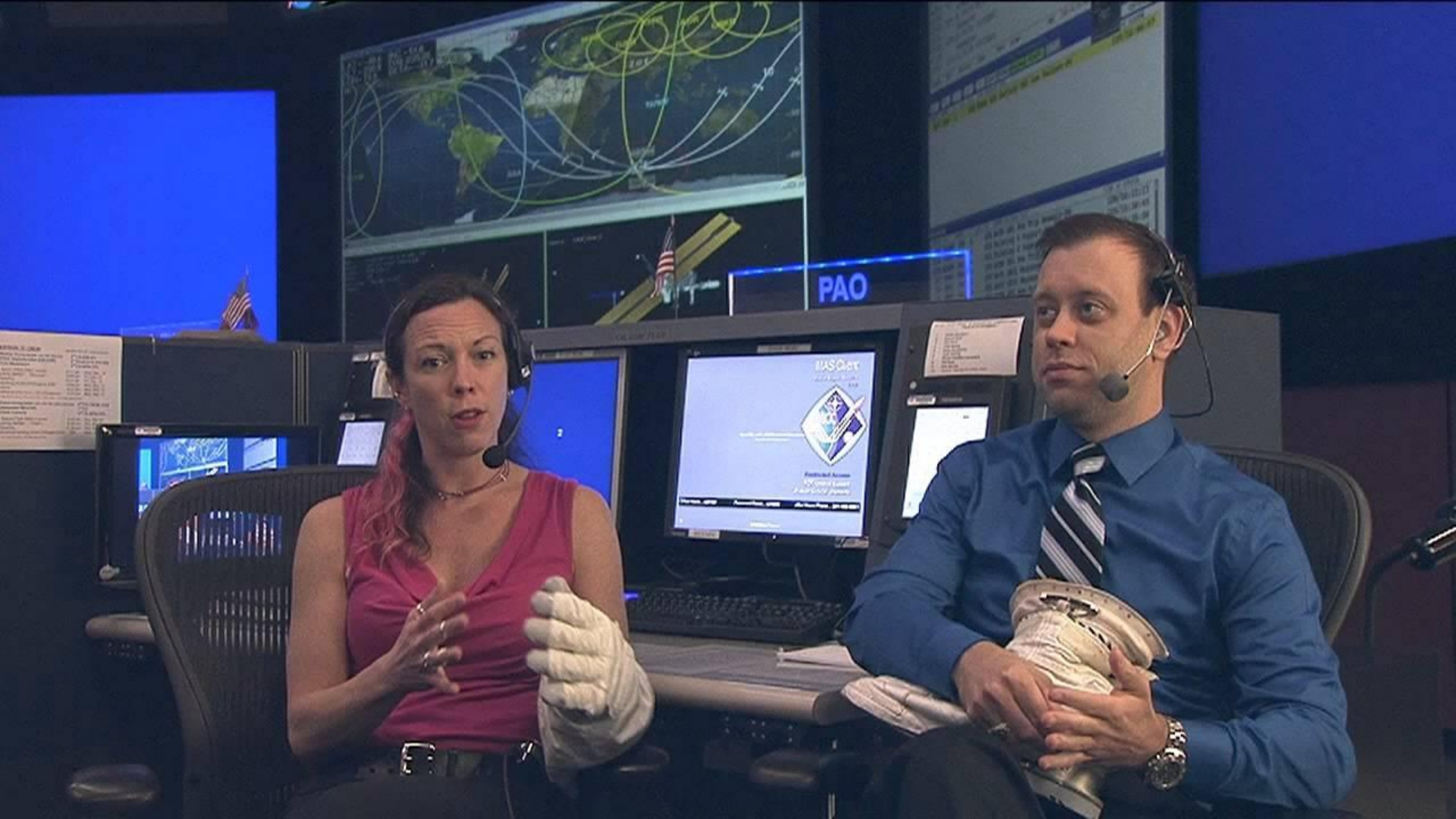
PAO

1
00:00:04,390 --> 00:00:02,710
hi everybody from mission control this

2
00:00:06,230 --> 00:00:04,400
is uh josh barley i'm joined by my

3
00:00:07,430 --> 00:00:06,240
friend heather paul spacesuit engineer

4
00:00:09,990 --> 00:00:07,440
here we are going to be talking to

5
00:00:11,270 --> 00:00:10,000
memorial school there in atlanta georgia

6
00:00:12,150 --> 00:00:11,280
i think we have quite a number of

7
00:00:13,430 --> 00:00:12,160
students here they're going to be

8
00:00:15,350 --> 00:00:13,440
talking to heather about all sorts of

9
00:00:19,670 --> 00:00:15,360
things so if you guys are ready we're

10
00:00:23,349 --> 00:00:21,670
my question is if there are several

11
00:00:25,509 --> 00:00:23,359
astronauts from different countries on

12
00:00:27,109 --> 00:00:25,519
this international space station and do

13
00:00:30,230 --> 00:00:27,119

they have to learn essential language to

14
00:00:31,750 --> 00:00:30,240
be able to communicate with each other i

15
00:00:34,310 --> 00:00:31,760
think that's a great question in fact a

16
00:00:35,910 --> 00:00:34,320
huge part of what is so fantastic about

17
00:00:37,830 --> 00:00:35,920
the international space station is that

18
00:00:39,670 --> 00:00:37,840
word international with all of our

19
00:00:41,350 --> 00:00:39,680
different collaborations across the

20
00:00:43,350 --> 00:00:41,360
world it really is an international

21
00:00:45,190 --> 00:00:43,360
effort and you're absolutely right we

22
00:00:46,790 --> 00:00:45,200
have a very diverse population of

23
00:00:49,190 --> 00:00:46,800
astronauts not only from the united

24
00:00:51,189 --> 00:00:49,200
states but across a variety of countries

25
00:00:53,750 --> 00:00:51,199
and so english is the standard language

26
00:00:55,430 --> 00:00:53,760
although a lot of our u.s astronauts do

27
00:00:58,229 --> 00:00:55,440
learn russian

28
00:00:59,510 --> 00:00:58,239
and some learn japanese as well so it's

29
00:01:00,790 --> 00:00:59,520
good to learn your foreign languages

30
00:01:02,310 --> 00:01:00,800
while you're in school because when you

31
00:01:04,950 --> 00:01:02,320
become an astronaut you're going to need

32
00:01:09,109 --> 00:01:04,960
to be able to work across those cultural

33
00:01:13,910 --> 00:01:11,670
hello my name is makai stevens mcglam

34
00:01:16,950 --> 00:01:13,920
and i want to know that

35
00:01:19,429 --> 00:01:16,960
if how detectable is a leak in a

36
00:01:20,550 --> 00:01:19,439
spacesuit

37
00:01:22,550 --> 00:01:20,560
i don't think i quite heard that

38
00:01:24,469 --> 00:01:22,560

question how detectable is a leak in a

39
00:01:26,070 --> 00:01:24,479
spacesuit i think that was it okay oh

40
00:01:27,670 --> 00:01:26,080
that's a very good question and a really

41
00:01:29,270 --> 00:01:27,680
important one because the spacesuit is

42
00:01:31,510 --> 00:01:29,280
basically like a big human-shaped

43
00:01:33,109 --> 00:01:31,520
balloon that's keeping you alive during

44
00:01:34,710 --> 00:01:33,119
your spacewalk and so you definitely

45
00:01:35,670 --> 00:01:34,720
don't want to get any leaks or rips or

46
00:01:36,390 --> 00:01:35,680
tears

47
00:01:37,590 --> 00:01:36,400
but

48
00:01:39,670 --> 00:01:37,600
if you were

49
00:01:41,590 --> 00:01:39,680
we have all of these sensors that are

50
00:01:44,149 --> 00:01:41,600
kind of monitoring the health of the

51
00:01:45,910 --> 00:01:44,159
spacesuit and so if there was any kind

52
00:01:47,990 --> 00:01:45,920
of a leak or a tear those sensors would

53
00:01:49,429 --> 00:01:48,000
detect it because you'd feel or the

54
00:01:52,389 --> 00:01:49,439
sensors would detect that change in

55
00:01:54,310 --> 00:01:52,399
pressure and we have emergency oxygen a

56
00:01:56,709 --> 00:01:54,320
separate oxygen tank that's high

57
00:01:58,469 --> 00:01:56,719
pressure and so if the sensors kick that

58
00:02:00,230 --> 00:01:58,479
on basically it floods the spacesuit

59
00:02:01,670 --> 00:02:00,240
with high pressure oxygen and an

60
00:02:03,590 --> 00:02:01,680
astronaut could survive for

61
00:02:05,190 --> 00:02:03,600
approximately 30 minutes and really what

62
00:02:06,870 --> 00:02:05,200
he or she would try to do is get inside

63
00:02:09,109 --> 00:02:06,880

as quickly as possible yeah that's a

64
00:02:11,510 --> 00:02:09,119
good question

65
00:02:13,830 --> 00:02:11,520
hello my name is miles and i relax know

66
00:02:15,430 --> 00:02:13,840
how do you take a shower in space

67
00:02:17,110 --> 00:02:15,440
oh miles that's an excellent question

68
00:02:19,350 --> 00:02:17,120
you know we all really think about

69
00:02:21,110 --> 00:02:19,360
hygiene and you know if you're on a long

70
00:02:22,790 --> 00:02:21,120
camping trip you're definitely thinking

71
00:02:25,030 --> 00:02:22,800
about when you can get in the hot shower

72
00:02:26,869 --> 00:02:25,040
but our astronauts you know water

73
00:02:28,550 --> 00:02:26,879
doesn't behave the same way it does here

74
00:02:30,150 --> 00:02:28,560
on earth and they have to be very

75
00:02:31,830 --> 00:02:30,160
careful with their water management

76
00:02:33,190 --> 00:02:31,840
because water basically because of the

77
00:02:35,030 --> 00:02:33,200
surface tension

78
00:02:36,710 --> 00:02:35,040
creates these small bubbles or sometimes

79
00:02:38,390 --> 00:02:36,720
big bubbles that can float around just

80
00:02:40,710 --> 00:02:38,400
like the humans and the equipment around

81
00:02:42,710 --> 00:02:40,720
them and so we don't take a shower like

82
00:02:44,070 --> 00:02:42,720
we would here on earth because basically

83
00:02:45,670 --> 00:02:44,080
all of those water bubbles would be

84
00:02:47,030 --> 00:02:45,680
floating around you

85
00:02:48,949 --> 00:02:47,040
so they do

86
00:02:51,430 --> 00:02:48,959
kind of like dry shampoo techniques kind

87
00:02:52,790 --> 00:02:51,440
of sponge bath style things and like wet

88
00:02:54,630 --> 00:02:52,800

wipes like you find here on earth

89
00:02:55,910 --> 00:02:54,640
exactly yeah

90
00:02:57,110 --> 00:02:55,920
now the great thing about the space

91
00:02:58,710 --> 00:02:57,120
station those you don't really get that

92
00:03:01,030 --> 00:02:58,720
dirty it's not like you're getting

93
00:03:02,830 --> 00:03:01,040
really hot and sweaty up there so i mean

94
00:03:06,149 --> 00:03:02,840
they stay fairly

95
00:03:07,990 --> 00:03:06,159
clean good afternoon my question is

96
00:03:09,270 --> 00:03:08,000
like so you know how they say you're in

97
00:03:11,270 --> 00:03:09,280
the free call and you're already

98
00:03:13,589 --> 00:03:11,280
floating in the air how did you like

99
00:03:15,670 --> 00:03:13,599
jump because this place they the people

100
00:03:16,869 --> 00:03:15,680
they be jumping but this but they said

101
00:03:19,509 --> 00:03:16,879
they're already in the freefall and

102
00:03:21,270 --> 00:03:19,519
they're already like meditating

103
00:03:23,270 --> 00:03:21,280
so basically because we're free falling

104
00:03:25,990 --> 00:03:23,280
in space i guess it's more about how do

105
00:03:28,309 --> 00:03:26,000
you jump and do things like that well

106
00:03:30,789 --> 00:03:28,319
when we're when we're in space we we

107
00:03:33,110 --> 00:03:30,799
train our astronauts to really be very

108
00:03:34,789 --> 00:03:33,120
careful with how hard they push off of

109
00:03:36,309 --> 00:03:34,799
off of the walls or the floors and in

110
00:03:38,149 --> 00:03:36,319
fact there really is no up or down

111
00:03:40,550 --> 00:03:38,159
ceiling or floor and we call it

112
00:03:43,350 --> 00:03:40,560
fingertip forces really just very light

113
00:03:45,030 --> 00:03:43,360

touches to move in any direction because

114
00:03:47,270 --> 00:03:45,040
you're free falling and you're in that

115
00:03:48,710 --> 00:03:47,280
microgravity environment it really

116
00:03:50,550 --> 00:03:48,720
doesn't take a lot of effort to move

117
00:03:52,470 --> 00:03:50,560
yourselves around and you know a lot of

118
00:03:54,229 --> 00:03:52,480
times when we have our rookie astronauts

119
00:03:55,990 --> 00:03:54,239
here it's their first flight

120
00:03:57,429 --> 00:03:56,000
we've done a lot of training but even

121
00:03:59,270 --> 00:03:57,439
sometimes they'll still think they

122
00:04:01,509 --> 00:03:59,280
really have to push off like we do here

123
00:04:03,509 --> 00:04:01,519
when we're moving on earth and it takes

124
00:04:05,429 --> 00:04:03,519
some time to get used to that feeling of

125
00:04:06,630 --> 00:04:05,439
just being gentle with your touch to

126
00:04:09,030 --> 00:04:06,640
move around

127
00:04:11,110 --> 00:04:09,040
now on the moon when we were on the moon

128
00:04:12,869 --> 00:04:11,120
back in the apollo era they had to work

129
00:04:14,309 --> 00:04:12,879
a little bit more a more

130
00:04:15,830 --> 00:04:14,319
it was a little more challenging of an

131
00:04:17,990 --> 00:04:15,840
environment because of the reduced

132
00:04:20,629 --> 00:04:18,000
gravity environment that's about 1 6

133
00:04:22,150 --> 00:04:20,639
what we have here on earth so there

134
00:04:24,390 --> 00:04:22,160
they had to work pretty hard to move

135
00:04:25,830 --> 00:04:24,400
around but part of that was because they

136
00:04:27,670 --> 00:04:25,840
were typically outside doing their

137
00:04:30,629 --> 00:04:27,680
science and work in their spacesuits and

138
00:04:32,790 --> 00:04:30,639

they had that heavy equipment on

139
00:04:34,790 --> 00:04:32,800
good question

140
00:04:36,710 --> 00:04:34,800
hi my name is emily and i need to know

141
00:04:39,030 --> 00:04:36,720
that if there is an emergency or is

142
00:04:40,629 --> 00:04:39,040
there a place for them to go or what

143
00:04:42,950 --> 00:04:40,639
would happen

144
00:04:44,950 --> 00:04:42,960
excellent question emily you know nasa

145
00:04:46,629 --> 00:04:44,960
really thinks a lot about the safety of

146
00:04:48,550 --> 00:04:46,639
our astronauts and you know something

147
00:04:50,150 --> 00:04:48,560
could go wrong uh just like we have

148
00:04:51,909 --> 00:04:50,160
things that go wrong here on earth and

149
00:04:53,110 --> 00:04:51,919
we have to have little safe havens to go

150
00:04:54,629 --> 00:04:53,120
to um

151
00:04:56,070 --> 00:04:54,639
in the international space station we do

152
00:04:59,189 --> 00:04:56,080
have an aircraft that they could climb

153
00:05:00,710 --> 00:04:59,199
into if they need to evacuate

154
00:05:01,909 --> 00:05:00,720
they have a lot of different procedures

155
00:05:03,510 --> 00:05:01,919
but the first thing that we always try

156
00:05:05,189 --> 00:05:03,520
to do is figure out what has actually

157
00:05:07,350 --> 00:05:05,199
happened and the astronauts are really

158
00:05:09,110 --> 00:05:07,360
well trained and we've got a great

159
00:05:11,029 --> 00:05:09,120
set of flight controllers here that are

160
00:05:13,590 --> 00:05:11,039
trained and ready to support in case of

161
00:05:15,270 --> 00:05:13,600
an emergency but absolutely there there

162
00:05:17,029 --> 00:05:15,280
is a vehicle that they can climb into

163
00:05:17,830 --> 00:05:17,039

and evacuate if they need to and there's

164
00:05:19,830 --> 00:05:17,840
three

165
00:05:22,230 --> 00:05:19,840
big emergencies they really train for a

166
00:05:23,430 --> 00:05:22,240
lot they do drills it's it's fire if

167
00:05:25,350 --> 00:05:23,440
there's some kind of fire on board

168
00:05:27,270 --> 00:05:25,360
there's depressurization like the leak

169
00:05:28,870 --> 00:05:27,280
we talked about before and some sort of

170
00:05:30,390 --> 00:05:28,880
toxic if there's something you know

171
00:05:31,510 --> 00:05:30,400
nasty that gets released inside there

172
00:05:33,510 --> 00:05:31,520
those are the three big things that they

173
00:05:35,110 --> 00:05:33,520
really do uh sort of train over and over

174
00:05:35,990 --> 00:05:35,120
for and get and get ready to go if they

175
00:05:38,870 --> 00:05:36,000
had to

176
00:05:40,870 --> 00:05:38,880
good question

177
00:05:42,070 --> 00:05:40,880
good afternoon my name is taraya um i

178
00:05:43,990 --> 00:05:42,080
wanted to ask

179
00:05:46,550 --> 00:05:44,000
what special materials we use to make

180
00:05:47,909 --> 00:05:46,560
spaces

181
00:05:50,390 --> 00:05:47,919
i don't think i heard that yeah can you

182
00:05:52,310 --> 00:05:50,400
say that again a little bit louder

183
00:05:54,390 --> 00:05:52,320
speak louder like i'm talking projecting

184
00:05:56,390 --> 00:05:54,400
your voicemail what special materials do

185
00:05:57,909 --> 00:05:56,400
you use to make spacesuits

186
00:05:59,189 --> 00:05:57,919
oh good question awesome that's a great

187
00:06:01,510 --> 00:05:59,199
question and actually i have some

188
00:06:03,270 --> 00:06:01,520

spacesuit pieces with me today so well

189
00:06:05,189 --> 00:06:03,280
let's start with what you wear on the

190
00:06:07,110 --> 00:06:05,199
inside of your suit and you know our

191
00:06:09,590 --> 00:06:07,120
astronauts are working outside the on

192
00:06:11,350 --> 00:06:09,600
the space walk for anywhere from six to

193
00:06:13,110 --> 00:06:11,360
eight hours at a time and it really is

194
00:06:15,110 --> 00:06:13,120
like exercising the whole time and you

195
00:06:16,790 --> 00:06:15,120
know when you exercise a lot or you're

196
00:06:18,629 --> 00:06:16,800
in your gym classes you start to get a

197
00:06:20,070 --> 00:06:18,639
little hot and sweaty so we want to make

198
00:06:21,830 --> 00:06:20,080
sure that the astronauts stay nice and

199
00:06:24,469 --> 00:06:21,840
cool inside of the suit and so we put

200
00:06:26,550 --> 00:06:24,479
you in a stretchy undergarment i like to

201
00:06:28,390 --> 00:06:26,560
call this your spacesuit underwear

202
00:06:30,070 --> 00:06:28,400
because you wear it under your spacesuit

203
00:06:32,629 --> 00:06:30,080
and it's a big cooling garment kind of

204
00:06:35,350 --> 00:06:32,639
like like thermal underwear like you'd

205
00:06:37,590 --> 00:06:35,360
wear if you were going skiing spandex so

206
00:06:38,550 --> 00:06:37,600
it sits nice and tight across your skin

207
00:06:40,710 --> 00:06:38,560
and then

208
00:06:42,790 --> 00:06:40,720
you can see that there's plastic tubing

209
00:06:43,909 --> 00:06:42,800
woven through it and we run ice-cold

210
00:06:46,070 --> 00:06:43,919
water through that to keep our

211
00:06:47,670 --> 00:06:46,080
astronauts cool so your spacesuit

212
00:06:49,430 --> 00:06:47,680
underwear is a little bit like spandex

213
00:06:50,629 --> 00:06:49,440

kind of like the underwear we wear here

214
00:06:52,070 --> 00:06:50,639
on earth

215
00:06:53,749 --> 00:06:52,080
now once you're prepared for your

216
00:06:56,070 --> 00:06:53,759
spacewalk and you're in your cooling

217
00:06:58,230 --> 00:06:56,080
garment the spacesuit itself is actually

218
00:06:59,670 --> 00:06:58,240
made out of a lot of different material

219
00:07:01,430 --> 00:06:59,680
layers and actually josh if you don't

220
00:07:02,870 --> 00:07:01,440
mind holding up the boot

221
00:07:04,710 --> 00:07:02,880
that's right we've got a boot and then

222
00:07:06,150 --> 00:07:04,720
i've got a glove here

223
00:07:07,909 --> 00:07:06,160
you need a lot of materials for the

224
00:07:09,749 --> 00:07:07,919
spacesuit for a variety of reasons

225
00:07:11,510 --> 00:07:09,759
number one remember i said it's kind of

226
00:07:13,990 --> 00:07:11,520
like a big human shaped balloon and it's

227
00:07:15,749 --> 00:07:14,000
holding in that oxygen and pressure

228
00:07:17,430 --> 00:07:15,759
so that internal layer that you can see

229
00:07:20,469 --> 00:07:17,440
here this yellow layer is what we call a

230
00:07:22,309 --> 00:07:20,479
bladder it holds that oxygen in

231
00:07:23,350 --> 00:07:22,319
um then the second layer is the one that

232
00:07:25,189 --> 00:07:23,360
makes it look

233
00:07:27,350 --> 00:07:25,199
almost to the shape of a human it's a

234
00:07:29,510 --> 00:07:27,360
it's a layer that we can sew and then

235
00:07:31,270 --> 00:07:29,520
the final layers are all the insulation

236
00:07:32,309 --> 00:07:31,280
kind of like the happy birthday balloons

237
00:07:34,629 --> 00:07:32,319
that you buy

238
00:07:37,110 --> 00:07:34,639

at the store that are that aluminized

239
00:07:38,790 --> 00:07:37,120
mylar really shiny or kind of like

240
00:07:40,950 --> 00:07:38,800
aluminum foil but a little bit lighter

241
00:07:43,029 --> 00:07:40,960
weight and they have reflective properly

242
00:07:45,189 --> 00:07:43,039
properties and they insulate and that's

243
00:07:46,950 --> 00:07:45,199
why you have so many different materials

244
00:07:50,150 --> 00:07:46,960
and i'm wearing the glove now and it's

245
00:07:52,230 --> 00:07:50,160
really like wearing a big ski glove or

246
00:07:54,469 --> 00:07:52,240
several several pairs of gloves it is in

247
00:07:56,070 --> 00:07:54,479
fact pretty challenging to move around

248
00:07:58,390 --> 00:07:56,080
so we want to make sure that when we

249
00:07:59,909 --> 00:07:58,400
size you for a suit we get it right and

250
00:08:06,390 --> 00:07:59,919
it fits comfortably

251
00:08:09,830 --> 00:08:07,749
is

252
00:08:11,510 --> 00:08:09,840
if the international space center and

253
00:08:13,430 --> 00:08:11,520
space guy hit would ask

254
00:08:16,869 --> 00:08:13,440
astro or meteor right

255
00:08:18,469 --> 00:08:16,879
what would the astronauts do

256
00:08:20,550 --> 00:08:18,479
if the international space station was

257
00:08:21,909 --> 00:08:20,560
to get hit by a leader what would our

258
00:08:24,390 --> 00:08:21,919
astronauts do

259
00:08:26,230 --> 00:08:24,400
um well you know actually i was i had

260
00:08:27,830 --> 00:08:26,240
the opportunity to talk with ron garan

261
00:08:29,909 --> 00:08:27,840
who was one of our astronauts who lived

262
00:08:32,389 --> 00:08:29,919
on board the space station and during

263
00:08:34,230 --> 00:08:32,399

his particular mission they did have a

264
00:08:35,750 --> 00:08:34,240
situation where we had something that

265
00:08:37,190 --> 00:08:35,760
was going to fly by and it seemed like

266
00:08:38,469 --> 00:08:37,200
it was going to get pretty close to the

267
00:08:40,070 --> 00:08:38,479
space station

268
00:08:41,589 --> 00:08:40,080
and he shared with me that they had to

269
00:08:43,190 --> 00:08:41,599
go through all of their procedures and

270
00:08:45,110 --> 00:08:43,200
actually kind of lock out certain

271
00:08:47,430 --> 00:08:45,120
aspects or certain areas or modules of

272
00:08:49,750 --> 00:08:47,440
the space station and start to move into

273
00:08:51,670 --> 00:08:49,760
that safe haven environment now luckily

274
00:08:53,509 --> 00:08:51,680
nothing happened and in fact what was

275
00:08:54,790 --> 00:08:53,519
the object that was flying by was

276
00:08:56,150 --> 00:08:54,800
actually farther away than we

277
00:08:57,990 --> 00:08:56,160
anticipated

278
00:08:59,910 --> 00:08:58,000
but um that is something that they do

279
00:09:01,670 --> 00:08:59,920
train for um and again they would

280
00:09:03,509 --> 00:09:01,680
basically lock down

281
00:09:05,190 --> 00:09:03,519
um parts of the space station get it

282
00:09:06,710 --> 00:09:05,200
prepared and then they'd probably move

283
00:09:08,310 --> 00:09:06,720
into one of those vehicles and we

284
00:09:10,230 --> 00:09:08,320
tracked there's a lot of stuff up there

285
00:09:12,790 --> 00:09:10,240
in space flying around you know me

286
00:09:15,030 --> 00:09:12,800
meteor and pieces of you know satellite

287
00:09:16,389 --> 00:09:15,040
junk and things like that so we track it

288
00:09:17,750 --> 00:09:16,399

and and we usually have a pretty good

289
00:09:19,430 --> 00:09:17,760
idea if something's even getting kind of

290
00:09:22,710 --> 00:09:19,440
close so it's a it's a pretty good

291
00:09:25,509 --> 00:09:22,720
system that works

292
00:09:28,550 --> 00:09:25,519
hello my name is imani williams and my

293
00:09:30,550 --> 00:09:28,560
question is what is the special training

294
00:09:32,630 --> 00:09:30,560
that people behind the scenes of

295
00:09:34,470 --> 00:09:32,640
astronaut do

296
00:09:36,470 --> 00:09:34,480
wow that is a great question imani and

297
00:09:38,230 --> 00:09:36,480
in fact you know for every astronaut

298
00:09:40,790 --> 00:09:38,240
that's on board the station we have a

299
00:09:42,230 --> 00:09:40,800
very huge team of people that are here

300
00:09:43,750 --> 00:09:42,240
on the ground supporting them you know

301
00:09:45,590 --> 00:09:43,760
engineers like me

302
00:09:47,350 --> 00:09:45,600
flight controllers like josh who sit

303
00:09:48,790 --> 00:09:47,360
here in mission control and not only in

304
00:09:50,949 --> 00:09:48,800
this big room that we're in right now

305
00:09:53,190 --> 00:09:50,959
but all of the back rooms and our labs

306
00:09:54,630 --> 00:09:53,200
and facilities and so we have to go

307
00:09:56,470 --> 00:09:54,640
through a lot of training it's kind of

308
00:09:58,150 --> 00:09:56,480
like going back to school so to be a

309
00:09:59,910 --> 00:09:58,160
flight controller it can take several

310
00:10:02,230 --> 00:09:59,920
years and you have to do these really

311
00:10:03,750 --> 00:10:02,240
interesting things called simulations

312
00:10:05,430 --> 00:10:03,760
and these are the hardest tests you'll

313
00:10:07,910 --> 00:10:05,440

ever take because they are true

314
00:10:10,389 --> 00:10:07,920
simulations of what could go wrong

315
00:10:11,750 --> 00:10:10,399
if you were manning or um or monitoring

316
00:10:13,910 --> 00:10:11,760
the space station and they're kind of

317
00:10:15,829 --> 00:10:13,920
fun they're a little scary but once you

318
00:10:17,590 --> 00:10:15,839
pass all of the written tests and you

319
00:10:18,470 --> 00:10:17,600
you work through your simulations and

320
00:10:21,509 --> 00:10:18,480
you really

321
00:10:23,750 --> 00:10:21,519
pass a lot of exams so to speak then you

322
00:10:25,990 --> 00:10:23,760
get certified to be a flight controller

323
00:10:27,829 --> 00:10:26,000
now engineers like me who aren't

324
00:10:29,750 --> 00:10:27,839
necessarily certified to be a flight

325
00:10:31,670 --> 00:10:29,760
controller we still work in the back

326
00:10:33,509 --> 00:10:31,680
room supporting the folks that are here

327
00:10:35,269 --> 00:10:33,519
in the mission control center and we're

328
00:10:37,110 --> 00:10:35,279
kind of the hardware providers so the

329
00:10:38,870 --> 00:10:37,120
people who are monitoring the health of

330
00:10:40,949 --> 00:10:38,880
the space suit or monitoring the

331
00:10:42,230 --> 00:10:40,959
equipment on the space station we go

332
00:10:44,550 --> 00:10:42,240
through kind of a different type of

333
00:10:46,710 --> 00:10:44,560
training where we run a lot of our own

334
00:10:48,710 --> 00:10:46,720
chamber tests and evaluations so my

335
00:10:50,550 --> 00:10:48,720
particular engineering team

336
00:10:52,470 --> 00:10:50,560
we have a lot of different chambers that

337
00:10:54,710 --> 00:10:52,480
can either simulate the temperatures on

338
00:10:56,630 --> 00:10:54,720

the space station the the vacuum

339
00:10:58,470 --> 00:10:56,640
environment of space or a combination of

340
00:11:00,470 --> 00:10:58,480
the two and so we do a lot of testing of

341
00:11:02,150 --> 00:11:00,480
our hardware and that's how we train

342
00:11:03,110 --> 00:11:02,160
for our missions and one thing you guys

343
00:11:05,110 --> 00:11:03,120
should know if you ever want to come

344
00:11:06,790 --> 00:11:05,120
work for nasa we take all kinds of

345
00:11:08,550 --> 00:11:06,800
people so whatever you want to study in

346
00:11:09,829 --> 00:11:08,560
college just go for something that you

347
00:11:11,590 --> 00:11:09,839
find interesting that you want to have

348
00:11:13,030 --> 00:11:11,600
this background to engineering mind

349
00:11:15,110 --> 00:11:13,040
communication so she had to do a lot of

350
00:11:16,470 --> 00:11:15,120
math and science i'm not very good at

351
00:11:18,389 --> 00:11:16,480
math and science i had to do a lot of

352
00:11:20,069 --> 00:11:18,399
writing and things such as that so it

353
00:11:21,910 --> 00:11:20,079
takes all sorts of people to make this

354
00:11:23,190 --> 00:11:21,920
huge place kind of kind of work and

355
00:11:25,269 --> 00:11:23,200
support the space station and everything

356
00:11:28,389 --> 00:11:25,279
else that nasa does so

357
00:11:30,470 --> 00:11:28,399
we take all types

358
00:11:37,350 --> 00:11:30,480
thank you you're welcome

359
00:11:42,790 --> 00:11:40,470
hello my name is deja and my question is

360
00:11:46,150 --> 00:11:42,800
if i were to become an astronaut

361
00:11:48,790 --> 00:11:46,160
how long will it take and

362
00:11:50,949 --> 00:11:48,800
what all do i have to go through

363
00:11:52,550 --> 00:11:50,959

wow okay well just like i talked about

364
00:11:54,310 --> 00:11:52,560
it's like going back to school to become

365
00:11:55,829 --> 00:11:54,320
a flight controller to sit in the

366
00:11:58,870 --> 00:11:55,839
mission control center when you're an

367
00:12:00,629 --> 00:11:58,880
astronaut the first few years you are

368
00:12:03,030 --> 00:12:00,639
really it's like you're back in school

369
00:12:05,670 --> 00:12:03,040
but the school is pretty fun you know

370
00:12:07,670 --> 00:12:05,680
you get to train in our mock-ups you get

371
00:12:09,190 --> 00:12:07,680
to meet engineers just like myself and

372
00:12:10,790 --> 00:12:09,200
work with all different kinds of people

373
00:12:12,550 --> 00:12:10,800
and learn about the different systems on

374
00:12:14,230 --> 00:12:12,560
the space station

375
00:12:15,990 --> 00:12:14,240
and you also get to do a lot of

376
00:12:17,190 --> 00:12:16,000
emergency things they teach you all

377
00:12:19,350 --> 00:12:17,200
about

378
00:12:21,190 --> 00:12:19,360
a survival aspect in fact they go

379
00:12:22,870 --> 00:12:21,200
camping and they have to learn how to do

380
00:12:25,110 --> 00:12:22,880
all kinds of survival aspects and so

381
00:12:26,710 --> 00:12:25,120
it's really fun so those first few years

382
00:12:27,990 --> 00:12:26,720
you're really just learning how to be a

383
00:12:29,670 --> 00:12:28,000
good team member

384
00:12:31,430 --> 00:12:29,680
learning about survival learning about

385
00:12:34,230 --> 00:12:31,440
you know just more general systems and

386
00:12:36,310 --> 00:12:34,240
then once you get selected for a mission

387
00:12:39,030 --> 00:12:36,320
then it's really hardcore you have to

388
00:12:40,790 --> 00:12:39,040

train with your team day in and day out

389
00:12:42,710 --> 00:12:40,800
work in your simulations you work in the

390
00:12:44,550 --> 00:12:42,720
sims the simulations just like the

391
00:12:46,150 --> 00:12:44,560
flight controllers

392
00:12:48,150 --> 00:12:46,160
you travel a lot they have to go to

393
00:12:49,430 --> 00:12:48,160
russia sometimes they go to japan

394
00:12:50,710 --> 00:12:49,440
because remember we've got all those

395
00:12:52,629 --> 00:12:50,720
international partners so there's

396
00:12:55,110 --> 00:12:52,639
facilities around the world that our

397
00:12:57,829 --> 00:12:55,120
astronauts get to travel to to train

398
00:12:59,509 --> 00:12:57,839
and so it can take several years even

399
00:13:01,350 --> 00:12:59,519
once you first get selected just to go

400
00:13:03,350 --> 00:13:01,360
through that initial training and then

401
00:13:05,829 --> 00:13:03,360
your mission specific training can be

402
00:13:07,670 --> 00:13:05,839
even more years but it's definitely well

403
00:13:10,790 --> 00:13:07,680
worth it because once you fly in space

404
00:13:12,949 --> 00:13:10,800
you are so prepared for that flight

405
00:13:15,990 --> 00:13:12,959
you know you can do anything exactly

406
00:13:24,310 --> 00:13:17,110
okay

407
00:13:28,389 --> 00:13:26,550
hi my name is naya and i wanted to know

408
00:13:33,030 --> 00:13:28,399
what protects the space station from

409
00:13:34,870 --> 00:13:33,040
like satellite pieces or like meteorites

410
00:13:37,269 --> 00:13:34,880
that's a great question naya and as josh

411
00:13:40,470 --> 00:13:37,279
mentioned we actually monitor

412
00:13:42,470 --> 00:13:40,480
a large majority of the space debris and

413
00:13:44,069 --> 00:13:42,480

space hardware that's out there so we

414
00:13:46,150 --> 00:13:44,079
really track the position of all of

415
00:13:48,629 --> 00:13:46,160
these different pieces of equipment

416
00:13:50,389 --> 00:13:48,639
and space debris so we we kind of know

417
00:13:51,829 --> 00:13:50,399
if there's going to be a situation where

418
00:13:55,269 --> 00:13:51,839
coming close yeah there's something

419
00:14:00,710 --> 00:13:58,389
thank you you're welcome

420
00:14:05,590 --> 00:14:00,720
hi my name is terry

421
00:14:10,310 --> 00:14:08,310
wow well it really depends on a number

422
00:14:12,230 --> 00:14:10,320
of factors number one i think the

423
00:14:13,990 --> 00:14:12,240
biggest thing that we look for when

424
00:14:15,509 --> 00:14:14,000
we're selecting astronauts is that this

425
00:14:16,710 --> 00:14:15,519
is going to be someone who can work well

426
00:14:18,949 --> 00:14:16,720
on a team

427
00:14:21,430 --> 00:14:18,959
because every astronaut relies on his or

428
00:14:23,350 --> 00:14:21,440
her teammates and crew while they're on

429
00:14:25,030 --> 00:14:23,360
board the space station to really help

430
00:14:27,189 --> 00:14:25,040
each other out go through whatever

431
00:14:29,590 --> 00:14:27,199
mission priorities you have to do but

432
00:14:31,350 --> 00:14:29,600
really they also become kind of a family

433
00:14:34,470 --> 00:14:31,360
you know it's a small group of people

434
00:14:36,790 --> 00:14:34,480
living in space for months at a time so

435
00:14:39,350 --> 00:14:36,800
we really make sure that the people we

436
00:14:40,949 --> 00:14:39,360
select are willing to work on a team and

437
00:14:43,189 --> 00:14:40,959
work well on a team

438
00:14:45,030 --> 00:14:43,199

and then really the rest of the aspects

439
00:14:47,030 --> 00:14:45,040
depend on what missions we think we're

440
00:14:50,389 --> 00:14:47,040
going to select them for

441
00:14:51,269 --> 00:14:50,399
and we look for a nice diverse variety

442
00:14:52,949 --> 00:14:51,279
of

443
00:14:54,629 --> 00:14:52,959
different careers so we have astronauts

444
00:14:56,470 --> 00:14:54,639
who are engineers we have astronauts who

445
00:14:58,230 --> 00:14:56,480
are scientists we have astronauts who

446
00:14:59,829 --> 00:14:58,240
are doctors we have astronauts who are

447
00:15:02,150 --> 00:14:59,839
teachers

448
00:15:03,829 --> 00:15:02,160
and really what we look for is someone

449
00:15:05,990 --> 00:15:03,839
who not only wants to do what they're

450
00:15:08,310 --> 00:15:06,000
doing in their career but really has a

451
00:15:10,069 --> 00:15:08,320
higher goal of helping us work on our

452
00:15:11,670 --> 00:15:10,079
exploration tasks i mean that's what

453
00:15:13,269 --> 00:15:11,680
everyone who works here at nasa that's

454
00:15:14,870 --> 00:15:13,279
what we're focused on

455
00:15:17,030 --> 00:15:14,880
living in space onboard the space

456
00:15:19,110 --> 00:15:17,040
station doing fantastic science with

457
00:15:21,110 --> 00:15:19,120
scientists around the world but then

458
00:15:23,590 --> 00:15:21,120
also looking beyond what we can do when

459
00:15:27,509 --> 00:15:23,600
we go someplace maybe back to the moon

460
00:15:28,870 --> 00:15:27,519
or onto mars or to an asteroid

461
00:15:31,350 --> 00:15:28,880
good i hope you're thinking about being

462
00:15:32,310 --> 00:15:31,360
an astronaut

463
00:15:36,629 --> 00:15:32,320

thank you

464
00:15:42,629 --> 00:15:39,509
hi my name is charlie and what makes

465
00:15:44,710 --> 00:15:42,639
spaces resistant to uv rays

466
00:15:46,710 --> 00:15:44,720
oh wow good question well so you can see

467
00:15:48,870 --> 00:15:46,720
here this outer layer that i have and

468
00:15:52,150 --> 00:15:48,880
that josh has with the boot is the color

469
00:15:53,910 --> 00:15:52,160
white and so um that white is chosen for

470
00:15:55,269 --> 00:15:53,920
a few reasons number one we want to be

471
00:15:57,269 --> 00:15:55,279
able to see the astronauts when they're

472
00:15:59,430 --> 00:15:57,279
outside so the easiest color to see

473
00:16:00,949 --> 00:15:59,440
against the black backdrop of space is

474
00:16:02,710 --> 00:16:00,959
in fact white

475
00:16:04,550 --> 00:16:02,720
the other thing is that there's a little

476
00:16:06,790 --> 00:16:04,560
bit of temperature control we can do you

477
00:16:08,870 --> 00:16:06,800
know in atlanta i grew up there so i

478
00:16:10,710 --> 00:16:08,880
know it gets hot there in the summertime

479
00:16:12,470 --> 00:16:10,720
and on a hot summer day

480
00:16:14,230 --> 00:16:12,480
if you had the choice between wearing a

481
00:16:15,509 --> 00:16:14,240
white t-shirt or a black t-shirt and

482
00:16:16,470 --> 00:16:15,519
you're going to be outside in the sun

483
00:16:18,230 --> 00:16:16,480
all day

484
00:16:19,990 --> 00:16:18,240
most likely you'll choose the white one

485
00:16:21,749 --> 00:16:20,000
to keep you a little bit cooler that's

486
00:16:24,069 --> 00:16:21,759
because the black color will absorb the

487
00:16:26,310 --> 00:16:24,079
sun and absorb the temperature whereas

488
00:16:28,550 --> 00:16:26,320

white is a little bit more reflective

489
00:16:31,269 --> 00:16:28,560
so that's part of it now as far as the

490
00:16:32,949 --> 00:16:31,279
uv and radiation protection the number

491
00:16:35,110 --> 00:16:32,959
of layers that we have here gives you

492
00:16:37,430 --> 00:16:35,120
some protection

493
00:16:39,990 --> 00:16:37,440
you have also on the helmet you have

494
00:16:41,590 --> 00:16:40,000
basically a spray coated layer of gold

495
00:16:43,030 --> 00:16:41,600
that's going to protect your eyes that's

496
00:16:44,470 --> 00:16:43,040
going to be just like your sunglasses

497
00:16:46,710 --> 00:16:44,480
that have some kind of protective

498
00:16:48,949 --> 00:16:46,720
properties but a big thing that we do to

499
00:16:51,590 --> 00:16:48,959
protect you from radiation is we just

500
00:16:53,670 --> 00:16:51,600
monitor your exposure over the duration

501
00:16:56,150 --> 00:16:53,680
of your life so they actually wear a

502
00:16:58,150 --> 00:16:56,160
little sensor inside of their spacesuit

503
00:16:59,990 --> 00:16:58,160
that's monitoring how much radiation

504
00:17:01,509 --> 00:17:00,000
you're absorbing and even in the

505
00:17:03,590 --> 00:17:01,519
international space station when they're

506
00:17:05,510 --> 00:17:03,600
inside they're still getting some

507
00:17:10,230 --> 00:17:05,520
exposure so we just monitor that over

508
00:17:10,240 --> 00:17:15,669
you're welcome

509
00:17:22,150 --> 00:17:17,990
my name is ben and i was wondering what

510
00:17:25,350 --> 00:17:23,829
wow that that's a good question an

511
00:17:27,990 --> 00:17:25,360
astronaut's day schedule on the

512
00:17:29,750 --> 00:17:28,000
international space station yeah it's so

513
00:17:30,710 --> 00:17:29,760

okay well one thing you need to know is

514
00:17:31,990 --> 00:17:30,720
that there's somebody here in mission

515
00:17:33,110 --> 00:17:32,000
control there's all sorts of people that

516
00:17:34,150 --> 00:17:33,120
do different jobs here in mission

517
00:17:36,150 --> 00:17:34,160
control and one of them is called the

518
00:17:38,150 --> 00:17:36,160
ops planner and they sit right back over

519
00:17:39,830 --> 00:17:38,160
here kind of close to where we are and

520
00:17:41,669 --> 00:17:39,840
they plan the astronauts and the

521
00:17:43,190 --> 00:17:41,679
cosmonauts days and sometimes five

522
00:17:44,630 --> 00:17:43,200
minute increments so you can imagine if

523
00:17:45,669 --> 00:17:44,640
you're going to school for eight or nine

524
00:17:47,430 --> 00:17:45,679
hours a day

525
00:17:49,190 --> 00:17:47,440
somebody planning your day within five

526
00:17:51,830 --> 00:17:49,200
minutes i mean it's a very specific

527
00:17:53,110 --> 00:17:51,840
schedule and they do everything from

528
00:17:54,150 --> 00:17:53,120
cleaning things onboard the space

529
00:17:55,270 --> 00:17:54,160
station i mean you're living up here

530
00:17:56,390 --> 00:17:55,280
that's your house you have to keep it

531
00:17:57,830 --> 00:17:56,400
clean they

532
00:17:59,110 --> 00:17:57,840
uh you know they have time to talk to

533
00:18:00,549 --> 00:17:59,120
their families but the biggest thing

534
00:18:03,029 --> 00:18:00,559
they're doing is a lot of science and

535
00:18:05,430 --> 00:18:03,039
research and that takes many many hours

536
00:18:06,789 --> 00:18:05,440
every week to do that so

537
00:18:07,830 --> 00:18:06,799
there's actually a look at the ops

538
00:18:10,870 --> 00:18:07,840

planner here in mission control he's

539
00:18:12,870 --> 00:18:10,880
waving at the camera to you guys

540
00:18:15,350 --> 00:18:12,880
so these guys stay very busy and they

541
00:18:17,750 --> 00:18:15,360
planted a day a day in advance and you

542
00:18:18,950 --> 00:18:17,760
know the crew stays pretty uh

543
00:18:20,630 --> 00:18:18,960
pretty busy up there on board the

544
00:18:22,150 --> 00:18:20,640
international space station as they do

545
00:18:24,310 --> 00:18:22,160
all this science and just keeping the

546
00:18:27,430 --> 00:18:24,320
thing running too so

547
00:18:32,630 --> 00:18:29,830
hello my name is ezekiel

548
00:18:33,750 --> 00:18:32,640
and when you're in a spaceship kit and

549
00:18:38,470 --> 00:18:33,760
water

550
00:18:39,990 --> 00:18:38,480
can

551
00:18:44,789 --> 00:18:40,000
and the water becomes

552
00:18:47,909 --> 00:18:46,070
that's a great question you know i

553
00:18:49,669 --> 00:18:47,919
talked earlier about how the surface

554
00:18:51,270 --> 00:18:49,679
properties of water the surface tension

555
00:18:53,190 --> 00:18:51,280
makes the water molecules all kind of

556
00:18:55,110 --> 00:18:53,200
stick to each other and they become

557
00:18:56,470 --> 00:18:55,120
these really cool bubbles and i know the

558
00:18:58,470 --> 00:18:56,480
astronauts like to have fun with that

559
00:19:00,150 --> 00:18:58,480
sometimes with their with their water

560
00:19:02,630 --> 00:19:00,160
and their juice drinks you know they'll

561
00:19:04,390 --> 00:19:02,640
they'll actually squeeze the juice pack

562
00:19:05,830 --> 00:19:04,400
and a little bubble will form just like

563
00:19:07,430 --> 00:19:05,840

a bubble like you'd blow here on earth

564
00:19:08,870 --> 00:19:07,440
with the soapy water

565
00:19:11,590 --> 00:19:08,880
except it's full

566
00:19:13,270 --> 00:19:11,600
of water and so that's why when you

567
00:19:15,110 --> 00:19:13,280
watch on the international space station

568
00:19:17,750 --> 00:19:15,120
we actually have to package all of the

569
00:19:20,150 --> 00:19:17,760
fluids that they drink in these

570
00:19:22,390 --> 00:19:20,160
foil packs they kind of look like a you

571
00:19:23,270 --> 00:19:22,400
know a juice a juice pouch

572
00:19:25,270 --> 00:19:23,280
and

573
00:19:26,630 --> 00:19:25,280
that's why the fluid has to be contained

574
00:19:28,549 --> 00:19:26,640
and even when they're heating up their

575
00:19:30,230 --> 00:19:28,559
food they actually pour it out of a

576
00:19:33,029 --> 00:19:30,240
little spout they actually put it right

577
00:19:35,029 --> 00:19:33,039
into the the food package so we don't

578
00:19:36,870 --> 00:19:35,039
really want that water floating around

579
00:19:38,710 --> 00:19:36,880
unintentionally so sometimes they do

580
00:19:39,909 --> 00:19:38,720
play with it but a lot of times they

581
00:19:41,590 --> 00:19:39,919
just drink it right out of their juice

582
00:19:42,630 --> 00:19:41,600
pouch they also can't have sodas up

583
00:19:44,150 --> 00:19:42,640
there too which is probably the reason

584
00:19:45,830 --> 00:19:44,160
why i would never be an astronaut but

585
00:19:47,510 --> 00:19:45,840
you know they can't because

586
00:19:48,789 --> 00:19:47,520
the carbonation and the bubbles it just

587
00:19:50,390 --> 00:19:48,799
doesn't work so they have to stick with

588
00:19:52,070 --> 00:19:50,400

coffee and tea and

589
00:19:55,510 --> 00:19:52,080
orange juice and things like that but

590
00:19:55,520 --> 00:20:02,390
thank you

591
00:20:06,149 --> 00:20:04,390
hi my name is miles gordon and i wanted

592
00:20:07,190 --> 00:20:06,159
to know are there alternate power

593
00:20:10,549 --> 00:20:07,200
sources

594
00:20:12,149 --> 00:20:10,559
on the international space station

595
00:20:13,830 --> 00:20:12,159
that's a good question yeah there are a

596
00:20:15,990 --> 00:20:13,840
lot of power sources on this on the

597
00:20:19,430 --> 00:20:16,000
space station in fact so the big solar

598
00:20:22,310 --> 00:20:19,440
arrays are a big power draw

599
00:20:24,630 --> 00:20:22,320
we also have a lot of batteries i mean

600
00:20:26,149 --> 00:20:24,640
we use batteries in the space suit but

601
00:20:28,310 --> 00:20:26,159
you know then you're kind of on your own

602
00:20:30,070 --> 00:20:28,320
independent system and in fact for

603
00:20:32,950 --> 00:20:30,080
future exploration we're looking at a

604
00:20:35,510 --> 00:20:32,960
variety of different power systems not

605
00:20:37,190 --> 00:20:35,520
only batteries or solar arrays but you

606
00:20:39,430 --> 00:20:37,200
know maybe things that are regenerable

607
00:20:41,350 --> 00:20:39,440
systems you know um

608
00:20:43,029 --> 00:20:41,360
so power power's a big thing we have to

609
00:20:44,310 --> 00:20:43,039
think about the batteries are huge on

610
00:20:45,510 --> 00:20:44,320
board the international space station

611
00:20:46,950 --> 00:20:45,520
and like heather said they've got these

612
00:20:48,070 --> 00:20:46,960
huge solar arrays that are just enormous

613
00:20:50,230 --> 00:20:48,080

i mean they're bigger than the football

614
00:20:51,669 --> 00:20:50,240
field really from from top to bottom but

615
00:20:53,430 --> 00:20:51,679
um it still has to have batteries

616
00:20:54,710 --> 00:20:53,440
because the space station is only in the

617
00:20:56,310 --> 00:20:54,720
daylight a certain amount of time and

618
00:20:57,750 --> 00:20:56,320
then it's in the dark and when it's in

619
00:20:59,750 --> 00:20:57,760
the dark obviously the sun's not there

620
00:21:01,190 --> 00:20:59,760
it's not gathering energy so it has to

621
00:21:02,549 --> 00:21:01,200
really rely on those batteries that are

622
00:21:03,669 --> 00:21:02,559
out there that have been charged during

623
00:21:05,830 --> 00:21:03,679
the previous

624
00:21:07,510 --> 00:21:05,840
it does the 16 times a day

625
00:21:09,430 --> 00:21:07,520
so basically whenever the space station

626
00:21:10,549 --> 00:21:09,440
is at in the night time pass it has to

627
00:21:12,230 --> 00:21:10,559
rely on those batteries to power

628
00:21:13,830 --> 00:21:12,240
everything on board so it's kind of a

629
00:21:16,070 --> 00:21:13,840
whole

630
00:21:18,230 --> 00:21:16,080
very fancy system to keep this thing

631
00:21:27,750 --> 00:21:18,240
running

632
00:21:31,669 --> 00:21:29,830
hello my name is mayana i want to know

633
00:21:33,110 --> 00:21:31,679
what material do they make the space

634
00:21:35,750 --> 00:21:33,120
helmets with

635
00:21:37,590 --> 00:21:35,760
like the glass on it

636
00:21:39,750 --> 00:21:37,600
very good well it's actually not made of

637
00:21:42,789 --> 00:21:39,760
glass at all you know glass if you break

638
00:21:44,630 --> 00:21:42,799

glass it forms these really sharp edges

639
00:21:46,230 --> 00:21:44,640
and pieces and you don't want that when

640
00:21:48,310 --> 00:21:46,240
you're wearing something like this that

641
00:21:49,669 --> 00:21:48,320
is pressurized and keeping you alive for

642
00:21:52,230 --> 00:21:49,679
your space walk

643
00:21:54,710 --> 00:21:52,240
so it's actually made out of kind of a

644
00:21:55,830 --> 00:21:54,720
fancy type of plastic material

645
00:21:57,510 --> 00:21:55,840
that

646
00:21:59,990 --> 00:21:57,520
you know has some protective properties

647
00:22:01,750 --> 00:22:00,000
to it and you've got basically an inner

648
00:22:03,669 --> 00:22:01,760
visor that's holding the pressure in and

649
00:22:05,590 --> 00:22:03,679
then an outer visor

650
00:22:07,029 --> 00:22:05,600
because sometimes they do tend to bump

651
00:22:09,029 --> 00:22:07,039
their heads a little bit i mean you're

652
00:22:11,190 --> 00:22:09,039
moving around it's a little bit you know

653
00:22:13,430 --> 00:22:11,200
you've got all this material around you

654
00:22:15,270 --> 00:22:13,440
and so you have that second layer

655
00:22:17,270 --> 00:22:15,280
that's there to kind of protect you from

656
00:22:19,110 --> 00:22:17,280
scratches and any cracks in the helmet

657
00:22:20,870 --> 00:22:19,120
and then when they're on the sunny side

658
00:22:22,390 --> 00:22:20,880
of the planet they pull down an outside

659
00:22:24,549 --> 00:22:22,400
visor and that's the visor i mentioned

660
00:22:25,350 --> 00:22:24,559
earlier that has that layer of gold on

661
00:22:34,390 --> 00:22:25,360
it

662
00:22:37,430 --> 00:22:36,470
and i had one other question

663
00:22:38,390 --> 00:22:37,440

okay

664
00:22:41,750 --> 00:22:38,400
you

665
00:22:45,430 --> 00:22:41,760
there was um the dehydrated shrimp there

666
00:22:47,190 --> 00:22:45,440
when you dehydrate meat doesn't it like

667
00:22:48,950 --> 00:22:47,200
lose like nutrition does when you

668
00:22:51,270 --> 00:22:48,960
dehydrate the food it doesn't it lose

669
00:22:53,029 --> 00:22:51,280
nutritional value

670
00:22:55,270 --> 00:22:53,039
that is a really interesting question

671
00:22:57,909 --> 00:22:55,280
and you know actually the nutrition we

672
00:23:00,390 --> 00:22:57,919
have a group of people here so i imagine

673
00:23:02,630 --> 00:23:00,400
several of you probably like food right

674
00:23:04,470 --> 00:23:02,640
i would imagine yep okay well we have a

675
00:23:07,029 --> 00:23:04,480
group of people here that are dedicated

676
00:23:09,590 --> 00:23:07,039
food scientists and all they do is

677
00:23:12,310 --> 00:23:09,600
figure out how to make foods that are

678
00:23:13,990 --> 00:23:12,320
better for you more nutritious and tasty

679
00:23:16,070 --> 00:23:14,000
in in space

680
00:23:17,830 --> 00:23:16,080
and so absolutely i mean they're always

681
00:23:19,510 --> 00:23:17,840
looking at the nutritional aspects of

682
00:23:21,110 --> 00:23:19,520
the food now dehydrating the food i

683
00:23:22,789 --> 00:23:21,120
haven't heard if that actually reduces

684
00:23:24,630 --> 00:23:22,799
the value at all

685
00:23:25,830 --> 00:23:24,640
i don't i don't think it would because

686
00:23:27,190 --> 00:23:25,840
you're basically just pulling out the

687
00:23:29,110 --> 00:23:27,200
moisture

688
00:23:30,950 --> 00:23:29,120

but it's possible that maybe you lose a

689
00:23:32,950 --> 00:23:30,960
little bit uh when you dehydrate they

690
00:23:34,310 --> 00:23:32,960
probably make up for that you know

691
00:23:35,909 --> 00:23:34,320
people smarter than us in terms of

692
00:23:37,350 --> 00:23:35,919
cooking food in space probably know that

693
00:23:38,789 --> 00:23:37,360
a little bit better than we do but but

694
00:23:40,310 --> 00:23:38,799
you know they they measure calorie

695
00:23:41,590 --> 00:23:40,320
content and fat content and sugar and

696
00:23:43,110 --> 00:23:41,600
stuff like that on i mean the astronauts

697
00:23:44,149 --> 00:23:43,120
have a very they get to pick and choose

698
00:23:45,430 --> 00:23:44,159
what they want to eat but they watch it

699
00:23:46,870 --> 00:23:45,440
fairly closely in terms of what their

700
00:23:48,789 --> 00:23:46,880
what their diet is because they're

701
00:23:50,149 --> 00:23:48,799
watching everything from muscle and bone

702
00:23:51,590 --> 00:23:50,159
loss and they're having to exercise i

703
00:23:53,590 --> 00:23:51,600
mean they really watch what these crews

704
00:23:54,870 --> 00:23:53,600
do and to make sure they're healthy and

705
00:23:56,149 --> 00:23:54,880
whenever they come back after five or

706
00:23:58,789 --> 00:23:56,159
six months that they're

707
00:24:00,390 --> 00:23:58,799
ready to be back on the planet

708
00:24:03,590 --> 00:24:00,400
their menu is pretty diverse though i

709
00:24:05,190 --> 00:24:03,600
mean they love pizza macaroni and cheese

710
00:24:07,190 --> 00:24:05,200
shrimp cocktail most of the food's

711
00:24:08,630 --> 00:24:07,200
pretty good it's it's uh their taste

712
00:24:10,310 --> 00:24:08,640
buds tend to kind of

713
00:24:12,549 --> 00:24:10,320

get a little off whenever they're up

714
00:24:14,230 --> 00:24:12,559
there so things that are spicy and and

715
00:24:16,070 --> 00:24:14,240
taste stronger here on earth and that's

716
00:24:20,390 --> 00:24:16,080
what they typically like so

717
00:24:24,950 --> 00:24:23,029
hi my name is convert um i want to act

718
00:24:28,950 --> 00:24:24,960
is it true that's actually gonna create

719
00:24:28,960 --> 00:24:35,590
say that again one more time

720
00:24:39,269 --> 00:24:37,510
are we going to create a city on mars

721
00:24:40,710 --> 00:24:39,279
you know that is a great question to end

722
00:24:42,230 --> 00:24:40,720
on because it really is something that

723
00:24:43,750 --> 00:24:42,240
we're looking at

724
00:24:45,669 --> 00:24:43,760
where are we going to go next you know

725
00:24:47,269 --> 00:24:45,679
we've been to the moon but i don't think

726
00:24:48,549 --> 00:24:47,279
we've quite finished the job there i

727
00:24:50,549 --> 00:24:48,559
think we have a lot more science and

728
00:24:53,110 --> 00:24:50,559
research to do we've got people on the

729
00:24:54,870 --> 00:24:53,120
space station right now helping us to do

730
00:24:57,110 --> 00:24:54,880
a lot of science and really understand

731
00:24:58,390 --> 00:24:57,120
the effects of living in space for a

732
00:24:59,669 --> 00:24:58,400
long time

733
00:25:01,830 --> 00:24:59,679
but you know we might go back to the

734
00:25:03,669 --> 00:25:01,840
moon but we've got rovers on mars right

735
00:25:05,669 --> 00:25:03,679
now that are basically being our little

736
00:25:07,590 --> 00:25:05,679
science buddies and they're trying

737
00:25:09,510 --> 00:25:07,600
trying to check things out and help us

738
00:25:11,909 --> 00:25:09,520

determine if there's enough resources if

739
00:25:14,230 --> 00:25:11,919
there's water maybe even signs of life

740
00:25:15,990 --> 00:25:14,240
currently or past signs of life to

741
00:25:17,269 --> 00:25:16,000
decide if that's a place that humans

742
00:25:19,029 --> 00:25:17,279
really want to go

743
00:25:21,029 --> 00:25:19,039
not only to visit and do science but

744
00:25:22,870 --> 00:25:21,039
maybe eventually to live

745
00:25:24,310 --> 00:25:22,880
you know we we have some science teams

746
00:25:26,390 --> 00:25:24,320
and engineering teams that have looked

747
00:25:29,029 --> 00:25:26,400
at how to colonize places like the moon

748
00:25:30,789 --> 00:25:29,039
or mars so that is kind of a study that

749
00:25:32,549 --> 00:25:30,799
we've been doing and we'll just have to

750
00:25:33,350 --> 00:25:32,559
stay tuned and see what happens with it

751
00:25:34,789 --> 00:25:33,360
but

752
00:25:36,870 --> 00:25:34,799
we've got our river buddies up there

753
00:25:38,070 --> 00:25:36,880
right now so way to go curiosity and

754
00:25:39,669 --> 00:25:38,080
certainly

755
00:25:40,870 --> 00:25:39,679
we've got teams here at nasa that are

756
00:25:42,950 --> 00:25:40,880
interested in doing those kinds of

757
00:25:44,549 --> 00:25:42,960
things so but you guys are going to be

758
00:25:46,870 --> 00:25:44,559
the ones that will make that kind of

759
00:25:49,110 --> 00:25:46,880
mission possible so definitely stay in

760
00:25:50,549 --> 00:25:49,120
school study hard you know as josh

761
00:25:52,470 --> 00:25:50,559
mentioned we have a lot of different

762
00:25:54,710 --> 00:25:52,480
careers here at nasa so if science and

763
00:25:56,789 --> 00:25:54,720

math isn't your thing that's okay we

764
00:25:58,630 --> 00:25:56,799
still need you so think about how you

765
00:26:00,470 --> 00:25:58,640
can contribute to these future missions

766
00:26:02,870 --> 00:26:00,480
it's a pretty exciting time

767
00:26:04,470 --> 00:26:02,880
to do space exploration yeah so we want

768
00:26:05,669 --> 00:26:04,480
to thank you guys thank heather for uh

769
00:26:07,269 --> 00:26:05,679
for coming in here and answering your

770
00:26:08,630 --> 00:26:07,279
questions so to all of our friends there

771
00:26:09,830 --> 00:26:08,640
in atlanta at memorial middle school we

772
00:26:11,909 --> 00:26:09,840
say thank you very much if you ever in

773
00:26:13,510 --> 00:26:11,919
houston come by and say hi sometime and

774
00:26:15,750 --> 00:26:13,520
we probably need to let you guys