1
00:00:07,110 --> 00:00:02,629
station this is issa

2
00:00:10,470 --> 00:00:08,710
he's aztec

3
00:00:17,189 --> 00:00:10,480
this is the international space station

4
00:00:22,390 --> 00:00:19,590
thank you paulo you are now connected

5
00:00:25,349 --> 00:00:22,400
with the students in toulouse cologne

6
00:00:43,030 --> 00:00:25,359
frascotti and lisbon please begin the

7
00:00:47,990 --> 00:00:45,670
station for the epo greenhouse

8
00:00:51,110 --> 00:00:48,000
experiment that involves us here in

9
00:00:53,990 --> 00:00:51,120
space but also down there because you

10
00:00:56,150 --> 00:00:54,000
guys are going to help us today in

11
00:00:59,189 --> 00:00:56,160
trying to figure out something about

12
00:01:01,750 --> 00:00:59,199
going in space growing uh exploring

13
00:01:02,709 --> 00:01:01,760

continuing our exploration we're gonna

14
00:01:05,429 --> 00:01:02,719
uh

15
00:01:07,429 --> 00:01:05,439
do together something to verify that if

16
00:01:09,990 --> 00:01:07,439
if we can actually put

17
00:01:11,350 --> 00:01:10,000
plants in space to grow things that we

18
00:01:13,910 --> 00:01:11,360
can eat

19
00:01:16,230 --> 00:01:13,920
and important to have them germinate

20
00:01:17,749 --> 00:01:16,240
have seeds and try to reseed them again

21
00:01:19,830 --> 00:01:17,759
this is something that

22
00:01:21,109 --> 00:01:19,840
not clear yet and we want to see how

23
00:01:23,030 --> 00:01:21,119
this

24
00:01:25,429 --> 00:01:23,040
microgravity environment radiation

25
00:01:27,030 --> 00:01:25,439
environment different environment does

26
00:01:30,469 --> 00:01:27,040
to this plant

27
00:01:33,030 --> 00:01:30,479
so we have here a mini greenhouse it's

28
00:01:35,590 --> 00:01:33,040
already set up here in a in a corner but

29
00:01:37,670 --> 00:01:35,600
we will now get a work and make sure

30
00:01:39,590 --> 00:01:37,680
that the the greenhouse the experiment

31
00:01:41,350 --> 00:01:39,600
starts so i'm going to start by putting

32
00:01:43,429 --> 00:01:41,360
on some glass because we don't want to

33
00:01:45,670 --> 00:01:43,439
contaminate the plants nor then to

34
00:01:47,510 --> 00:01:45,680
contaminate us here in space you're on

35
00:01:50,630 --> 00:01:47,520
the ground when you will do your

36
00:01:52,710 --> 00:01:50,640
experiment you will not need to do this

37
00:01:55,190 --> 00:01:52,720
and and then we work together we'll put

38
00:02:24,070 --> 00:01:55,200

some water into the the chamber and

39
00:02:27,190 --> 00:02:26,309
okay this is the setup that we have uh

40
00:02:29,990 --> 00:02:27,200
here

41
00:02:33,270 --> 00:02:30,000
we have a mini chamber containing

42
00:02:34,070 --> 00:02:33,280
a growth medium which is a big term for

43
00:02:39,270 --> 00:02:34,080
some

44
00:02:41,670 --> 00:02:39,280
we have a pillow that contains the plant

45
00:02:43,190 --> 00:02:41,680
so the plants can be isolated and if the

46
00:02:45,350 --> 00:02:43,200
plants will lose something it doesn't

47
00:02:47,509 --> 00:02:45,360
float around here in space as you see

48
00:02:48,949 --> 00:02:47,519
everything flows so you you really need

49
00:02:50,470 --> 00:02:48,959
to be careful otherwise you lose

50
00:02:53,270 --> 00:02:50,480
everything

51
00:02:55,910 --> 00:02:53,280
attached to this growth chamber we have

52
00:02:58,630 --> 00:02:55,920
a syringe and a little reservoir with

53
00:03:01,589 --> 00:02:58,640
water so what i'm going to do now i'm

54
00:03:04,470 --> 00:03:01,599
going to take a measured

55
00:03:07,110 --> 00:03:04,480
quantity of water a specified quantity

56
00:03:10,149 --> 00:03:07,120
of water from the reservoir put it into

57
00:03:13,110 --> 00:03:10,159
the syringe and then with the syringe uh

58
00:03:16,070 --> 00:03:13,120
put the water into the gross medium i'm

59
00:03:17,830 --> 00:03:16,080
going to take about 50 milliliters the

60
00:03:20,949 --> 00:03:17,840
total amount that we'll put there is

61
00:03:23,509 --> 00:03:20,959
going to be about 210 milliliters

62
00:03:26,149 --> 00:03:23,519
uh and you will do the same so as you

63
00:03:27,830 --> 00:03:26,159

see it's growing apply something simple

64
00:03:29,190 --> 00:03:27,840
but but we're not trying to make it

65
00:03:31,750 --> 00:03:29,200
complicated by doing all these

66
00:03:33,670 --> 00:03:31,760
measurements but we we are trying to

67
00:03:35,910 --> 00:03:33,680
make out of this little thing a

68
00:03:37,589 --> 00:03:35,920
scientific experiment and you can do a

69
00:03:39,750 --> 00:03:37,599
lot of things a lot of observation you

70
00:03:41,589 --> 00:03:39,760
can help us if you really look at what

71
00:03:43,190 --> 00:03:41,599
you're doing and make sure that you

72
00:03:45,990 --> 00:03:43,200
understand what you do and you do it

73
00:04:13,990 --> 00:03:46,000
carefully so let's go ahead and put some

74
00:04:18,949 --> 00:04:16,229
and now carefully i'm pushing the water

75
00:04:22,310 --> 00:04:18,959
into the growth chamber we don't want to

76
00:04:25,430 --> 00:04:22,320
go too fast because the water may spill

77
00:04:26,790 --> 00:04:25,440
uh or it may blood chamber we want to

78
00:04:28,629 --> 00:04:26,800
make sure that

79
00:04:31,350 --> 00:04:28,639
we put enough force to get the water in

80
00:04:35,189 --> 00:04:31,360
there but slowly so the the

81
00:04:38,710 --> 00:04:35,199
growth pinion medium the the earth

82
00:04:42,150 --> 00:04:38,720
uh the dirt that is inside there get wet

83
00:04:43,990 --> 00:04:42,160
homogeneously without creating a spot

84
00:04:52,469 --> 00:04:44,000
and here we are we have about a half of

85
00:04:55,510 --> 00:04:54,390
and when uh but i'm going to be done

86
00:04:58,870 --> 00:04:55,520
here

87
00:05:01,189 --> 00:04:58,880
we'll wait uh a minute to let the water

88
00:05:02,550 --> 00:05:01,199

expand inside but then we will actually

89
00:05:05,189 --> 00:05:02,560
drain

90
00:05:07,189 --> 00:05:05,199
the excess water if there is any just to

91
00:05:09,510 --> 00:05:07,199
make sure that we don't leave water

92
00:05:11,270 --> 00:05:09,520
inside and floating around this can pose

93
00:05:13,670 --> 00:05:11,280
especially here in space

94
00:05:16,310 --> 00:05:13,680
some mold some growth

95
00:05:19,110 --> 00:05:16,320
something inside that we don't want

96
00:05:20,469 --> 00:05:19,120
so we will drain the excess water

97
00:05:23,430 --> 00:05:20,479
so here we go

98
00:05:25,990 --> 00:05:23,440
i'm now complete with the 15 millimeters

99
00:05:28,710 --> 00:05:26,000
i'm going to remove the clean water

100
00:05:30,550 --> 00:05:28,720
supply water reservoir and put a waste

101
00:06:02,230 --> 00:05:30,560
water bag on it

102
00:06:07,510 --> 00:06:03,909
as you can see a little bit of water

103
00:06:10,790 --> 00:06:07,520
came out not too much which means that

104
00:06:12,629 --> 00:06:10,800
all the water has been uh

105
00:06:15,749 --> 00:06:12,639
the vast majority of the water has been

106
00:06:18,070 --> 00:06:15,759
absorbed by the growth medium medium

107
00:06:19,510 --> 00:06:18,080
we also have a measure of amount how

108
00:06:22,390 --> 00:06:19,520
much water

109
00:06:25,189 --> 00:06:22,400
given there and this is also important

110
00:06:26,710 --> 00:06:25,199
to know so at this point we can

111
00:06:28,629 --> 00:06:26,720
disconnect

112
00:06:31,909 --> 00:06:28,639
this uh

113
00:06:34,790 --> 00:06:31,919

system for watering we will be watering

114
00:06:35,749 --> 00:06:34,800
frequently in order to maintain the root

115
00:06:39,110 --> 00:06:35,759
wet

116
00:06:40,150 --> 00:06:39,120
and and then we will actually

117
00:06:43,189 --> 00:06:40,160
remove

118
00:06:44,390 --> 00:06:43,199
and prepare the upper part to let the

119
00:07:27,430 --> 00:06:44,400
plant

120
00:07:30,870 --> 00:07:29,589
so inside the chamber we have seven

121
00:07:32,950 --> 00:07:30,880
plugs

122
00:07:35,430 --> 00:07:32,960
which correspond to the areas where the

123
00:07:38,469 --> 00:07:35,440
seeds have been planted i'm going to

124
00:07:39,430 --> 00:07:38,479
remove those flags plugs in order to

125
00:08:52,150 --> 00:07:39,440
leave the

126
00:08:57,509 --> 00:08:55,269
very good the plaques have been removed

127
00:09:00,150 --> 00:08:57,519
it's now free to grow we will close the

128
00:09:02,150 --> 00:09:00,160
chamber and put it up in our corner in

129
00:09:04,870 --> 00:09:02,160
our little corner that we have set up

130
00:09:07,030 --> 00:09:04,880
where there is a light we have a control

131
00:09:09,430 --> 00:09:07,040
temperature temperature environment so

132
00:09:11,590 --> 00:09:09,440
we make sure that there is enough light

133
00:09:13,829 --> 00:09:11,600
a good temperature enough water for the

134
00:09:15,750 --> 00:09:13,839
plants to grow and we will initiate our

135
00:09:17,750 --> 00:09:15,760
measurements the same way you will do on

136
00:09:19,829 --> 00:09:17,760
earth and then we will compare i will

137
00:09:22,070 --> 00:09:19,839
take pictures video and you will do the

138
00:09:58,710 --> 00:09:22,080

same and we'll post them and compare our

139
00:10:01,910 --> 00:10:00,389
as you can see in our corner there we

140
00:10:05,030 --> 00:10:01,920
have two chambers

141
00:10:07,030 --> 00:10:05,040
one has a seed of lettuce and the other

142
00:10:09,990 --> 00:10:07,040
one the one we just initiated now

143
00:10:14,150 --> 00:10:10,000
contains arabidopsis which is a plan

144
00:10:16,710 --> 00:10:14,160
that has been has a very non-genetical

145
00:10:18,470 --> 00:10:16,720
buildup so we can actually know what is

146
00:10:22,310 --> 00:10:18,480
doing and it's very well known very used

147
00:10:24,150 --> 00:10:22,320
in biology so here is our setup and and

148
00:10:27,110 --> 00:10:24,160
so we can declare the experiment

149
00:10:29,590 --> 00:10:27,120
initiated i'm looking forward the plants

150
00:10:31,670 --> 00:10:29,600
grow maybe we'll eat some salad here we

151
00:10:34,470 --> 00:10:31,680
have some fresh food here in station

152
00:10:35,430 --> 00:10:34,480
it's not going to be enough for us to

153
00:10:37,670 --> 00:10:35,440
actually

154
00:10:39,350 --> 00:10:37,680
eat and survive on that but for the

155
00:10:41,509 --> 00:10:39,360
future generation for the future

156
00:10:43,670 --> 00:10:41,519
restaurants going to mars going

157
00:10:46,389 --> 00:10:43,680
even beyond that this will be a very

158
00:10:48,790 --> 00:10:46,399
important so all together today we're

159
00:10:51,269 --> 00:10:48,800
doing a very important step and we're

160
00:10:53,110 --> 00:10:51,279
also having fun so let's uh go ahead

161
00:10:59,190 --> 00:10:53,120
with your questions

162
00:11:03,590 --> 00:11:00,310
toulouse

163
00:11:08,310 --> 00:11:05,670

hello my name is

164
00:11:16,949 --> 00:11:08,320
i have a question how is oxygen

165
00:11:21,190 --> 00:11:19,829
the oxygen on the space station

166
00:11:24,310 --> 00:11:21,200
is um

167
00:11:26,630 --> 00:11:24,320
is generated by breaking down water uh

168
00:11:29,670 --> 00:11:26,640
we actually have water and especially

169
00:11:32,790 --> 00:11:29,680
waste water we have a special equipment

170
00:11:34,630 --> 00:11:32,800
here that breaks it down and discharge

171
00:11:36,310 --> 00:11:34,640
we discharge the nitrogen but we keep

172
00:11:38,870 --> 00:11:36,320
the oxygen and we

173
00:11:41,030 --> 00:11:38,880
breathe it in this way we have a very

174
00:11:43,030 --> 00:11:41,040
interesting system here on station

175
00:11:45,750 --> 00:11:43,040
because we have to recycle everything we

176
00:11:48,389 --> 00:11:45,760
cannot throw away stuff or at least we

177
00:11:50,470 --> 00:11:48,399
try to throw away the absolutely minimum

178
00:11:53,269 --> 00:11:50,480
and oxygen is one of the resources that

179
00:12:00,389 --> 00:11:53,279
we need to maintain and be careful on

180
00:12:00,399 --> 00:12:06,470
cologne your question please

181
00:12:10,870 --> 00:12:09,110
hello my name is clara and my question

182
00:12:18,629 --> 00:12:10,880
is how does the water get through the

183
00:12:23,670 --> 00:12:21,509
hey sarah the the water how the water

184
00:12:26,710 --> 00:12:23,680
gets the plant well the water is

185
00:12:28,389 --> 00:12:26,720
distributed inside this growth medium

186
00:12:30,790 --> 00:12:28,399
and and uh

187
00:12:33,430 --> 00:12:30,800
it gets homogeneously distributed in in

188
00:12:35,910 --> 00:12:33,440

there plants actually have roots and and

189
00:12:38,470 --> 00:12:35,920
the roots fix the water

190
00:12:40,069 --> 00:12:38,480
so is actually the plate looking for the

191
00:12:42,389 --> 00:12:40,079
water more than the water looking for

192
00:12:44,629 --> 00:12:42,399
the plant and this is also one aspect

193
00:12:46,470 --> 00:12:44,639
that we are actually looking into it

194
00:12:47,910 --> 00:12:46,480
verifying if the fact that there is no

195
00:12:51,190 --> 00:12:47,920
more gravity

196
00:12:53,990 --> 00:12:51,200
uh how this this fact changes the way

197
00:13:02,550 --> 00:12:54,000
the roots go down on the growth medium

198
00:13:07,509 --> 00:13:05,269
scotty your question please your

199
00:13:08,470 --> 00:13:07,519
question please

200
00:13:12,470 --> 00:13:08,480
hello

201
00:13:16,790 --> 00:13:12,480
my name is flavia and my question is

202
00:13:19,269 --> 00:13:16,800
what happens if the author of the suit

203
00:13:22,470 --> 00:13:19,279
is them is doing

204
00:13:23,990 --> 00:13:22,480
the external activity from

205
00:13:25,750 --> 00:13:24,000
the

206
00:13:30,550 --> 00:13:25,760
iss

207
00:13:38,790 --> 00:13:30,560
and how much time have you got to return

208
00:13:44,230 --> 00:13:40,949
really make sure that everything outside

209
00:13:47,110 --> 00:13:44,240
the station doesn't have any any surface

210
00:13:49,670 --> 00:13:47,120
or any anything that could cut

211
00:13:52,310 --> 00:13:49,680
or provide or give us put us in danger

212
00:13:53,829 --> 00:13:52,320
so this is very well uh carefully

213
00:13:56,230 --> 00:13:53,839

checked and make sure that this doesn't

214
00:13:58,629 --> 00:13:56,240
happen but in case this would happen it

215
00:13:59,750 --> 00:13:58,639
depends of the size of the hole and how

216
00:14:01,990 --> 00:13:59,760
much

217
00:14:03,829 --> 00:14:02,000
air will actually escape from the suit

218
00:14:07,509 --> 00:14:03,839
we have a special

219
00:14:10,310 --> 00:14:07,519
container pressurized uh tank in our uh

220
00:14:12,069 --> 00:14:10,320
ea spacewalk the suit and in case of an

221
00:14:15,110 --> 00:14:12,079
emergency this tank is actually

222
00:14:18,870 --> 00:14:15,120
activated and can provide us for

223
00:14:21,189 --> 00:14:18,880
about 30 minutes of additional air

224
00:14:24,310 --> 00:14:21,199
to pressurize our suits and this should

225
00:14:26,069 --> 00:14:24,320
be enough for us to rush back to airlock

226
00:14:33,670 --> 00:14:26,079
close the airlock and pressurize it

227
00:14:33,680 --> 00:14:38,150
lisbon your question please

228
00:14:43,990 --> 00:14:41,189
hello my name is simel and my question

229
00:14:46,949 --> 00:14:44,000
is how many times do we have day and

230
00:14:52,389 --> 00:14:46,959
night and how do we deal with it on the

231
00:14:55,030 --> 00:14:53,910
it's a very interesting question because

232
00:14:58,550 --> 00:14:55,040
we use

233
00:15:01,750 --> 00:14:58,560
the title of the sun and the night day

234
00:15:04,550 --> 00:15:01,760
and night to to actually pet ourselves

235
00:15:05,430 --> 00:15:04,560
and actually set our working day in our

236
00:15:08,230 --> 00:15:05,440
rest

237
00:15:11,030 --> 00:15:08,240
time well here on stage we are orbiting

238
00:15:13,110 --> 00:15:11,040

around the earth at 28 000 kilometers

239
00:15:15,910 --> 00:15:13,120
per hour that's about seven kilometers

240
00:15:17,750 --> 00:15:15,920
per second and which means that every

241
00:15:21,750 --> 00:15:17,760
hour and a half we actually go around

242
00:15:24,150 --> 00:15:21,760
the earth and and we are uh for about i

243
00:15:27,189 --> 00:15:24,160
would say 45 minutes 50 minutes to an

244
00:15:29,189 --> 00:15:27,199
hour on the sun side but oh half an hour

245
00:15:30,949 --> 00:15:29,199
more or less in the other side of the

246
00:15:32,629 --> 00:15:30,959
earth so which means we are shielded

247
00:15:34,870 --> 00:15:32,639
from the sun so

248
00:15:38,710 --> 00:15:34,880
at the end if you really counted we we

249
00:15:40,949 --> 00:15:38,720
have 16 sunset and 16 sunrises per day

250
00:15:42,629 --> 00:15:40,959
which confuses us and but of course we

251
00:15:44,470 --> 00:15:42,639
are not looking outside the window all

252
00:15:46,310 --> 00:15:44,480
the time we're actually checking our

253
00:15:48,470 --> 00:15:46,320
watch we use

254
00:15:51,269 --> 00:15:48,480
the greenwich mean time which is the

255
00:15:53,030 --> 00:15:51,279
time of london the universal time and we

256
00:15:55,030 --> 00:15:53,040
go by that and we make sure that we

257
00:15:56,790 --> 00:15:55,040
don't look outside the window if we if

258
00:16:04,069 --> 00:15:56,800
if we want to know if it's time to sleep

259
00:16:12,230 --> 00:16:05,990
to lose we have time for another

260
00:16:16,790 --> 00:16:14,949
hi my name is jenny and my question is

261
00:16:23,350 --> 00:16:16,800
how do you communicate with your loved

262
00:16:27,990 --> 00:16:26,150
yes uh that's uh that's obviously it's

263
00:16:29,749 --> 00:16:28,000

very important for us to be in touch

264
00:16:31,189 --> 00:16:29,759
from the ground and uh

265
00:16:32,949 --> 00:16:31,199
first we will talk to our mission

266
00:16:34,550 --> 00:16:32,959
control center and make sure that we get

267
00:16:35,749 --> 00:16:34,560
all the work and they follow us what we

268
00:16:37,670 --> 00:16:35,759
are doing

269
00:16:40,629 --> 00:16:37,680
but second also have a little bit of

270
00:16:42,870 --> 00:16:40,639
time off and make sure we talk to our

271
00:16:45,670 --> 00:16:42,880
family's friends

272
00:16:46,949 --> 00:16:45,680
we do have here on board the possibility

273
00:16:49,110 --> 00:16:46,959
of using

274
00:16:50,949 --> 00:16:49,120
what is called an ip phone which is a

275
00:16:52,710 --> 00:16:50,959
kind of internet phone

276
00:16:54,949 --> 00:16:52,720
and we can actually talk when the saddle

277
00:16:57,749 --> 00:16:54,959
is available when the link is available

278
00:17:00,550 --> 00:16:57,759
i can actually call uh

279
00:17:02,870 --> 00:17:00,560
essentially any phone on earth

280
00:17:06,069 --> 00:17:02,880
also periodically about once a week we

281
00:17:08,549 --> 00:17:06,079
have a 10 minutes or 15 minutes slot in

282
00:17:10,949 --> 00:17:08,559
which a video conference is set up and

283
00:17:13,590 --> 00:17:10,959
we can actually talk to our families i i

284
00:17:16,390 --> 00:17:13,600
talk to my wife sasha and to my daughter

285
00:17:18,630 --> 00:17:16,400
sophia and it's very nice them talk to

286
00:17:25,189 --> 00:17:18,640
them and make sure that they don't feel

287
00:17:33,029 --> 00:17:27,510
we have time for one last question

288
00:17:42,470 --> 00:17:35,430

hello my name is patrick and my question

289
00:17:52,710 --> 00:17:44,789
i'm sorry i i missed it say it again

290
00:18:01,430 --> 00:17:54,549
my name is patrick and my question is

291
00:18:06,470 --> 00:18:03,430
understand correctly how do you pour

292
00:18:08,630 --> 00:18:06,480
water yes yes well obviously

293
00:18:11,190 --> 00:18:08,640
here in the uss you cannot pour water

294
00:18:15,270 --> 00:18:11,200
because water doesn't go down we have

295
00:18:17,029 --> 00:18:15,280
this drinks bag that i like our cup so

296
00:18:20,070 --> 00:18:17,039
they are completely closed the water is

297
00:18:21,270 --> 00:18:20,080
inside they have a special straw with a

298
00:18:23,270 --> 00:18:21,280
kind of a

299
00:18:26,870 --> 00:18:23,280
tap in there because we need to close it

300
00:18:29,750 --> 00:18:26,880
if we don't would not close the

301
00:18:32,070 --> 00:18:29,760
attack this is what happens which means

302
00:18:33,110 --> 00:18:32,080
water is going all over the place and of

303
00:18:34,950 --> 00:18:33,120
course

304
00:18:39,510 --> 00:18:34,960
we don't want it to go

305
00:18:42,549 --> 00:18:39,520
experiment and to the equipment and

306
00:18:48,070 --> 00:18:44,870
we keep it contained all the time it's

307
00:18:57,029 --> 00:18:48,080
very interesting and it's fun to play

308
00:19:00,870 --> 00:18:58,870
we hear we're near the end of our time

309
00:19:03,190 --> 00:19:00,880
we would like to thank you so much for

310
00:19:05,590 --> 00:19:03,200
the greenhouse demonstration today and

311
00:19:07,270 --> 00:19:05,600
for taking our questions

312
00:19:12,710 --> 00:19:07,280
if you would say goodbye to the audience

313
00:19:18,070 --> 00:19:15,350

yes uh thank you everybody for uh being

314
00:19:19,669 --> 00:19:18,080
up here in space with me and my other

315
00:19:21,590 --> 00:19:19,679
fellow astronauts and they are on board

316
00:19:23,350 --> 00:19:21,600
on the international space station i'm

317
00:19:25,750 --> 00:19:23,360
pretty sure that you when you grow up

318
00:19:28,150 --> 00:19:25,760
will have possibility to go into space

319
00:19:31,029 --> 00:19:28,160
space probably continue exploration will

320
00:19:33,110 --> 00:19:31,039
continue thank you for helping us in

321
00:19:35,750 --> 00:19:33,120
following this experiment doing yours

322
00:19:38,789 --> 00:19:35,760
observations compare them with us and

323
00:19:41,750 --> 00:19:38,799
help us help all of us in understanding

324
00:19:43,510 --> 00:19:41,760
better what happens so

325
00:19:49,830 --> 00:19:43,520
thank you to everybody

326
00:19:51,510 --> 00:19:49,840
your participation here and we are

327
00:19:53,029 --> 00:19:51,520
looking forward to

328
00:19:54,710 --> 00:19:53,039
see you on

329
00:19:57,029 --> 00:19:54,720
the internet and see you when i come

330
00:19:58,789 --> 00:19:57,039
back we will do another of this section

331
00:20:07,190 --> 00:19:58,799
and compare the results

332
00:20:12,630 --> 00:20:09,029
station this is houston acr that

333
00:20:15,909 --> 00:20:13,750
and thank you

334
00:20:18,830 --> 00:20:15,919
s tech station we're now re use the

335
00:20:21,750 --> 00:20:18,840
station uh thank you i appreciate