
PAO

1
00:00:05,190 --> 00:00:02,950
well hello everybody welcome inside

2
00:00:07,349 --> 00:00:05,200
mission control we're welcoming the east

3
00:00:09,509 --> 00:00:07,359
paulding middle school students in

4
00:00:11,589 --> 00:00:09,519
dallas georgia we we know you guys are

5
00:00:13,430 --> 00:00:11,599
outside atlanta and i'm

6
00:00:16,070 --> 00:00:13,440
very pleased to have heather paul with

7
00:00:18,070 --> 00:00:16,080
me she is a mechanical engineer she

8
00:00:19,109 --> 00:00:18,080
graduated from high school in atlanta so

9
00:00:21,590 --> 00:00:19,119
she's

10
00:00:23,269 --> 00:00:21,600
very familiar with that area

11
00:00:25,750 --> 00:00:23,279
she currently is a crew and thermal

12
00:00:26,950 --> 00:00:25,760
systems division

13
00:00:28,470 --> 00:00:26,960

engineer

14
00:00:30,310 --> 00:00:28,480
here at the johnson space center and

15
00:00:32,470 --> 00:00:30,320
you're inside mission control where the

16
00:00:34,389 --> 00:00:32,480
flight control team oversees all the

17
00:00:36,470 --> 00:00:34,399
operations of the international space

18
00:00:37,830 --> 00:00:36,480
station we are very pleased to have you

19
00:00:40,630 --> 00:00:37,840
guys with us

20
00:00:42,869 --> 00:00:40,640
today uh me and heather and she's gonna

21
00:00:45,990 --> 00:00:42,879
handle all the hard questions that you

22
00:00:47,830 --> 00:00:46,000
guys may have for us and michael and

23
00:00:50,069 --> 00:00:47,840
i guess april leachman you're the

24
00:00:55,670 --> 00:00:50,079
teacher for these students so we're

25
00:01:00,950 --> 00:00:58,709
hello my name is and my question is if

26
00:01:03,110 --> 00:01:00,960
we ever live on the moon how we transfer

27
00:01:05,030 --> 00:01:03,120
oxygen

28
00:01:06,710 --> 00:01:05,040
clark that is a very very important

29
00:01:08,469 --> 00:01:06,720
question to think about because the moon

30
00:01:10,550 --> 00:01:08,479
doesn't have an atmosphere so we would

31
00:01:13,990 --> 00:01:10,560
have to provide our own oxygen for the

32
00:01:15,830 --> 00:01:14,000
astronauts to live and we may bring some

33
00:01:17,590 --> 00:01:15,840
of the oxygen with us but most likely if

34
00:01:19,270 --> 00:01:17,600
we're looking at living on the moon for

35
00:01:20,950 --> 00:01:19,280
a longer period of time than we did in

36
00:01:23,590 --> 00:01:20,960
the apollo days we're going to have to

37
00:01:25,270 --> 00:01:23,600
figure out a way to generate that oxygen

38
00:01:27,429 --> 00:01:25,280

so that is something that our engineers

39
00:01:29,670 --> 00:01:27,439
are working on right now in fact and not

40
00:01:31,749 --> 00:01:29,680
only generating the oxygen but recycling

41
00:01:33,510 --> 00:01:31,759
the oxygen that we use you know we

42
00:01:35,670 --> 00:01:33,520
breathe in oxygen we breathe out carbon

43
00:01:38,630 --> 00:01:35,680
dioxide so how could you recycle the

44
00:01:40,710 --> 00:01:38,640
oxygen out of your exhale and make sure

45
00:01:42,950 --> 00:01:40,720
that you pull the oxygen molecules in

46
00:01:45,429 --> 00:01:42,960
and maybe even generate oxygen from the

47
00:01:51,109 --> 00:01:45,439
carbon dioxide molecules great question

48
00:01:56,149 --> 00:01:53,749
hello my name is seth grenin and will we

49
00:01:58,550 --> 00:01:56,159
ever be able to walk on the moon or walk

50
00:02:00,389 --> 00:01:58,560
on the i'll walk on mars

51
00:02:03,109 --> 00:02:00,399
seth you know that's a question i often

52
00:02:05,109 --> 00:02:03,119
ask and we are working on our spacesuits

53
00:02:07,109 --> 00:02:05,119
and our vehicles and our robots and

54
00:02:09,430 --> 00:02:07,119
rovers to get us there and to work on

55
00:02:11,190 --> 00:02:09,440
the surface of mars as far as when that

56
00:02:12,550 --> 00:02:11,200
will happen you know it's it's a

57
00:02:14,949 --> 00:02:12,560
challenge to get there it's a lot

58
00:02:16,710 --> 00:02:14,959
further away than the moon the moon only

59
00:02:18,470 --> 00:02:16,720
took us about two to three days to get

60
00:02:20,390 --> 00:02:18,480
there to get to do our work

61
00:02:21,910 --> 00:02:20,400
mars is a lot further away so it could

62
00:02:24,070 --> 00:02:21,920
take us anywhere from three to six

63
00:02:25,750 --> 00:02:24,080

months to get there so you gotta let our

64
00:02:27,510 --> 00:02:25,760
engineers work hard on that new vehicle

65
00:02:29,270 --> 00:02:27,520
we're developing in our new suits and

66
00:02:31,509 --> 00:02:29,280
rovers and robots and then hopefully

67
00:02:35,030 --> 00:02:31,519
maybe you maybe your classmates will get

68
00:02:37,030 --> 00:02:35,040
to either work with us here to

69
00:02:41,589 --> 00:02:37,040
be in mission control center or even fly

70
00:02:41,599 --> 00:02:44,630
thank you

71
00:02:50,309 --> 00:02:46,630
hello my name is riley rossen and my

72
00:02:52,550 --> 00:02:50,319
question is aren't you ever worried that

73
00:02:55,350 --> 00:02:52,560
from the rockets the fuel that it will

74
00:02:57,350 --> 00:02:55,360
pollute outer space

75
00:02:59,990 --> 00:02:57,360
i see that's a very environmental

76
00:03:02,149 --> 00:03:00,000
question absolutely and we do a lot to

77
00:03:03,589 --> 00:03:02,159
really make sure that we understand

78
00:03:05,430 --> 00:03:03,599
where everything

79
00:03:08,070 --> 00:03:05,440
that we put out of our vehicles goes

80
00:03:10,869 --> 00:03:08,080
whether it's our rocket fuel or even our

81
00:03:13,509 --> 00:03:10,879
trash um or other things like that so

82
00:03:14,869 --> 00:03:13,519
we're very very aware of what kinds of

83
00:03:17,110 --> 00:03:14,879
things we're putting out into the

84
00:03:21,110 --> 00:03:17,120
atmosphere or in the case of space the

85
00:03:21,120 --> 00:03:24,470
thank you

86
00:03:29,030 --> 00:03:26,949
my name is brandon cuda my question is

87
00:03:33,589 --> 00:03:29,040
can you like tell the

88
00:03:34,789 --> 00:03:33,599

of what the weather would be like on

89
00:03:36,630 --> 00:03:34,799
earth

90
00:03:38,869 --> 00:03:36,640
absolutely and in fact if you watch the

91
00:03:41,670 --> 00:03:38,879
news and you learn about you know storm

92
00:03:43,750 --> 00:03:41,680
systems whether it's rain or snow

93
00:03:45,190 --> 00:03:43,760
all of those that information is coming

94
00:03:47,509 --> 00:03:45,200
from our satellites that we have

95
00:03:49,910 --> 00:03:47,519
positioned around our planet

96
00:03:52,710 --> 00:03:49,920
in part thanks to our space space

97
00:03:53,990 --> 00:03:52,720
shuttle and space missions and so you

98
00:03:56,229 --> 00:03:54,000
know a lot of what we're doing in our

99
00:03:58,070 --> 00:03:56,239
space program is not only to go explore

100
00:04:01,190 --> 00:03:58,080
places like the moon or mars or even an

101
00:04:03,670 --> 00:04:01,200
asteroid but a huge influence is to make

102
00:04:05,509 --> 00:04:03,680
sure that we are affecting and

103
00:04:07,270 --> 00:04:05,519
benefiting life here on earth and that's

104
00:04:10,470 --> 00:04:07,280
through monitoring the weather and

105
00:04:11,910 --> 00:04:10,480
keeping everyone informed

106
00:04:14,309 --> 00:04:11,920
okay thank you

107
00:04:17,189 --> 00:04:14,319
great question

108
00:04:19,830 --> 00:04:17,199
hello my name is devin spain and i want

109
00:04:22,230 --> 00:04:19,840
to know how you assure that the uh the

110
00:04:24,629 --> 00:04:22,240
astronauts have enough oxygen to survive

111
00:04:26,150 --> 00:04:24,639
in space yeah great question excellent

112
00:04:27,590 --> 00:04:26,160
you know i'm loving these life support

113
00:04:29,590 --> 00:04:27,600

questions because that's a lot of what

114
00:04:32,070 --> 00:04:29,600
i've focused my engineering career on is

115
00:04:34,629 --> 00:04:32,080
making sure the astronauts have not only

116
00:04:36,629 --> 00:04:34,639
enough oxygen but good clean breathing

117
00:04:38,230 --> 00:04:36,639
oxygen to keep our astronauts alive so

118
00:04:40,629 --> 00:04:38,240
they can do all of their work and

119
00:04:43,270 --> 00:04:40,639
science on board the space station so we

120
00:04:45,189 --> 00:04:43,280
bring up oxygen with us when we fly but

121
00:04:47,510 --> 00:04:45,199
then we also can generate oxygen and we

122
00:04:49,670 --> 00:04:47,520
recycle that oxygen as well our

123
00:04:51,510 --> 00:04:49,680
spacesuits have oxygen tanks so it's

124
00:04:53,510 --> 00:04:51,520
kind of like your own portable breathing

125
00:04:54,390 --> 00:04:53,520
apparatus inside of the life support

126
00:04:56,390 --> 00:04:54,400
system

127
00:04:59,749 --> 00:04:56,400
and then we have adequate oxygen onboard

128
00:04:59,759 --> 00:05:03,270
thank you

129
00:05:08,390 --> 00:05:05,510
my name is patrick huntington

130
00:05:11,749 --> 00:05:08,400
and if is nasa competitive with any

131
00:05:13,189 --> 00:05:11,759
other space programs if so who are they

132
00:05:15,670 --> 00:05:13,199
good question well back in the day

133
00:05:17,990 --> 00:05:15,680
patrick we were actually in a space race

134
00:05:20,230 --> 00:05:18,000
with what are now our partners um the

135
00:05:22,710 --> 00:05:20,240
russians so a long time ago we were

136
00:05:25,430 --> 00:05:22,720
under more of a competition but nowadays

137
00:05:27,670 --> 00:05:25,440
it's really about all about teamwork we

138
00:05:29,189 --> 00:05:27,680

have 16 international partners in

139
00:05:31,590 --> 00:05:29,199
working on the international space

140
00:05:33,430 --> 00:05:31,600
station and it's more important to think

141
00:05:35,510 --> 00:05:33,440
about how we can work together instead

142
00:05:37,110 --> 00:05:35,520
of competing against each other and we

143
00:05:39,029 --> 00:05:37,120
not only have our international partners

144
00:05:41,270 --> 00:05:39,039
for space station but we've now branched

145
00:05:43,270 --> 00:05:41,280
out to our industry partners you know we

146
00:05:45,189 --> 00:05:43,280
just launched the cygnus so that is a

147
00:05:47,510 --> 00:05:45,199
great example of one of our new

148
00:05:49,110 --> 00:05:47,520
commercial spacecraft that is going to

149
00:05:51,590 --> 00:05:49,120
connect with our space station in just a

150
00:05:55,110 --> 00:05:51,600
few days

151
00:06:01,350 --> 00:05:58,230
my name is neil jackson and i don't know

152
00:06:03,670 --> 00:06:01,360
what rocket fuel is made of

153
00:06:05,189 --> 00:06:03,680
what rocket fuels neil what rocket fuel

154
00:06:07,350 --> 00:06:05,199
is made of well that depends on the

155
00:06:09,830 --> 00:06:07,360
rocket i suppose you know

156
00:06:11,590 --> 00:06:09,840
our space shuttle had solid propellant

157
00:06:14,070 --> 00:06:11,600
as well as liquid and i don't know the

158
00:06:15,749 --> 00:06:14,080
exact formulation because that is not my

159
00:06:17,510 --> 00:06:15,759
area of expertise

160
00:06:18,950 --> 00:06:17,520
but really when you think about where

161
00:06:20,629 --> 00:06:18,960
you're going in space that's going to

162
00:06:22,150 --> 00:06:20,639
determine what kind of propellant you

163
00:06:24,469 --> 00:06:22,160

would use so if you're going into low

164
00:06:26,150 --> 00:06:24,479
earth orbit you probably don't need as

165
00:06:27,990 --> 00:06:26,160
much as you would need if you were going

166
00:06:29,189 --> 00:06:28,000
to a place like the moon or even further

167
00:06:32,710 --> 00:06:29,199
like mars

168
00:06:37,430 --> 00:06:35,590
cute

169
00:06:39,430 --> 00:06:37,440
hello my name is connor pitts and my

170
00:06:42,150 --> 00:06:39,440
question is what is your plan to put

171
00:06:43,749 --> 00:06:42,160
people back on space

172
00:06:45,590 --> 00:06:43,759
well connor we have people in space

173
00:06:47,270 --> 00:06:45,600
right now on board the international

174
00:06:49,430 --> 00:06:47,280
space station living up there for about

175
00:06:51,270 --> 00:06:49,440
six months at a time and we just

176
00:06:53,029 --> 00:06:51,280
recently um

177
00:06:54,790 --> 00:06:53,039
selected our first astronaut and

178
00:06:56,950 --> 00:06:54,800
cosmonaut who are going to live on board

179
00:06:59,589 --> 00:06:56,960
the space station for one year

180
00:07:01,430 --> 00:06:59,599
continuously so we have people up there

181
00:07:03,830 --> 00:07:01,440
pretty much 24 hours a day seven days a

182
00:07:05,749 --> 00:07:03,840
week right now now as far as looking to

183
00:07:07,430 --> 00:07:05,759
our next destinations we're trying to

184
00:07:09,029 --> 00:07:07,440
figure out if we want to go back to the

185
00:07:11,510 --> 00:07:09,039
moon which would be pretty cool in my

186
00:07:13,110 --> 00:07:11,520
opinion or maybe even go and find an

187
00:07:15,589 --> 00:07:13,120
asteroid and bring it back closer to

188
00:07:18,790 --> 00:07:15,599

earth so we could study it or eventually

189
00:07:18,800 --> 00:07:22,309
thank you

190
00:07:27,430 --> 00:07:24,950
my name is olivia rozika and my question

191
00:07:29,589 --> 00:07:27,440
is what materials are in the present-day

192
00:07:31,510 --> 00:07:29,599
spacesuits

193
00:07:33,350 --> 00:07:31,520
excellent question and there's several

194
00:07:35,270 --> 00:07:33,360
different layers in our spacesuit and

195
00:07:36,469 --> 00:07:35,280
all of those layers are important

196
00:07:38,070 --> 00:07:36,479
because

197
00:07:40,469 --> 00:07:38,080
they make sure that the astronaut stays

198
00:07:42,230 --> 00:07:40,479
alive inside of the suit as well as

199
00:07:44,550 --> 00:07:42,240
thermally protected

200
00:07:47,029 --> 00:07:44,560
so we first have a layer that kind of

201
00:07:49,430 --> 00:07:47,039
acts not as flexible as a balloon but a

202
00:07:51,189 --> 00:07:49,440
balloon when you inflate it with air it

203
00:07:53,189 --> 00:07:51,199
holds that air and especially if you tie

204
00:07:55,189 --> 00:07:53,199
it up really tight well because we

205
00:07:57,430 --> 00:07:55,199
essentially inflate our spacesuit with

206
00:07:59,990 --> 00:07:57,440
oxygen you need a layer a pressure layer

207
00:08:01,830 --> 00:08:00,000
that's going to hold that oxygen in

208
00:08:03,430 --> 00:08:01,840
but once you inflate a balloon it tends

209
00:08:04,710 --> 00:08:03,440
to get kind of rigid and it wants to

210
00:08:07,029 --> 00:08:04,720
stay in the shape that it's been

211
00:08:09,589 --> 00:08:07,039
designed to be the spacesuit is no

212
00:08:11,029 --> 00:08:09,599
different so then the second layer is

213
00:08:13,029 --> 00:08:11,039

what we call a restraint layer and it's

214
00:08:15,110 --> 00:08:13,039
made out of dacron which is found in a

215
00:08:16,790 --> 00:08:15,120
lot of camping equipment it's a very

216
00:08:19,430 --> 00:08:16,800
nice lightweight

217
00:08:21,510 --> 00:08:19,440
flexible somewhat flexible material and

218
00:08:23,670 --> 00:08:21,520
we can sew that material to make the

219
00:08:25,830 --> 00:08:23,680
spacesuit into more of a human shape and

220
00:08:27,270 --> 00:08:25,840
that's what's going to hold that bladder

221
00:08:28,869 --> 00:08:27,280
that pressure layer

222
00:08:31,670 --> 00:08:28,879
in and make sure it doesn't over

223
00:08:33,909 --> 00:08:31,680
pressurize and then we have a multi

224
00:08:35,750 --> 00:08:33,919
multi-layer garment that first starts

225
00:08:37,750 --> 00:08:35,760
off with neoprene and if any of you are

226
00:08:39,829 --> 00:08:37,760
interested in scuba diving you would

227
00:08:41,350 --> 00:08:39,839
wear a wetsuit that's primarily made out

228
00:08:43,430 --> 00:08:41,360
of neoprene to make sure that you stay

229
00:08:45,910 --> 00:08:43,440
nice and warm especially as you go

230
00:08:47,430 --> 00:08:45,920
deeper into the water environment we

231
00:08:49,509 --> 00:08:47,440
have neoprene in the spacesuit for the

232
00:08:52,150 --> 00:08:49,519
same reason to keep our astronauts

233
00:08:54,710 --> 00:08:52,160
comfortable inside then we have multiple

234
00:08:56,550 --> 00:08:54,720
layers of a really shiny material called

235
00:08:58,630 --> 00:08:56,560
mylar and if you've ever gotten a happy

236
00:09:00,389 --> 00:08:58,640
birthday balloon from a grocery store

237
00:09:02,150 --> 00:09:00,399
one of those shiny ones that's typically

238
00:09:03,829 --> 00:09:02,160

made of a thicker mylar than what we

239
00:09:06,310 --> 00:09:03,839
have in the spacesuit

240
00:09:07,829 --> 00:09:06,320
or here in texas every day and summer we

241
00:09:09,590 --> 00:09:07,839
have to put up those sun shields in the

242
00:09:11,430 --> 00:09:09,600
car otherwise the car gets really hot

243
00:09:13,030 --> 00:09:11,440
well mine is made out of mylar so i

244
00:09:14,550 --> 00:09:13,040
always think about that hey cool i'm in

245
00:09:16,150 --> 00:09:14,560
a spacesuit right now

246
00:09:18,710 --> 00:09:16,160
and then the outer garment that's white

247
00:09:20,470 --> 00:09:18,720
is actually a combination of materials

248
00:09:23,190 --> 00:09:20,480
nomex which is in a lot of our

249
00:09:25,269 --> 00:09:23,200
firefighter suits kevlar which is in

250
00:09:27,910 --> 00:09:25,279
bulletproof vests and then a little bit

251
00:09:29,829 --> 00:09:27,920
of teflon as well so a lot of really

252
00:09:31,990 --> 00:09:29,839
common materials that we use here on

253
00:09:35,990 --> 00:09:32,000
earth we've developed into a garment

254
00:09:42,710 --> 00:09:37,190
thank you

255
00:09:46,070 --> 00:09:44,630
hi my name is hannah vandermae and my

256
00:09:48,310 --> 00:09:46,080
question is

257
00:09:51,110 --> 00:09:48,320
what what is what's the farthest planet

258
00:09:52,949 --> 00:09:51,120
that nasa's been to

259
00:09:55,110 --> 00:09:52,959
excellent question well the farthest

260
00:09:56,870 --> 00:09:55,120
that we've been with humans

261
00:09:58,070 --> 00:09:56,880
is to the moon and that's not really a

262
00:09:59,910 --> 00:09:58,080
planet

263
00:10:01,750 --> 00:09:59,920

but of course we've got our rovers on

264
00:10:03,670 --> 00:10:01,760
mars right now and we've got a lot of

265
00:10:05,910 --> 00:10:03,680
different vehicles that are out there

266
00:10:08,230 --> 00:10:05,920
exploring space even beyond and i think

267
00:10:10,710 --> 00:10:08,240
one recently just even went beyond our

268
00:10:12,630 --> 00:10:10,720
solar system yeah voyager 1. that's

269
00:10:14,310 --> 00:10:12,640
right voyager 1 is out there collecting

270
00:10:17,990 --> 00:10:14,320
great information for our scientists and

271
00:10:18,000 --> 00:10:21,430
thank you

272
00:10:26,550 --> 00:10:23,509
hi my name is drew patterson i was going

273
00:10:28,150 --> 00:10:26,560
to ask how many degrees have you earned

274
00:10:32,550 --> 00:10:28,160
all right drew well that is a great

275
00:10:34,790 --> 00:10:32,560
question i started a long answer

276
00:10:37,269 --> 00:10:34,800
i started off at auburn university in

277
00:10:39,590 --> 00:10:37,279
alabama and i studied mechanical

278
00:10:41,910 --> 00:10:39,600
engineering and spanish so i have two

279
00:10:43,430 --> 00:10:41,920
undergraduate degrees and during that

280
00:10:45,190 --> 00:10:43,440
time i actually was also a student

281
00:10:47,430 --> 00:10:45,200
working at nasa so it was a great way to

282
00:10:48,710 --> 00:10:47,440
kind of get some work experience in to

283
00:10:50,230 --> 00:10:48,720
try to figure out

284
00:10:52,790 --> 00:10:50,240
what type of engineering work i'd want

285
00:10:54,710 --> 00:10:52,800
to do when i eventually got hired here i

286
00:10:56,870 --> 00:10:54,720
then went to the university of texas at

287
00:10:58,710 --> 00:10:56,880
austin to continue my mechanical

288
00:11:01,030 --> 00:10:58,720

engineering studies and i got a master's

289
00:11:02,949 --> 00:11:01,040
degree there then i joined the nasa

290
00:11:04,550 --> 00:11:02,959
workforce and a few years afterwards i

291
00:11:06,389 --> 00:11:04,560
realized that i just was not done with

292
00:11:08,710 --> 00:11:06,399
my education and i went to the

293
00:11:10,870 --> 00:11:08,720
university of houston clear lake and got

294
00:11:12,470 --> 00:11:10,880
a master's degree in fitness and human

295
00:11:15,110 --> 00:11:12,480
performance to really get a better

296
00:11:17,590 --> 00:11:15,120
understanding of how the human body

297
00:11:19,190 --> 00:11:17,600
works when we're under exercise and i've

298
00:11:21,750 --> 00:11:19,200
spent a long time working with our

299
00:11:23,590 --> 00:11:21,760
spacesuit team and we talk about working

300
00:11:25,829 --> 00:11:23,600
in the spacesuit is really about six to

301
00:11:27,670 --> 00:11:25,839
eight hours of exercise so thinking

302
00:11:29,110 --> 00:11:27,680
about how to prepare enough oxygen for

303
00:11:31,350 --> 00:11:29,120
them to breathe you have to understand

304
00:11:33,750 --> 00:11:31,360
how that exercise affects your heart

305
00:11:35,509 --> 00:11:33,760
rate your your lung capacity

306
00:11:37,829 --> 00:11:35,519
i think that's a

307
00:11:40,069 --> 00:11:37,839
that's a really good example of how your

308
00:11:41,430 --> 00:11:40,079
education can continue even after you

309
00:11:42,790 --> 00:11:41,440
finish school i know you're probably

310
00:11:44,150 --> 00:11:42,800
thinking right now i don't want to go to

311
00:11:44,949 --> 00:11:44,160
school anymore

312
00:11:47,269 --> 00:11:44,959
but

313
00:11:49,829 --> 00:11:47,279

you may want to once you've gotten out

314
00:11:51,590 --> 00:11:49,839
and and you started working and you say

315
00:11:53,910 --> 00:11:51,600
there's so much more that i want to

316
00:11:55,509 --> 00:11:53,920
learn and heather's a perfect example of

317
00:11:58,069 --> 00:11:55,519
someone who

318
00:12:00,629 --> 00:11:58,079
continues to want to learn even after

319
00:12:02,790 --> 00:12:00,639
being a professional and working

320
00:12:04,550 --> 00:12:02,800
you know after school and so

321
00:12:06,629 --> 00:12:04,560
that's a really good question and you

322
00:12:08,710 --> 00:12:06,639
guys don't don't feel like you stop at

323
00:12:10,949 --> 00:12:08,720
high school or college

324
00:12:17,269 --> 00:12:10,959
you can you can keep learning even after

325
00:12:22,870 --> 00:12:19,910
hello my name hello my name is leon and

326
00:12:25,670 --> 00:12:22,880
yuki my question is how many gallons of

327
00:12:28,790 --> 00:12:25,680
field does it take to launch the rocket

328
00:12:32,870 --> 00:12:30,790
man this is a toughy i don't know i'd

329
00:12:34,550 --> 00:12:32,880
have to go and look that up

330
00:12:36,710 --> 00:12:34,560
yeah the uh

331
00:12:39,509 --> 00:12:36,720
i know that the uh the space shuttle

332
00:12:41,990 --> 00:12:39,519
which we just retired obviously the um

333
00:12:45,910 --> 00:12:42,000
it's about a half a million gallons of

334
00:12:48,790 --> 00:12:45,920
uh propellant oxygen and and hydrogen

335
00:12:51,350 --> 00:12:48,800
uh that's required to uh to get a space

336
00:12:53,990 --> 00:12:51,360
shuttle into orbit and and the moon

337
00:12:55,590 --> 00:12:54,000
rockets uh back in the late 60s and

338
00:12:57,910 --> 00:12:55,600

early 70s was

339
00:12:59,750 --> 00:12:57,920
even more than that um

340
00:13:01,990 --> 00:12:59,760
remembering that the atmosphere is very

341
00:13:03,829 --> 00:13:02,000
thick and the hardest part of of a

342
00:13:06,389 --> 00:13:03,839
rocket launch is actually the first two

343
00:13:08,470 --> 00:13:06,399
minutes or so once you get past that you

344
00:13:10,150 --> 00:13:08,480
get into the thin part of the atmosphere

345
00:13:11,910 --> 00:13:10,160
the vehicle's engines are start

346
00:13:13,670 --> 00:13:11,920
accelerating the vehicle because the

347
00:13:16,150 --> 00:13:13,680
atmosphere is so thin and suddenly you

348
00:13:18,870 --> 00:13:16,160
get to a point where you're almost

349
00:13:20,230 --> 00:13:18,880
out of the atmosphere completely and so

350
00:13:22,069 --> 00:13:20,240
you don't need as much propellant to

351
00:13:24,870 --> 00:13:22,079
move around once you're in space but you

352
00:13:27,190 --> 00:13:24,880
still require it to move uh but that's a

353
00:13:29,430 --> 00:13:27,200
great question it is takes a great deal

354
00:13:32,230 --> 00:13:29,440
of propellant to break earth's gravity

355
00:13:35,110 --> 00:13:32,240
and so living in space and and moving

356
00:13:36,870 --> 00:13:35,120
from space to further deeper space

357
00:13:39,269 --> 00:13:36,880
you know may eventually be the way to go

358
00:13:40,550 --> 00:13:39,279
and and and produce propellant depots in

359
00:13:42,710 --> 00:13:40,560
space where you

360
00:13:44,230 --> 00:13:42,720
refuel like a gas station and then go

361
00:13:45,910 --> 00:13:44,240
further because you don't you might not

362
00:13:47,509 --> 00:13:45,920
need as much out there that's a great

363
00:13:50,470 --> 00:13:47,519

question really great and that really

364
00:13:53,110 --> 00:13:50,480
relies a lot on orbital mechanics too

365
00:13:55,509 --> 00:13:53,120
understanding how if you can do a loop

366
00:13:57,750 --> 00:13:55,519
or two around a planet like earth or

367
00:14:00,069 --> 00:13:57,760
maybe even around the moon you can use

368
00:14:01,990 --> 00:14:00,079
that gravitational pull to essentially

369
00:14:04,150 --> 00:14:02,000
slingshot your vehicle so maybe you

370
00:14:06,389 --> 00:14:04,160
don't need as much propellant the more

371
00:14:08,710 --> 00:14:06,399
propellant you have on launch

372
00:14:10,949 --> 00:14:08,720
the heavier your vehicle is the harder

373
00:14:12,550 --> 00:14:10,959
it is to really get up into space so our

374
00:14:14,230 --> 00:14:12,560
engineers and our scientists are really

375
00:14:16,310 --> 00:14:14,240
smart about looking at all the different

376
00:14:18,470 --> 00:14:16,320
options for if we want to go from earth

377
00:14:23,750 --> 00:14:18,480
to a destination what's going to be the

378
00:14:23,760 --> 00:14:27,990
thanks

379
00:14:32,389 --> 00:14:30,069
hi my name is kennedy and i was

380
00:14:35,269 --> 00:14:32,399
wondering how long did you stay in

381
00:14:37,829 --> 00:14:35,279
college to have this job

382
00:14:40,389 --> 00:14:37,839
good question kennedy well i was at

383
00:14:42,310 --> 00:14:40,399
auburn university for a total of about

384
00:14:44,389 --> 00:14:42,320
four and a half years that's my time

385
00:14:46,790 --> 00:14:44,399
that i was actually at school

386
00:14:48,629 --> 00:14:46,800
but i was also taking some time to do a

387
00:14:51,670 --> 00:14:48,639
semester at school and then a semester

388
00:14:54,310 --> 00:14:51,680

at nasa so it took me probably about

389
00:14:56,870 --> 00:14:54,320
seven years total to get through

390
00:14:58,550 --> 00:14:56,880
my school as well as my work experience

391
00:15:00,150 --> 00:14:58,560
and i decided to extend out my work

392
00:15:02,389 --> 00:15:00,160
experience a little bit because i just

393
00:15:04,310 --> 00:15:02,399
loved so much working here and it really

394
00:15:06,230 --> 00:15:04,320
helped me to understand

395
00:15:07,670 --> 00:15:06,240
what all of that those theories and

396
00:15:09,750 --> 00:15:07,680
those homework projects that i had to

397
00:15:11,350 --> 00:15:09,760
learn at school how to apply them to

398
00:15:13,189 --> 00:15:11,360
really cool stuff that could fly in

399
00:15:14,949 --> 00:15:13,199
space so i thought it was an important

400
00:15:17,110 --> 00:15:14,959
thing for me to really

401
00:15:18,710 --> 00:15:17,120
do my research here at nasa too to

402
00:15:21,110 --> 00:15:18,720
figure out where i would best fit in and

403
00:15:22,870 --> 00:15:21,120
what i wanted to do with my career then

404
00:15:24,629 --> 00:15:22,880
my graduate degree took me about two

405
00:15:26,629 --> 00:15:24,639
years and even then i was still

406
00:15:35,670 --> 00:15:26,639
alternating between a semester at school

407
00:15:39,670 --> 00:15:38,230
hi my name is danny what is the favorite

408
00:15:41,990 --> 00:15:39,680
part what is your favorite part of your

409
00:15:45,990 --> 00:15:44,150
oh danny wow i wish i could answer

410
00:15:47,749 --> 00:15:46,000
several things you know i think one of

411
00:15:50,150 --> 00:15:47,759
the favorite things that i think about

412
00:15:52,550 --> 00:15:50,160
when i get to work here is working with

413
00:15:53,990 --> 00:15:52,560

this great team of people it's really

414
00:15:55,269 --> 00:15:54,000
all about teamwork here when you look at

415
00:15:56,870 --> 00:15:55,279
the mission control center i mean

416
00:15:59,430 --> 00:15:56,880
there's several people here that are all

417
00:16:02,150 --> 00:15:59,440
working together as a team to make sure

418
00:16:03,670 --> 00:16:02,160
astronauts are living successfully and

419
00:16:05,990 --> 00:16:03,680
working on board the space station and

420
00:16:07,509 --> 00:16:06,000
even behind the scenes we have rooms

421
00:16:09,509 --> 00:16:07,519
full of people that are supporting each

422
00:16:11,670 --> 00:16:09,519
person here in mission control and then

423
00:16:13,749 --> 00:16:11,680
engineers and scientists all across

424
00:16:15,350 --> 00:16:13,759
johnson space center all across the

425
00:16:16,790 --> 00:16:15,360
united states at our different nasa

426
00:16:18,470 --> 00:16:16,800
centers and just

427
00:16:20,629 --> 00:16:18,480
the amount of teamwork and effort and

428
00:16:22,629 --> 00:16:20,639
communication it's just amazing to be a

429
00:16:23,990 --> 00:16:22,639
part of and then the other thing i like

430
00:16:25,749 --> 00:16:24,000
to think about with my engineering

431
00:16:27,990 --> 00:16:25,759
career is i really see myself as a

432
00:16:30,710 --> 00:16:28,000
problem solver so if you like solving

433
00:16:32,790 --> 00:16:30,720
puzzles whether it's sudoku a crossword

434
00:16:34,230 --> 00:16:32,800
or putting a jigsaw puzzle together

435
00:16:36,389 --> 00:16:34,240
that's really the heart and the essence

436
00:16:38,470 --> 00:16:36,399
of engineering is being willing to look

437
00:16:40,470 --> 00:16:38,480
at a problem and see it as a creative

438
00:16:42,629 --> 00:16:40,480

challenge and how can you overcome that

439
00:16:50,550 --> 00:16:42,639
and fix that problem so i like to say

440
00:16:54,550 --> 00:16:52,710
hi my name is abby and i was wondering

441
00:16:56,710 --> 00:16:54,560
about how old you were when you decided

442
00:16:58,550 --> 00:16:56,720
she wanted to become an engineer

443
00:17:01,189 --> 00:16:58,560
that's a great question that's a great

444
00:17:03,269 --> 00:17:01,199
question abby i was interested in space

445
00:17:05,189 --> 00:17:03,279
from a very very young age but when i

446
00:17:07,750 --> 00:17:05,199
decided i wanted to become an engineer

447
00:17:10,309 --> 00:17:07,760
was probably about your age i started

448
00:17:11,829 --> 00:17:10,319
realizing that to be an astronaut you

449
00:17:13,429 --> 00:17:11,839
could go down a couple of different

450
00:17:15,510 --> 00:17:13,439
different career paths and one of them

451
00:17:17,750 --> 00:17:15,520
was engineering and the benefit with

452
00:17:19,429 --> 00:17:17,760
going into engineering was that if i

453
00:17:21,909 --> 00:17:19,439
didn't end up getting selected to be an

454
00:17:23,510 --> 00:17:21,919
astronaut i could do what's really a

455
00:17:24,710 --> 00:17:23,520
very close second which is be an

456
00:17:26,549 --> 00:17:24,720
engineer

457
00:17:27,909 --> 00:17:26,559
that works and trains the astronauts and

458
00:17:30,150 --> 00:17:27,919
develops the the hardware that the

459
00:17:31,909 --> 00:17:30,160
astronauts get to use in space and in

460
00:17:33,669 --> 00:17:31,919
fact a lot of the training that our

461
00:17:35,590 --> 00:17:33,679
astronauts go through our engineers have

462
00:17:37,430 --> 00:17:35,600
to do as well especially when you're

463
00:17:38,710 --> 00:17:37,440

thinking about a spacesuit design or

464
00:17:40,070 --> 00:17:38,720
some hardware that the astronauts are

465
00:17:41,830 --> 00:17:40,080
going to use

466
00:17:43,750 --> 00:17:41,840
our engineers have to be familiar with

467
00:17:45,350 --> 00:17:43,760
working with that same equipment so that

468
00:17:47,990 --> 00:17:45,360
if there is something that happens in

469
00:17:50,630 --> 00:17:48,000
space we can replicate it or simulate it

470
00:17:52,390 --> 00:17:50,640
here on earth so really being an

471
00:17:54,549 --> 00:17:52,400
engineer for nasa is something that i

472
00:17:56,390 --> 00:17:54,559
thought about a long time ago i didn't

473
00:17:58,070 --> 00:17:56,400
know which kind of engineer i wanted to

474
00:17:59,909 --> 00:17:58,080
be but once i started looking at

475
00:18:02,230 --> 00:17:59,919
colleges i realized that mechanical

476
00:18:03,830 --> 00:18:02,240
engineering was the way to go because of

477
00:18:05,750 --> 00:18:03,840
all of the different opportunities the

478
00:18:07,510 --> 00:18:05,760
really foundational aspects of

479
00:18:08,230 --> 00:18:07,520
mechanical engineering would allow me to

480
00:18:12,870 --> 00:18:08,240
do

481
00:18:12,880 --> 00:18:17,830
thank you

482
00:18:23,590 --> 00:18:20,470
hi my name is bonnie and i was wondering

483
00:18:26,310 --> 00:18:23,600
what qualifications do you need to be

484
00:18:28,470 --> 00:18:26,320
a engineer nasa

485
00:18:30,470 --> 00:18:28,480
excellent question well you first of all

486
00:18:32,630 --> 00:18:30,480
have to go to college and study some

487
00:18:34,310 --> 00:18:32,640
kind of a technical degree typically

488
00:18:36,230 --> 00:18:34,320

engineering

489
00:18:37,430 --> 00:18:36,240
and get your bachelor of science degree

490
00:18:39,990 --> 00:18:37,440
in engineering and that can be

491
00:18:42,470 --> 00:18:40,000
mechanical chemical electrical computer

492
00:18:44,950 --> 00:18:42,480
industrial i work with so many different

493
00:18:47,190 --> 00:18:44,960
types of engineers and really realizing

494
00:18:48,789 --> 00:18:47,200
that you may not even need to do that

495
00:18:51,350 --> 00:18:48,799
kind of engineering ultimately because

496
00:18:54,950 --> 00:18:51,360
really we have to be able to kind of

497
00:18:56,789 --> 00:18:54,960
merge into other aspects of engineering

498
00:18:58,630 --> 00:18:56,799
so a minimum i would say is a bachelor

499
00:19:00,310 --> 00:18:58,640
of science degree now some of our

500
00:19:02,950 --> 00:19:00,320
engineers like me choose to go on and

501
00:19:04,710 --> 00:19:02,960
get a master's but it's not required we

502
00:19:06,310 --> 00:19:04,720
also like to make sure that you have

503
00:19:08,630 --> 00:19:06,320
some work experience so if you're

504
00:19:10,549 --> 00:19:08,640
interested in engineering start looking

505
00:19:12,230 --> 00:19:10,559
at opportunities for internships whether

506
00:19:14,230 --> 00:19:12,240
it's here at nasa which of course i

507
00:19:16,470 --> 00:19:14,240
highly recommend or with one of our

508
00:19:17,990 --> 00:19:16,480
contract partners or one of our

509
00:19:19,750 --> 00:19:18,000
commercial partners there's a lot of

510
00:19:22,310 --> 00:19:19,760
opportunities out there to get that work

511
00:19:26,630 --> 00:19:22,320
experience

512
00:19:31,909 --> 00:19:29,750
um hello my name is angelica santiago my

513
00:19:34,549 --> 00:19:31,919

question is how does a person sleep in

514
00:19:38,230 --> 00:19:36,630
a very important aspect of living in

515
00:19:40,630 --> 00:19:38,240
space you got to make sure that you get

516
00:19:42,230 --> 00:19:40,640
enough rest we have crew quarters where

517
00:19:43,830 --> 00:19:42,240
the astronauts basically can kind of

518
00:19:45,350 --> 00:19:43,840
close themselves up in their own little

519
00:19:46,950 --> 00:19:45,360
personal space

520
00:19:48,150 --> 00:19:46,960
and really what they sleep in is

521
00:19:50,390 --> 00:19:48,160
something that looks a lot like a

522
00:19:52,870 --> 00:19:50,400
sleeping bag they climb into it their

523
00:19:55,270 --> 00:19:52,880
legs go in and one of the more

524
00:19:56,710 --> 00:19:55,280
interesting things that the astronauts

525
00:19:59,190 --> 00:19:56,720
have shared with me about sleeping in

526
00:20:01,590 --> 00:19:59,200
space is that they miss that sensation

527
00:20:04,070 --> 00:20:01,600
of resting their head on a pillow so we

528
00:20:06,149 --> 00:20:04,080
had to design a head strap that would go

529
00:20:07,909 --> 00:20:06,159
across the astronaut's head to tilt

530
00:20:09,830 --> 00:20:07,919
their head back and then rest on the

531
00:20:11,590 --> 00:20:09,840
back of their sleeping bag essentially

532
00:20:13,830 --> 00:20:11,600
to give them that feeling

533
00:20:15,750 --> 00:20:13,840
of sleeping and a lot of times our

534
00:20:17,669 --> 00:20:15,760
astronauts can choose or not choose to

535
00:20:19,350 --> 00:20:17,679
restrain their arms so sometimes if you

536
00:20:20,789 --> 00:20:19,360
see astronauts sleeping in space their

537
00:20:22,870 --> 00:20:20,799
arms have risen up and they look a

538
00:20:24,310 --> 00:20:22,880

little bit like a mummy just in time for

539
00:20:25,990 --> 00:20:24,320
halloween

540
00:20:28,149 --> 00:20:26,000
but i've heard it's very comfortable to

541
00:20:29,510 --> 00:20:28,159
sleep in space and really we work our

542
00:20:31,190 --> 00:20:29,520
astronauts pretty hard and they do a lot

543
00:20:34,310 --> 00:20:31,200
of great work for us so by the time they

544
00:20:42,070 --> 00:20:34,320
get to lay down or float and sleep

545
00:20:45,270 --> 00:20:44,070
hi my name is sophia morgan and i'm

546
00:20:48,950 --> 00:20:45,280
wondering

547
00:20:50,950 --> 00:20:48,960
why did you decide to be part of nasa

548
00:20:52,710 --> 00:20:50,960
excellent excellent question

549
00:20:53,990 --> 00:20:52,720
well back when i was about your age and

550
00:20:56,470 --> 00:20:54,000
i started looking at the different

551
00:20:58,149 --> 00:20:56,480
career options that were out there i was

552
00:20:59,990 --> 00:20:58,159
so interested i was already tied into

553
00:21:00,870 --> 00:21:00,000
what nasa was doing

554
00:21:05,029 --> 00:21:00,880
through

555
00:21:06,789 --> 00:21:05,039
and i really just decided that to be an

556
00:21:08,630 --> 00:21:06,799
astronaut or even an engineer working in

557
00:21:09,510 --> 00:21:08,640
the space program nasa was the place to

558
00:21:11,750 --> 00:21:09,520
be

559
00:21:13,830 --> 00:21:11,760
nowadays there's even more opportunities

560
00:21:15,510 --> 00:21:13,840
of course nasa is really at the

561
00:21:17,110 --> 00:21:15,520
forefront of working with our

562
00:21:18,870 --> 00:21:17,120
international space station and looking

563
00:21:20,789 --> 00:21:18,880

at future technologies but there are a

564
00:21:23,110 --> 00:21:20,799
lot of contractor partners that we work

565
00:21:24,390 --> 00:21:23,120
with that offer a similar experience and

566
00:21:26,630 --> 00:21:24,400
we have all of our international

567
00:21:28,149 --> 00:21:26,640
partners so really the opportunities are

568
00:21:30,310 --> 00:21:28,159
even greater for you guys that are

569
00:21:35,669 --> 00:21:30,320
interested in working for the space

570
00:21:38,789 --> 00:21:37,270
hi my name is emily rogers and i was

571
00:21:40,470 --> 00:21:38,799
wondering if you were working on any new

572
00:21:42,549 --> 00:21:40,480
spacesuits

573
00:21:45,350 --> 00:21:42,559
hey emily well i love that t-shirt so

574
00:21:47,750 --> 00:21:45,360
war eagle to you absolutely we are

575
00:21:49,350 --> 00:21:47,760
working on new suits right now and we're

576
00:21:51,029 --> 00:21:49,360
trying to make our suits kind of

577
00:21:52,390 --> 00:21:51,039
multi-purpose because we don't know yet

578
00:21:54,470 --> 00:21:52,400
where we're going

579
00:21:56,230 --> 00:21:54,480
but we're really focusing a lot on a

580
00:21:58,390 --> 00:21:56,240
suit to work with our new

581
00:22:00,230 --> 00:21:58,400
orion vehicle and it's going to look

582
00:22:01,909 --> 00:22:00,240
kind of like the suit that we wore when

583
00:22:03,430 --> 00:22:01,919
our astronauts launched and landed in

584
00:22:05,350 --> 00:22:03,440
the space shuttle the bright orange

585
00:22:07,350 --> 00:22:05,360
advanced crew escape suit

586
00:22:08,230 --> 00:22:07,360
we're working on modifications to that

587
00:22:10,549 --> 00:22:08,240
to

588
00:22:13,110 --> 00:22:10,559

work with the requirements for our our

589
00:22:16,070 --> 00:22:13,120
orion program and then we've got our

590
00:22:18,149 --> 00:22:16,080
engineers off working on a surface suit

591
00:22:20,070 --> 00:22:18,159
as well something that's going to be a

592
00:22:22,310 --> 00:22:20,080
definite upgrade from what we used on

593
00:22:23,750 --> 00:22:22,320
the moon much more mobile hopefully

594
00:22:25,510 --> 00:22:23,760
lighter weight and hopefully more

595
00:22:28,230 --> 00:22:25,520
efficient with the life support system

596
00:22:30,310 --> 00:22:28,240
so maybe we can stay out longer or wear

597
00:22:31,669 --> 00:22:30,320
less weight on our back so stay tuned

598
00:22:33,830 --> 00:22:31,679
and maybe hopefully you can join our

599
00:22:37,029 --> 00:22:33,840
team as well

600
00:22:41,510 --> 00:22:39,270
hi i'm jaleja pay and i was wondering

601
00:22:43,990 --> 00:22:41,520
what happened if an astronaut gets it

602
00:22:45,909 --> 00:22:44,000
can i go home early

603
00:22:49,110 --> 00:22:45,919
a very a very important thing to think

604
00:22:50,310 --> 00:22:49,120
about now our astronauts are trained in

605
00:22:51,990 --> 00:22:50,320
a little bit of medicine so they can

606
00:22:53,669 --> 00:22:52,000
kind of help each other and we have some

607
00:22:55,510 --> 00:22:53,679
certain medications up there if they get

608
00:22:57,270 --> 00:22:55,520
a little under the weather if they

609
00:22:59,669 --> 00:22:57,280
became really serious we'd have to

610
00:23:01,510 --> 00:22:59,679
evaluate how to get them back home but

611
00:23:03,270 --> 00:23:01,520
really our astronauts are very very well

612
00:23:05,590 --> 00:23:03,280
trained to take care of themselves in

613
00:23:08,149 --> 00:23:05,600

space we also have a flight doctor that

614
00:23:09,430 --> 00:23:08,159
is here in mission control that monitors

615
00:23:11,110 --> 00:23:09,440
the crew health and make sure that

616
00:23:13,029 --> 00:23:11,120
they're feeling well enough to stay up

617
00:23:15,430 --> 00:23:13,039
there and do the job

618
00:23:18,549 --> 00:23:15,440
and if it's really an emergency they do

619
00:23:20,390 --> 00:23:18,559
have their spacecraft that's always

620
00:23:24,230 --> 00:23:20,400
at the space station so they can come

621
00:23:26,230 --> 00:23:24,240
home in an emergency fairly quickly

622
00:23:28,549 --> 00:23:26,240
great question

623
00:23:30,870 --> 00:23:28,559
thank you

624
00:23:33,190 --> 00:23:30,880
hi my name is madison essen and i was

625
00:23:34,950 --> 00:23:33,200
wondering what have you learned from the

626
00:23:37,669 --> 00:23:34,960
voyager 1 now it's out of our solar

627
00:23:39,270 --> 00:23:37,679
system

628
00:23:40,950 --> 00:23:39,280
that's an excellent question you know i

629
00:23:42,710 --> 00:23:40,960
think we're excited to see what we

630
00:23:45,110 --> 00:23:42,720
learned from voyager 1. i think it just

631
00:23:46,710 --> 00:23:45,120
left not too long ago so we have a

632
00:23:49,669 --> 00:23:46,720
little bit of time to figure out what

633
00:23:51,990 --> 00:23:49,679
we're going to see next

634
00:23:54,149 --> 00:23:52,000
so hopefully stay tuned to the nasa.gov

635
00:23:55,669 --> 00:23:54,159
website and we'll keep you guys informed

636
00:23:57,269 --> 00:23:55,679
and the other great program that that

637
00:23:59,669 --> 00:23:57,279
we're working on right now is the james

638
00:24:01,110 --> 00:23:59,679

webb space telescope that is going to be

639
00:24:03,029 --> 00:24:01,120
a huge improvement we've got the

640
00:24:05,190 --> 00:24:03,039
fantastic hubble space telescope up

641
00:24:07,110 --> 00:24:05,200
right now but james webb is going to let

642
00:24:09,350 --> 00:24:07,120
us see even further

643
00:24:11,350 --> 00:24:09,360
out there to see what's going on so

644
00:24:13,430 --> 00:24:11,360
there's a lot of really exciting things

645
00:24:15,190 --> 00:24:13,440
going on in the space program right now

646
00:24:17,029 --> 00:24:15,200
i'm so excited you guys prepared these

647
00:24:19,269 --> 00:24:17,039
amazing questions and i really do hope

648
00:24:21,590 --> 00:24:19,279
that you stay tuned in and i hope that

649
00:24:23,830 --> 00:24:21,600
you can come and join our team

650
00:24:25,830 --> 00:24:23,840
yeah we really do appreciate you guys

651
00:24:27,510 --> 00:24:25,840
coming into mission control and joining

652
00:24:29,750 --> 00:24:27,520
heather and myself we've had a great

653
00:24:31,990 --> 00:24:29,760
time and uh and as she said those were

654
00:24:34,630 --> 00:24:32,000
great questions and she also alluded to

655
00:24:35,909 --> 00:24:34,640
you you kind of can see there are a ton

656
00:24:38,070 --> 00:24:35,919
of different jobs out there in the

657
00:24:39,669 --> 00:24:38,080
aerospace business and nasa and all the

658
00:24:41,430 --> 00:24:39,679
contractors so

659
00:24:43,430 --> 00:24:41,440
um we certainly would love to have you

660
00:24:44,950 --> 00:24:43,440
guys come and join us when you guys get

661
00:24:46,710 --> 00:24:44,960
out of college and

662
00:24:48,230 --> 00:24:46,720
and we're looking forward to it and

663
00:24:50,789 --> 00:24:48,240

thanks again for coming and joining us