> 00:26:13,999
four minutes until we connect with the

611
00:26:19,869 --> 00:26:16,159
space station this questions for both of

612
00:26:22,539 --> 00:26:19,879
you and it's from Twitter I.I well

613
00:26:24,099 --> 00:26:22,549

underscore Donna ass when did you know

614

00:26:25,419 --> 00:26:24,109

you want to be an astronaut and how

615

00:26:28,910 --> 00:26:25,429

early did you start working toward your

616

00:26:35,390 --> 00:26:33,680

oh okay well you know um I I'm one of

617

00:26:36,830 --> 00:26:35,400

those people yeah and it's yeah it's

618

00:26:38,900 --> 00:26:36,840

going to be hard to believe old enough

619

00:26:42,430 --> 00:26:38,910

to have watched that first moon landing

620

00:26:45,320 --> 00:26:42,440

and and I can tell ya I no surprise it

621

00:26:47,450 --> 00:26:45,330

it it made a real impression on me but I

622

00:26:49,850 --> 00:26:47,460

think it made an impression as as a kid

623

00:26:52,790 --> 00:26:49,860

that thought it was something really

624

00:26:55,220 --> 00:26:52,800

cool and and it was a really long time

625

00:26:56,720 --> 00:26:55,230

before that that impression of

626
00:26:58,880 --> 00:26:56,730
impression evolved into something that

627
00:27:01,370 --> 00:26:58,890
was something that I thought could

628
00:27:03,320 --> 00:27:01,380
happen for me I grew up with a dad who

629
00:27:04,880 --> 00:27:03,330
like to fly I was always interested in

630
00:27:06,170 --> 00:27:04,890
flying because of that I knew I wanted

631
00:27:09,770 --> 00:27:06,180
to do something that was related to

632
00:27:12,950 --> 00:27:09,780
flying and I lived in Florida go Orlando

633
00:27:14,870 --> 00:27:12,960
and so grew up near the Kennedy Space

634
00:27:16,520 --> 00:27:14,880
Center and knew I wanted to work with

635
00:27:21,380 --> 00:27:16,530
the space program but it really and

636
00:27:24,110 --> 00:27:21,390
truly wasn't until I was at KSC working

637
00:27:26,120 --> 00:27:24,120
for several years that it started to

638
00:27:28,400 --> 00:27:26,130

become something that felt like it could

639

00:27:30,320 --> 00:27:28,410

be real and I'm very thankful for people

640

00:27:32,420 --> 00:27:30,330

that I consider to be mentors from then

641

00:27:36,380 --> 00:27:32,430

and through today that encouraged me to

642

00:27:38,450 --> 00:27:36,390

apply and I think for me I was kind of

643

00:27:40,280 --> 00:27:38,460

fortunate because I like a lot of others

644

00:27:41,840 --> 00:27:40,290

paid attention to what I enjoy doing I

645

00:27:43,400 --> 00:27:41,850

keep think flying was at the basis of

646

00:27:46,010 --> 00:27:43,410

that that led to an engineering degree

647

00:27:48,050 --> 00:27:46,020

which evolved to working for NASA and

648

00:27:53,450 --> 00:27:48,060

then ultimately having the opportunity

649

00:28:00,110 --> 00:27:53,460

to become an astronaut Ron you want its

650

00:28:02,060 --> 00:28:00,120

own yeah well um you know I didn't want

651
00:28:03,710 --> 00:28:02,070
to be an astronaut my whole life only

652
00:28:06,770 --> 00:28:03,720
since July twentieth nineteen sixty-nine

653
00:28:08,080 --> 00:28:06,780
so I was I was a little kid just like a

654
00:28:11,090 --> 00:28:08,090
Cole watching the moon landing an

655
00:28:13,370 --> 00:28:11,100
interesting story is you know throughout

656
00:28:14,960 --> 00:28:13,380
my whole life since that point you know

657
00:28:16,730 --> 00:28:14,970
I wanted to be an ass shot i was working

658
00:28:18,530 --> 00:28:16,740
even as a kid to be an astronaut but

659
00:28:20,030 --> 00:28:18,540
when i get to high school I kind of lost

660
00:28:22,100 --> 00:28:20,040
that dream and I lost that train because

661
00:28:24,170 --> 00:28:22,110
it was after Skylab it was before the

662
00:28:25,940 --> 00:28:24,180
shuttle had ever flown and I didn't

663
00:28:27,530 --> 00:28:25,950

think we had a space program and so it

664

00:28:29,300 --> 00:28:27,540

didn't make any sense to try and be an

665

00:28:30,740 --> 00:28:29,310

astronaut since we never accorded to

666

00:28:32,480 --> 00:28:30,750

what I thought we didn't have a space

667

00:28:34,330 --> 00:28:32,490

program anymore but when I was a

668

00:28:37,220 --> 00:28:34,340

sophomore in college they had the first

669

00:28:39,950 --> 00:28:37,230

mission of the space shuttle and it

670

00:28:42,360 --> 00:28:39,960

completely reawakened that dream and the

671

00:28:44,340 --> 00:28:42,370

very next day I wanted to make

672

00:28:46,110 --> 00:28:44,350

counselor my counselors and advisors and

673

00:28:47,640 --> 00:28:46,120

said how can I start taking math and

674

00:28:50,340 --> 00:28:47,650

science I you know I want to start

675

00:28:52,430 --> 00:28:50,350

pursuing an engineering degree and 15

676

00:28:55,740 --> 00:28:52,440

years later or more than 15 years later

677

00:28:59,100 --> 00:28:55,750

I was able to become an astronaut and so

678

00:29:01,560 --> 00:28:59,110

I think that's a really good powerful

679

00:29:04,200 --> 00:29:01,570

story about how the space program is

680

00:29:06,120 --> 00:29:04,210

going to inspire people to study hard

681

00:29:07,530 --> 00:29:06,130

into work hard and to enter the fields

682

00:29:11,010 --> 00:29:07,540

of math in size so it really had an

683

00:29:12,690 --> 00:29:11,020

effect on me personally and if you don't

684

00:29:14,130 --> 00:29:12,700

mind I'm gonna follow on a little bit to

685

00:29:16,680 --> 00:29:14,140

what Ron just said because I think he

686

00:29:18,780 --> 00:29:16,690

made a really really key point there and

687

00:29:21,090 --> 00:29:18,790

talking about that kind of transition he

688

00:29:23,310 --> 00:29:21,100

had where he didn't think there was a

689

00:29:25,320 --> 00:29:23,320

space program and I think you know with

690

00:29:27,540 --> 00:29:25,330

what's going on in these days where

691

00:29:29,669 --> 00:29:27,550

we've retired the space shuttle and

692

00:29:31,260 --> 00:29:29,679

we're looking towards some you know

693

00:29:34,080 --> 00:29:31,270

different vehicles for going beyond

694

00:29:35,460 --> 00:29:34,090

lower I hated it Nicole hate they're up

695

00:29:36,900 --> 00:29:35,470

to I just you can face the thought

696

00:29:38,910 --> 00:29:36,910

afterward but we're about to connect

697

00:29:42,150 --> 00:29:38,920

with a Space Station astronauts Kevin

698

00:29:44,100 --> 00:29:42,160

Ford Tom Marshburn of NASA and Chris

699

00:29:46,230 --> 00:29:44,110

Hadfield k space agency with the Nash

700

00:29:47,370 --> 00:29:46,240

spacers are about to join us alright

701
00:29:48,780 --> 00:29:47,380
well that's that's gonna be more

702
00:29:50,160 --> 00:29:48,790
exciting than anything I can say but

703
00:29:52,380 --> 00:29:50,170
just to let you all know the space

704
00:29:53,580 --> 00:29:52,390
program is alive and well and if you

705
00:30:04,590 --> 00:29:53,590
want to be an astronaut you should go

706
00:30:10,580 --> 00:30:04,600
for it thank you station this is Houston

707
00:30:14,040 --> 00:30:10,590
are you ready for the event Houston

708
00:30:15,690 --> 00:30:14,050
stations ready for the event google+

709
00:30:18,750 --> 00:30:15,700
moderator this is Mission Control

710
00:30:21,390 --> 00:30:18,760
Houston please call station for a voice

711
00:30:27,150 --> 00:30:21,400
check station this is a Google+ Hangout

712
00:30:29,190 --> 00:30:27,160
how do you hear me google+ hangout

713
00:30:31,710 --> 00:30:29,200

International Space Station we have you

714

00:30:33,419 --> 00:30:31,720

loud and clear aboard we have our way

715

00:30:35,130 --> 00:30:33,429

own way of hanging out up here watch my

716

00:30:40,560 --> 00:30:35,140

buddies hang out we're ready to hang out

717

00:30:41,520 --> 00:30:40,570

with you guys welcome aboard awesome we

718

00:30:43,140 --> 00:30:41,530

have a lot of questions for you guys

719

00:30:47,400 --> 00:30:43,150

today so let's start the first one from

720

00:30:49,740 --> 00:30:47,410

YouTube I'm Kristin well I'm ready and

721

00:30:52,310 --> 00:30:49,750

we're from Union High School in Iowa our

722

00:30:53,659 --> 00:30:52,320

question is what is the exact purpose

723

00:31:00,680 --> 00:30:53,669

how many humans live on the space

724

00:31:02,360 --> 00:31:00,690

station Thanks well the whole point of

725

00:31:04,340 --> 00:31:02,370

having a space station is to have some

726

00:31:07,399 --> 00:31:04,350

place in space where people can take

727

00:31:09,740 --> 00:31:07,409

their ideas we have a huge power supply

728

00:31:11,600 --> 00:31:09,750

up here we have a lot of rackspace and

729

00:31:13,220 --> 00:31:11,610

we have a lot of scientists on the

730

00:31:15,139 --> 00:31:13,230

ground with a lot of ideas about things

731

00:31:16,730 --> 00:31:15,149

to do in space we have literally

732

00:31:19,879 --> 00:31:16,740

hundreds of experiments going on right

733

00:31:21,499 --> 00:31:19,889

now as we were working up here and the

734

00:31:23,419 --> 00:31:21,509

space station really offers a lot of

735

00:31:25,310 --> 00:31:23,429

flexibility to us that you wouldn't have

736

00:31:26,419 --> 00:31:25,320

if you wanted to put an experiment in

737

00:31:28,100 --> 00:31:26,429

space and you didn't have a space

738

00:31:30,320 --> 00:31:28,110

station I don't know where you'd put it

739

00:31:32,180 --> 00:31:30,330

right next to this is a rack yesterday

740

00:31:34,399 --> 00:31:32,190

we took an experiment out of it called

741

00:31:37,669 --> 00:31:34,409

in space which is looking at special

742

00:31:40,610 --> 00:31:37,679

magnetic fluids that can change the the

743

00:31:43,190 --> 00:31:40,620

way we have really changed the operation

744

00:31:45,649 --> 00:31:43,200

of braking systems and maybe have

745

00:31:48,169 --> 00:31:45,659

applications to seismic dampers and

746

00:31:50,810 --> 00:31:48,179

stuff or earthquake zones many many many

747

00:31:52,850 --> 00:31:50,820

good offsets from that particular

748

00:31:55,759 --> 00:31:52,860

experiment and we finished it out

749

00:31:57,619 --> 00:31:55,769

yesterday and we're going to put in a

750

00:32:00,139 --> 00:31:57,629

new experiment next week that's coming

751

00:32:01,789 --> 00:32:00,149

up on Dragon and it'll look at a

752

00:32:03,710 --> 00:32:01,799

completely different kind of thing you

753

00:32:05,149 --> 00:32:03,720

look at the way metals form in zero

754

00:32:07,129 --> 00:32:05,159

gravity it's very important for us to

755

00:32:08,629 --> 00:32:07,139

look at the way the crystals formed

756

00:32:10,549 --> 00:32:08,639

because it can make things very much

757

00:32:12,379 --> 00:32:10,559

stronger and so these are things that

758

00:32:14,419 --> 00:32:12,389

can only be done in zero gravity and we

759

00:32:17,080 --> 00:32:14,429

have no lack of ideas of things to do up

760

00:32:19,039 --> 00:32:17,090

here and we're here to facilitate it

761

00:32:21,950 --> 00:32:19,049

Thanks we're going to take our next

762

00:32:24,590 --> 00:32:21,960

question from youtube it's simon drupal

763

00:32:26,389 --> 00:32:24,600

who asks do you sometimes see falling

764

00:32:29,119 --> 00:32:26,399

stars and the atmosphere from the space

765

00:32:31,220 --> 00:32:29,129

station or is it frequent or do you see

766

00:32:36,830 --> 00:32:31,230

stuff like satellites in orbit thank you

767

00:32:39,049 --> 00:32:36,840

from belgium there's a matter of fact

768

00:32:41,210 --> 00:32:39,059

shooting stars we do see there's one big

769

00:32:43,100 --> 00:32:41,220

difference there below us instead of

770

00:32:44,930 --> 00:32:43,110

above us so when we're looking down at

771

00:32:46,249 --> 00:32:44,940

the earth we can see a little shooting

772

00:32:47,960 --> 00:32:46,259

star usually don't see much movement

773

00:32:51,049 --> 00:32:47,970

other than the Earth's slowly going by

774

00:32:52,999 --> 00:32:51,059

you and so when it really catches your

775

00:32:54,409 --> 00:32:53,009

eye when you see a shooting stars a lot

776

00:32:56,299 --> 00:32:54,419

of movement there in the atmosphere it's

777

00:33:00,139 --> 00:32:56,309

very beautiful we don't see other

778

00:33:03,259 --> 00:33:00,149

satellites typically because we're all

779

00:33:05,640 --> 00:33:03,269

going very fast 17,500 miles an hour and

780

00:33:08,130 --> 00:33:05,650

if one's in orbit near ours and dip

781

00:33:09,840 --> 00:33:08,140

slightly different orbital plane we pass

782

00:33:11,790 --> 00:33:09,850

by each other very quickly I've heard

783

00:33:14,000 --> 00:33:11,800

some astronauts have seen some go by but

784

00:33:16,230 --> 00:33:14,010

it's a very rare event great question

785

00:33:18,690 --> 00:33:16,240

right thank you why don't we take the

786

00:33:20,640 --> 00:33:18,700

next question on YouTube I'm destined

787

00:33:22,050 --> 00:33:20,650

from Huntsville Alabama this is Sammy in

788

00:33:23,910 --> 00:33:22,060

spotsy on the International Space

789

00:33:25,860 --> 00:33:23,920

Station if you're free-falling in one

790

00:33:28,380 --> 00:33:25,870

position without touching anything with

791

00:33:29,940 --> 00:33:28,390

no spin is it possible to wiggle in such

792

00:33:32,340 --> 00:33:29,950

a way that you're able to rotate to a

793

00:33:34,110 --> 00:33:32,350

different angular position and then stop

794

00:33:35,790 --> 00:33:34,120

on smarter every day we demonstrated

795

00:33:37,950 --> 00:33:35,800

this with a high-speed camera and a cat

796

00:33:39,690 --> 00:33:37,960

who is a non holonomic system and can do

797

00:33:41,070 --> 00:33:39,700

this by extending his legs arching his

798

00:33:43,380 --> 00:33:41,080

back and twisting in a very specific

799

00:33:45,650 --> 00:33:43,390

pattern so can humans do this on orbit

800

00:33:52,200 --> 00:33:45,660

you want to say hey to the astronauts oh

801
00:33:54,090 --> 00:33:52,210
thank you we look up to you guys okay

802
00:33:56,280 --> 00:33:54,100
well that's a great question we don't

803
00:33:58,560 --> 00:33:56,290
have any cats on board but we have a

804
00:34:00,510 --> 00:33:58,570
medical doctor who maybe can try to

805
00:34:01,980 --> 00:34:00,520
demonstrate that yeah next best thing to

806
00:34:04,110 --> 00:34:01,990
a cat so he's gonna try to demonstrate

807
00:34:05,250 --> 00:34:04,120
for you yes indeed you can you can do

808
00:34:07,950 --> 00:34:05,260
this so he's going to get out here and

809
00:34:08,880 --> 00:34:07,960
stop himself in an open space and he's

810
00:34:12,090 --> 00:34:08,890
going to show you how he can turn

811
00:34:13,500 --> 00:34:12,100
himself around so he he can't change his

812
00:34:15,210 --> 00:34:13,510
angular momentum but he can change his

813
00:34:18,000 --> 00:34:15,220

body position and move himself to an

814

00:34:20,669 --> 00:34:18,010

orientation so I hope you believe that

815

00:34:22,590 --> 00:34:20,679

what you saw happened with the cat isn't

816

00:34:26,790 --> 00:34:22,600

a mystery and that it can happen in

817

00:34:28,050 --> 00:34:26,800

space too great question thnx here's

818

00:34:30,810 --> 00:34:28,060

kind of timely question from Facebook

819

00:34:32,490 --> 00:34:30,820

ian beckon asks what was the first

820

00:34:34,440 --> 00:34:32,500

emotional reaction of the crew when they

821

00:34:35,909 --> 00:34:34,450

realized a few days ago that the s-band

822

00:34:37,320 --> 00:34:35,919

calm was lost and they weren't able to

823

00:34:38,940 --> 00:34:37,330

talk to the ground anymore or just over

824

00:34:40,649 --> 00:34:38,950

Russian ground sites are there any

825

00:34:42,570 --> 00:34:40,659

procedures to keep calm those situations

826

00:34:48,810 --> 00:34:42,580

or does training experience kick into

827

00:34:53,010 --> 00:34:51,300

trained individually as astronauts for

828

00:34:55,140 --> 00:34:53,020

many many years and we've trained

829

00:34:58,320 --> 00:34:55,150

together as a crew for several years as

830

00:35:01,440 --> 00:34:58,330

well so really we're ready for all sorts

831

00:35:03,690 --> 00:35:01,450

of things to happen what happened just a

832

00:35:05,340 --> 00:35:03,700

couple days ago was really not not that

833

00:35:08,340 --> 00:35:05,350

big a deal we lost communications with

834

00:35:12,480 --> 00:35:08,350

the ground but the space station is a

835

00:35:14,370 --> 00:35:12,490

robust tough spaceship and it kept just

836

00:35:16,800 --> 00:35:14,380

going around the world and all of its

837

00:35:19,350 --> 00:35:16,810

systems running just fine we work

838

00:35:21,510 --> 00:35:19,360

together as a crew following the

839

00:35:24,120 --> 00:35:21,520

procedures like we trained to do it was

840

00:35:26,370 --> 00:35:24,130

actually pretty nice I was sitting there

841

00:35:27,990 --> 00:35:26,380

typing on the main interface tom was

842

00:35:30,180 --> 00:35:28,000

running the procedures with me and Kevin

843

00:35:31,620 --> 00:35:30,190

as the commander was stand back watching

844

00:35:33,210 --> 00:35:31,630

how the whole thing was flowing and

845

00:35:36,000 --> 00:35:33,220

making sure that we were headed down the

846

00:35:38,190 --> 00:35:36,010

right path the people on the ground were

847

00:35:39,900 --> 00:35:38,200

scrambling and working hard and it

848

00:35:42,090 --> 00:35:39,910

wasn't until we came around the world

849

00:35:43,950 --> 00:35:42,100

and up and over top of Russia where we

850

00:35:46,380 --> 00:35:43,960

can talk directly from an antenna on the

851

00:35:48,510 --> 00:35:46,390

ground to our antennas on board that

852

00:35:50,070 --> 00:35:48,520

then we could compare notes see where we

853

00:35:51,780 --> 00:35:50,080

were and eventually we had everything

854

00:35:53,670 --> 00:35:51,790

together and after just a couple orbits

855

00:35:55,560 --> 00:35:53,680

we got the computers talking to the

856

00:35:58,020 --> 00:35:55,570

antennas properly so we could talk to

857

00:36:01,620 --> 00:35:58,030

the ground so it wasn't any sort of

858

00:36:03,120 --> 00:36:01,630

panic or anything it was just us dealing

859

00:36:04,650 --> 00:36:03,130

with a problem on the ground and our

860

00:36:06,780 --> 00:36:04,660

crew dealing with a problem on board

861

00:36:08,850 --> 00:36:06,790

working like we've been trained working

862

00:36:11,310 --> 00:36:08,860

together as a team with a successful

863

00:36:14,850 --> 00:36:11,320

result it was things that happen in

864

00:36:17,880 --> 00:36:14,860

space thank you why don't we take our

865

00:36:19,740 --> 00:36:17,890

next question on YouTube hi my name's

866

00:36:21,960 --> 00:36:19,750

Neil bramson I'm a teacher at New South

867

00:36:23,610 --> 00:36:21,970

Wales Australia my students have been

868

00:36:26,760 --> 00:36:23,620

following the expedition 34 crew

869

00:36:29,520 --> 00:36:26,770

progress on Twitter Facebook and Google+

870

00:36:31,380 --> 00:36:29,530

now my question relates to social media

871

00:36:32,640 --> 00:36:31,390

how do you feel as astronauts now that

872

00:36:34,440 --> 00:36:32,650

your communication methods have changed

873

00:36:37,530 --> 00:36:34,450

through the use of the likes of Twitter

874

00:36:39,090 --> 00:36:37,540

and Facebook and the impact that you now

875

00:36:41,760 --> 00:36:39,100

have on the global public in terms of

876

00:36:43,200 --> 00:36:41,770

space and space education secondly how

877

00:36:49,440 --> 00:36:43,210

do you feel the social media stars

878

00:36:55,650 --> 00:36:52,770

uh I don't think anybody tries to use

879

00:36:58,140 --> 00:36:55,660

technology to push back the edge of the

880

00:36:59,670 --> 00:36:58,150

human experience more than we do I mean

881

00:37:02,520 --> 00:36:59,680

look where we live and what we're doing

882

00:37:04,500 --> 00:37:02,530

how we're making this happen and so we

883

00:37:07,980 --> 00:37:04,510

constantly try and take something simple

884

00:37:11,220 --> 00:37:07,990

but then apply it in a new way and allow

885

00:37:13,890 --> 00:37:11,230

it to improve our understanding really

886

00:37:15,960 --> 00:37:13,900

as a species and we are for the first

887

00:37:18,510 --> 00:37:15,970

time in history with this space station

888

00:37:21,450 --> 00:37:18,520

as a planet as a species we're leaving

889

00:37:23,790 --> 00:37:21,460

Earth and it is just it's too good an

890

00:37:26,040 --> 00:37:23,800

experience not to share and with

891

00:37:28,589 --> 00:37:26,050

technology that we have now with the

892

00:37:30,810 --> 00:37:28,599

communications capability that NASA and

893

00:37:33,810 --> 00:37:30,820

others have put on board here we can

894

00:37:35,700 --> 00:37:33,820

real-time communicate as people with

895

00:37:38,160 --> 00:37:35,710

with pretty much everybody on earth who

896

00:37:40,650 --> 00:37:38,170

has who has a computer an iphone or

897

00:37:42,960 --> 00:37:40,660

something and so with Twitter which is a

898

00:37:44,730 --> 00:37:42,970

really handy way to do that we can take

899

00:37:46,620 --> 00:37:44,740

a picture have a thought here on board

900

00:37:48,870 --> 00:37:46,630

and just in a matter of a few minutes

901
00:37:51,180 --> 00:37:48,880
get it down to the ground and spread

902
00:37:53,250 --> 00:37:51,190
around the world that's wonderful for

903
00:37:55,190 --> 00:37:53,260
viewing things like the big tropical

904
00:37:58,620 --> 00:37:55,200
cyclone that's off Madagascar right now

905
00:38:00,540 --> 00:37:58,630
it's a great way to communicate the

906
00:38:02,370 --> 00:38:00,550
transit emotions and the thoughts that

907
00:38:04,050 --> 00:38:02,380
that go through us as we are

908
00:38:06,750 --> 00:38:04,060
experiencing this really on behalf of

909
00:38:09,900 --> 00:38:06,760
everybody and as far as being a media

910
00:38:12,809 --> 00:38:09,910
star I mean this is just a really rare

911
00:38:14,819 --> 00:38:12,819
human experience and we've worked hard

912
00:38:17,250 --> 00:38:14,829
to get here but at the same time we know

913
00:38:19,260 --> 00:38:17,260

just how lucky we are to be here and I

914

00:38:22,020 --> 00:38:19,270

think it's important to try and share it

915

00:38:23,910 --> 00:38:22,030

with as many people as possible but

916

00:38:25,650 --> 00:38:23,920

something else to remember everybody

917

00:38:27,510 --> 00:38:25,660

around the world if you just choose the

918

00:38:29,940 --> 00:38:27,520

right time of day you can look up and

919

00:38:31,740 --> 00:38:29,950

watch this star go over as well and

920

00:38:35,430 --> 00:38:31,750

that's a pretty nice touch back and

921

00:38:37,530 --> 00:38:35,440

forth also thanks I'll take another one

922

00:38:38,790 --> 00:38:37,540

from social media I'm not sure if you

923

00:38:40,260 --> 00:38:38,800

guys have thought about this or not but

924

00:38:42,630 --> 00:38:40,270

it's something i don't think i've heard

925

00:38:44,730 --> 00:38:42,640

asked before it's on twitter at nozzle

926

00:38:45,930 --> 00:38:44,740

bar ass which scientists of the past

927

00:38:54,860 --> 00:38:45,940

would you like to take into space like

928

00:39:00,540 --> 00:38:57,720

why for me it just popped right into my

929

00:39:02,460 --> 00:39:00,550

head Isaac Newton because we see what he

930

00:39:05,520 --> 00:39:02,470

could only imagine we see it every day

931

00:39:07,320 --> 00:39:05,530

and everything we do large objects that

932

00:39:08,820 --> 00:39:07,330

we can move with a push of a finger

933

00:39:10,740 --> 00:39:08,830

although we takes a little bit of time

934

00:39:13,080 --> 00:39:10,750

to get them going small objects that

935

00:39:15,120 --> 00:39:13,090

bounce around very quickly the angular

936

00:39:17,130 --> 00:39:15,130

momentum demonstration you just saw all

937

00:39:18,930 --> 00:39:17,140

of these things it's really hard to

938

00:39:21,810 --> 00:39:18,940

believe that he was able to imagine

939

00:39:26,580 --> 00:39:21,820

these things and I would love for him to

940

00:39:29,700 --> 00:39:26,590

be able to see it great when we taking

941

00:39:31,050 --> 00:39:29,710

the question on YouTube hi my name is

942

00:39:33,150 --> 00:39:31,060

Jennifer gates and I'm a high school

943

00:39:35,100 --> 00:39:33,160

science teacher in the Midwest of the

944

00:39:37,440 --> 00:39:35,110

United States mostly teaching chemistry

945

00:39:38,970 --> 00:39:37,450

and physics and my question for you is

946

00:39:40,950 --> 00:39:38,980

what's the most important thing that

947

00:39:43,290 --> 00:39:40,960

they should be learning and focusing on

948

00:39:46,140 --> 00:39:43,300

understanding at this time in terms of

949

00:39:47,220 --> 00:39:46,150

perhaps working in science later or what

950

00:39:48,600 --> 00:39:47,230

do you feel like the most important

951
00:39:50,220 --> 00:39:48,610
thing was that you took from your high

952
00:39:57,900 --> 00:39:50,230
school science courses to help you get

953
00:40:00,630 --> 00:39:57,910
where you are today thank you well well

954
00:40:02,420 --> 00:40:00,640
that's a great question I wish I could

955
00:40:05,430 --> 00:40:02,430
have taken everything in high school

956
00:40:07,770 --> 00:40:05,440
twice actually because there's so much

957
00:40:10,170 --> 00:40:07,780
information there for students at that

958
00:40:12,300 --> 00:40:10,180
time and and I know that's really really

959
00:40:14,520 --> 00:40:12,310
tough time in their lives and everything

960
00:40:16,350 --> 00:40:14,530
and there is it is almost overwhelming

961
00:40:17,640 --> 00:40:16,360
all the subjects that are offered to you

962
00:40:20,550 --> 00:40:17,650
and the choices that are offered to you

963
00:40:22,580 --> 00:40:20,560

at that time I'll of math and I love

964

00:40:25,230 --> 00:40:22,590

physics and I happen to have a very

965

00:40:27,060 --> 00:40:25,240

enthusiastic physics teacher who just

966

00:40:29,910 --> 00:40:27,070

made me I just couldn't wait to go to

967

00:40:33,240 --> 00:40:29,920

class every day and we talked about

968

00:40:35,280 --> 00:40:33,250

things like you know Newton's laws and

969

00:40:37,080 --> 00:40:35,290

that sort of thing and and like Tom just

970

00:40:39,720 --> 00:40:37,090

mentioned we get to see up see them up

971

00:40:41,670 --> 00:40:39,730

here in action and in their advanced

972

00:40:43,140 --> 00:40:41,680

phases and stages as well like in

973

00:40:44,910 --> 00:40:43,150

orbital mechanics and those sorts of

974

00:40:47,430 --> 00:40:44,920

things so though that's the one that

975

00:40:49,500 --> 00:40:47,440

really piqued my interest but we we have

976
00:40:51,990 --> 00:40:49,510
a life support system when bored that's

977
00:40:53,910 --> 00:40:52,000
very chemistry intensive and we we talk

978
00:40:56,400 --> 00:40:53,920
chemistry almost every day we use a

979
00:40:58,140 --> 00:40:56,410
mathematics every day it's very

980
00:41:00,690 --> 00:40:58,150
important in Mission Control to for the

981
00:41:02,610 --> 00:41:00,700
people who support us trajectories to

982
00:41:04,320 --> 00:41:02,620
get up i'm going back to earth in about

983
00:41:06,720 --> 00:41:04,330
three weeks and there are some brilliant

984
00:41:08,670 --> 00:41:06,730
mathematicians working on putting me in

985
00:41:10,799 --> 00:41:08,680
a very small spot in kazakhstan

986
00:41:12,270 --> 00:41:10,809
on so there are people working waiting

987
00:41:14,280 --> 00:41:12,280
there for me and they're doing calculus

988
00:41:15,660 --> 00:41:14,290

and they're running it backwards so they

989

00:41:17,280 --> 00:41:15,670

can integrate all the way back to the

990

00:41:19,620 --> 00:41:17,290

ground and get me to the right place on

991

00:41:23,099 --> 00:41:19,630

the ground so it's a lot of complicated

992

00:41:25,799 --> 00:41:23,109

science to make this all work there's a

993

00:41:27,270 --> 00:41:25,809

medical you can see chris's got a

994

00:41:29,099 --> 00:41:27,280

special thing on his head today the

995

00:41:31,319 --> 00:41:29,109

medical science is very important as to

996

00:41:33,299 --> 00:41:31,329

what we're doing space station and no

997

00:41:36,450 --> 00:41:33,309

matter what you like what your field is

998

00:41:39,329 --> 00:41:36,460

you can find an area and in that that

999

00:41:41,309 --> 00:41:39,339

applies to spaceflight for sure so just

1000

00:41:42,900 --> 00:41:41,319

take all of them you can and learn as

1001
00:41:44,220 --> 00:41:42,910
much as you can about all of them you'll

1002
00:41:45,510 --> 00:41:44,230
probably need them all that you're going

1003
00:41:48,030 --> 00:41:45,520
to end up in the space business and you

1004
00:41:50,700 --> 00:41:48,040
might need them all in almost any any

1005
00:41:55,440 --> 00:41:50,710
business you end up in so take advantage

1006
00:41:58,710 --> 00:41:55,450
of it why don't we thinking the question

1007
00:42:00,780 --> 00:41:58,720
on YouTube my name is Fraser Cain and i

1008
00:42:02,460 --> 00:42:00,790
live on vancouver island canada and my

1009
00:42:03,870 --> 00:42:02,470
question that is for Chris Hadfield has

1010
00:42:06,270 --> 00:42:03,880
been delivering all these beautiful

1011
00:42:08,220 --> 00:42:06,280
photographs from space and my question

1012
00:42:10,380 --> 00:42:08,230
is how does being on the International

1013
00:42:13,410 --> 00:42:10,390

Space Station change your photography

1014

00:42:15,569 --> 00:42:13,420

technique with the microgravity the very

1015

00:42:17,099 --> 00:42:15,579

harsh exposures they're very distant

1016

00:42:18,750 --> 00:42:17,109

objects that you're trying to focus on

1017

00:42:25,559 --> 00:42:18,760

in perhaps the low light conditions

1018

00:42:26,730 --> 00:42:25,569

thank you very much hey thanks Fraser

1019

00:42:28,140 --> 00:42:26,740

and I used to live on vancouver island

1020

00:42:31,140 --> 00:42:28,150

as well it's a beautiful part of the

1021

00:42:33,900 --> 00:42:31,150

world nice part of Canada taking

1022

00:42:37,260 --> 00:42:33,910

pictures up here especially outside is

1023

00:42:38,819 --> 00:42:37,270

quite complex at first we fortunately we

1024

00:42:40,349 --> 00:42:38,829

have really good instructors down on are

1025

00:42:43,549 --> 00:42:40,359

some really good trainers who taught us

1026
00:42:47,039 --> 00:42:43,559
prepared us gave us a lot of good tricks

1027
00:42:49,710 --> 00:42:47,049
the the weird part about it is space is

1028
00:42:53,579 --> 00:42:49,720
so incredibly black so incredibly dark

1029
00:42:56,520 --> 00:42:53,589
it's a bottomless pit of deep black

1030
00:42:58,260 --> 00:42:56,530
almost so deep it almost as a texture

1031
00:42:59,849 --> 00:42:58,270
when you look at it and and when you

1032
00:43:01,859 --> 00:42:59,859
have that in part of your picture and

1033
00:43:04,260 --> 00:43:01,869
then the world reflecting the sunlight

1034
00:43:07,230 --> 00:43:04,270
especially the tops of clouds somewhere

1035
00:43:08,789 --> 00:43:07,240
else it's very difficult at least four

1036
00:43:10,770 --> 00:43:08,799
people aren't professional photographers

1037
00:43:13,079 --> 00:43:10,780
to try and balance that and get a

1038
00:43:15,420 --> 00:43:13,089

picture that that looks good both ways

1039

00:43:17,099 --> 00:43:15,430

and the advantage of being in space

1040

00:43:19,170 --> 00:43:17,109

though of course we have cameras with

1041

00:43:21,510 --> 00:43:19,180

fairly typical lenses on them but we can

1042

00:43:22,380 --> 00:43:21,520

get right out to 400 or 800 millimeter

1043

00:43:24,390 --> 00:43:22,390

lenses

1044

00:43:26,370 --> 00:43:24,400

and they're weightless we don't need a

1045

00:43:28,200 --> 00:43:26,380

tripod so every photographer in the

1046

00:43:30,569 --> 00:43:28,210

world would love to have that much glass

1047

00:43:31,740 --> 00:43:30,579

out in front of their eyes and it's not

1048

00:43:35,009 --> 00:43:31,750

have to hold it up or not have to

1049

00:43:37,289 --> 00:43:35,019

balance it that the best part is even

1050

00:43:39,480 --> 00:43:37,299

though we're not photographers bye-bye

1051
00:43:40,920 --> 00:43:39,490
trade of course we have some really good

1052
00:43:43,950 --> 00:43:40,930
professional photographers who trained

1053
00:43:45,720 --> 00:43:43,960
us and we have a vantage point up here

1054
00:43:47,400 --> 00:43:45,730
perspective that is absolutely

1055
00:43:51,329 --> 00:43:47,410
unparalleled so we do our best to take

1056
00:43:53,009 --> 00:43:51,339
pictures of it Thanks yeah I'm not sure

1057
00:43:55,230 --> 00:43:53,019
there's a bad shot of Earth from space

1058
00:43:57,450 --> 00:43:55,240
station the next question from social

1059
00:44:00,000 --> 00:43:57,460
media is on google+ it's from hip eNOS

1060
00:44:01,859 --> 00:44:00,010
wins and the question is astronaut

1061
00:44:04,079 --> 00:44:01,869
Marshburn forward Hadfield good morning

1062
00:44:13,049 --> 00:44:04,089
and what is that on Chris Hadfield

1063
00:44:14,970 --> 00:44:13,059

forehead well what he has on his

1064

00:44:17,940 --> 00:44:14,980

forehead is actually a temperature probe

1065

00:44:20,069 --> 00:44:17,950

so it said two things being investigated

1066

00:44:21,809 --> 00:44:20,079

here number one is the technology it's

1067

00:44:23,670 --> 00:44:21,819

really nice to be able to merit measure

1068

00:44:26,759 --> 00:44:23,680

body core temperature without having to

1069

00:44:28,349 --> 00:44:26,769

get too invasive and so what that's

1070

00:44:29,670 --> 00:44:28,359

doing is he's got another one on his

1071

00:44:31,200 --> 00:44:29,680

chest this measuring his core

1072

00:44:33,480 --> 00:44:31,210

temperature the reason why they're doing

1073

00:44:34,980 --> 00:44:33,490

that is your body temperature the core

1074

00:44:36,839 --> 00:44:34,990

temperature is a good indicator of how

1075

00:44:40,079 --> 00:44:36,849

your body cycle is moving your circadian

1076
00:44:43,349 --> 00:44:40,089
rhythm we don't have sun sunrises and

1077
00:44:44,999 --> 00:44:43,359
sunsets coming through the window like

1078
00:44:47,009 --> 00:44:45,009
you do on earth we have 16 a day

1079
00:44:48,960 --> 00:44:47,019
actually it's or can really mess up your

1080
00:44:52,589 --> 00:44:48,970
circadian rhythm so they're learning a

1081
00:44:55,529 --> 00:44:52,599
lot about how our body functions through

1082
00:44:57,450 --> 00:44:55,539
this kind of time cycle that's very

1083
00:44:59,430 --> 00:44:57,460
strange and it has a lot of implications

1084
00:45:01,650 --> 00:44:59,440
for people that do night shifts and that

1085
00:45:03,240 --> 00:45:01,660
work extremely long hours and four

1086
00:45:05,700 --> 00:45:03,250
astronauts limiting and living in space

1087
00:45:09,900 --> 00:45:05,710
how we can improve work efficiency and

1088
00:45:13,750 --> 00:45:09,910

improve rest as well great let's take

1089

00:45:19,420 --> 00:45:16,120

my name is Mira Richmond i live in

1090

00:45:22,210 --> 00:45:19,430

bolivar library i am in second grade and

1091

00:45:24,490 --> 00:45:22,220

i am eight the other night at desk I saw

1092

00:45:26,430 --> 00:45:24,500

you guys fly over my house how long do

1093

00:45:29,550 --> 00:45:26,440

you buy stay after in the space station

1094

00:45:32,050 --> 00:45:29,560

how who has the record for the longest

1095

00:45:40,240 --> 00:45:32,060

for staying up there the longest thank

1096

00:45:42,400 --> 00:45:40,250

you oh no well I'm glad you could see us

1097

00:45:45,490 --> 00:45:42,410

hopefully one of us was waving back at

1098

00:45:47,230 --> 00:45:45,500

you we can stay up here about six months

1099

00:45:48,760 --> 00:45:47,240

and that's actually a limitation of our

1100

00:45:51,160 --> 00:45:48,770

spaceship that gets us here and brings

1101

00:45:52,600 --> 00:45:51,170

us back home again it's certified to be

1102

00:45:55,390 --> 00:45:52,610

up here in space for about six months

1103

00:45:57,970 --> 00:45:55,400

humans can stay up longer the longest is

1104

00:46:00,280 --> 00:45:57,980

a doctor Polyakov he's a cosmonaut he

1105

00:46:02,950 --> 00:46:00,290

lived on the MIR Space Station for 14

1106

00:46:05,110 --> 00:46:02,960

months actually so and we're going to

1107

00:46:08,440 --> 00:46:05,120

have a few astronauts and a cosmonaut

1108

00:46:11,440 --> 00:46:08,450

living up here for up to a year here in

1109

00:46:12,760 --> 00:46:11,450

the next couple of years or so so right

1110

00:46:14,860 --> 00:46:12,770

now as far as we can tell there's no

1111

00:46:18,310 --> 00:46:14,870

limit how long humans can stay up here

1112

00:46:19,840 --> 00:46:18,320

as long as we have the machines here to

1113

00:46:22,030 --> 00:46:19,850

keep our bones and our muscles strong

1114

00:46:24,610 --> 00:46:22,040

and have enough food water and such and

1115

00:46:26,440 --> 00:46:24,620

a lot of great work to do such as we're

1116

00:46:27,970 --> 00:46:26,450

doing here right now and of course the

1117

00:46:32,590 --> 00:46:27,980

view of the earth helps to stay up here

1118

00:46:34,120 --> 00:46:32,600

a lot as well great what's going to the

1119

00:46:35,920 --> 00:46:34,130

question from a social media this is

1120

00:46:37,690 --> 00:46:35,930

from facebook Sheila a ver Bush asks

1121

00:46:39,400 --> 00:46:37,700

what was the most influential book you

1122

00:46:48,040 --> 00:46:39,410

read that helped you helped inspire you

1123

00:46:50,530 --> 00:46:48,050

to go to space well I actually was

1124

00:46:52,120 --> 00:46:50,540

inspired to pursue becoming an astronaut

1125

00:46:55,240 --> 00:46:52,130

because of a book I read when I was

1126
00:46:57,160 --> 00:46:55,250
about 13 or 14 years old by an astronaut

1127
00:47:00,430 --> 00:46:57,170
named michael collins who is part of the

1128
00:47:02,770 --> 00:47:00,440
apollo 11 crew and it was called

1129
00:47:06,340 --> 00:47:02,780
carrying the fire and it was a fantastic

1130
00:47:09,340 --> 00:47:06,350
account of his early life as a pilot and

1131
00:47:12,580 --> 00:47:09,350
test pilot and i just really fell in

1132
00:47:15,190 --> 00:47:12,590
love with with that profession because

1133
00:47:17,380 --> 00:47:15,200
of that book and of course what he did

1134
00:47:19,060 --> 00:47:17,390
was one of the most magical things

1135
00:47:20,890 --> 00:47:19,070
that's happened in the course of human

1136
00:47:23,470 --> 00:47:20,900
history as far as I'm concerned with the

1137
00:47:25,570 --> 00:47:23,480
trippy took to the moon with Neil

1138
00:47:27,610 --> 00:47:25,580

Armstrong and Buzz Aldrin so that's what

1139

00:47:29,200 --> 00:47:27,620

inspired me that particular book

1140

00:47:31,420 --> 00:47:29,210

after that I read lots and lots more

1141

00:47:34,080 --> 00:47:31,430

that just inspired me further but that

1142

00:47:36,100 --> 00:47:34,090

was really the one that set it all off

1143

00:47:37,300 --> 00:47:36,110

great answer when we take another

1144

00:47:38,830 --> 00:47:37,310

question from YouTube we have a couple

1145

00:47:42,850 --> 00:47:38,840

more minutes before this portion of

1146

00:47:45,190 --> 00:47:42,860

event concludes hello of the

1147

00:47:47,530 --> 00:47:45,200

International Space Station my name is

1148

00:47:49,390 --> 00:47:47,540

Karina Morales and I'm a student of the

1149

00:47:52,450 --> 00:47:49,400

Neo after institute in Monterrey Mexico

1150

00:47:55,060 --> 00:47:52,460

on behalf of my classmate we will have

1151
00:47:57,310 --> 00:47:55,070
to ask you this all in question how are

1152
00:47:59,830 --> 00:47:57,320
you prepared to face medical emergencies

1153
00:48:02,020 --> 00:47:59,840
in the space station how do you treat

1154
00:48:04,630 --> 00:48:02,030
regular thickness and what do you do in

1155
00:48:13,870 --> 00:48:04,640
case you need surgical attention thank

1156
00:48:15,520 --> 00:48:13,880
you very much so we can actually handle

1157
00:48:17,290 --> 00:48:15,530
some pretty big emergencies up here

1158
00:48:19,720 --> 00:48:17,300
medical emergencies first of all we

1159
00:48:22,210 --> 00:48:19,730
always have to crew medical officers on

1160
00:48:24,460 --> 00:48:22,220
board it could have any background but

1161
00:48:26,470 --> 00:48:24,470
they're trained to apply first aid or

1162
00:48:28,660 --> 00:48:26,480
take care of emergencies that can keep

1163
00:48:30,730 --> 00:48:28,670

somebody alive for up to 24 hours I

1164

00:48:32,440 --> 00:48:30,740

happen to be a doctor but there's no

1165

00:48:34,630 --> 00:48:32,450

requirement to have a doctor up here all

1166

00:48:36,520 --> 00:48:34,640

the time but right under our feet here

1167

00:48:38,500 --> 00:48:36,530

are some medical kits and they are

1168

00:48:41,560 --> 00:48:38,510

packed full of everything you need from

1169

00:48:45,310 --> 00:48:41,570

stay and aspirin to an IV if you got

1170

00:48:47,110 --> 00:48:45,320

really sick the big answer though is if

1171

00:48:48,880 --> 00:48:47,120

we ran into a big problem and that's a

1172

00:48:50,380 --> 00:48:48,890

defibrillator we hope you never have to

1173

00:48:52,450 --> 00:48:50,390

actually use that but we know how to use

1174

00:48:54,850 --> 00:48:52,460

it that's the emergency kick the the big

1175

00:48:57,550 --> 00:48:54,860

red get the big answer though is our

1176

00:48:59,230 --> 00:48:57,560

Soyuz is our ambulance and we would hop

1177

00:49:01,110 --> 00:48:59,240

in the soy use and bring somebody home

1178

00:49:04,150 --> 00:49:01,120

if we thought that they were going to be

1179

00:49:07,150 --> 00:49:04,160

have a real big problem or even die from

1180

00:49:08,800 --> 00:49:07,160

a medical problem up here not to mention

1181

00:49:10,510 --> 00:49:08,810

all the doctors on the ground who have

1182

00:49:12,160 --> 00:49:10,520

not only been preparing us for preparing

1183

00:49:14,050 --> 00:49:12,170

this equipment and the procedures and

1184

00:49:15,580 --> 00:49:14,060

the techniques but also would be given

1185

00:49:17,800 --> 00:49:15,590

us advice real time if something

1186

00:49:19,240 --> 00:49:17,810

happened space motion sickness is really

1187

00:49:20,800 --> 00:49:19,250

common the about three out of five

1188

00:49:22,360 --> 00:49:20,810

astronauts get it we've got some

1189

00:49:25,050 --> 00:49:22,370

medicines to take care of that so it's

1190

00:49:27,880 --> 00:49:25,060

really not much of an impact anymore

1191

00:49:29,230 --> 00:49:27,890

thank you that concludes our portion we

1192

00:49:30,880 --> 00:49:29,240

really appreciate you guys from joining

1193

00:49:32,560 --> 00:49:30,890

us on your National Space Station please

1194

00:49:33,820 --> 00:49:32,570

visits please stay with us for more

1195

00:49:41,260 --> 00:49:33,830

questions from astronauts here on the

1196

00:49:48,380 --> 00:49:44,180

station this is Houston ACR thank you

1197

00:49:51,020 --> 00:49:48,390

that concludes the event Thank You

1198

00:49:54,349 --> 00:49:51,030

Google+ Hangout participants and NASA

1199

00:49:56,299 --> 00:49:54,359

social media guests next question were

1200

00:49:58,640 --> 00:49:56,309

and a half for Ron and Nicole is from

1201

00:49:59,930 --> 00:49:58,650

google plus it's a lauren ward she asked

1202

00:50:01,609 --> 00:49:59,940

when you guys were on Space Station how

1203

00:50:06,680 --> 00:50:01,619

long did you guys talk how often do you

1204

00:50:10,160 --> 00:50:06,690

talk to your families um I talked every

1205

00:50:12,680 --> 00:50:10,170

day to my family on the we have an IP

1206

00:50:14,660 --> 00:50:12,690

phone up there internet phone that we

1207

00:50:16,609 --> 00:50:14,670

can use as long as we have the right

1208

00:50:19,520 --> 00:50:16,619

communications coverage which is pretty

1209

00:50:21,410 --> 00:50:19,530

much most of the day but then once a

1210

00:50:23,420 --> 00:50:21,420

week we would have video conferencing as

1211

00:50:28,400 --> 00:50:23,430

well so it was really nice to be able to

1212

00:50:31,010 --> 00:50:28,410

stay in touch great and I did the same

1213

00:50:34,339 --> 00:50:31,020

thing it was it was great the in fact I

1214

00:50:35,690 --> 00:50:34,349

think we feel pretty I don't have

1215

00:50:37,910 --> 00:50:35,700

privileges the word but certainly

1216

00:50:41,089 --> 00:50:37,920

thankful that we have the kind of

1217

00:50:45,230 --> 00:50:41,099

communication that we do now and we I

1218

00:50:47,000 --> 00:50:45,240

think on arm just in general you know we

1219

00:50:48,829 --> 00:50:47,010

have a lot better communication I think

1220

00:50:51,200 --> 00:50:48,839

with our families from a space station

1221

00:50:52,910 --> 00:50:51,210

down to earth and most of the people

1222

00:50:56,480 --> 00:50:52,920

that are on military deployments around

1223

00:50:57,950 --> 00:50:56,490

the world so it's not so bad what one

1224

00:50:59,690 --> 00:50:57,960

thing that I have learned about that too

1225

00:51:00,920 --> 00:50:59,700

is if you're going to call somebody from

1226

00:51:02,359 --> 00:51:00,930

space you need to let them know that

1227

00:51:05,120 --> 00:51:02,369

that's a possibility before you do that

1228

00:51:06,349 --> 00:51:05,130

because there's twosome really surprised

1229

00:51:09,380 --> 00:51:06,359

people that have answered the phone

1230

00:51:11,000 --> 00:51:09,390

gotten phone calls from space and didn't

1231

00:51:15,980 --> 00:51:11,010

believe that they were actually doing it

1232

00:51:19,940 --> 00:51:15,990

I can imagine let's take a question from

1233

00:51:23,450 --> 00:51:19,950

YouTube hi this is francesca from

1234

00:51:25,130 --> 00:51:23,460

chillen South America there is a common

1235

00:51:28,010 --> 00:51:25,140

belief that you can see the Great Wall

1236

00:51:29,930 --> 00:51:28,020

of China from outer space I did a little

1237

00:51:32,839 --> 00:51:29,940

research and I realized that's not true

1238

00:51:36,410 --> 00:51:32,849

so my question is if you can really see

1239

00:51:42,170 --> 00:51:36,420

any human make instruction from the

1240

00:51:43,609 --> 00:51:42,180

space station thank you well I think I'm

1241

00:51:45,140 --> 00:51:43,619

gonna let Ron talk about something he

1242

00:51:46,519 --> 00:51:45,150

saw well while he was up there too

1243

00:51:48,109 --> 00:51:46,529

because that was pretty cool and he got

1244

00:51:50,599 --> 00:51:48,119

a great picture of it and I think you

1245

00:51:52,280 --> 00:51:50,609

could see it from on orbit as well but I

1246

00:51:55,490 --> 00:51:52,290

think most of what

1247

00:51:57,350 --> 00:51:55,500

I you know kind of man made things that

1248

00:51:59,450 --> 00:51:57,360

you see from space just with the naked

1249

00:52:03,230 --> 00:51:59,460

eye without using a 400 or an 800

1250

00:52:04,820 --> 00:52:03,240

millimeter lens on your camera is kind

1251
00:52:07,730 --> 00:52:04,830
of impacts we've had on the earth where

1252
00:52:10,490 --> 00:52:07,740
where land has been cleared or farming

1253
00:52:11,870 --> 00:52:10,500
has been done or maybe there are

1254
00:52:14,090 --> 00:52:11,880
different things going on with the lakes

1255
00:52:16,760 --> 00:52:14,100
you know salt lakes you can see very

1256
00:52:19,790 --> 00:52:16,770
very clearly and that kind of thing but

1257
00:52:22,070 --> 00:52:19,800
as far as the Great Wall of China goes I

1258
00:52:24,560 --> 00:52:22,080
was not able to see that everybody tries

1259
00:52:26,450 --> 00:52:24,570
to look for it because of the this idea

1260
00:52:31,430 --> 00:52:26,460
out there but you can get really great

1261
00:52:48,100 --> 00:52:31,440
pictures with a camera thanks let's take

1262
00:52:55,100 --> 00:52:51,380
so how does this solar solar storms if I

1263
00:52:57,140 --> 00:52:55,110

communication on the space station so

1264

00:52:59,990 --> 00:52:57,150

that is a big concern and it's something

1265

00:53:01,490 --> 00:53:00,000

that we watch really closely not only

1266

00:53:03,230 --> 00:53:01,500

for the effect that it could have on

1267

00:53:06,800 --> 00:53:03,240

communications but on the radiation on

1268

00:53:08,150 --> 00:53:06,810

the crew um and so if we think there's

1269

00:53:10,160 --> 00:53:08,160

going to be a big event we might take

1270

00:53:14,090 --> 00:53:10,170

some precautions on the space station oh

1271

00:53:16,390 --> 00:53:14,100

and it is a concern for communications

1272

00:53:19,040 --> 00:53:16,400

as well I don't think we've had any

1273

00:53:20,660 --> 00:53:19,050

significant outages because of that but

1274

00:53:23,030 --> 00:53:20,670

it's always a possibility and always

1275

00:53:25,430 --> 00:53:23,040

something that we're looking at and if I

1276

00:53:26,720 --> 00:53:25,440

could just go back to Nicole the

1277

00:53:30,710 --> 00:53:26,730

question that Nicole acted before

1278

00:53:32,480 --> 00:53:30,720

because what she was alluding to is you

1279

00:53:34,520 --> 00:53:32,490

know can you see man-made structures

1280

00:53:36,410 --> 00:53:34,530

from space and the answers is definitely

1281

00:53:38,360 --> 00:53:36,420

yes and I was always one of these

1282

00:53:40,250 --> 00:53:38,370

astronauts that says you couldn't you

1283

00:53:42,110 --> 00:53:40,260

can't see any borders from space but

1284

00:53:44,450 --> 00:53:42,120

that's not true because actually I saw

1285

00:53:46,490 --> 00:53:44,460

the man-made illuminated border between

1286

00:53:47,930 --> 00:53:46,500

India and Pakistan when I was up there

1287

00:53:50,690 --> 00:53:47,940

and it was really had a profound effect

1288

00:53:54,140 --> 00:53:50,700

on me seeing that from space and seeing

1289

00:53:56,240 --> 00:53:54,150

that that that you know man-made change

1290

00:54:00,320 --> 00:53:56,250

to the landscape and as as Nicole said

1291

00:54:02,210 --> 00:54:00,330

you know cutting a forest and human

1292

00:54:05,000 --> 00:54:02,220

impact basically is extremely obvious

1293

00:54:06,200 --> 00:54:05,010

from space and it shows up very very

1294

00:54:08,660 --> 00:54:06,210

distinctly of

1295

00:54:11,300 --> 00:54:08,670

throughout the whole world and so it's a

1296

00:54:12,829 --> 00:54:11,310

something that gives you the gives you

1297

00:54:14,930 --> 00:54:12,839

really the impression and really the

1298

00:54:16,880 --> 00:54:14,940

understanding that we're all

1299

00:54:18,020 --> 00:54:16,890

interconnected and what happens on one

1300

00:54:20,900 --> 00:54:18,030

side of the planet affects the other

1301
00:54:24,560 --> 00:54:20,910
side of the planet it's really kind of

1302
00:54:26,089 --> 00:54:24,570
sobering to see that from space right we

1303
00:54:27,349 --> 00:54:26,099
have about five more minutes left i'll

1304
00:54:30,770 --> 00:54:27,359
try to get a few more questions and

1305
00:54:32,720 --> 00:54:30,780
let's do another one from youtube hi

1306
00:54:34,310 --> 00:54:32,730
this is chris from Pittsburgh my

1307
00:54:35,810 --> 00:54:34,320
question is in regards to the

1308
00:54:37,490 --> 00:54:35,820
construction of future space stations

1309
00:54:39,530 --> 00:54:37,500
how do you feel that the ISS could be

1310
00:54:47,599 --> 00:54:39,540
improved to maximize the scientific

1311
00:54:49,609 --> 00:54:47,609
output thanks I'll try on an anime be on

1312
00:54:51,290 --> 00:54:49,619
a small scale because i think the you

1313
00:54:53,930 --> 00:54:51,300

know the International Space Station is

1314

00:54:56,660 --> 00:54:53,940

a pretty impressive facility the way it

1315

00:54:59,450 --> 00:54:56,670

is not only from the structure itself

1316

00:55:00,380 --> 00:54:59,460

but that kind of the relationships in

1317

00:55:03,109 --> 00:55:00,390

the building we've done between

1318

00:55:05,140 --> 00:55:03,119

different countries to make it happen so

1319

00:55:07,579 --> 00:55:05,150

I hope that you know in the future for

1320

00:55:09,710 --> 00:55:07,589

for new facilities will maintain that

1321

00:55:12,740 --> 00:55:09,720

those kinds of relationships and have it

1322

00:55:13,970 --> 00:55:12,750

be you know a global project but I think

1323

00:55:16,070 --> 00:55:13,980

you know one of the things that people

1324

00:55:17,750 --> 00:55:16,080

are looking at scientists now and I

1325

00:55:19,849 --> 00:55:17,760

think I think astronauts are interested

1326

00:55:21,500 --> 00:55:19,859

in as well and I think we need to do it

1327

00:55:23,359 --> 00:55:21,510

to further advance the kind of science

1328

00:55:27,410 --> 00:55:23,369

we do on board these orbiting

1329

00:55:31,570 --> 00:55:27,420

laboratories is provide facilities in a

1330

00:55:34,040 --> 00:55:31,580

way that that the astronauts become more

1331

00:55:35,930 --> 00:55:34,050

involved with the actual science where

1332

00:55:38,150 --> 00:55:35,940

there's a more of an more of an active

1333

00:55:40,520 --> 00:55:38,160

interaction with the payloads and the

1334

00:55:42,440 --> 00:55:40,530

science itself so that we're not so

1335

00:55:44,810 --> 00:55:42,450

reliant on having to send samples back

1336

00:55:46,280 --> 00:55:44,820

to the earth for for the scientists on

1337

00:55:50,180 --> 00:55:46,290

the ground to look at it but that we can

1338

00:55:52,700 --> 00:55:50,190

have actual you know kind of cycling of

1339

00:55:55,310 --> 00:55:52,710

the science and the payloads up there in

1340

00:55:57,410 --> 00:55:55,320

a way that we're seeing the results on

1341

00:56:00,410 --> 00:55:57,420

orbit and being able to communicate that

1342

00:56:02,450 --> 00:56:00,420

to ground and then one of the other ways

1343

00:56:04,010 --> 00:56:02,460

that's a very useful thing is that if

1344

00:56:07,490 --> 00:56:04,020

things aren't going quite right as

1345

00:56:09,770 --> 00:56:07,500

planned with an experiment that the crew

1346

00:56:11,540 --> 00:56:09,780

member could be more involved with maybe

1347

00:56:14,380 --> 00:56:11,550

taking a different path that could lead

1348

00:56:16,700 --> 00:56:14,390

to you know the same or a better can

1349

00:56:20,059 --> 00:56:16,710

result that the scientists were looking

1350

00:56:22,489 --> 00:56:20,069

for or you know just be able to help

1351
00:56:24,469 --> 00:56:22,499
things in a more efficient way and I

1352
00:56:26,239 --> 00:56:24,479
think I think both the people that build

1353
00:56:27,380 --> 00:56:26,249
space stations and the laboratories and

1354
00:56:28,999 --> 00:56:27,390
the scientists on the ground that

1355
00:56:31,249 --> 00:56:29,009
developed the research are looking at

1356
00:56:34,099 --> 00:56:31,259
how we make that a more interactive

1357
00:56:35,539 --> 00:56:34,109
experience experience on on orbit and

1358
00:56:39,259 --> 00:56:35,549
will certainly need to do that as we get

1359
00:56:40,819 --> 00:56:39,269
further away from Earth thanks to Cole

1360
00:56:44,930 --> 00:56:40,829
let's try to take a question again from

1361
00:56:48,469 --> 00:56:44,940
University High School in orlando I'm

1362
00:56:50,749 --> 00:56:48,479
Megan Levin from the UHS girls robotics

1363
00:56:53,269 --> 00:56:50,759

teams and our question is how do robots

1364

00:56:57,589 --> 00:56:53,279

and robotics influence life on the space

1365

00:56:59,509 --> 00:56:57,599

station well we we have a great deal of

1366

00:57:02,959 --> 00:56:59,519

robotics on the space station we have

1367

00:57:04,880 --> 00:57:02,969

robotic arms outside that initially were

1368

00:57:06,380 --> 00:57:04,890

used to help construct the International

1369

00:57:09,049 --> 00:57:06,390

Space Station but now we use it for

1370

00:57:11,779 --> 00:57:09,059

experiments we actually have several

1371

00:57:15,799 --> 00:57:11,789

arms that we use for experiments or for

1372

00:57:18,829 --> 00:57:15,809

maintenance repairs we have robotics

1373

00:57:21,199 --> 00:57:18,839

inside we have these things called

1374

00:57:23,569 --> 00:57:21,209

spheres which are these flying robots

1375

00:57:26,660 --> 00:57:23,579

that can fly in formation with each

1376

00:57:29,749 --> 00:57:26,670

other and actually schools use that in

1377

00:57:33,160 --> 00:57:29,759

their robotics competitions to program

1378

00:57:35,239 --> 00:57:33,170

different flight paths and different

1379

00:57:37,249 --> 00:57:35,249

tasks that the robots to do we have

1380

00:57:40,489 --> 00:57:37,259

Robonaut which is a humanoid-looking

1381

00:57:43,640 --> 00:57:40,499

robot robot up there and what the hope

1382

00:57:45,199 --> 00:57:43,650

is for Roman odd is that someday instead

1383

00:57:47,180 --> 00:57:45,209

of sending astronauts out into the

1384

00:57:49,359 --> 00:57:47,190

vacuum of space on a spacewalk we can

1385

00:57:53,900 --> 00:57:49,369

send Robonaut to do some of the repairs

1386

00:57:57,289 --> 00:57:53,910

so we're robotics is a really critical

1387

00:57:59,930 --> 00:57:57,299

aspect of space exploration and it's

1388

00:58:01,789 --> 00:57:59,940

certainly a very important part of the

1389

00:58:02,989 --> 00:58:01,799

space station and we couldn't do what we

1390

00:58:05,059 --> 00:58:02,999

do on the space station without

1391

00:58:09,049 --> 00:58:05,069

significant the significant robotics

1392

00:58:12,190 --> 00:58:09,059

that we have on board but um let's take

1393

00:58:16,839 --> 00:58:14,589

I where the life science class I grew

1394

00:58:19,329 --> 00:58:16,849

school in tyrone pennsylvania in the

1395

00:58:22,569 --> 00:58:19,339

united states our question for you is

1396

00:58:24,520 --> 00:58:22,579

what does it feel like to walk on land

1397

00:58:31,540 --> 00:58:24,530

and breathe the air when you return to

1398

00:58:33,490 --> 00:58:31,550

Earth have another day it feels awesome

1399

00:58:36,730 --> 00:58:33,500

you know it's a Ron mentioned earlier

1400

00:58:38,740 --> 00:58:36,740

about how you know how just impressive

1401

00:58:41,040 --> 00:58:38,750

our bodies are and how quickly our brain

1402

00:58:43,420 --> 00:58:41,050

and our body figures out you know how to

1403

00:58:45,250 --> 00:58:43,430

operate in the environment it's in and

1404

00:58:47,200 --> 00:58:45,260

that's both true from you know that

1405

00:58:49,480 --> 00:58:47,210

going to space standpoint as well as as

1406

00:58:51,760 --> 00:58:49,490

coming back and I can tell you there's

1407

00:58:54,010 --> 00:58:51,770

you know there's something very special

1408

00:58:55,720 --> 00:58:54,020

about when your spacecraft opens up and

1409

00:58:58,780 --> 00:58:55,730

you get that you know that kind of waft

1410

00:59:01,089 --> 00:58:58,790

of fresh air again for me on my first

1411

00:59:03,250 --> 00:59:01,099

landing it was you know kool Kris day in

1412

00:59:05,829 --> 00:59:03,260

November in Florida just you know that

1413

00:59:10,180 --> 00:59:05,839

you know those smells of Earth coming

1414

00:59:12,520 --> 00:59:10,190

into the spacecraft and for a few days

1415

00:59:13,750 --> 00:59:12,530

you certainly feel really heavy once

1416

00:59:16,150 --> 00:59:13,760

you're back on earth you know you're

1417

00:59:17,980 --> 00:59:16,160

walking around and again your body's

1418

00:59:20,140 --> 00:59:17,990

figuring out just how to adapt again and

1419

00:59:21,490 --> 00:59:20,150

and you feel like you weigh about 500

1420

00:59:23,050 --> 00:59:21,500

pounds and you're every time you get up

1421

00:59:24,579 --> 00:59:23,060

your tab and I think okay just think

1422

00:59:27,359 --> 00:59:24,589

about that biggest squat you've ever

1423

00:59:31,089 --> 00:59:27,369

done on uh on a machine at the gym and

1424

00:59:32,470 --> 00:59:31,099

and then it just magically happens and

1425

00:59:34,270 --> 00:59:32,480

you're walking around like it never

1426

00:59:36,430 --> 00:59:34,280

happened before and it's it's a really

1427

00:59:39,220 --> 00:59:36,440

cool thing yeah and I if I could just

1428

00:59:41,650 --> 00:59:39,230

jump in there it kind of that redefines

1429

00:59:43,390 --> 00:59:41,660

your definition of home and on my second

1430

00:59:45,609 --> 00:59:43,400

spaceflight I landed in a capsule in

1431

00:59:47,140 --> 00:59:45,619

Kazakhstan and when we when we hit the

1432

00:59:48,910 --> 00:59:47,150

ground that the capsules are rolled over

1433

00:59:50,440 --> 00:59:48,920

on its side so that I was on the bottom

1434

00:59:52,660 --> 00:59:50,450

and so right next to my face was a

1435

00:59:54,970 --> 00:59:52,670

window that was facing into the dirt and

1436

00:59:57,339 --> 00:59:54,980

I remember looking out that window and

1437

00:59:59,140 --> 00:59:57,349

seeing just some grass and a little

1438

01:00:01,690 --> 00:59:59,150

flower growing out of the ground and

1439

01:00:03,099 --> 01:00:01,700

thinking we're home I can't believe it's

1440

01:00:04,630 --> 01:00:03,109

just as this is so wonderful we're home

1441

01:00:06,849 --> 01:00:04,640

even though we were in Kazakhstan your

1442

01:00:09,220 --> 01:00:06,859

definition of home changes home home

1443

01:00:12,790 --> 01:00:09,230

became earth so it was a really

1444

01:00:15,160 --> 01:00:12,800

interesting experience okay i want to

1445

01:00:16,540 --> 01:00:15,170

ask I know we're out of time I want to

1446

01:00:18,910 --> 01:00:16,550

ask two more questions before we

1447

01:00:21,460 --> 01:00:18,920

conclude this one's for Ron on social

1448

01:00:23,200 --> 01:00:21,470

media at a hundred percent Susan on

1449

01:00:24,579 --> 01:00:23,210

twitter asks if you're going there up

1450

01:00:26,080 --> 01:00:24,589

there in Russian spacecraft which

1451

01:00:29,950 --> 01:00:26,090

language languages do you

1452

01:00:32,740 --> 01:00:29,960

communicate producing clinician Russian

1453

01:00:33,790 --> 01:00:32,750

certainly so if you're writing or if

1454

01:00:36,160 --> 01:00:33,800

you're writing in a Russian spacecraft

1455

01:00:38,560 --> 01:00:36,170

then you're a part of the Russian crew

1456

01:00:40,030 --> 01:00:38,570

on that spacecraft and the language is

1457

01:00:41,800 --> 01:00:40,040

Russian once you get to the

1458

01:00:43,540 --> 01:00:41,810

International Space Station the official

1459

01:00:45,730 --> 01:00:43,550

language is English but we do speak

1460

01:00:49,690 --> 01:00:45,740

Russian on board to if for instance

1461

01:00:51,130 --> 01:00:49,700

talking to the controller in Moscow so

1462

01:00:53,620 --> 01:00:51,140

we're an international crew we need to

1463

01:00:56,950 --> 01:00:53,630

we need to be able to communicate in

1464

01:00:58,600 --> 01:00:56,960

each other's languages great one more

1465

01:01:05,560 --> 01:00:58,610

question and this is gonna be for both

1466

01:01:08,230 --> 01:01:05,570

of you it's from YouTube I'm crystal oh

1467

01:01:11,680 --> 01:01:08,240

I'm raggy and we're from Union High

1468

01:01:13,420 --> 01:01:11,690

School in Iowa our question is what was

1469

01:01:14,920 --> 01:01:13,430

their motive for taking all the training

1470

01:01:16,960 --> 01:01:14,930

and risking your life to go into space

1471

01:01:22,660 --> 01:01:16,970

for the advancements of science thank

1472

01:01:24,520 --> 01:01:22,670

you well I Braun can speak very

1473

01:01:26,170 --> 01:01:24,530

eloquently about this I'm not I'm not so

1474

01:01:27,850 --> 01:01:26,180

good at it but I have to tell you I

1475

01:01:30,850 --> 01:01:27,860

think that you know there's certainly

1476

01:01:33,480 --> 01:01:30,860

the you know the adventure the

1477

01:01:35,350 --> 01:01:33,490

exploration side of it but I think that

1478

01:01:37,600 --> 01:01:35,360

you know something that was said earlier

1479

01:01:40,810 --> 01:01:37,610

about what's you know what really and

1480

01:01:42,790 --> 01:01:40,820

truly is going on up there what what

1481

01:01:47,380 --> 01:01:42,800

we're doing for life both here on the

1482

01:01:50,470 --> 01:01:47,390

planet and and helping us explore beyond

1483

01:01:52,600 --> 01:01:50,480

low-earth orbit is a very worthy goal

1484

01:01:54,760 --> 01:01:52,610

and when we're doing that as

1485

01:01:58,540 --> 01:01:54,770

international community because we know

1486

01:02:01,630 --> 01:01:58,550

that there are benefits for how we live

1487

01:02:03,820 --> 01:02:01,640

and survive here on earth and how we

1488

01:02:07,240 --> 01:02:03,830

learn more about you know why we're here

1489

01:02:09,280 --> 01:02:07,250

and how we're here and all of that I

1490

01:02:13,780 --> 01:02:09,290

think that you know they're there are

1491

01:02:16,630 --> 01:02:13,790

just kind of an eight reasons for doing

1492

01:02:18,220 --> 01:02:16,640

it and it just it's just one of those

1493

01:02:20,650 --> 01:02:18,230

things I think if you do it it just

1494

01:02:22,570 --> 01:02:20,660

makes sense to you and you almost you

1495

01:02:24,550 --> 01:02:22,580

almost really can't like nail down that

1496

01:02:26,560 --> 01:02:24,560

exact that exact reason other than

1497

01:02:28,600 --> 01:02:26,570

knowing there is this kind of greater

1498

01:02:30,970 --> 01:02:28,610

good that comes from doing these kinds

1499

01:02:32,650 --> 01:02:30,980

of things so Nicole I have to disagree

1500

01:02:34,240 --> 01:02:32,660

with you I think that was very eloquent

1501

01:02:37,769 --> 01:02:34,250

and so much so that I don't need to add

1502

01:02:43,630 --> 01:02:41,859

thank you astronauts Ron Garan and

1503

01:02:45,370 --> 01:02:43,640

Nicole stock for joining us also want to

1504

01:02:48,250 --> 01:02:45,380

thank the two NASA Explorer schools and

1505

01:02:50,289 --> 01:02:48,260

Fred that concludes today's Google Plus

1506

01:02:51,880 --> 01:02:50,299

hangout for information about the space

1507

01:02:54,010 --> 01:02:51,890

station research in low-earth orbit

1508

01:02:56,700 --> 01:02:54,020

NASA's commercial space programs in the

1509

01:03:01,029 --> 01:02:56,710

future of American space flight visit w

1510

01:03:02,200 --> 01:03:01,039

WN AC gov / exploration NASA will

1511

01:03:03,960 --> 01:03:02,210

continue to host Hangouts with

1512

01:03:06,370 --> 01:03:03,970

astronauts on the ground and its base

1513

01:03:08,500 --> 01:03:06,380

scientists engineers and managers on the

1514

01:03:10,089 --> 01:03:08,510

agency's missions and milestones to

1515

01:03:13,779 --> 01:03:10,099

learn more about upcoming events follow

1516

01:03:15,309 --> 01:03:13,789

us at [google.com](https://www.google.com) / + NASA thank you for

1517

01:03:18,430 --> 01:03:15,319

your questions and thank you for joining

1518

01:03:25,329 --> 01:03:18,440

us goodbye thanks everyone great