
PAO

1
00:00:03,909 --> 00:00:02,149
hi everybody from mission control this

2
00:00:05,749 --> 00:00:03,919
is uh josh barley i'm joined by my

3
00:00:06,950 --> 00:00:05,759
friend heather paul spacesuit engineer

4
00:00:09,509 --> 00:00:06,960
here we are going to be talking to

5
00:00:10,709 --> 00:00:09,519
memorial school there in atlanta georgia

6
00:00:11,669 --> 00:00:10,719
i think we have quite a number of

7
00:00:12,950 --> 00:00:11,679
students here they're going to be

8
00:00:14,870 --> 00:00:12,960
talking to heather about all sorts of

9
00:00:23,109 --> 00:00:14,880
things so if you guys are ready we're

10
00:00:26,790 --> 00:00:25,189
my question is if there are several

11
00:00:29,029 --> 00:00:26,800
astronauts from different countries on

12
00:00:30,550 --> 00:00:29,039
this international space station and do

13
00:00:35,190 --> 00:00:30,560

they have to learn a central language to

14
00:00:39,110 --> 00:00:36,709
i think that's a great question in fact

15
00:00:40,790 --> 00:00:39,120
a huge part of what is so fantastic

16
00:00:42,869 --> 00:00:40,800
about the international space station is

17
00:00:44,709 --> 00:00:42,879
that word international with all of our

18
00:00:46,389 --> 00:00:44,719
different collaborations across the

19
00:00:48,470 --> 00:00:46,399
world it really is an international

20
00:00:50,229 --> 00:00:48,480
effort and you're absolutely right we

21
00:00:51,830 --> 00:00:50,239
have a very diverse population of

22
00:00:54,229 --> 00:00:51,840
astronauts not only from the united

23
00:00:56,229 --> 00:00:54,239
states but across a variety of countries

24
00:00:58,790 --> 00:00:56,239
and so english is the standard language

25
00:01:00,470 --> 00:00:58,800
although a lot of our us astronauts do

26
00:01:03,270 --> 00:01:00,480
learn russian

27
00:01:04,549 --> 00:01:03,280
and some learn japanese as well so it's

28
00:01:05,830 --> 00:01:04,559
good to learn your foreign languages

29
00:01:07,350 --> 00:01:05,840
while you're in school because when you

30
00:01:09,990 --> 00:01:07,360
become an astronaut you're going to need

31
00:01:20,950 --> 00:01:10,000
to be able to work across those cultural

32
00:01:26,390 --> 00:01:23,590
hello my name is makai stevens mcqueen

33
00:01:31,350 --> 00:01:26,400
and i want to know that if how

34
00:01:32,390 --> 00:01:31,360
detectable is a leak in a spacesuit

35
00:01:34,469 --> 00:01:32,400
i don't think i quite heard that

36
00:01:36,390 --> 00:01:34,479
question how detectable is a leak in a

37
00:01:37,990 --> 00:01:36,400
spacesuit i think that was it okay oh

38
00:01:39,510 --> 00:01:38,000

that's a very good question and a really

39
00:01:41,190 --> 00:01:39,520
important one because the spacesuit is

40
00:01:43,350 --> 00:01:41,200
basically like a big human shaped

41
00:01:44,950 --> 00:01:43,360
balloon that's keeping you alive during

42
00:01:46,630 --> 00:01:44,960
your spacewalk and so you definitely

43
00:01:49,429 --> 00:01:46,640
don't want to get any leaks or rips or

44
00:01:51,590 --> 00:01:49,439
tears but if you were

45
00:01:53,510 --> 00:01:51,600
we have all of these sensors that are

46
00:01:55,990 --> 00:01:53,520
kind of monitoring the health of the

47
00:01:57,830 --> 00:01:56,000
spacesuit and so if there was any kind

48
00:01:59,830 --> 00:01:57,840
of a leak or a tear those sensors would

49
00:02:01,350 --> 00:01:59,840
detect it because you'd feel or the

50
00:02:04,310 --> 00:02:01,360
sensors would detect that change in

51
00:02:06,149 --> 00:02:04,320
pressure and we have emergency oxygen a

52
00:02:08,630 --> 00:02:06,159
separate oxygen tank that's high

53
00:02:10,389 --> 00:02:08,640
pressure and so if the sensors kick that

54
00:02:12,150 --> 00:02:10,399
on basically it floods the spacesuit

55
00:02:13,510 --> 00:02:12,160
with high pressure oxygen and an

56
00:02:15,430 --> 00:02:13,520
astronaut could survive for

57
00:02:17,110 --> 00:02:15,440
approximately 30 minutes and really what

58
00:02:18,790 --> 00:02:17,120
he or she would try to do is get inside

59
00:02:29,350 --> 00:02:18,800
as quickly as possible yeah that's a

60
00:02:34,070 --> 00:02:31,750
hello my name is miles and i relax know

61
00:02:35,589 --> 00:02:34,080
how do you take a shower in space

62
00:02:37,350 --> 00:02:35,599
oh miles that's an excellent question

63
00:02:39,589 --> 00:02:37,360

you know we all really think about

64
00:02:41,350 --> 00:02:39,599
hygiene and you know if you're on a long

65
00:02:43,110 --> 00:02:41,360
camping trip you're definitely thinking

66
00:02:45,270 --> 00:02:43,120
about when you can get in the hot shower

67
00:02:47,110 --> 00:02:45,280
but our astronauts you know water

68
00:02:48,790 --> 00:02:47,120
doesn't behave the same way it does here

69
00:02:50,390 --> 00:02:48,800
on earth and they have to be very

70
00:02:52,070 --> 00:02:50,400
careful with their water management

71
00:02:53,430 --> 00:02:52,080
because water basically because of the

72
00:02:55,270 --> 00:02:53,440
surface tension

73
00:02:56,949 --> 00:02:55,280
creates these small bubbles or sometimes

74
00:02:58,630 --> 00:02:56,959
big bubbles that can float around just

75
00:03:00,949 --> 00:02:58,640
like the humans and the equipment around

76
00:03:02,949 --> 00:03:00,959
them and so we don't take a shower like

77
00:03:04,309 --> 00:03:02,959
we would here on earth because basically

78
00:03:05,990 --> 00:03:04,319
all of those water bubbles would be

79
00:03:08,390 --> 00:03:06,000
floating around you

80
00:03:10,470 --> 00:03:08,400
so they do um kind of like dry shampoo

81
00:03:12,390 --> 00:03:10,480
techniques kind of sponge bath style

82
00:03:14,869 --> 00:03:12,400
things and like wet wipes like you find

83
00:03:16,149 --> 00:03:14,879
here on earth exactly yeah

84
00:03:17,430 --> 00:03:16,159
now the great thing about the space

85
00:03:18,949 --> 00:03:17,440
station those you don't really get that

86
00:03:21,270 --> 00:03:18,959
dirty it's not like you're getting

87
00:03:32,949 --> 00:03:21,280
really hot and sweaty up there so i mean

88
00:03:37,030 --> 00:03:35,190

good afternoon my question is

89
00:03:38,309 --> 00:03:37,040
like so you know how they say you're in

90
00:03:40,309 --> 00:03:38,319
the free call and you're already

91
00:03:42,630 --> 00:03:40,319
floating in the air how did you like

92
00:03:44,710 --> 00:03:42,640
jump because this place they the people

93
00:03:45,910 --> 00:03:44,720
they'd be jumping but this they said

94
00:03:48,550 --> 00:03:45,920
they're already in the free fall and

95
00:03:50,309 --> 00:03:48,560
they're already like levitated

96
00:03:52,309 --> 00:03:50,319
so basically because we're free falling

97
00:03:54,149 --> 00:03:52,319
in space i guess it's more about how do

98
00:03:55,030 --> 00:03:54,159
you jump and and do things like that

99
00:03:57,350 --> 00:03:55,040
well

100
00:03:59,830 --> 00:03:57,360
when we're when we're in space we we

101
00:04:02,149 --> 00:03:59,840
train our astronauts to really be very

102
00:04:03,830 --> 00:04:02,159
careful with how hard they push off of

103
00:04:05,350 --> 00:04:03,840
off of the walls or the floors and in

104
00:04:07,190 --> 00:04:05,360
fact there really is no up or down

105
00:04:09,589 --> 00:04:07,200
ceiling or floor and we call it

106
00:04:12,390 --> 00:04:09,599
fingertip forces really just very light

107
00:04:14,070 --> 00:04:12,400
touches to move in any direction because

108
00:04:16,310 --> 00:04:14,080
you're free falling and you're in that

109
00:04:17,749 --> 00:04:16,320
microgravity environment it really

110
00:04:19,590 --> 00:04:17,759
doesn't take a lot of effort to move

111
00:04:21,509 --> 00:04:19,600
yourselves around and you know a lot of

112
00:04:23,270 --> 00:04:21,519
times when we have our rookie astronauts

113
00:04:25,030 --> 00:04:23,280

here it's their first flight

114
00:04:26,469 --> 00:04:25,040
we've done a lot of training but even

115
00:04:28,310 --> 00:04:26,479
sometimes they'll still think they

116
00:04:30,550 --> 00:04:28,320
really have to push off like we do here

117
00:04:32,550 --> 00:04:30,560
when we're moving on earth and it takes

118
00:04:34,469 --> 00:04:32,560
some time to get used to that feeling of

119
00:04:35,670 --> 00:04:34,479
just being gentle with your touch to

120
00:04:38,070 --> 00:04:35,680
move around

121
00:04:40,150 --> 00:04:38,080
now on the moon when we were on the moon

122
00:04:41,909 --> 00:04:40,160
back in the apollo era they had to work

123
00:04:43,350 --> 00:04:41,919
a little bit more a more

124
00:04:44,870 --> 00:04:43,360
it was a little more challenging of an

125
00:04:47,030 --> 00:04:44,880
environment because of the reduced

126
00:04:49,670 --> 00:04:47,040
gravity environment that's about 1 6

127
00:04:51,189 --> 00:04:49,680
what we have here on earth so there

128
00:04:53,430 --> 00:04:51,199
they had to work pretty hard to move

129
00:04:54,870 --> 00:04:53,440
around but part of that was because they

130
00:04:56,790 --> 00:04:54,880
were typically outside doing their

131
00:04:59,670 --> 00:04:56,800
science and work in their spacesuits and

132
00:05:08,710 --> 00:04:59,680
they had that heavy equipment on

133
00:05:12,629 --> 00:05:10,710
hi my name is emily and i need to know

134
00:05:14,950 --> 00:05:12,639
that if there is an emergency or is

135
00:05:16,550 --> 00:05:14,960
there a place for them to go or what

136
00:05:18,870 --> 00:05:16,560
would happen

137
00:05:20,870 --> 00:05:18,880
excellent question emily you know nasa

138
00:05:22,550 --> 00:05:20,880

really thinks a lot about the safety of

139
00:05:23,909 --> 00:05:22,560
our astronauts and you know something

140
00:05:25,270 --> 00:05:23,919
could go wrong

141
00:05:26,870 --> 00:05:25,280
just like we have things that go wrong

142
00:05:29,029 --> 00:05:26,880
here on earth and we have to have little

143
00:05:30,629 --> 00:05:29,039
safe havens to go to

144
00:05:31,990 --> 00:05:30,639
in the international space station we do

145
00:05:35,110 --> 00:05:32,000
have an aircraft that they could climb

146
00:05:36,629 --> 00:05:35,120
into if they need to evacuate

147
00:05:37,909 --> 00:05:36,639
they have a lot of different procedures

148
00:05:39,510 --> 00:05:37,919
but the first thing that we always try

149
00:05:41,110 --> 00:05:39,520
to do is figure out what has actually

150
00:05:43,350 --> 00:05:41,120
happened and the astronauts are really

151
00:05:45,029 --> 00:05:43,360
well trained and we've got a great

152
00:05:47,029 --> 00:05:45,039
set of flight controllers here that are

153
00:05:49,510 --> 00:05:47,039
trained and ready to support in case of

154
00:05:51,189 --> 00:05:49,520
an emergency but absolutely there there

155
00:05:52,950 --> 00:05:51,199
is a vehicle that they can climb into

156
00:05:53,749 --> 00:05:52,960
and evacuate if they need to and there's

157
00:05:55,830 --> 00:05:53,759
three

158
00:05:58,150 --> 00:05:55,840
big emergencies they really train for a

159
00:05:59,350 --> 00:05:58,160
lot they do drills it's it's fire if

160
00:06:01,350 --> 00:05:59,360
there's some kind of fire on board

161
00:06:03,189 --> 00:06:01,360
there's depressurization like the leak

162
00:06:04,790 --> 00:06:03,199
we talked about before and some sort of

163
00:06:06,309 --> 00:06:04,800

toxic if there's something you know

164
00:06:07,510 --> 00:06:06,319
nasty that gets released inside there

165
00:06:09,430 --> 00:06:07,520
those are the three big things that they

166
00:06:11,029 --> 00:06:09,440
really do sort of train over and over

167
00:06:11,909 --> 00:06:11,039
for and get and get ready to go if they

168
00:06:18,830 --> 00:06:11,919
had to

169
00:06:24,150 --> 00:06:21,590
question afternoon my name is taraya um

170
00:06:27,350 --> 00:06:24,160
i wanted to ask what special materials

171
00:06:28,469 --> 00:06:27,360
we use to make spaces

172
00:06:29,430 --> 00:06:28,479
i don't think i heard that question yeah

173
00:06:31,189 --> 00:06:29,440
can you say that again a little bit

174
00:06:35,350 --> 00:06:31,199
louder

175
00:06:37,270 --> 00:06:35,360
voicemail what special material do you

176
00:06:38,710 --> 00:06:37,280
use to make spacesuits

177
00:06:39,990 --> 00:06:38,720
oh good question awesome that's a great

178
00:06:42,309 --> 00:06:40,000
question and actually i have some

179
00:06:44,150 --> 00:06:42,319
spacesuit pieces with me today so well

180
00:06:46,070 --> 00:06:44,160
let's start with what you wear on the

181
00:06:47,990 --> 00:06:46,080
inside of your suit and you know our

182
00:06:50,629 --> 00:06:48,000
astronauts are working outside the on a

183
00:06:52,469 --> 00:06:50,639
spacewalk for anywhere from six to eight

184
00:06:54,390 --> 00:06:52,479
hours at a time and it really is like

185
00:06:55,990 --> 00:06:54,400
exercising the whole time and you know

186
00:06:57,589 --> 00:06:56,000
when you exercise a lot or you're in

187
00:06:59,430 --> 00:06:57,599
your gym classes you start to get a

188
00:07:00,870 --> 00:06:59,440

little hot and sweaty so we want to make

189
00:07:02,629 --> 00:07:00,880
sure that the astronauts stay nice and

190
00:07:05,270 --> 00:07:02,639
cool inside of the suit and so we put

191
00:07:07,350 --> 00:07:05,280
you in a stretchy undergarment i like to

192
00:07:09,270 --> 00:07:07,360
call this your spacesuit underwear

193
00:07:10,950 --> 00:07:09,280
because you wear it under your spacesuit

194
00:07:13,430 --> 00:07:10,960
and it's a big cooling garment kind of

195
00:07:16,150 --> 00:07:13,440
like like thermal underwear like you'd

196
00:07:18,390 --> 00:07:16,160
wear if you were going skiing spandex so

197
00:07:19,430 --> 00:07:18,400
it sits nice and tight across your skin

198
00:07:21,510 --> 00:07:19,440
and then

199
00:07:23,670 --> 00:07:21,520
you can see that there's plastic tubing

200
00:07:24,790 --> 00:07:23,680
woven through it and we run ice cold

201
00:07:26,870 --> 00:07:24,800
water through that to keep our

202
00:07:28,550 --> 00:07:26,880
astronauts cool so your spacesuit

203
00:07:30,309 --> 00:07:28,560
underwear is a little bit like spandex

204
00:07:31,430 --> 00:07:30,319
kind of like the underwear we wear here

205
00:07:33,189 --> 00:07:31,440
on earth

206
00:07:35,270 --> 00:07:33,199
now once you're prepared for your space

207
00:07:37,270 --> 00:07:35,280
walk and you're in your cooling garment

208
00:07:39,029 --> 00:07:37,280
the spacesuit itself is actually made

209
00:07:40,469 --> 00:07:39,039
out of a lot of different material

210
00:07:42,230 --> 00:07:40,479
layers and actually josh if you don't

211
00:07:43,670 --> 00:07:42,240
mind holding up the boot

212
00:07:45,510 --> 00:07:43,680
that's right we've got a boot and then

213
00:07:46,950 --> 00:07:45,520

i've got a glove here

214
00:07:48,710 --> 00:07:46,960
you need a lot of materials for the

215
00:07:50,550 --> 00:07:48,720
spacesuit for a variety of reasons

216
00:07:52,309 --> 00:07:50,560
number one remember i said it's kind of

217
00:07:55,029 --> 00:07:52,319
like a big human shaped balloon and it's

218
00:07:56,629 --> 00:07:55,039
holding in that oxygen and pressure so

219
00:07:58,230 --> 00:07:56,639
that internal layer that you can see

220
00:08:01,589 --> 00:07:58,240
here this yellow layer is what we call a

221
00:08:03,110 --> 00:08:01,599
bladder it holds that oxygen in

222
00:08:05,110 --> 00:08:03,120
then the second layer is the one that

223
00:08:07,029 --> 00:08:05,120
makes it look to almost to the shape of

224
00:08:07,909 --> 00:08:07,039
a human it's a it's a layer that we can

225
00:08:09,589 --> 00:08:07,919
sew

226
00:08:11,350 --> 00:08:09,599
and then the final layers are all the

227
00:08:13,189 --> 00:08:11,360
insulation kind of like the happy

228
00:08:15,430 --> 00:08:13,199
birthday balloons that you buy

229
00:08:17,909 --> 00:08:15,440
at the store that are that aluminized

230
00:08:19,589 --> 00:08:17,919
mylar really shiny or kind of like

231
00:08:21,749 --> 00:08:19,599
aluminum foil but a little bit lighter

232
00:08:23,830 --> 00:08:21,759
weight and they have reflective properly

233
00:08:25,990 --> 00:08:23,840
properties and they insulate and that's

234
00:08:27,749 --> 00:08:26,000
why you have so many different materials

235
00:08:30,950 --> 00:08:27,759
and i'm wearing the glove now and it's

236
00:08:33,029 --> 00:08:30,960
really like wearing a big ski glove or

237
00:08:35,269 --> 00:08:33,039
several several pairs of gloves it is in

238
00:08:36,949 --> 00:08:35,279

fact pretty challenging to move around

239
00:08:39,190 --> 00:08:36,959
so we want to make sure that when we

240
00:08:41,750 --> 00:08:39,200
size you for a suit we get it right and

241
00:08:50,470 --> 00:08:41,760
it fits comfortably excellent question

242
00:08:50,480 --> 00:08:54,230
hi my name is

243
00:08:57,750 --> 00:08:56,310
if the international space center and

244
00:08:59,910 --> 00:08:57,760
space got hit with

245
00:09:03,430 --> 00:08:59,920
uh actual or meteor right what would um

246
00:09:05,030 --> 00:09:03,440
what would the astronauts do

247
00:09:07,030 --> 00:09:05,040
if the international space station was

248
00:09:08,470 --> 00:09:07,040
to get hit by a leader what would our

249
00:09:10,870 --> 00:09:08,480
astronauts do

250
00:09:12,710 --> 00:09:10,880
um well you know actually i was i had

251
00:09:14,310 --> 00:09:12,720
the opportunity to talk with ron garan

252
00:09:16,470 --> 00:09:14,320
who was one of our astronauts who lived

253
00:09:18,949 --> 00:09:16,480
on board the space station and during

254
00:09:20,790 --> 00:09:18,959
his particular mission they did have a

255
00:09:22,310 --> 00:09:20,800
situation where we had something that

256
00:09:23,670 --> 00:09:22,320
was going to fly by and it seemed like

257
00:09:25,030 --> 00:09:23,680
it was going to get pretty close to the

258
00:09:26,550 --> 00:09:25,040
space station

259
00:09:28,150 --> 00:09:26,560
and he shared with me that they had to

260
00:09:29,670 --> 00:09:28,160
go through all of their procedures and

261
00:09:31,670 --> 00:09:29,680
actually kind of lock out certain

262
00:09:33,910 --> 00:09:31,680
aspects or certain areas or modules of

263
00:09:36,230 --> 00:09:33,920

the space station and start to move into

264
00:09:38,630 --> 00:09:36,240
that safe haven environment now luckily

265
00:09:40,070 --> 00:09:38,640
nothing happened in fact what was the

266
00:09:41,350 --> 00:09:40,080
the object that was flying by was

267
00:09:43,430 --> 00:09:41,360
actually farther away than we

268
00:09:45,590 --> 00:09:43,440
anticipated but

269
00:09:48,550 --> 00:09:45,600
that is something that they do train for

270
00:09:50,070 --> 00:09:48,560
and again they would basically lock down

271
00:09:51,670 --> 00:09:50,080
parts of the space station get it

272
00:09:53,190 --> 00:09:51,680
prepared and then they'd probably move

273
00:09:54,790 --> 00:09:53,200
into one of those vehicles and we

274
00:09:56,790 --> 00:09:54,800
tracked there's a lot of stuff up there

275
00:09:59,269 --> 00:09:56,800
in space flying around you know me

276
00:10:01,590 --> 00:09:59,279
meteor and pieces of you know satellite

277
00:10:02,949 --> 00:10:01,600
junk and things like that so we track it

278
00:10:04,230 --> 00:10:02,959
and and we usually have a pretty good

279
00:10:05,990 --> 00:10:04,240
idea if something's even getting kind of

280
00:10:14,710 --> 00:10:06,000
close so it's a it's a pretty good

281
00:10:20,630 --> 00:10:17,590
hello my name is imani williams and my

282
00:10:22,550 --> 00:10:20,640
question is what is the special training

283
00:10:24,710 --> 00:10:22,560
that people behind the scenes of

284
00:10:26,470 --> 00:10:24,720
astronaut do

285
00:10:28,550 --> 00:10:26,480
wow that is a great question imani and

286
00:10:30,310 --> 00:10:28,560
in fact you know for every astronaut

287
00:10:32,790 --> 00:10:30,320
that's on board the station we have a

288
00:10:34,310 --> 00:10:32,800

very huge team of people that are here

289
00:10:35,829 --> 00:10:34,320
on the ground supporting them you know

290
00:10:37,590 --> 00:10:35,839
engineers like me

291
00:10:39,430 --> 00:10:37,600
flight controllers like josh who sit

292
00:10:40,790 --> 00:10:39,440
here in mission control and not only in

293
00:10:43,030 --> 00:10:40,800
this big room that we're in right now

294
00:10:45,269 --> 00:10:43,040
but all of the back rooms and our labs

295
00:10:46,630 --> 00:10:45,279
and facilities and so we have to go

296
00:10:48,550 --> 00:10:46,640
through a lot of training it's kind of

297
00:10:50,150 --> 00:10:48,560
like going back to school so to be a

298
00:10:51,910 --> 00:10:50,160
flight controller it can take several

299
00:10:54,310 --> 00:10:51,920
years and you have to do these really

300
00:10:55,829 --> 00:10:54,320
interesting things called simulations

301
00:10:57,509 --> 00:10:55,839
and these are the hardest tests you'll

302
00:11:00,069 --> 00:10:57,519
ever take because they are true

303
00:11:02,630 --> 00:11:00,079
simulations of what could go wrong if

304
00:11:03,990 --> 00:11:02,640
you were manning or um or monitoring the

305
00:11:06,310 --> 00:11:04,000
space station and they're kind of fun

306
00:11:08,230 --> 00:11:06,320
they're a little scary but once you pass

307
00:11:09,829 --> 00:11:08,240
all of their written tests and you you

308
00:11:12,949 --> 00:11:09,839
work through your simulations and you

309
00:11:14,710 --> 00:11:12,959
really pass a lot of exams so to speak

310
00:11:17,750 --> 00:11:14,720
then you get certified to be a flight

311
00:11:19,590 --> 00:11:17,760
controller now engineers like me who

312
00:11:21,509 --> 00:11:19,600
aren't necessarily certified to be a

313
00:11:23,430 --> 00:11:21,519

flight controller we still work in the

314
00:11:25,350 --> 00:11:23,440
back room supporting the folks that are

315
00:11:27,110 --> 00:11:25,360
here in the mission control center and

316
00:11:29,110 --> 00:11:27,120
we're kind of the hardware providers so

317
00:11:30,949 --> 00:11:29,120
the people who are monitoring the health

318
00:11:33,030 --> 00:11:30,959
of the space suit or monitoring the

319
00:11:34,310 --> 00:11:33,040
equipment on the space station we go

320
00:11:36,630 --> 00:11:34,320
through kind of a different type of

321
00:11:38,710 --> 00:11:36,640
training where we run a lot of our own

322
00:11:40,710 --> 00:11:38,720
chamber tests and evaluations so my

323
00:11:42,630 --> 00:11:40,720
particular engineering team

324
00:11:44,470 --> 00:11:42,640
we have a lot of different chambers that

325
00:11:46,790 --> 00:11:44,480
can either simulate the temperatures on

326
00:11:48,630 --> 00:11:46,800
the space station the the vacuum

327
00:11:50,550 --> 00:11:48,640
environment of space or a combination of

328
00:11:52,629 --> 00:11:50,560
the two and so we do a lot of testing of

329
00:11:54,230 --> 00:11:52,639
our hardware and that's how we train for

330
00:11:55,110 --> 00:11:54,240
our missions and one thing you guys

331
00:11:57,190 --> 00:11:55,120
should know if you ever want to come

332
00:11:58,790 --> 00:11:57,200
work for nasa we take all kinds of

333
00:12:00,629 --> 00:11:58,800
people so whatever you want to study in

334
00:12:01,670 --> 00:12:00,639
college just go for something that you

335
00:12:03,590 --> 00:12:01,680
find interesting that you want to

336
00:12:05,110 --> 00:12:03,600
heather's background to engineering mind

337
00:12:07,190 --> 00:12:05,120
communication so she had to do a lot of

338
00:12:08,550 --> 00:12:07,200

math and science i'm not very good at

339
00:12:10,470 --> 00:12:08,560
math and science so i had to do a lot of

340
00:12:12,150 --> 00:12:10,480
writing and things such as that so it

341
00:12:13,910 --> 00:12:12,160
takes all sorts of people to make this

342
00:12:15,269 --> 00:12:13,920
huge place kind of kind of work and

343
00:12:17,350 --> 00:12:15,279
support the space station and everything

344
00:12:20,470 --> 00:12:17,360
else that nasa does so

345
00:12:29,430 --> 00:12:22,470
thank you you're welcome

346
00:12:34,870 --> 00:12:32,470
hello my name is deja and my question is

347
00:12:40,790 --> 00:12:34,880
if i were to become an astronaut

348
00:12:44,629 --> 00:12:42,949
wow okay well just like i talked about

349
00:12:46,310 --> 00:12:44,639
it's like going back to school to become

350
00:12:47,910 --> 00:12:46,320
a flight controller to sit in the

351
00:12:50,870 --> 00:12:47,920
mission control center when you're an

352
00:12:52,629 --> 00:12:50,880
astronaut the first few years you are

353
00:12:55,110 --> 00:12:52,639
really it's like you're back in school

354
00:12:57,590 --> 00:12:55,120
but the school is pretty fun you know

355
00:12:59,590 --> 00:12:57,600
you get to train in our mock-ups um you

356
00:13:00,949 --> 00:12:59,600
get to meet engineers just like myself

357
00:13:02,310 --> 00:13:00,959
and work with all different kinds of

358
00:13:04,550 --> 00:13:02,320
people and learn about the different

359
00:13:06,310 --> 00:13:04,560
systems on the space station

360
00:13:08,069 --> 00:13:06,320
and you also get to do a lot of

361
00:13:11,190 --> 00:13:08,079
emergency things they teach you all

362
00:13:13,030 --> 00:13:11,200
about um a survival aspect in fact they

363
00:13:14,870 --> 00:13:13,040

go camping and they have to learn how to

364
00:13:17,190 --> 00:13:14,880
do all kinds of survival aspects and so

365
00:13:18,710 --> 00:13:17,200
it's really fun so those first few years

366
00:13:21,110 --> 00:13:18,720
you're really just learning how to be a

367
00:13:22,389 --> 00:13:21,120
good team member learning about survival

368
00:13:24,310 --> 00:13:22,399
learning about you know just more

369
00:13:26,310 --> 00:13:24,320
general systems and then once you get

370
00:13:28,389 --> 00:13:26,320
selected for a mission

371
00:13:31,110 --> 00:13:28,399
then it's really hardcore you have to

372
00:13:32,870 --> 00:13:31,120
train with your team day in and day out

373
00:13:34,790 --> 00:13:32,880
work in your simulations you work in the

374
00:13:36,629 --> 00:13:34,800
sims the simulations just like the

375
00:13:38,230 --> 00:13:36,639
flight controllers

376
00:13:40,230 --> 00:13:38,240
you travel a lot they have to go to

377
00:13:41,430 --> 00:13:40,240
russia sometimes they go to japan

378
00:13:42,790 --> 00:13:41,440
because remember we've got all those

379
00:13:44,710 --> 00:13:42,800
international partners so there's

380
00:13:47,189 --> 00:13:44,720
facilities around the world that our

381
00:13:49,829 --> 00:13:47,199
astronauts get to travel to to train

382
00:13:51,509 --> 00:13:49,839
and so it can take several years even

383
00:13:53,430 --> 00:13:51,519
once you first get selected just to go

384
00:13:55,430 --> 00:13:53,440
through that initial training and then

385
00:13:57,910 --> 00:13:55,440
your mission specific training can be

386
00:13:59,750 --> 00:13:57,920
even more years but it's definitely well

387
00:14:02,870 --> 00:13:59,760
worth it because once you fly in space

388
00:14:05,030 --> 00:14:02,880

you are so prepared for that flight

389
00:14:08,069 --> 00:14:05,040
you know you can do anything exactly

390
00:14:16,310 --> 00:14:09,189
okay

391
00:14:20,470 --> 00:14:18,550
hi my name is naya and i wanted to know

392
00:14:25,030 --> 00:14:20,480
what protects the space station from

393
00:14:26,870 --> 00:14:25,040
like satellite pieces or like meteorites

394
00:14:29,269 --> 00:14:26,880
that's a great question naya and as josh

395
00:14:32,550 --> 00:14:29,279
mentioned we actually monitor

396
00:14:34,470 --> 00:14:32,560
a large majority of the space debris and

397
00:14:36,150 --> 00:14:34,480
space hardware that's out there so we

398
00:14:38,230 --> 00:14:36,160
really track the position of all of

399
00:14:40,710 --> 00:14:38,240
these different pieces of equipment

400
00:14:42,470 --> 00:14:40,720
and space debris so we we kind of know

401
00:14:43,910 --> 00:14:42,480
if there's going to be a situation where

402
00:14:47,030 --> 00:14:43,920
coming close yeah there's something

403
00:14:47,040 --> 00:14:53,189
yeah thank you you're welcome

404
00:15:00,310 --> 00:14:55,509
hi my name is

405
00:15:05,030 --> 00:15:03,110
wow well it really depends on a number

406
00:15:06,949 --> 00:15:05,040
of factors number one i think the

407
00:15:08,790 --> 00:15:06,959
biggest thing that we look for when

408
00:15:10,310 --> 00:15:08,800
we're selecting astronauts is that this

409
00:15:11,509 --> 00:15:10,320
is going to be someone who can work well

410
00:15:13,670 --> 00:15:11,519
on a team

411
00:15:16,150 --> 00:15:13,680
because every astronaut relies on his or

412
00:15:18,150 --> 00:15:16,160
her teammates and crew while they're on

413
00:15:19,829 --> 00:15:18,160

board the space station to really help

414
00:15:21,910 --> 00:15:19,839
each other out go through whatever

415
00:15:24,389 --> 00:15:21,920
mission priorities you have to do but

416
00:15:26,150 --> 00:15:24,399
really they also become kind of a family

417
00:15:27,829 --> 00:15:26,160
you know it's a small group of people

418
00:15:30,230 --> 00:15:27,839
living in space for

419
00:15:33,269 --> 00:15:30,240
months at a time so we really make sure

420
00:15:35,749 --> 00:15:33,279
that the people we select are willing to

421
00:15:37,990 --> 00:15:35,759
work on a team and work well on a team

422
00:15:39,829 --> 00:15:38,000
and then really the rest of the aspects

423
00:15:41,829 --> 00:15:39,839
depend on what missions we think we're

424
00:15:44,150 --> 00:15:41,839
going to select them for

425
00:15:45,189 --> 00:15:44,160
and we look for a nice diverse

426
00:15:46,069 --> 00:15:45,199
variety

427
00:15:47,749 --> 00:15:46,079
of

428
00:15:49,350 --> 00:15:47,759
different careers so we have astronauts

429
00:15:51,269 --> 00:15:49,360
who are engineers we have astronauts who

430
00:15:53,030 --> 00:15:51,279
are scientists we have astronauts who

431
00:15:54,629 --> 00:15:53,040
are doctors we have astronauts who are

432
00:15:56,870 --> 00:15:54,639
teachers

433
00:15:58,550 --> 00:15:56,880
and really what we look for is someone

434
00:16:00,790 --> 00:15:58,560
who not only wants to do what they're

435
00:16:03,110 --> 00:16:00,800
doing in their career but really has a

436
00:16:04,870 --> 00:16:03,120
higher goal of helping us work on our

437
00:16:06,470 --> 00:16:04,880
exploration tasks i mean that's what

438
00:16:08,870 --> 00:16:06,480

everyone who works here at nasa that's

439
00:16:10,550 --> 00:16:08,880
what we're focused on living in space

440
00:16:12,710 --> 00:16:10,560
onboard the space station doing

441
00:16:14,949 --> 00:16:12,720
fantastic science with scientists around

442
00:16:16,790 --> 00:16:14,959
the world but then also looking beyond

443
00:16:18,870 --> 00:16:16,800
what we can do when we go

444
00:16:20,829 --> 00:16:18,880
someplace maybe back to the moon or onto

445
00:16:23,189 --> 00:16:20,839
mars or to an

446
00:16:26,069 --> 00:16:23,199
asteroid good i hope you're thinking

447
00:16:27,110 --> 00:16:26,079
about being an astronaut

448
00:16:31,350 --> 00:16:27,120
thank you

449
00:16:37,350 --> 00:16:34,230
hi my name is charlie and what makes

450
00:16:39,509 --> 00:16:37,360
space resistant to uv rays

451
00:16:41,430 --> 00:16:39,519
oh wow good question well so you can see

452
00:16:43,670 --> 00:16:41,440
here this outer layer that i have and

453
00:16:46,870 --> 00:16:43,680
that josh has with the boot is the color

454
00:16:48,710 --> 00:16:46,880
white and so um that white is chosen for

455
00:16:50,069 --> 00:16:48,720
a few reasons number one we want to be

456
00:16:51,990 --> 00:16:50,079
able to see the astronauts when they're

457
00:16:54,150 --> 00:16:52,000
outside so the easiest color to see

458
00:16:55,670 --> 00:16:54,160
against the black backdrop of space is

459
00:16:57,430 --> 00:16:55,680
in fact white

460
00:16:59,269 --> 00:16:57,440
the other thing is that there's a little

461
00:17:01,509 --> 00:16:59,279
bit of temperature control we can do you

462
00:17:03,670 --> 00:17:01,519
know in atlanta i grew up there so i

463
00:17:05,510 --> 00:17:03,680

know it gets hot there in the summertime

464
00:17:07,270 --> 00:17:05,520
and on a hot summer day

465
00:17:09,029 --> 00:17:07,280
if you had the choice between wearing a

466
00:17:10,309 --> 00:17:09,039
white t-shirt or a black t-shirt and

467
00:17:12,630 --> 00:17:10,319
you're going to be outside in the sun

468
00:17:13,909 --> 00:17:12,640
all day most likely you'll choose the

469
00:17:15,669 --> 00:17:13,919
white one to keep you a little bit

470
00:17:17,669 --> 00:17:15,679
cooler that's because the black color

471
00:17:19,510 --> 00:17:17,679
will absorb the sun and absorb the

472
00:17:22,549 --> 00:17:19,520
temperature whereas white is a little

473
00:17:24,710 --> 00:17:22,559
bit more reflective so that's part of it

474
00:17:26,789 --> 00:17:24,720
now as far as the uv and radiation

475
00:17:29,830 --> 00:17:26,799
protection the number of layers that we

476
00:17:32,150 --> 00:17:29,840
have here gives you some protection

477
00:17:34,710 --> 00:17:32,160
you have also on the helmet you have

478
00:17:36,310 --> 00:17:34,720
basically a spray coated layer of gold

479
00:17:37,830 --> 00:17:36,320
that's going to protect your eyes that's

480
00:17:39,190 --> 00:17:37,840
going to be just like your sunglasses

481
00:17:41,510 --> 00:17:39,200
that have some kind of protective

482
00:17:43,669 --> 00:17:41,520
properties but a big thing that we do to

483
00:17:46,310 --> 00:17:43,679
protect you from radiation is we just

484
00:17:48,470 --> 00:17:46,320
monitor your exposure over the duration

485
00:17:50,950 --> 00:17:48,480
of your life so they actually wear a

486
00:17:52,870 --> 00:17:50,960
little sensor inside of their spacesuit

487
00:17:54,789 --> 00:17:52,880
that's monitoring how much radiation

488
00:17:56,310 --> 00:17:54,799

you're absorbing and even in the

489
00:17:58,390 --> 00:17:56,320
international space station when they're

490
00:18:00,230 --> 00:17:58,400
inside they're still getting some

491
00:18:04,950 --> 00:18:00,240
exposure so we just monitor that over

492
00:18:04,960 --> 00:18:10,470
you're welcome

493
00:18:16,870 --> 00:18:12,789
my name is ben and i was wondering what

494
00:18:20,070 --> 00:18:18,630
wow that that's a good question an

495
00:18:22,710 --> 00:18:20,080
astronaut's day schedule on the

496
00:18:24,549 --> 00:18:22,720
international space station yeah it's so

497
00:18:25,430 --> 00:18:24,559
okay well one thing you need to know is

498
00:18:26,789 --> 00:18:25,440
that there's somebody here in mission

499
00:18:27,909 --> 00:18:26,799
control there's all sorts of people that

500
00:18:28,870 --> 00:18:27,919
do different jobs here in mission

501
00:18:30,950 --> 00:18:28,880
control and one of them is called the

502
00:18:32,789 --> 00:18:30,960
ops planner and they sit right back over

503
00:18:34,549 --> 00:18:32,799
here kind of close to where we are

504
00:18:36,390 --> 00:18:34,559
and they plan the astronauts and the

505
00:18:37,990 --> 00:18:36,400
cosmonauts days and sometimes five

506
00:18:39,350 --> 00:18:38,000
minute increments so you can imagine if

507
00:18:40,470 --> 00:18:39,360
you're going to school for eight or nine

508
00:18:42,230 --> 00:18:40,480
hours a day

509
00:18:43,990 --> 00:18:42,240
somebody planning your day within five

510
00:18:46,549 --> 00:18:44,000
minutes i mean it's a very specific

511
00:18:47,830 --> 00:18:46,559
schedule and they do everything from

512
00:18:48,950 --> 00:18:47,840
cleaning things on board the space

513
00:18:49,990 --> 00:18:48,960

station i mean you're living up here

514
00:18:51,190 --> 00:18:50,000
that's your house you have to keep it

515
00:18:52,630 --> 00:18:51,200
clean they

516
00:18:53,830 --> 00:18:52,640
uh you know they have time to talk to

517
00:18:55,270 --> 00:18:53,840
their families but the biggest thing

518
00:18:57,750 --> 00:18:55,280
they're doing is a lot of science and

519
00:19:00,150 --> 00:18:57,760
research and that takes many many hours

520
00:19:01,590 --> 00:19:00,160
every week to do that so

521
00:19:02,630 --> 00:19:01,600
there's actually a look at the ops

522
00:19:05,669 --> 00:19:02,640
planner here in mission control he's

523
00:19:07,590 --> 00:19:05,679
waving at the camera to you guys

524
00:19:10,150 --> 00:19:07,600
so these guys stay very busy and they

525
00:19:12,549 --> 00:19:10,160
planted a day a day in advance and you

526
00:19:13,750 --> 00:19:12,559
know the crew stays pretty uh

527
00:19:15,350 --> 00:19:13,760
pretty busy up there onboard the

528
00:19:16,870 --> 00:19:15,360
international space station as they do

529
00:19:19,110 --> 00:19:16,880
all this science and just keeping the

530
00:19:28,070 --> 00:19:19,120
thing running too so

531
00:19:33,110 --> 00:19:30,470
hello my name is ezekiel

532
00:19:34,390 --> 00:19:33,120
and when you're in a spaceship

533
00:19:37,669 --> 00:19:34,400
and water

534
00:19:39,110 --> 00:19:37,679
when you pour water to drink it

535
00:19:42,070 --> 00:19:39,120
can

536
00:19:45,430 --> 00:19:42,080
and the water becomes a bubble case in a

537
00:19:48,549 --> 00:19:46,710
that's a great question you know i

538
00:19:50,310 --> 00:19:48,559

talked earlier about how the surface

539
00:19:51,990 --> 00:19:50,320
properties of water the surface tension

540
00:19:53,830 --> 00:19:52,000
makes the water molecules all kind of

541
00:19:55,830 --> 00:19:53,840
stick to each other and they become

542
00:19:57,110 --> 00:19:55,840
these really cool bubbles and i know the

543
00:19:59,110 --> 00:19:57,120
astronauts like to have fun with that

544
00:20:01,029 --> 00:19:59,120
sometimes with their um with their water

545
00:20:03,510 --> 00:20:01,039
and their juice drinks you know they'll

546
00:20:05,110 --> 00:20:03,520
actually squeeze the juice pack and a

547
00:20:06,549 --> 00:20:05,120
little bubble will form just like a

548
00:20:08,070 --> 00:20:06,559
bubble like you'd blow here on earth

549
00:20:09,510 --> 00:20:08,080
with the soapy water

550
00:20:10,950 --> 00:20:09,520
except it's full

551
00:20:12,870 --> 00:20:10,960
of water

552
00:20:14,310 --> 00:20:12,880
and so that's why when you watch on the

553
00:20:16,230 --> 00:20:14,320
international space station we actually

554
00:20:18,390 --> 00:20:16,240
have to package all of the fluids that

555
00:20:20,789 --> 00:20:18,400
they drink in these

556
00:20:23,029 --> 00:20:20,799
foil packs they kind of look like a you

557
00:20:25,190 --> 00:20:23,039
know a juice a juice pouch

558
00:20:27,029 --> 00:20:25,200
and um that's why the fluid has to be

559
00:20:29,029 --> 00:20:27,039
contained and even when they're heating

560
00:20:30,630 --> 00:20:29,039
up their food they actually pour it out

561
00:20:33,510 --> 00:20:30,640
of a little spout they actually put it

562
00:20:34,950 --> 00:20:33,520
right into the the food package so we

563
00:20:37,350 --> 00:20:34,960

don't really want that water floating

564
00:20:39,350 --> 00:20:37,360
around unintentionally so sometimes they

565
00:20:40,549 --> 00:20:39,360
do play with it but a lot of times they

566
00:20:42,230 --> 00:20:40,559
just drink it right out of their juice

567
00:20:43,510 --> 00:20:42,240
pouch they also can't have sodas up

568
00:20:45,029 --> 00:20:43,520
there too which is probably reason why i

569
00:20:46,470 --> 00:20:45,039
would never be an astronaut but you know

570
00:20:48,230 --> 00:20:46,480
they can't because

571
00:20:49,430 --> 00:20:48,240
the carbonation and the bubbles it just

572
00:20:51,029 --> 00:20:49,440
doesn't work so they have to stick with

573
00:20:52,710 --> 00:20:51,039
coffee and tea and

574
00:20:56,149 --> 00:20:52,720
orange juice and things like that but

575
00:20:56,159 --> 00:21:03,029
thank you

576
00:21:06,870 --> 00:21:05,029
hi my name is miles gordon and i wanted

577
00:21:09,190 --> 00:21:06,880
to know are there alternate power

578
00:21:11,270 --> 00:21:09,200
sources on on the international space

579
00:21:12,789 --> 00:21:11,280
station

580
00:21:14,470 --> 00:21:12,799
it's a good question yeah there are a

581
00:21:16,630 --> 00:21:14,480
lot of power sources on this on the

582
00:21:20,070 --> 00:21:16,640
space station in fact so the big solar

583
00:21:22,950 --> 00:21:20,080
arrays are are a big power draw

584
00:21:25,270 --> 00:21:22,960
we also have a lot of batteries i mean

585
00:21:26,789 --> 00:21:25,280
we use batteries in the space suit but

586
00:21:28,310 --> 00:21:26,799
you know then you're kind of on your own

587
00:21:30,230 --> 00:21:28,320
independent system

588
00:21:32,870 --> 00:21:30,240

and in fact for future exploration we're

589
00:21:35,029 --> 00:21:32,880
looking at a variety of different power

590
00:21:36,950 --> 00:21:35,039
systems not only batteries or solar

591
00:21:40,070 --> 00:21:36,960
arrays but you know maybe things that

592
00:21:41,990 --> 00:21:40,080
are regenerable systems you know um

593
00:21:43,669 --> 00:21:42,000
so power power's a big thing we have to

594
00:21:44,950 --> 00:21:43,679
think about the batteries are huge on

595
00:21:46,149 --> 00:21:44,960
board the international space station

596
00:21:47,590 --> 00:21:46,159
and like heather said they've got these

597
00:21:48,710 --> 00:21:47,600
huge solar arrays that are just enormous

598
00:21:50,950 --> 00:21:48,720
i mean they're bigger than the football

599
00:21:52,310 --> 00:21:50,960
field really from from top to bottom but

600
00:21:54,070 --> 00:21:52,320
um it still has to have batteries

601
00:21:55,350 --> 00:21:54,080
because the space station is only in the

602
00:21:56,950 --> 00:21:55,360
daylight a certain amount of time and

603
00:21:58,470 --> 00:21:56,960
then it's in the dark and when it's in

604
00:22:00,390 --> 00:21:58,480
the dark obviously the sun's not there

605
00:22:01,909 --> 00:22:00,400
it's not gathering energy so it has to

606
00:22:03,190 --> 00:22:01,919
really rely on those batteries that are

607
00:22:04,390 --> 00:22:03,200
out there that have been charged during

608
00:22:06,789 --> 00:22:04,400
the previous

609
00:22:08,310 --> 00:22:06,799
it does the 16 times a day um so

610
00:22:10,230 --> 00:22:08,320
basically whenever the space station is

611
00:22:11,510 --> 00:22:10,240
at in the night time pass it has to rely

612
00:22:14,549 --> 00:22:11,520
on those batteries to power everything

613
00:22:16,710 --> 00:22:14,559

on board so it's kind of a whole

614
00:22:28,470 --> 00:22:16,720
very fancy system to keep this thing

615
00:22:32,310 --> 00:22:30,549
hello my name is mayana i want to know

616
00:22:33,750 --> 00:22:32,320
what material do they make the space

617
00:22:36,390 --> 00:22:33,760
helmets with

618
00:22:38,230 --> 00:22:36,400
like the glass on it

619
00:22:40,390 --> 00:22:38,240
very good well it's actually not made of

620
00:22:43,430 --> 00:22:40,400
glass at all you know glass if you break

621
00:22:45,350 --> 00:22:43,440
glass it forms these really sharp edges

622
00:22:46,870 --> 00:22:45,360
and pieces and you don't want that when

623
00:22:49,029 --> 00:22:46,880
you're wearing something like this that

624
00:22:50,310 --> 00:22:49,039
is pressurized and keeping you alive for

625
00:22:52,789 --> 00:22:50,320
your space walk

626
00:22:56,470 --> 00:22:52,799
so um it's actually made out of kind of

627
00:22:58,230 --> 00:22:56,480
a fancy type of plastic material that

628
00:23:00,630 --> 00:22:58,240
you know has some protective properties

629
00:23:02,390 --> 00:23:00,640
to it and you've got basically an inner

630
00:23:04,310 --> 00:23:02,400
visor that's holding the pressure in and

631
00:23:06,230 --> 00:23:04,320
then an outer visor

632
00:23:07,669 --> 00:23:06,240
because sometimes they do tend to bump

633
00:23:09,669 --> 00:23:07,679
their heads a little bit i mean you're

634
00:23:11,830 --> 00:23:09,679
moving around it's a little bit you know

635
00:23:14,070 --> 00:23:11,840
you've got all this material around you

636
00:23:15,909 --> 00:23:14,080
and so you have that second layer

637
00:23:17,909 --> 00:23:15,919
that's there to kind of protect you from

638
00:23:19,750 --> 00:23:17,919

scratches and any cracks in the helmet

639
00:23:21,510 --> 00:23:19,760
and then when they're on the sunny side

640
00:23:23,110 --> 00:23:21,520
of the planet they pull down an outside

641
00:23:25,190 --> 00:23:23,120
visor and that's the visor i mentioned

642
00:23:25,990 --> 00:23:25,200
earlier that has that layer of gold on

643
00:23:35,029 --> 00:23:26,000
it

644
00:23:38,070 --> 00:23:37,110
and i had one other question

645
00:23:39,029 --> 00:23:38,080
okay

646
00:23:42,390 --> 00:23:39,039
you

647
00:23:46,070 --> 00:23:42,400
there was um the dehydrated shrimp there

648
00:23:48,390 --> 00:23:46,080
when you dehydrate meat doesn't it like

649
00:23:51,909 --> 00:23:48,400
lose like nutrition when you dehydrate

650
00:23:53,669 --> 00:23:51,919
the food it it lose nutritional value

651
00:23:55,909 --> 00:23:53,679
that is a really interesting question

652
00:23:58,549 --> 00:23:55,919
and you know actually the nutrition we

653
00:24:01,029 --> 00:23:58,559
have a group of people here so i imagine

654
00:24:03,269 --> 00:24:01,039
several of you probably like food right

655
00:24:05,110 --> 00:24:03,279
i would imagine yep okay well we have a

656
00:24:07,669 --> 00:24:05,120
group of people here that are dedicated

657
00:24:10,310 --> 00:24:07,679
food scientists and all they do is

658
00:24:12,950 --> 00:24:10,320
figure out how to make foods that are

659
00:24:14,630 --> 00:24:12,960
better for you more nutritious and tasty

660
00:24:16,710 --> 00:24:14,640
in in space

661
00:24:18,470 --> 00:24:16,720
and so absolutely i mean they're always

662
00:24:20,149 --> 00:24:18,480
looking at the nutritional aspects of

663
00:24:21,750 --> 00:24:20,159

the food now dehydrating the food i

664
00:24:23,430 --> 00:24:21,760
haven't heard if that actually reduces

665
00:24:25,269 --> 00:24:23,440
the value at all

666
00:24:26,549 --> 00:24:25,279
i don't i don't think it would because

667
00:24:27,909 --> 00:24:26,559
you're basically just pulling out the

668
00:24:29,750 --> 00:24:27,919
moisture

669
00:24:31,590 --> 00:24:29,760
but it's possible that maybe you lose a

670
00:24:33,590 --> 00:24:31,600
little bit uh when you dehydrate they

671
00:24:34,950 --> 00:24:33,600
probably make up for that you know

672
00:24:36,630 --> 00:24:34,960
people smarter than us in terms of

673
00:24:37,990 --> 00:24:36,640
cooking food in space probably know that

674
00:24:39,430 --> 00:24:38,000
a little bit better than we do but but

675
00:24:41,029 --> 00:24:39,440
you know they they measure calorie

676
00:24:42,230 --> 00:24:41,039
content and fat content and sugar and

677
00:24:43,830 --> 00:24:42,240
stuff like that on i mean the astronauts

678
00:24:44,789 --> 00:24:43,840
have a very they get to pick and choose

679
00:24:46,070 --> 00:24:44,799
what they want to eat but they watch it

680
00:24:47,510 --> 00:24:46,080
fairly closely in terms of what their

681
00:24:49,430 --> 00:24:47,520
what their diet is because they're

682
00:24:50,870 --> 00:24:49,440
watching everything from muscle and bone

683
00:24:52,549 --> 00:24:50,880
loss and they're having to exercise and

684
00:24:54,230 --> 00:24:52,559
they really watch what these crews do

685
00:24:55,510 --> 00:24:54,240
and to make sure they're healthy and

686
00:24:56,789 --> 00:24:55,520
whenever they come back after five or

687
00:24:59,430 --> 00:24:56,799
six months that they're

688
00:25:01,029 --> 00:24:59,440

ready to be back on the planet

689
00:25:04,230 --> 00:25:01,039
their menu is pretty diverse though i

690
00:25:05,830 --> 00:25:04,240
mean they love pizza macaroni and cheese

691
00:25:07,830 --> 00:25:05,840
shrimp cocktails most of the food's

692
00:25:09,269 --> 00:25:07,840
pretty good it's it's uh their taste

693
00:25:11,029 --> 00:25:09,279
buds tend to kind of

694
00:25:13,190 --> 00:25:11,039
get a little off whenever they're up

695
00:25:14,870 --> 00:25:13,200
there so things that are spicy and and

696
00:25:16,710 --> 00:25:14,880
taste stronger here on earth and that's

697
00:25:26,070 --> 00:25:16,720
what they typically like so

698
00:25:30,230 --> 00:25:28,710
hi my name is comfort um i want to act

699
00:25:34,549 --> 00:25:30,240
is it sure that they're actually gonna

700
00:25:34,559 --> 00:25:38,870
say that again one more time

701
00:25:42,789 --> 00:25:40,549
that you're actually gonna create a city

702
00:25:44,549 --> 00:25:42,799
in mars are we going to create a city on

703
00:25:46,230 --> 00:25:44,559
mars you know that is a great question

704
00:25:47,909 --> 00:25:46,240
to end on because it really is something

705
00:25:49,350 --> 00:25:47,919
that we're looking at

706
00:25:51,350 --> 00:25:49,360
where are we going to go next you know

707
00:25:52,950 --> 00:25:51,360
we've been to the moon but i don't think

708
00:25:54,149 --> 00:25:52,960
we've quite finished the job there i

709
00:25:56,230 --> 00:25:54,159
think we have a lot more science and

710
00:25:57,990 --> 00:25:56,240
research to do we've got people on the

711
00:25:59,590 --> 00:25:58,000
space station right now

712
00:26:01,510 --> 00:25:59,600
helping us to do a lot of science and

713
00:26:04,070 --> 00:26:01,520

really understand the effects of living

714
00:26:05,350 --> 00:26:04,080
in space for a long time

715
00:26:07,510 --> 00:26:05,360
but you know we might go back to the

716
00:26:09,350 --> 00:26:07,520
moon but we've got rovers on mars right

717
00:26:11,269 --> 00:26:09,360
now that are basically being our little

718
00:26:13,190 --> 00:26:11,279
science buddies and they're trying

719
00:26:15,110 --> 00:26:13,200
trying to check things out and help us

720
00:26:17,510 --> 00:26:15,120
determine if there's enough resources if

721
00:26:19,909 --> 00:26:17,520
there's water maybe even signs of life

722
00:26:21,669 --> 00:26:19,919
currently or past signs of life to

723
00:26:22,950 --> 00:26:21,679
decide if that's a place that humans

724
00:26:24,710 --> 00:26:22,960
really want to go

725
00:26:26,710 --> 00:26:24,720
not only to visit and do science but

726
00:26:28,470 --> 00:26:26,720
maybe eventually to live

727
00:26:29,990 --> 00:26:28,480
you know we we have some science teams

728
00:26:32,070 --> 00:26:30,000
and engineering teams that have looked

729
00:26:34,630 --> 00:26:32,080
at how to colonize places like the moon

730
00:26:36,470 --> 00:26:34,640
or mars so that is kind of a study that

731
00:26:38,230 --> 00:26:36,480
we've been doing and we'll just have to

732
00:26:39,029 --> 00:26:38,240
stay tuned and see what happens with it

733
00:26:40,390 --> 00:26:39,039
but

734
00:26:42,549 --> 00:26:40,400
we've got our rover buddies up there

735
00:26:43,669 --> 00:26:42,559
right now so way to go curiosity and

736
00:26:45,350 --> 00:26:43,679
certainly

737
00:26:46,549 --> 00:26:45,360
we've got teams here at nasa that are

738
00:26:48,630 --> 00:26:46,559

interested in doing those kinds of

739
00:26:50,230 --> 00:26:48,640
things so but you guys are going to be

740
00:26:52,549 --> 00:26:50,240
the ones that'll make that kind of

741
00:26:54,789 --> 00:26:52,559
mission possible so definitely stay in

742
00:26:56,230 --> 00:26:54,799
school study hard you know as josh

743
00:26:58,149 --> 00:26:56,240
mentioned we have a lot of different

744
00:27:00,390 --> 00:26:58,159
careers here at nasa so if science and

745
00:27:02,470 --> 00:27:00,400
math isn't your thing that's okay we

746
00:27:04,310 --> 00:27:02,480
still need you so think about how you

747
00:27:06,870 --> 00:27:04,320
can contribute to these future missions

748
00:27:09,029 --> 00:27:06,880
it's a pretty exciting time to do space

749
00:27:10,630 --> 00:27:09,039
exploration yeah so we want to thank you

750
00:27:12,310 --> 00:27:10,640
guys thank heather for uh for coming in

751
00:27:13,350 --> 00:27:12,320
here and answering your questions so to

752
00:27:14,710 --> 00:27:13,360
all of our friends here in atlanta

753
00:27:16,230 --> 00:27:14,720
memorial middle school we say thank you

754
00:27:18,070 --> 00:27:16,240
very much if you ever in houston come by

755
00:27:19,190 --> 00:27:18,080
and say hi sometime and we probably need

756
00:27:21,430 --> 00:27:19,200
to let you guys