
OVHD
EXIT
EMER 1
EMER 2

1
00:00:07,349 --> 00:00:02,629
nation this is houston are you ready for

2
00:00:17,109 --> 00:00:08,710
houston station we are ready for the

3
00:00:21,109 --> 00:00:18,950
station station we're ready for the

4
00:00:23,590 --> 00:00:21,119
event

5
00:00:30,230 --> 00:00:23,600
station this is houston acr please stand

6
00:00:34,950 --> 00:00:32,069
hi this is

7
00:00:37,990 --> 00:00:34,960
ben dolan from

8
00:00:41,510 --> 00:00:38,000
mill town school in new jersey

9
00:00:49,590 --> 00:00:41,520
how will my helium face

10
00:00:52,549 --> 00:00:50,790
well that's an interesting question

11
00:00:54,869 --> 00:00:52,559
unfortunately we don't have handy any

12
00:00:57,110 --> 00:00:54,879
helium right now but it turns out we do

13
00:00:59,670 --> 00:00:57,120

have a balloon and we can demonstrate

14
00:01:01,510 --> 00:00:59,680
how a balloon when pressurized behaves

15
00:01:03,349 --> 00:01:01,520
in the microgravity environment of the

16
00:01:06,710 --> 00:01:03,359
international space station we had never

17
00:01:09,510 --> 00:01:06,720
tried this before so here goes

18
00:01:12,230 --> 00:01:09,520
and we don't have a fish balloon but

19
00:01:14,710 --> 00:01:12,240
this balloon looks a lot like a clown

20
00:01:16,870 --> 00:01:14,720
fish a long-nosed clown fish i think

21
00:01:19,749 --> 00:01:16,880
it's close enough see he's got the

22
00:01:22,149 --> 00:01:19,759
clownfish tail and the long nose and it

23
00:01:24,149 --> 00:01:22,159
actually looks like a clownfish and and

24
00:01:25,910 --> 00:01:24,159
it's blown up with air

25
00:01:38,149 --> 00:01:25,920
and we'll we'll see what happens let me

26
00:01:38,159 --> 00:01:44,149
okay

27
00:01:46,950 --> 00:01:44,950
so

28
00:01:49,590 --> 00:01:46,960
if you release a balloon that's what it

29
00:01:51,510 --> 00:01:49,600
does in microgravity it's very similar

30
00:01:53,670 --> 00:01:51,520
to what it would do on planet earth if

31
00:01:55,749 --> 00:01:53,680
you have a helium fill balloon in the

32
00:01:57,270 --> 00:01:55,759
atmosphere that you're that that you

33
00:01:59,670 --> 00:01:57,280
have in your house for example that that

34
00:02:07,830 --> 00:01:59,680
balloon is going to float here in space

35
00:02:13,750 --> 00:02:11,029
hello my name is james morris i live in

36
00:02:20,229 --> 00:02:13,760
lancashire england and i want to know

37
00:02:25,350 --> 00:02:23,030
that's a good question if if you mean

38
00:02:27,190 --> 00:02:25,360

how well do we sleep i would say the

39
00:02:30,150 --> 00:02:27,200
answer is very well i think we sleep as

40
00:02:32,229 --> 00:02:30,160
well here as you do on planet earth we

41
00:02:34,150 --> 00:02:32,239
all have a small each of us have our own

42
00:02:35,830 --> 00:02:34,160
small sleep station we call it it's like

43
00:02:38,070 --> 00:02:35,840
a bedroom but it's a very small bedroom

44
00:02:40,070 --> 00:02:38,080
about the size of a of an old-fashioned

45
00:02:41,750 --> 00:02:40,080
style phone booth but it's big enough

46
00:02:43,110 --> 00:02:41,760
for our sleeping bag it's big enough for

47
00:02:45,110 --> 00:02:43,120
a computer

48
00:02:48,229 --> 00:02:45,120
it's big enough for pictures from

49
00:02:50,309 --> 00:02:48,239
friends and family and we basically have

50
00:02:53,190 --> 00:02:50,319
that sleeping bag tied to the to the

51
00:02:54,949 --> 00:02:53,200
wall or maybe hanging from the ceiling

52
00:02:57,350 --> 00:02:54,959
and we essentially float in that

53
00:03:04,790 --> 00:02:57,360
sleeping bag and it's like sleeping on

54
00:03:09,110 --> 00:03:06,630
hi my name's george christensen and i'm

55
00:03:11,589 --> 00:03:09,120
living in lincolnshire in the uk

56
00:03:13,589 --> 00:03:11,599
my question is can astronauts on the

57
00:03:14,869 --> 00:03:13,599
space station see changes happening on

58
00:03:16,790 --> 00:03:14,879
the earth below

59
00:03:18,309 --> 00:03:16,800
and what kind of processes can you see

60
00:03:24,149 --> 00:03:18,319
happening on the on the planet when you

61
00:03:29,509 --> 00:03:26,630
you can certainly see seasonal changes

62
00:03:31,190 --> 00:03:29,519
on earth what's most striking from our

63
00:03:32,869 --> 00:03:31,200

mission here during the winter time is

64
00:03:35,750 --> 00:03:32,879
watching the

65
00:03:37,589 --> 00:03:35,760
snow season in the northern hemisphere

66
00:03:40,070 --> 00:03:37,599
change in the spring and you can see ice

67
00:03:42,229 --> 00:03:40,080
packs melting you can see the snow

68
00:03:44,229 --> 00:03:42,239
melting you could see a late spring snow

69
00:03:47,270 --> 00:03:44,239
storm that might blanket everything so

70
00:03:49,430 --> 00:03:47,280
certainly seasonal changes you can see

71
00:03:51,670 --> 00:03:49,440
uh on a wide scale

72
00:03:54,309 --> 00:03:51,680
from space

73
00:03:56,710 --> 00:03:54,319
other changes for for example geologic

74
00:03:58,710 --> 00:03:56,720
changes you really can't see but you can

75
00:04:00,710 --> 00:03:58,720
see the effects of geology

76
00:04:03,030 --> 00:04:00,720
because you can see things on the length

77
00:04:04,470 --> 00:04:03,040
scale of half a continent so you can see

78
00:04:06,390 --> 00:04:04,480
synclines

79
00:04:09,030 --> 00:04:06,400
and you can see

80
00:04:11,990 --> 00:04:09,040
see effects of glaciation you can see

81
00:04:14,309 --> 00:04:12,000
all kinds of of natural phenomenology

82
00:04:22,629 --> 00:04:14,319
that you read about in geology books on

83
00:04:26,390 --> 00:04:24,950
hello commander burbrink and the rest of

84
00:04:28,070 --> 00:04:26,400
the crew on the international space

85
00:04:29,830 --> 00:04:28,080
station i'm oliver from village

86
00:04:31,270 --> 00:04:29,840
elementary school in skillman new jersey

87
00:04:33,350 --> 00:04:31,280
usa

88
00:04:39,749 --> 00:04:33,360

what is a typical day in a space station

89
00:04:42,950 --> 00:04:41,670
oliver hello

90
00:04:45,189 --> 00:04:42,960
the interesting thing about living on

91
00:04:47,270 --> 00:04:45,199
board the international space station is

92
00:04:48,469 --> 00:04:47,280
a typical day really doesn't happen up

93
00:04:49,350 --> 00:04:48,479
here every day is something very

94
00:04:50,870 --> 00:04:49,360
different

95
00:04:52,950 --> 00:04:50,880
the biggest thing that we do is we spend

96
00:04:54,629 --> 00:04:52,960
a lot of time doing science but we get

97
00:04:56,310 --> 00:04:54,639
up early in the morning about six

98
00:04:58,150 --> 00:04:56,320
o'clock in the morning we get a chance

99
00:04:59,830 --> 00:04:58,160
to uh to clean up we do we don't have a

100
00:05:02,390 --> 00:04:59,840
shower on board space station so we

101
00:05:04,550 --> 00:05:02,400
can't shower or bathe like you would

102
00:05:07,990 --> 00:05:04,560
ordinarily on planet earth at your home

103
00:05:10,550 --> 00:05:08,000
for example uh but uh but we have

104
00:05:12,550 --> 00:05:10,560
we can essentially take a sponge baths

105
00:05:14,469 --> 00:05:12,560
we have lots of towels we have

106
00:05:16,550 --> 00:05:14,479
special soap that that doesn't require a

107
00:05:19,189 --> 00:05:16,560
lot of water because water is a precious

108
00:05:21,590 --> 00:05:19,199
commodity on space station and we can

109
00:05:23,590 --> 00:05:21,600
get very clean that way and we'll have

110
00:05:25,990 --> 00:05:23,600
breakfast we'll read the the morning

111
00:05:28,150 --> 00:05:26,000
mail if you will the uh the various

112
00:05:29,909 --> 00:05:28,160
activities that the ground uh has set up

113
00:05:31,749 --> 00:05:29,919

for us to do during that day and these

114
00:05:33,430 --> 00:05:31,759
are control centers all around the world

115
00:05:34,870 --> 00:05:33,440
and then we'll set about our work and

116
00:05:36,550 --> 00:05:34,880
our work may be doing science

117
00:05:38,710 --> 00:05:36,560
experiments it may be getting ready to

118
00:05:39,830 --> 00:05:38,720
do a space spacewalk as will happen in a

119
00:05:41,830 --> 00:05:39,840
in a week

120
00:05:45,270 --> 00:05:41,840
it'll maybe it may be getting ready to

121
00:05:46,790 --> 00:05:45,280
receive a visiting vehicle um and it may

122
00:05:48,629 --> 00:05:46,800
be working on international space

123
00:05:55,909 --> 00:05:48,639
station fixing systems working and

124
00:06:01,830 --> 00:05:59,350
do you get bored of microgravity

125
00:06:03,990 --> 00:06:01,840
it doesn't get boring to play with your

126
00:06:06,230 --> 00:06:04,000
food while it flies around

127
00:06:08,150 --> 00:06:06,240
does it get boring to fly around

128
00:06:09,670 --> 00:06:08,160
yourself

129
00:06:12,469 --> 00:06:09,680
like um

130
00:06:16,070 --> 00:06:12,479
or does it just get normal like every

131
00:06:19,189 --> 00:06:16,080
day life casual don't really

132
00:06:20,469 --> 00:06:19,199
notice it that much or or what

133
00:06:22,790 --> 00:06:20,479
and uh

134
00:06:27,670 --> 00:06:22,800
what's irritating about it apart from

135
00:06:31,189 --> 00:06:28,469
uh

136
00:06:32,870 --> 00:06:31,199
there's never a boring moment on space

137
00:06:35,110 --> 00:06:32,880
station and

138
00:06:38,070 --> 00:06:35,120

just as an example while we're we're

139
00:06:41,110 --> 00:06:38,080
sitting here or floating here uh talking

140
00:06:44,870 --> 00:06:41,120
to you guys i had this balloon that uh i

141
00:06:46,950 --> 00:06:44,880
used for a demonstration earlier and

142
00:06:48,390 --> 00:06:46,960
hold the mic and the thought occurred to

143
00:06:50,469 --> 00:06:48,400
me what happens

144
00:06:53,430 --> 00:06:50,479
if i rub it on my head

145
00:06:56,950 --> 00:06:53,440
and can i do static electricity look at

146
00:07:02,629 --> 00:07:00,710
and and then i can rub it on here and

147
00:07:05,350 --> 00:07:02,639
i can stick it to me

148
00:07:07,350 --> 00:07:05,360
so how could you be bored when

149
00:07:09,350 --> 00:07:07,360
everything you look at is new and

150
00:07:12,870 --> 00:07:09,360
wonderful and there's all kinds of

151
00:07:15,909 --> 00:07:12,880
amazing physics and chemistry that

152
00:07:17,749 --> 00:07:15,919
are just waiting to be demonstrated here

153
00:07:23,110 --> 00:07:17,759
that you can't see when you're living on

154
00:07:26,390 --> 00:07:25,110
hi commander burbank my name is ahan

155
00:07:27,990 --> 00:07:26,400
from village elementary school in

156
00:07:34,390 --> 00:07:28,000
skillman new jersey

157
00:07:37,510 --> 00:07:35,589
that's a great question it's one of the

158
00:07:39,909 --> 00:07:37,520
biggest concerns i think that

159
00:07:42,150 --> 00:07:39,919
that space flight presents for

160
00:07:44,550 --> 00:07:42,160
for at least journeys beyond low earth

161
00:07:47,029 --> 00:07:44,560
orbit and right now low earth orbit is

162
00:07:48,790 --> 00:07:47,039
where space station is located and most

163
00:07:50,629 --> 00:07:48,800

of the protection that that all of us

164
00:07:52,309 --> 00:07:50,639
enjoy on planet earth is actually for

165
00:07:55,029 --> 00:07:52,319
from radiation is actually provided by

166
00:07:56,710 --> 00:07:55,039
the earth's magnetosphere so charged

167
00:07:58,629 --> 00:07:56,720
particles

168
00:08:00,550 --> 00:07:58,639
be they from the sun be they from

169
00:08:02,150 --> 00:08:00,560
galactic cosmic rays

170
00:08:04,070 --> 00:08:02,160
most of those are a good deal of those

171
00:08:05,990 --> 00:08:04,080
unless it's a very energetic event get

172
00:08:09,110 --> 00:08:06,000
captured by the magnetic field of the

173
00:08:11,430 --> 00:08:09,120
earth and those charged particles run

174
00:08:13,510 --> 00:08:11,440
relatively harmlessly to us back and

175
00:08:15,430 --> 00:08:13,520
forth from the north to the south pole

176
00:08:17,189 --> 00:08:15,440
and they make the spectacular roar is

177
00:08:18,950 --> 00:08:17,199
that we get to see if we're lucky to

178
00:08:21,430 --> 00:08:18,960
live in extreme northern or southern

179
00:08:22,710 --> 00:08:21,440
latitudes and if we're lucky enough to

180
00:08:24,309 --> 00:08:22,720
live on board international space

181
00:08:25,189 --> 00:08:24,319
station we get to see those almost every

182
00:08:27,430 --> 00:08:25,199
day

183
00:08:29,350 --> 00:08:27,440
if there's a really energetic solar

184
00:08:32,149 --> 00:08:29,360
event that can present a problem for us

185
00:08:33,589 --> 00:08:32,159
here on board space station and up until

186
00:08:35,029 --> 00:08:33,599
now and

187
00:08:36,870 --> 00:08:35,039
in the 10 years plus that space

188
00:08:38,149 --> 00:08:36,880

station's been here there hasn't been

189
00:08:41,190 --> 00:08:38,159
one that has presented a big enough

190
00:08:43,029 --> 00:08:41,200
danger for the crew we have safer places

191
00:08:43,990 --> 00:08:43,039
to be on board space station should we

192
00:08:46,230 --> 00:08:44,000
need to

193
00:08:48,550 --> 00:08:46,240
and there's a whole suite of satellites

194
00:08:50,550 --> 00:08:48,560
that observe the sun and when there when

195
00:08:52,389 --> 00:08:50,560
there is a charged particle event or a

196
00:08:54,070 --> 00:08:52,399
coronal mass ejection

197
00:08:55,750 --> 00:08:54,080
we've got scientists that can track that

198
00:08:57,430 --> 00:08:55,760
the stuff that's particularly dangerous

199
00:09:00,070 --> 00:08:57,440
actually gives us a couple days notice

200
00:09:01,590 --> 00:09:00,080
typically uh so we can shelter

201
00:09:03,030 --> 00:09:01,600
if we want to leave low earth orbit

202
00:09:05,430 --> 00:09:03,040
though and if we want to go to the moon

203
00:09:08,310 --> 00:09:05,440
or if we want to go on to mars and uh

204
00:09:10,310 --> 00:09:08,320
and further destinations then we leave

205
00:09:11,750 --> 00:09:10,320
the protection of the earth's magnetic

206
00:09:13,430 --> 00:09:11,760
field so

207
00:09:15,430 --> 00:09:13,440
we need to be thinking very carefully

208
00:09:22,710 --> 00:09:15,440
about that how to protect crews and it's

209
00:09:26,470 --> 00:09:23,509
hi

210
00:09:29,509 --> 00:09:26,480
i'm jeff from italy uh have noticed that

211
00:09:33,030 --> 00:09:29,519
your horrors look good in space

212
00:09:44,070 --> 00:09:33,040
my question is how you cut your hair or

213
00:09:48,790 --> 00:09:44,949

we

214
00:09:51,750 --> 00:09:48,800
ground i use a

215
00:09:53,670 --> 00:09:51,760
i use an electric razor

216
00:09:55,829 --> 00:09:53,680
and all the whiskers get caught in a

217
00:09:57,829 --> 00:09:55,839
razor and then once a week when i'm

218
00:09:59,670 --> 00:09:57,839
doing normal vacuuming

219
00:10:00,870 --> 00:09:59,680
i vacuum my razor out because you can

220
00:10:02,389 --> 00:10:00,880
imagine you don't want to open your

221
00:10:04,389 --> 00:10:02,399
razor up in a weightless environment

222
00:10:06,150 --> 00:10:04,399
because all those nasty little whiskers

223
00:10:09,110 --> 00:10:06,160
that go floating out and

224
00:10:10,470 --> 00:10:09,120
and and get in the air so i open my

225
00:10:12,790 --> 00:10:10,480
razor very carefully in front of the

226
00:10:15,910 --> 00:10:12,800
vacuum cleaner and all the whiskers get

227
00:10:17,670 --> 00:10:15,920
sucked out in the vacuum cleaner and uh

228
00:10:20,550 --> 00:10:17,680
and then my razor's ready for another

229
00:10:26,389 --> 00:10:22,949
hair cutting is a bigger challenge

230
00:10:28,389 --> 00:10:26,399
we've got we have hair clippers here and

231
00:10:30,230 --> 00:10:28,399
we don't have a hairdresser or barber

232
00:10:32,069 --> 00:10:30,240
though so all of us that may be

233
00:10:33,829 --> 00:10:32,079
professional astronauts or pilots or

234
00:10:36,389 --> 00:10:33,839
engineers or scientists

235
00:10:37,910 --> 00:10:36,399
are anything but professional

236
00:10:39,269 --> 00:10:37,920
hairdressers so

237
00:10:42,870 --> 00:10:39,279
the first couple of haircuts that we

238
00:10:44,230 --> 00:10:42,880

subject each other to typically aren't

239
00:10:46,949 --> 00:10:44,240
all great and they certainly are

240
00:10:48,710 --> 00:10:46,959
professional looking and we learn as we

241
00:10:51,590 --> 00:10:48,720
go we learned during the six months or

242
00:10:53,910 --> 00:10:51,600
so we're on board space station and

243
00:10:55,670 --> 00:10:53,920
that's really not a big challenge for us

244
00:10:57,590 --> 00:10:55,680
and it's one of

245
00:11:01,350 --> 00:10:57,600
the interesting aspects of living in

246
00:11:06,630 --> 00:11:03,670
good evening to expedition 30 crew

247
00:11:09,110 --> 00:11:06,640
members my name is clinton evely i'm

248
00:11:10,630 --> 00:11:09,120
from durban south africa

249
00:11:11,910 --> 00:11:10,640
my question is

250
00:11:14,630 --> 00:11:11,920
what do

251
00:11:16,310 --> 00:11:14,640
you gentlemen do in your own free time

252
00:11:18,949 --> 00:11:16,320
when you have time off you're not

253
00:11:21,350 --> 00:11:18,959
working on experiments or concentrating

254
00:11:24,310 --> 00:11:21,360
on maintenance on the space station what

255
00:11:26,470 --> 00:11:24,320
do you do in space to take time out

256
00:11:32,230 --> 00:11:26,480
i look forward to your answer

257
00:11:35,670 --> 00:11:34,150
uh there's uh

258
00:11:37,670 --> 00:11:35,680
all kinds of things we could do in our

259
00:11:40,389 --> 00:11:37,680
off-duty time

260
00:11:43,670 --> 00:11:40,399
one is take pictures out the window of

261
00:11:46,069 --> 00:11:43,680
earth and of space and and and it's the

262
00:11:49,190 --> 00:11:46,079
the views are amazing another thing you

263
00:11:52,870 --> 00:11:49,200

can do and and it's because i'm i'm a

264
00:11:55,750 --> 00:11:52,880
scientist by training and and i live and

265
00:11:57,350 --> 00:11:55,760
breathe science and it's such an amazing

266
00:11:58,710 --> 00:11:57,360
environment up here

267
00:12:00,870 --> 00:11:58,720
i like to do

268
00:12:03,509 --> 00:12:00,880
little educational based science

269
00:12:05,350 --> 00:12:03,519
demonstrations during my spare time and

270
00:12:07,350 --> 00:12:05,360
just as an example

271
00:12:11,190 --> 00:12:07,360
i've got this balloon here

272
00:12:13,509 --> 00:12:11,200
and in the course of of this conference

273
00:12:15,910 --> 00:12:13,519
i'm thinking of some ideas i might be

274
00:12:18,550 --> 00:12:15,920
able to use this balloon for so either

275
00:12:21,430 --> 00:12:18,560
tonight my spare time maybe tomorrow my

276
00:12:24,389 --> 00:12:21,440
spare time i'm gonna use this balloon

277
00:12:26,790 --> 00:12:24,399
and do some uh interesting

278
00:12:30,470 --> 00:12:26,800
little science demonstrations and i'll

279
00:12:32,629 --> 00:12:30,480
film it in a video and maybe uh uh give

280
00:12:36,230 --> 00:12:32,639
me a week or so and i'll end up

281
00:12:38,550 --> 00:12:36,240
downlinking it and everyone can see

282
00:12:44,150 --> 00:12:38,560
what i did in my spare time with this

283
00:12:47,750 --> 00:12:46,150
how does it feel to breathe the air

284
00:12:49,430 --> 00:12:47,760
inside the station

285
00:12:51,990 --> 00:12:49,440
does it feel fresh

286
00:12:58,949 --> 00:12:52,000
or does it feel stuffy so that you want

287
00:13:02,150 --> 00:13:00,629
well unfortunately we don't have an

288
00:13:03,750 --> 00:13:02,160

opportunity to open the windows or if we

289
00:13:04,790 --> 00:13:03,760
do we got to be dressed for the occasion

290
00:13:06,949 --> 00:13:04,800
here

291
00:13:08,310 --> 00:13:06,959
the air onboard space station is cleaned

292
00:13:11,190 --> 00:13:08,320
and filtered and scrubbed to carbon

293
00:13:13,110 --> 00:13:11,200
dioxide um it's still a it's a big

294
00:13:14,710 --> 00:13:13,120
challenge there's a huge volume and a

295
00:13:16,629 --> 00:13:14,720
massive amount of air that needs to be

296
00:13:18,069 --> 00:13:16,639
moved around here and it needs to be

297
00:13:20,790 --> 00:13:18,079
strained and filtered through the

298
00:13:22,710 --> 00:13:20,800
filtration system and it's it's

299
00:13:24,790 --> 00:13:22,720
processed like i say to remove primarily

300
00:13:26,470 --> 00:13:24,800
carbon dioxide but there's also other

301
00:13:28,550 --> 00:13:26,480
trace contaminants that could be here as

302
00:13:30,389 --> 00:13:28,560
well we've got a lot of systems that

303
00:13:32,069 --> 00:13:30,399
monitor all those and monitor the

304
00:13:34,550 --> 00:13:32,079
condition of the atmosphere

305
00:13:35,670 --> 00:13:34,560
to me to all of us i think on board here

306
00:13:38,069 --> 00:13:35,680
it uh

307
00:13:40,230 --> 00:13:38,079
it smells and and feels a lot like it

308
00:13:42,069 --> 00:13:40,240
would inside of a building on planet

309
00:13:44,150 --> 00:13:42,079
earth a building that's air-conditioned

310
00:13:46,310 --> 00:13:44,160
and relatively comfortable some of the

311
00:13:49,189 --> 00:13:46,320
things you miss though you don't smell

312
00:13:52,230 --> 00:13:49,199
moan grass for example you don't smell

313
00:13:53,750 --> 00:13:52,240

uh flowers you don't smell uh pine trees

314
00:13:55,829 --> 00:13:53,760
you don't smell the kinds of things that

315
00:13:57,110 --> 00:13:55,839
are that are part and parcel with living

316
00:13:58,870 --> 00:13:57,120
on planet earth and i think after a

317
00:14:00,949 --> 00:13:58,880
while you kind of miss that a little bit

318
00:14:04,710 --> 00:14:00,959
but the quality here i think is very

319
00:14:13,750 --> 00:14:07,350
station this is houston acr thank you

320
00:14:17,269 --> 00:14:15,030
thank you station and youtube