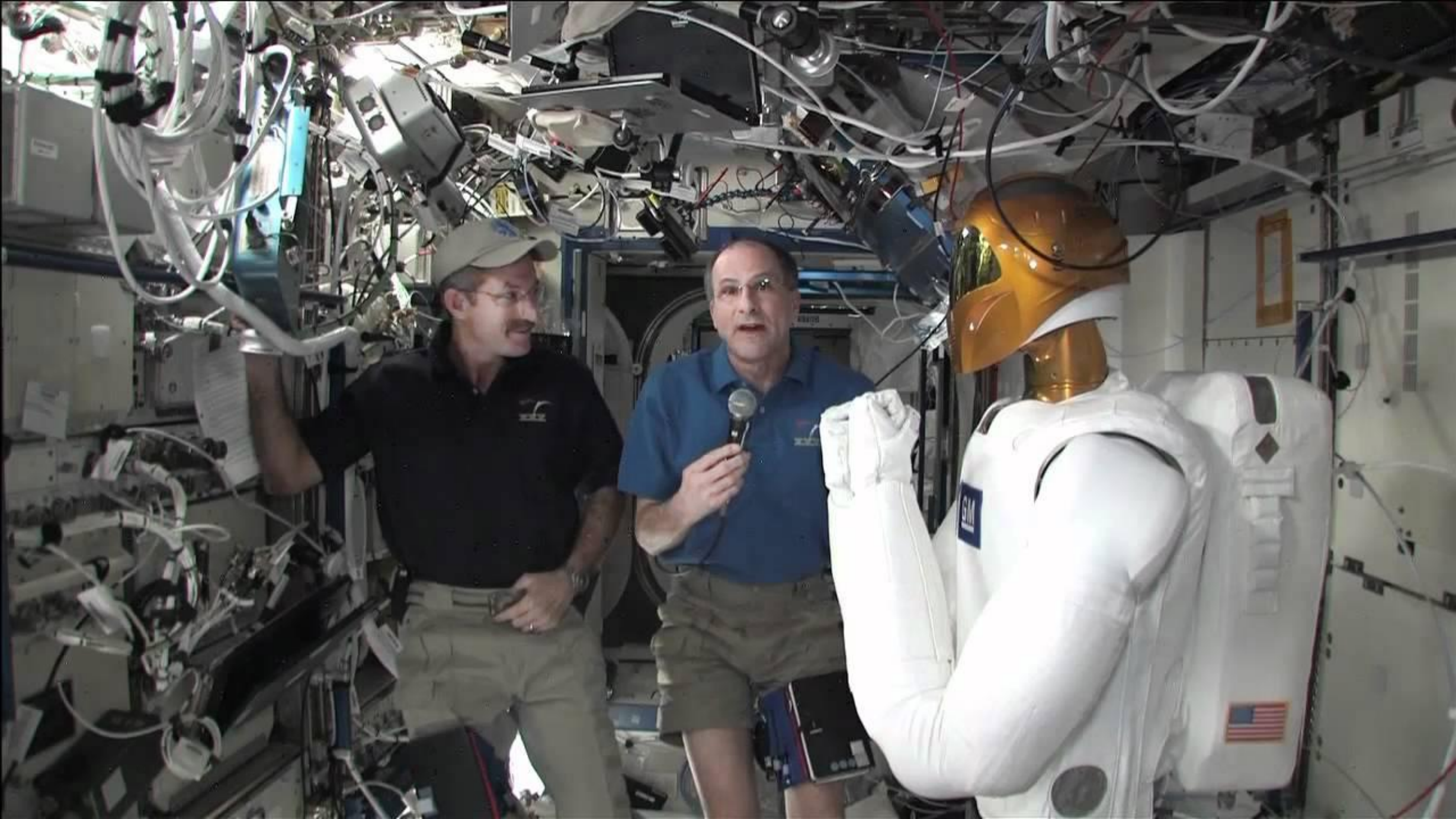

1
00:00:05,110 --> 00:00:03,350
station houston this is uh stations

2
00:00:10,070 --> 00:00:05,120
houston space to ground two you ready

3
00:00:14,629 --> 00:00:13,350
we are ready for the event

4
00:00:16,310 --> 00:00:14,639
great middle school this is mission

5
00:00:18,390 --> 00:00:16,320
control houston please call the station

6
00:00:38,229 --> 00:00:18,400
for a voice

7
00:00:38,239 --> 00:00:51,750
very nice

8
00:00:58,310 --> 00:00:53,830
station this is creighton middle school

9
00:01:05,830 --> 00:01:00,229
middle school this is space station we

10
00:01:11,350 --> 00:01:08,710
good morning captain dan burbank and

11
00:01:13,590 --> 00:01:11,360
flight engineer don pettit i'm ann

12
00:01:16,149 --> 00:01:13,600
carboni 7th grade team leader at

13
00:01:18,469 --> 00:01:16,159

creighton and nasa volunteer solar

14
00:01:20,789 --> 00:01:18,479
system educator on behalf of the

15
00:01:23,429 --> 00:01:20,799
students and faculty at creighton middle

16
00:01:26,149 --> 00:01:23,439
school richland district 1 in columbia

17
00:01:28,070 --> 00:01:26,159
south carolina i'd like to welcome you

18
00:01:30,469 --> 00:01:28,080
and thank you very much for taking the

19
00:01:34,069 --> 00:01:30,479
time to answer our questions today and

20
00:01:38,069 --> 00:01:36,069
hello dan

21
00:01:40,870 --> 00:01:38,079
my name is alexis

22
00:01:42,230 --> 00:01:40,880
and here is my question what obstacles

23
00:01:46,870 --> 00:01:42,240
did you go through to become an

24
00:01:50,230 --> 00:01:48,789
hi lexi welcome aboard the international

25
00:01:52,469 --> 00:01:50,240
space station to you and to all your

26
00:01:55,109 --> 00:01:52,479
classmates and the teachers and staff

27
00:01:57,350 --> 00:01:55,119
from creighton middle school i think i

28
00:01:59,590 --> 00:01:57,360
like many of the other astronauts and

29
00:02:01,190 --> 00:01:59,600
cosmonauts in the space program probably

30
00:02:03,190 --> 00:02:01,200
went through a number of obstacles to

31
00:02:05,109 --> 00:02:03,200
get here number one i think was probably

32
00:02:07,429 --> 00:02:05,119
a personal one and that is

33
00:02:09,270 --> 00:02:07,439
i had to have enough self-confidence

34
00:02:10,949 --> 00:02:09,280
when i was younger to believe that this

35
00:02:12,550 --> 00:02:10,959
was something that i could do

36
00:02:14,070 --> 00:02:12,560
and in my case

37
00:02:16,229 --> 00:02:14,080
it wasn't until i was an adult and

38
00:02:18,150 --> 00:02:16,239

already a coast guard pilot and engineer

39
00:02:19,910 --> 00:02:18,160
that i applied to nasa and i was one of

40
00:02:21,830 --> 00:02:19,920
many many people that applied to to

41
00:02:23,670 --> 00:02:21,840
become an astronaut and the first time i

42
00:02:25,990 --> 00:02:23,680
applied i was not selected the second

43
00:02:28,630 --> 00:02:26,000
time i was also not selected and finally

44
00:02:30,309 --> 00:02:28,640
on the third time i was selected so

45
00:02:32,550 --> 00:02:30,319
persistence

46
00:02:33,990 --> 00:02:32,560
the lesson to just keep trying even if

47
00:02:43,670 --> 00:02:34,000
you don't succeed the first time was

48
00:02:48,550 --> 00:02:46,150
hello don my question

49
00:02:50,070 --> 00:02:48,560
my name is christina and my question is

50
00:02:56,229 --> 00:02:50,080
how do you stay in contact with your

51
00:03:00,229 --> 00:02:58,710
we could stay in contact with our family

52
00:03:03,350 --> 00:03:00,239
by using

53
00:03:04,869 --> 00:03:03,360
s-band and ku band radios that we have

54
00:03:07,430 --> 00:03:04,879
on space station these are different

55
00:03:11,509 --> 00:03:07,440
parts of the electromagnetic spectrum

56
00:03:14,470 --> 00:03:11,519
and we use these radios to

57
00:03:15,910 --> 00:03:14,480
talk to our families in private family

58
00:03:19,190 --> 00:03:15,920
conferences

59
00:03:20,550 --> 00:03:19,200
and we actually have video as well so

60
00:03:30,390 --> 00:03:20,560
i can see

61
00:03:34,470 --> 00:03:32,390
my name is meredith quarles and i'd like

62
00:03:41,030 --> 00:03:34,480
to know what is the most surprising

63
00:03:43,990 --> 00:03:42,949

that's a really hard question to answer

64
00:03:45,589 --> 00:03:44,000
when you live

65
00:03:47,750 --> 00:03:45,599
on the international space station live

66
00:03:49,670 --> 00:03:47,760
in space um every day there's something

67
00:03:52,390 --> 00:03:49,680
new and surprising that you see probably

68
00:03:55,110 --> 00:03:52,400
for me the most surprising thing i saw

69
00:03:57,830 --> 00:03:55,120
was um on december 20th uh shortly

70
00:04:01,270 --> 00:03:57,840
before christmas um it was nighttime and

71
00:04:02,470 --> 00:04:01,280
space station was flying over

72
00:04:08,149 --> 00:04:02,480
australia

73
00:04:12,390 --> 00:04:09,750
the sun was just about ready to rise and

74
00:04:14,070 --> 00:04:12,400
before it did i saw a bright streak of

75
00:04:16,069 --> 00:04:14,080
light that extended from where the sun

76
00:04:18,550 --> 00:04:16,079
was about to come over the horizon all

77
00:04:20,310 --> 00:04:18,560
the way up as far as i could see and i

78
00:04:23,110 --> 00:04:20,320
didn't know what could have caused that

79
00:04:25,110 --> 00:04:23,120
and i've i've seen lots and lots of

80
00:04:27,270 --> 00:04:25,120
stars from space i've seen lots of night

81
00:04:28,710 --> 00:04:27,280
time lots of daytime views of the earth

82
00:04:30,390 --> 00:04:28,720
and this was something entirely new and

83
00:04:32,390 --> 00:04:30,400
it turns out it was a big surprise to a

84
00:04:34,790 --> 00:04:32,400
lot of people and it was a comet a brand

85
00:04:36,950 --> 00:04:34,800
new comet that had just survived a close

86
00:04:38,710 --> 00:04:36,960
encounter with the sun and was on its

87
00:04:41,189 --> 00:04:38,720
way back out to the outer solar system

88
00:04:43,590 --> 00:04:41,199

and it was probably the first few hours

89
00:04:45,749 --> 00:04:43,600
her first day at least anyways before it

90
00:04:54,390 --> 00:04:45,759
just came by the back side of the sun

91
00:04:58,070 --> 00:04:56,950
my name is lauren kuzada and here is my

92
00:04:59,990 --> 00:04:58,080
question

93
00:05:01,990 --> 00:05:00,000
have you discovered any effects that

94
00:05:08,070 --> 00:05:02,000
space may have on the growth of a living

95
00:05:08,080 --> 00:05:11,909
all right

96
00:05:15,749 --> 00:05:13,830
there there are a number of different

97
00:05:17,430 --> 00:05:15,759
effects on growing organisms on space

98
00:05:20,550 --> 00:05:17,440
station and maybe the prime example of

99
00:05:23,029 --> 00:05:20,560
that is us uh the crew on space station

100
00:05:25,510 --> 00:05:23,039
and and and one thing that happens is

101
00:05:28,710 --> 00:05:25,520
your bones can decalcify and we do

102
00:05:31,909 --> 00:05:28,720
exercise to

103
00:05:33,830 --> 00:05:31,919
counteract the bone decalcification

104
00:05:35,909 --> 00:05:33,840
another thing that can happen is is your

105
00:05:38,469 --> 00:05:35,919
muscles can shrink and again the

106
00:05:39,590 --> 00:05:38,479
exercise helps that in terms of growing

107
00:05:43,510 --> 00:05:39,600
plants

108
00:05:45,670 --> 00:05:43,520
a weightless environment you you often

109
00:05:47,430 --> 00:05:45,680
need to have a pretty sophisticated

110
00:05:49,110 --> 00:05:47,440
terrarium that provides all kinds of

111
00:05:51,990 --> 00:05:49,120
things for them and can handle the

112
00:05:53,590 --> 00:05:52,000
fluids and and as far as the plants grow

113
00:05:57,670 --> 00:05:53,600

they seem to grow pretty much the same

114
00:05:57,680 --> 00:06:02,790
thank you

115
00:06:06,629 --> 00:06:04,469
my name is kennedy

116
00:06:08,950 --> 00:06:06,639
what is an example of an experiment you

117
00:06:10,950 --> 00:06:08,960
have worked on while on the iss that

118
00:06:16,950 --> 00:06:10,960
will have a potentially positive effect

119
00:06:20,390 --> 00:06:18,870
hi katie there's a lot of experiments

120
00:06:21,909 --> 00:06:20,400
we're doing onboard space station right

121
00:06:23,510 --> 00:06:21,919
now a lot of them are life sciences

122
00:06:25,189 --> 00:06:23,520
experiments a lot of them are

123
00:06:27,510 --> 00:06:25,199
understanding how to keep humans healthy

124
00:06:29,749 --> 00:06:27,520
in space long enough to go to distant

125
00:06:31,670 --> 00:06:29,759
destinations like the moon and mars

126
00:06:34,150 --> 00:06:31,680
and some of them are basic physical

127
00:06:35,749 --> 00:06:34,160
science kinds of experiments for example

128
00:06:37,430 --> 00:06:35,759
i think in the field in your field of

129
00:06:39,029 --> 00:06:37,440
view right now towards the very upper

130
00:06:40,790 --> 00:06:39,039
part of it there's two racks that are

131
00:06:42,790 --> 00:06:40,800
right near us right now

132
00:06:44,390 --> 00:06:42,800
that have been in use over uh including

133
00:06:46,150 --> 00:06:44,400
this past week and and also in the

134
00:06:47,830 --> 00:06:46,160
previous months and those

135
00:06:50,790 --> 00:06:47,840
the experiments we had going on in those

136
00:06:52,550 --> 00:06:50,800
racks um were specifically targeted

137
00:06:54,950 --> 00:06:52,560
for a better understanding how

138
00:06:57,029 --> 00:06:54,960

combustion works in a very very pure

139
00:06:59,749 --> 00:06:57,039
sense something that we can't replicate

140
00:07:01,270 --> 00:06:59,759
on earth because of the gravity-induced

141
00:07:02,469 --> 00:07:01,280
effects of convection and how that

142
00:07:04,870 --> 00:07:02,479
influences

143
00:07:07,189 --> 00:07:04,880
flames so here we can study in an

144
00:07:09,430 --> 00:07:07,199
absolutely perfectly pure environment

145
00:07:11,749 --> 00:07:09,440
and isolate the effects of gravity for

146
00:07:13,830 --> 00:07:11,759
example and better understand how

147
00:07:15,510 --> 00:07:13,840
combustion works how sooting works how

148
00:07:18,309 --> 00:07:15,520
the production of dust and combustion

149
00:07:20,390 --> 00:07:18,319
products work byproducts works and by so

150
00:07:21,510 --> 00:07:20,400
doing better understand it so that

151
00:07:24,070 --> 00:07:21,520
through a whole host of different

152
00:07:25,909 --> 00:07:24,080
industries on the ground we can use

153
00:07:30,950 --> 00:07:25,919
those cut that kind of knowledge to make

154
00:07:30,960 --> 00:07:35,830
thank you

155
00:07:41,270 --> 00:07:38,950
my name is samantha and my question is

156
00:07:47,270 --> 00:07:41,280
do you have a ritual or a tradition that

157
00:07:51,430 --> 00:07:49,510
well when we flew on the space shuttle

158
00:07:53,749 --> 00:07:51,440
we would have a

159
00:07:55,830 --> 00:07:53,759
breakfast a crew breakfast before we'd

160
00:08:00,309 --> 00:07:55,840
uh get on our spacesuits and roll out to

161
00:08:02,469 --> 00:08:00,319
the launch pad in russia we go to

162
00:08:03,909 --> 00:08:02,479
the criminal wall and we pay our

163
00:08:07,749 --> 00:08:03,919

respects to

164
00:08:11,110 --> 00:08:07,759
the yuri gagarin and and other heroes of

165
00:08:15,510 --> 00:08:11,120
the soviet union that are entombed

166
00:08:15,520 --> 00:08:21,909
thank you

167
00:08:27,110 --> 00:08:23,830
my name is nehemiah

168
00:08:33,110 --> 00:08:27,120
and here's my question why do astronauts

169
00:08:35,670 --> 00:08:34,469
that's a great question it's a very

170
00:08:37,509 --> 00:08:35,680
important one

171
00:08:39,750 --> 00:08:37,519
it turns out that we adapt very very

172
00:08:41,990 --> 00:08:39,760
quickly to whatever environment we're in

173
00:08:45,190 --> 00:08:42,000
and the way i think about it this is a

174
00:08:47,829 --> 00:08:45,200
little bit like the use it or lose it

175
00:08:49,509 --> 00:08:47,839
philosophy or rule so what happens here

176
00:08:51,110 --> 00:08:49,519
is your bones are just as strong as they

177
00:08:52,630 --> 00:08:51,120
need to be your muscles are just as

178
00:08:54,710 --> 00:08:52,640
strong as they need to be

179
00:08:56,389 --> 00:08:54,720
the the organisms or the

180
00:08:58,790 --> 00:08:56,399
the organs in your inner ear that help

181
00:09:00,470 --> 00:08:58,800
maintain your balance are tuned exactly

182
00:09:02,470 --> 00:09:00,480
the way they need to be for us to be

183
00:09:04,550 --> 00:09:02,480
operating wherever we are and for you

184
00:09:06,790 --> 00:09:04,560
right now and for us before we launch

185
00:09:08,070 --> 00:09:06,800
that was on planet earth so here in

186
00:09:10,550 --> 00:09:08,080
space our bones don't have to be

187
00:09:12,070 --> 00:09:10,560
terribly strong so our body will get rid

188
00:09:14,150 --> 00:09:12,080

of the calcium the minerals and the

189
00:09:15,750 --> 00:09:14,160
bones and they'll be strong enough to do

190
00:09:17,190 --> 00:09:15,760
the things that we do up here our

191
00:09:19,590 --> 00:09:17,200
muscles don't need to be as strong our

192
00:09:21,750 --> 00:09:19,600
bloods our circulatory system and our

193
00:09:24,470 --> 00:09:21,760
cardiovascular system that supports

194
00:09:26,470 --> 00:09:24,480
exercise doesn't have to be tuned quite

195
00:09:28,310 --> 00:09:26,480
the way it is on earth to be able to

196
00:09:29,990 --> 00:09:28,320
operate in space so what we have to do

197
00:09:32,310 --> 00:09:30,000
here is if we were going to live in

198
00:09:34,070 --> 00:09:32,320
space forever then this would be fine we

199
00:09:35,590 --> 00:09:34,080
wouldn't need to exercise we would

200
00:09:37,670 --> 00:09:35,600
become creatures of space and be

201
00:09:39,110 --> 00:09:37,680
perfectly adapted to it but we want to

202
00:09:41,110 --> 00:09:39,120
return home we want to go back to our

203
00:09:43,269 --> 00:09:41,120
families and returning home means

204
00:09:45,350 --> 00:09:43,279
returning back to the 1g gravity

205
00:09:47,430 --> 00:09:45,360
environment of planet earth so that

206
00:09:49,269 --> 00:09:47,440
means we have to exercise an awful lot

207
00:09:51,829 --> 00:09:49,279
by at least our normal standards on

208
00:09:54,150 --> 00:09:51,839
earth so we we exercise two and a half

209
00:09:56,230 --> 00:09:54,160
hours a day and that includes

210
00:09:57,990 --> 00:09:56,240
running or bicycling

211
00:09:59,350 --> 00:09:58,000
and it also includes weight lifting or

212
00:10:01,350 --> 00:09:59,360
the form of weight lifting that we can

213
00:10:04,710 --> 00:10:01,360

do up here and that is crucial for us to

214
00:10:09,190 --> 00:10:04,720
be healthy after the flight

215
00:10:13,269 --> 00:10:11,430
my name is diamond and i'd like to know

216
00:10:20,630 --> 00:10:13,279
what is the most exciting experiment you

217
00:10:24,389 --> 00:10:22,389
one science experiment that i'm working

218
00:10:25,750 --> 00:10:24,399
on is actually

219
00:10:28,230 --> 00:10:25,760
working on me

220
00:10:31,670 --> 00:10:28,240
and that's this exercise protocol called

221
00:10:33,190 --> 00:10:31,680
sprint where i do real heavy-duty

222
00:10:34,150 --> 00:10:33,200
workouts

223
00:10:38,870 --> 00:10:34,160
and

224
00:10:41,590 --> 00:10:38,880
collection to see how that affects

225
00:10:42,470 --> 00:10:41,600
your your muscle volume

226
00:10:46,630 --> 00:10:42,480
and

227
00:10:48,790 --> 00:10:46,640
how it affects your bone density that's

228
00:10:51,670 --> 00:10:48,800
an exciting project another exciting

229
00:10:54,949 --> 00:10:51,680
project is this marangoni convection

230
00:10:57,509 --> 00:10:54,959
experiment involves taking liquids and

231
00:10:59,509 --> 00:10:57,519
drawing them out into a long liquid

232
00:11:01,750 --> 00:10:59,519
cylinder so you got this bridge as we

233
00:11:03,509 --> 00:11:01,760
call it and then you look at how the

234
00:11:06,389 --> 00:11:03,519
liquid gets stirred around when you heat

235
00:11:09,110 --> 00:11:06,399
one end of it and it's what we call

236
00:11:11,430 --> 00:11:09,120
fundamental science and learning the

237
00:11:15,030 --> 00:11:11,440
principles of the fundamental science is

238
00:11:19,350 --> 00:11:15,040

really really interesting

239
00:11:23,670 --> 00:11:21,670
hello my name is ian and i wanted to

240
00:11:25,509 --> 00:11:23,680
know has there ever been a malfunction

241
00:11:32,790 --> 00:11:25,519
on the space station and if so how did

242
00:11:36,310 --> 00:11:34,150
as a matter of fact

243
00:11:38,550 --> 00:11:36,320
if you have a space station or a

244
00:11:41,030 --> 00:11:38,560
spaceship as big as this one i think it

245
00:11:43,110 --> 00:11:41,040
would be impossible to have it operate

246
00:11:45,670 --> 00:11:43,120
without ever having any excitement or

247
00:11:47,590 --> 00:11:45,680
any malfunctions in the hardware and

248
00:11:50,470 --> 00:11:47,600
this is about a million pounds worth of

249
00:11:52,870 --> 00:11:50,480
spaceship it's a huge laboratory so we

250
00:11:54,790 --> 00:11:52,880
get our share of various malfunctions

251
00:11:56,949 --> 00:11:54,800
thankfully none of them serious uh this

252
00:11:58,389 --> 00:11:56,959
weekend on sunday morning for instance

253
00:12:01,030 --> 00:11:58,399
we had a malfunction with one of the

254
00:12:03,750 --> 00:12:01,040
electrical power system boxes uh we've

255
00:12:05,590 --> 00:12:03,760
got giant uh solar arrays probably about

256
00:12:07,590 --> 00:12:05,600
an acre worth that gather the sun's

257
00:12:09,430 --> 00:12:07,600
energy and turn it into electrons to run

258
00:12:11,670 --> 00:12:09,440
all the experiments to run all the life

259
00:12:13,030 --> 00:12:11,680
support equipment that we have and

260
00:12:15,269 --> 00:12:13,040
basically everything on board space

261
00:12:17,590 --> 00:12:15,279
station and one of the components in

262
00:12:19,670 --> 00:12:17,600
that very complicated uh and very

263
00:12:20,790 --> 00:12:19,680

capable system actually had a problem it

264
00:12:23,030 --> 00:12:20,800
basically

265
00:12:24,710 --> 00:12:23,040
spontaneously rebooted itself if you

266
00:12:26,710 --> 00:12:24,720
will if your computer were to just power

267
00:12:28,949 --> 00:12:26,720
down and power back up wasn't anything

268
00:12:32,069 --> 00:12:28,959
serious it required

269
00:12:33,990 --> 00:12:32,079
more work on the process on the part of

270
00:12:35,750 --> 00:12:34,000
the people in mission control

271
00:12:37,590 --> 00:12:35,760
that had to reconfigure the systems to

272
00:12:39,350 --> 00:12:37,600
recover from that but the space station

273
00:12:41,350 --> 00:12:39,360
is pretty well designed so that if

274
00:12:43,350 --> 00:12:41,360
things like that happen uh there are

275
00:12:45,829 --> 00:12:43,360
backup systems that automatically step

276
00:12:48,389 --> 00:12:45,839
in in place so for us we heard some some

277
00:12:50,710 --> 00:12:48,399
alarms we got up we saw some messages

278
00:12:52,150 --> 00:12:50,720
space station was flying along just fine

279
00:12:53,829 --> 00:12:52,160
and it took a few hours later and

280
00:12:55,750 --> 00:12:53,839
everything was back completely to normal

281
00:12:58,470 --> 00:12:55,760
now there's still be some some kinds of

282
00:13:00,550 --> 00:12:58,480
things that don and i or andre or oleg

283
00:13:02,790 --> 00:13:00,560
or anton ranatoli the six crew members

284
00:13:04,949 --> 00:13:02,800
here will have to actually put human

285
00:13:06,710 --> 00:13:04,959
hands on to fix and some of those

286
00:13:08,870 --> 00:13:06,720
systems include

287
00:13:10,949 --> 00:13:08,880
the the toilet system that we have here

288
00:13:13,269 --> 00:13:10,959

that is um a very refined very

289
00:13:15,030 --> 00:13:13,279
sophisticated one that converts

290
00:13:17,269 --> 00:13:15,040
urine believe it or not into very

291
00:13:19,110 --> 00:13:17,279
drinkable very pure water and it's an

292
00:13:21,509 --> 00:13:19,120
incredibly complicated system it's also

293
00:13:24,710 --> 00:13:21,519
a system that can help us understand how

294
00:13:26,949 --> 00:13:24,720
to uh purify water on planet earth and

295
00:13:29,110 --> 00:13:26,959
do it efficiently and effectively but

296
00:13:30,870 --> 00:13:29,120
occasionally it needs a little bit of

297
00:13:32,790 --> 00:13:30,880
help and whenever that happens when

298
00:13:35,269 --> 00:13:32,800
there's a problem with it we step in and

299
00:13:36,710 --> 00:13:35,279
we fix it and actually

300
00:13:38,550 --> 00:13:36,720
the maintenance part of keeping the

301
00:13:41,350 --> 00:13:38,560
space station running is one of the more

302
00:13:44,550 --> 00:13:41,360
interesting and uh and uh exciting you

303
00:13:44,560 --> 00:13:47,110
thank you

304
00:13:52,790 --> 00:13:49,990
hi my name is jacob and here is my

305
00:13:59,030 --> 00:13:52,800
question what do you do and it's your

306
00:14:04,389 --> 00:14:02,150
what do we do on space station

307
00:14:07,509 --> 00:14:04,399
it falls into

308
00:14:08,790 --> 00:14:07,519
two basic categories

309
00:14:11,110 --> 00:14:08,800
one we

310
00:14:13,750 --> 00:14:11,120
take care of space station we we

311
00:14:16,870 --> 00:14:13,760
maintain the systems we repair the

312
00:14:18,550 --> 00:14:16,880
systems and the second thing that we do

313
00:14:21,189 --> 00:14:18,560

is we do science experiments and

314
00:14:24,470 --> 00:14:21,199
engineering research

315
00:14:27,030 --> 00:14:24,480
and it's a lot like living on a sailboat

316
00:14:29,670 --> 00:14:27,040
where you spend a lot of your time just

317
00:14:33,030 --> 00:14:29,680
fixing the sailboat and then some of

318
00:14:35,350 --> 00:14:33,040
your time sailing the sailboat and and

319
00:14:37,750 --> 00:14:35,360
that's what you do when you live on a

320
00:14:42,150 --> 00:14:37,760
vehicle that's uh

321
00:14:42,160 --> 00:14:46,870
thank you

322
00:14:50,790 --> 00:14:48,870
my name is blythe and i would like to

323
00:14:52,710 --> 00:14:50,800
know what are some of the functions of

324
00:14:58,949 --> 00:14:52,720
robonaut and what is it like to work

325
00:15:02,790 --> 00:15:00,870
very timely question so right here in

326
00:15:04,230 --> 00:15:02,800
your field of view uh towards the right

327
00:15:07,350 --> 00:15:04,240
side of your screen you should see

328
00:15:09,110 --> 00:15:07,360
robonaut and uh he is

329
00:15:12,470 --> 00:15:09,120
designed as basically a technology

330
00:15:15,910 --> 00:15:12,480
demonstration experiment that basically

331
00:15:18,150 --> 00:15:15,920
understand how best to employ a robot on

332
00:15:19,750 --> 00:15:18,160
board a space station and right now he's

333
00:15:21,430 --> 00:15:19,760
all configured to work inside a space

334
00:15:24,310 --> 00:15:21,440
station we're doing checkouts right now

335
00:15:26,389 --> 00:15:24,320
on them but it's a very very very

336
00:15:30,150 --> 00:15:26,399
sophisticated capable

337
00:15:33,590 --> 00:15:30,160
robot it's uh it's hands and arms and

338
00:15:35,670 --> 00:15:33,600

neck and waist all told have about 40

339
00:15:38,150 --> 00:15:35,680
over 40 degrees of freedom that means he

340
00:15:40,230 --> 00:15:38,160
can move in almost as many ways as human

341
00:15:42,550 --> 00:15:40,240
beings can his hands are roughly human

342
00:15:44,870 --> 00:15:42,560
hand size so all the tools that we use

343
00:15:47,749 --> 00:15:44,880
on onboard space station he's perfectly

344
00:15:50,389 --> 00:15:47,759
well suited to use he's got in place of

345
00:15:52,470 --> 00:15:50,399
our eyes he's got two video cameras that

346
00:15:53,509 --> 00:15:52,480
actually are stereo optics so they can

347
00:15:55,749 --> 00:15:53,519
actually

348
00:15:58,310 --> 00:15:55,759
just like our eyes um that you know

349
00:16:00,790 --> 00:15:58,320
humanize we can actually um determine

350
00:16:02,949 --> 00:16:00,800
how far away something is by a process

351
00:16:05,189 --> 00:16:02,959
called parallax and he can do the exact

352
00:16:06,629 --> 00:16:05,199
same thing so he can interact with tools

353
00:16:08,550 --> 00:16:06,639
and various kinds of things and he can

354
00:16:10,870 --> 00:16:08,560
actually track his own hands as they

355
00:16:13,030 --> 00:16:10,880
move his fingers as they move interact

356
00:16:14,550 --> 00:16:13,040
with the equipment that we have here

357
00:16:15,990 --> 00:16:14,560
right now we're in checkout mode but

358
00:16:18,310 --> 00:16:16,000
down the road the kinds of things we'd

359
00:16:19,670 --> 00:16:18,320
like to do is have him do things that

360
00:16:21,430 --> 00:16:19,680
are routine

361
00:16:24,550 --> 00:16:21,440
that are maybe

362
00:16:25,990 --> 00:16:24,560
would be better suited for a robot than

363
00:16:27,430 --> 00:16:26,000

perhaps a human

364
00:16:29,350 --> 00:16:27,440
we would like to also be able to take

365
00:16:30,790 --> 00:16:29,360
him outside during a spacewalk there's a

366
00:16:32,310 --> 00:16:30,800
lot of things that we do that tend to be

367
00:16:34,230 --> 00:16:32,320
a little bit more dangerous than other

368
00:16:36,470 --> 00:16:34,240
things and the more dangerous things i

369
00:16:40,069 --> 00:16:36,480
think would be perfectly well suited for

370
00:16:40,079 --> 00:16:46,310
thank you

371
00:16:48,550 --> 00:16:47,430
hello

372
00:16:51,350 --> 00:16:48,560
don

373
00:16:53,509 --> 00:16:51,360
my name is emmanuel and my question is

374
00:17:01,910 --> 00:16:53,519
what recreational activities do you

375
00:17:07,750 --> 00:17:04,870
we spend most of our time working on

376
00:17:08,710 --> 00:17:07,760
space station we do have some off-duty

377
00:17:12,230 --> 00:17:08,720
time

378
00:17:13,350 --> 00:17:12,240
number of things you can do some of them

379
00:17:15,429 --> 00:17:13,360
are the same kinds of things you could

380
00:17:18,549 --> 00:17:15,439
do on earth like you can you could check

381
00:17:20,710 --> 00:17:18,559
your email and and and read and do

382
00:17:23,909 --> 00:17:20,720
things like that or

383
00:17:25,829 --> 00:17:23,919
you can go to one of any number windows

384
00:17:28,710 --> 00:17:25,839
that we have on space station and look

385
00:17:31,990 --> 00:17:28,720
out at planet earth and look out at our

386
00:17:32,950 --> 00:17:32,000
solar system and what i enjoy to do the

387
00:17:35,830 --> 00:17:32,960
most

388
00:17:38,390 --> 00:17:35,840

is looking out the window at this

389
00:17:39,190 --> 00:17:38,400
amazing solar system that we have

390
00:17:42,870 --> 00:17:39,200
or

391
00:17:45,110 --> 00:17:42,880
doing little science demonstrations

392
00:17:49,029 --> 00:17:45,120
that take advantage of the weightless

393
00:17:49,039 --> 00:17:53,510
thank you very much

394
00:18:09,270 --> 00:17:56,310
my name is hampton and i'd like to know

395
00:18:11,990 --> 00:18:11,190
hampton this is a very serious business

396
00:18:17,990 --> 00:18:12,000
we

397
00:18:19,750 --> 00:18:18,000
here uh but but no in all seriousness

398
00:18:21,510 --> 00:18:19,760
it's really difficult a question to

399
00:18:23,750 --> 00:18:21,520
answer i'm trying to think

400
00:18:25,750 --> 00:18:23,760
i guess probably in general i would say

401
00:18:27,669 --> 00:18:25,760
there's so many things that happen that

402
00:18:28,630 --> 00:18:27,679
are associated with being weightless

403
00:18:30,549 --> 00:18:28,640
that

404
00:18:32,150 --> 00:18:30,559
it takes your brain a little while to

405
00:18:34,310 --> 00:18:32,160
understand even after you've been here

406
00:18:36,310 --> 00:18:34,320
for months and months

407
00:18:38,310 --> 00:18:36,320
i would just put it this way it's really

408
00:18:39,590 --> 00:18:38,320
easy to lose things and it's very easy

409
00:18:42,390 --> 00:18:39,600
to lose things

410
00:18:44,390 --> 00:18:42,400
for quite a long time sometimes

411
00:18:46,630 --> 00:18:44,400
gravity is a really good organizer if

412
00:18:50,150 --> 00:18:46,640
you drop a tool or if you drop a toy or

413
00:18:53,350 --> 00:18:50,160

whatever it ends up on the xy plane of

414
00:18:55,029 --> 00:18:53,360
the floor if you drop something on space

415
00:18:56,630 --> 00:18:55,039
station and space station for example

416
00:18:59,750 --> 00:18:56,640
and that happens a lot it's very easy to

417
00:19:03,110 --> 00:18:59,760
have happen it goes anywhere xyz

418
00:19:05,750 --> 00:19:03,120
anywhere it wants and the airflow on

419
00:19:07,110 --> 00:19:05,760
space station typically takes it to one

420
00:19:09,750 --> 00:19:07,120
of several

421
00:19:12,230 --> 00:19:09,760
favorite locations and those are the

422
00:19:15,909 --> 00:19:12,240
the inlet screens for the ventilation

423
00:19:18,310 --> 00:19:15,919
system so every week or so when we do a

424
00:19:19,990 --> 00:19:18,320
good cleaning of space station it's a

425
00:19:23,750 --> 00:19:20,000
little bit like a treasure hunt and we

426
00:19:25,270 --> 00:19:23,760
can see whose spoon whose tool whose

427
00:19:26,950 --> 00:19:25,280
glasses

428
00:19:28,789 --> 00:19:26,960
turn up on some of these favorite little

429
00:19:29,669 --> 00:19:28,799
locations but

430
00:19:32,710 --> 00:19:29,679
i guess

431
00:19:34,789 --> 00:19:32,720
every day it's full of things that kind

432
00:19:39,270 --> 00:19:34,799
of make your brain stop and say well now

433
00:19:39,280 --> 00:19:44,230
thank you

434
00:19:48,230 --> 00:19:46,630
my name is quebe andre what are the

435
00:19:50,390 --> 00:19:48,240
different varieties of food that are

436
00:19:55,190 --> 00:19:50,400
offered on the iss and do you have to

437
00:19:59,110 --> 00:19:57,590
sometimes yeah do we have to eat food

438
00:20:00,549 --> 00:19:59,120

that we don't like well i guess it

439
00:20:03,029 --> 00:20:00,559
depends on if you want to go to bed

440
00:20:05,270 --> 00:20:03,039
hungry

441
00:20:06,870 --> 00:20:05,280
i have other we have other crew members

442
00:20:08,950 --> 00:20:06,880
off camera that are shaking their heads

443
00:20:10,470 --> 00:20:08,960
too uh we have

444
00:20:11,830 --> 00:20:10,480
the kind of food we have is sort of like

445
00:20:14,630 --> 00:20:11,840
camp and food

446
00:20:17,190 --> 00:20:14,640
and we've had we have dehydrated food

447
00:20:19,669 --> 00:20:17,200
dehydrated reef freeze dried food and

448
00:20:20,549 --> 00:20:19,679
all we do is squirt some either warm

449
00:20:25,190 --> 00:20:20,559
water

450
00:20:27,590 --> 00:20:25,200
and and then we we squish it around a

451
00:20:30,789 --> 00:20:27,600
bit and then cut open the package and

452
00:20:33,750 --> 00:20:30,799
and eat it out of the package or we have

453
00:20:36,710 --> 00:20:33,760
thermally stabilized packets and this is

454
00:20:38,230 --> 00:20:36,720
kind of like canned meat without the can

455
00:20:42,549 --> 00:20:38,240
and and so it's a

456
00:20:44,630 --> 00:20:42,559
foil a foil polymer package that

457
00:20:45,990 --> 00:20:44,640
that can keep meats and other products

458
00:20:47,430 --> 00:20:46,000
safe without having to have the the

459
00:20:50,070 --> 00:20:47,440
weight of a can

460
00:20:52,070 --> 00:20:50,080
and then we have drinks and it's kind of

461
00:20:53,909 --> 00:20:52,080
hard to have an open container in space

462
00:20:55,110 --> 00:20:53,919
station although there are ways that you

463
00:20:56,789 --> 00:20:55,120

could do that

464
00:20:59,270 --> 00:20:56,799
and we

465
00:21:01,430 --> 00:20:59,280
do drink most of our fluids from these

466
00:21:03,830 --> 00:21:01,440
bags it's kind of like a juice bag that

467
00:21:05,669 --> 00:21:03,840
you'd have from the grocery store but

468
00:21:08,310 --> 00:21:05,679
this is just an empty bag and we fill it

469
00:21:09,990 --> 00:21:08,320
full of water and sometimes it has

470
00:21:12,870 --> 00:21:10,000
grapefruit drink in it sometimes it has

471
00:21:19,350 --> 00:21:12,880
coffee and that's how we do our eating

472
00:21:23,430 --> 00:21:21,270
dan and don on behalf of creighton

473
00:21:25,669 --> 00:21:23,440
middle school students and faculty thank

474
00:21:38,789 --> 00:21:25,679
you so much and we wish you a pleasant

475
00:21:44,310 --> 00:21:40,470
and thank you for joining us it was

476
00:21:50,950 --> 00:21:44,320
great to have you aboard today

477
00:21:59,029 --> 00:21:52,789
station this is houston acr that

478
00:22:02,390 --> 00:22:00,870
and thank you creighton middle middle