



STEM IN 30

3E

MF57E

MF71E

43G

MF71G

43H

the middeck look
a mission?

43K

1
00:00:37,380 --> 00:00:34,860
hi welcome to 7:30 I'm your host Beth

2
00:00:39,960 --> 00:00:37,390
Wilson and we are coming to you live

3
00:00:42,150 --> 00:00:39,970
from the moving beyond Earth gallery in

4
00:00:45,360 --> 00:00:42,160
the National Air and Space Museum in

5
00:00:47,430 --> 00:00:45,370
Washington DC and today helping me out I

6
00:00:52,280 --> 00:00:47,440
have some students from Whittier

7
00:00:55,759 --> 00:00:52,290
education campus also Washington DC I

8
00:00:58,619 --> 00:00:55,769
think we're ready to go all right so

9
00:01:01,770 --> 00:00:58,629
we're gonna talk about space food today

10
00:01:05,130 --> 00:01:01,780
and the first thing I have is a little

11
00:01:07,620 --> 00:01:05,140
challenge for you all okay so you guys

12
00:01:09,330 --> 00:01:07,630
have got 30 seconds I'm gonna walk

13
00:01:14,390 --> 00:01:09,340

around and we're gonna guess what this

14

00:01:48,360 --> 00:01:14,400

is okay let's go what do you think it is

15

00:01:56,100 --> 00:01:53,780

oh okay so I had some really interesting

16

00:01:58,980 --> 00:01:56,110

guesses this time my favorite was

17

00:02:01,620 --> 00:01:58,990

crocodile legs but actually what this is

18

00:02:04,650 --> 00:02:01,630

is this is space food from the Mercury

19

00:02:06,930 --> 00:02:04,660

Gemini missions so very early on in our

20

00:02:09,180 --> 00:02:06,940

travels into space we were eating food

21

00:02:11,340 --> 00:02:09,190

that looked like this well we're going

22

00:02:15,330 --> 00:02:11,350

to talk a little bit more about some

23

00:02:19,440 --> 00:02:15,340

food and I have another great guest here

24

00:02:22,020 --> 00:02:19,450

chef Kay she is the author of phat taste

25

00:02:23,730 --> 00:02:22,030

little phat and you can tell she's a

26

00:02:25,710 --> 00:02:23,740

real chef because she is dressed like a

27

00:02:29,370 --> 00:02:25,720

chef and thank you so much for being

28

00:02:32,670 --> 00:02:29,380

here today okay so chef Kay what do our

29

00:02:35,400 --> 00:02:32,680

bodies need from food well nutrition is

30

00:02:37,230 --> 00:02:35,410

a important part of everything we do so

31

00:02:39,060 --> 00:02:37,240

I like to think of it almost like a

32

00:02:41,550 --> 00:02:39,070

rocket cuz we're there and Space Museum

33

00:02:43,710 --> 00:02:41,560

right so think of the structure is

34

00:02:45,150 --> 00:02:43,720

everything you need it's a protein first

35

00:02:47,130 --> 00:02:45,160

and you're going to build muscle

36

00:02:49,170 --> 00:02:47,140

structure with that bone structure and

37

00:02:52,320 --> 00:02:49,180

let everything you know be your strong

38

00:02:54,090 --> 00:02:52,330

point there then a minerals and the

39

00:02:55,740 --> 00:02:54,100

vitamins all come from fruits and

40

00:02:57,600 --> 00:02:55,750

vegetables and that's going to be more

41

00:02:59,340 --> 00:02:57,610

your circuitry keeping it everything

42

00:03:01,140 --> 00:02:59,350

communicating properly you know you guys

43

00:03:03,750 --> 00:03:01,150

are seeing and touching and tasting all

44

00:03:06,300 --> 00:03:03,760

of that skin everything it'll keep that

45

00:03:08,100 --> 00:03:06,310

in line then you need carbs carbs are

46

00:03:10,050 --> 00:03:08,110

the fuel basically it gives you the

47

00:03:11,490 --> 00:03:10,060

energy carbohydrates and that'll get

48

00:03:14,370 --> 00:03:11,500

your rocket off the ground so you're

49

00:03:17,070 --> 00:03:14,380

ready to go through the day okay so why

50

00:03:19,260 --> 00:03:17,080

should we care about what we eat well

51
00:03:20,940 --> 00:03:19,270
that's gonna affect how you're feeling

52
00:03:23,070 --> 00:03:20,950
it's gonna affect your energy level

53
00:03:24,600 --> 00:03:23,080
that's gonna affect your mood it's gonna

54
00:03:25,949 --> 00:03:24,610
affect your growing you guys are all

55
00:03:27,000 --> 00:03:25,959
growing right now so you need to make

56
00:03:28,770 --> 00:03:27,010
sure that you're eating everything

57
00:03:30,720 --> 00:03:28,780
important for your muscles and your

58
00:03:33,630 --> 00:03:30,730
bones to do what they need to do develop

59
00:03:36,780 --> 00:03:33,640
and what exactly goes into a nutritious

60
00:03:39,090 --> 00:03:36,790
meal I see we've got some stuff in on

61
00:03:40,229 --> 00:03:39,100
the table here so proteins let's talk a

62
00:03:42,330 --> 00:03:40,239
little bit about what goes into

63
00:03:43,830 --> 00:03:42,340

nutrition right proteins we started with

64

00:03:46,259 --> 00:03:43,840

can anybody tell me so is that meat

65

00:03:48,360 --> 00:03:46,269

everybody knows that beans we have nuts

66

00:03:49,890 --> 00:03:48,370

here that gives you all kinds of the

67

00:03:52,440 --> 00:03:49,900

structure building that we were talking

68

00:03:54,420 --> 00:03:52,450

about the vegetables the brighter the

69

00:03:57,000 --> 00:03:54,430

colors the better you get more minerals

70

00:03:58,890 --> 00:03:57,010

and vitamins from those this is kale and

71

00:03:59,680 --> 00:03:58,900

I've got a pepper I've got apple when

72

00:04:01,780 --> 00:03:59,690

you're eating veg

73

00:04:03,190 --> 00:04:01,790

two bulls and fruits you need to eat the

74

00:04:05,380 --> 00:04:03,200

fruit a lot of people think that

75

00:04:06,670 --> 00:04:05,390

drinking the fruit juice it works but

76

00:04:08,050 --> 00:04:06,680

it's actually a lot of sugar you

77

00:04:10,810 --> 00:04:08,060

actually need the fiber and everything

78

00:04:12,490 --> 00:04:10,820

that the fruit can provide so then you

79

00:04:14,620 --> 00:04:12,500

have your carbohydrates you have some

80

00:04:17,320 --> 00:04:14,630

good fats fat is actually something kind

81

00:04:19,270 --> 00:04:17,330

of like oxygen we need it and this is a

82

00:04:21,460 --> 00:04:19,280

avocado which is filled with a lot of

83

00:04:23,410 --> 00:04:21,470

fat but it's a good fat and that's

84

00:04:24,790 --> 00:04:23,420

something that we store if you're low on

85

00:04:26,800 --> 00:04:24,800

carbs or you're low on everything and

86

00:04:28,600 --> 00:04:26,810

your energy is low then your body starts

87

00:04:30,400 --> 00:04:28,610

going into the fat to search for the

88

00:04:33,010 --> 00:04:30,410

energy so that's kind of your reserve

89

00:04:35,140 --> 00:04:33,020

fuel tank and I think we've got

90

00:04:36,820 --> 00:04:35,150

questions from the audience and we might

91

00:04:42,840 --> 00:04:36,830

have some online questions as well so

92

00:04:50,020 --> 00:04:47,620

what was the the easiest thing you

93

00:04:52,510 --> 00:04:50,030

probably ever will cook the easiest

94

00:04:54,370 --> 00:04:52,520

thing I've ever made um I would probably

95

00:04:58,420 --> 00:04:54,380

say do you mean like a whole meal or

96

00:05:01,300 --> 00:04:58,430

just one thing the whole meal um you

97

00:05:02,740 --> 00:05:01,310

know I I I think of a making a chicken

98

00:05:04,570 --> 00:05:02,750

breast or something like that pretty

99

00:05:06,040 --> 00:05:04,580

easier scrambled eggs scrambled eggs are

100

00:05:08,680 --> 00:05:06,050

pretty easy to make in here can you make

101
00:05:11,790 --> 00:05:08,690
this yeah alright excellent I think

102
00:05:15,100 --> 00:05:11,800
we've got a question over here how did

103
00:05:17,590 --> 00:05:15,110
how did you start making space for food

104
00:05:19,240 --> 00:05:17,600
I started making food yeah I actually

105
00:05:21,159 --> 00:05:19,250
just make all the nutritional meals

106
00:05:23,110 --> 00:05:21,169
that's not make for everybody but I

107
00:05:24,670 --> 00:05:23,120
started out in Italy when I was about

108
00:05:27,640 --> 00:05:24,680
all you guys his age I was living over

109
00:05:29,710 --> 00:05:27,650
there and I began learning from all the

110
00:05:31,360 --> 00:05:29,720
Mamas and the grandmas all the fresh

111
00:05:33,310 --> 00:05:31,370
fruits and vegetables and herbs and

112
00:05:34,750 --> 00:05:33,320
spices that you can put into everything

113
00:05:37,150 --> 00:05:34,760

to make sure you were having a healthy

114

00:05:39,370 --> 00:05:37,160

healthy but delicious meal so that's

115

00:05:43,240 --> 00:05:39,380

what got me started and we have an

116

00:05:45,820 --> 00:05:43,250

online question okay can dessert be

117

00:05:47,110 --> 00:05:45,830

healthy yes sir I can yep if you're

118

00:05:49,090 --> 00:05:47,120

gonna go with fruits and you want to

119

00:05:51,070 --> 00:05:49,100

slice fruits we actually have apple

120

00:05:53,050 --> 00:05:51,080

crisp that I do that's in my book and

121

00:05:54,760 --> 00:05:53,060

we'd have you slice the apples thinly

122

00:05:56,080 --> 00:05:54,770

just do a slight topping on there we

123

00:05:57,760 --> 00:05:56,090

leave out all the butter that's in like

124

00:05:59,320 --> 00:05:57,770

apple cobblers and stuff and we can

125

00:06:02,320 --> 00:05:59,330

still make it a really low lean and

126
00:06:04,930 --> 00:06:02,330
healthy vitamins and minerals going for

127
00:06:07,000 --> 00:06:04,940
it healthy people okay you've got a

128
00:06:08,330 --> 00:06:07,010
question yeah I almost say that how do

129
00:06:11,750 --> 00:06:08,340
you make like rough

130
00:06:14,180 --> 00:06:11,760
due to hard food what's that how do you

131
00:06:16,480 --> 00:06:14,190
make real food was too hard for too hard

132
00:06:21,470 --> 00:06:16,490
food yeah I think you're jumping ahead

133
00:06:22,580 --> 00:06:21,480
real food like would you send the spin

134
00:06:25,190 --> 00:06:22,590
sorry

135
00:06:26,810 --> 00:06:25,200
oh that's where they dehydrated actually

136
00:06:27,920 --> 00:06:26,820
suck all the moisture out of it and

137
00:06:29,330 --> 00:06:27,930
we're gonna actually have somebody

138
00:06:31,160 --> 00:06:29,340

that's going to talk to you from the

139

00:06:32,870 --> 00:06:31,170

Space Center in Houston that will get

140

00:06:36,650 --> 00:06:32,880

back with you later so catch up on that

141

00:06:39,590 --> 00:06:36,660

okay got a question was a firm you to

142

00:06:41,480 --> 00:06:39,600

make what's that what's your favorite

143

00:06:43,490 --> 00:06:41,490

you my favorite meal is probably my beef

144

00:06:47,570 --> 00:06:43,500

bourguignon I love that and it goes over

145

00:06:50,780 --> 00:06:47,580

rice any other questions

146

00:06:53,120 --> 00:06:50,790

oh we got one here is being a chef your

147

00:06:58,040 --> 00:06:53,130

favorite job absolutely

148

00:06:59,960 --> 00:06:58,050

I love vanishes okay how much steak

149

00:07:04,550 --> 00:06:59,970

should you eat and maybe a day

150

00:07:06,020 --> 00:07:04,560

yeah a day well about four ounces unless

151
00:07:11,450 --> 00:07:06,030
you want to eat steak each meal then I

152
00:07:16,640 --> 00:07:11,460
guess you could do four ounces each okay

153
00:07:21,470 --> 00:07:16,650
so we did an activity earlier and you

154
00:07:24,440 --> 00:07:21,480
all put together some healthy meals so

155
00:07:26,810 --> 00:07:24,450
do you do you want to tell us what

156
00:07:33,050 --> 00:07:26,820
ingredients did you use and what did you

157
00:07:37,640 --> 00:07:33,060
create making it a Sally

158
00:07:41,660 --> 00:07:37,650
um we use like meat and what else and

159
00:07:45,470 --> 00:07:41,670
chips and the dessert was supposed to be

160
00:07:47,690 --> 00:07:45,480
imminent ray the desserts M&Ms and what

161
00:07:50,480 --> 00:07:47,700
unhealthy stuff did you can I see yet

162
00:07:53,120 --> 00:07:50,490
soda in here but you you you've used a

163
00:07:55,670 --> 00:07:53,130

lot of healthy stuff didn't you yes good

164

00:07:58,820 --> 00:07:55,680

I think we've got someone over on with

165

00:08:00,980 --> 00:07:58,830

chef K absolutely so in your box I had

166

00:08:04,160 --> 00:08:00,990

some hummus I add some cheese and a

167

00:08:05,960 --> 00:08:04,170

Milky Way bar and I had some other candy

168

00:08:08,540 --> 00:08:05,970

bars and then you had some apples and a

169

00:08:13,700 --> 00:08:08,550

muffin what did you guys come up with we

170

00:08:16,910 --> 00:08:13,710

came up with we did apples and muffins

171

00:08:19,760 --> 00:08:16,920

with peanut butter and we

172

00:08:21,710 --> 00:08:19,770

with dessert okay so it's like a dessert

173

00:08:24,890 --> 00:08:21,720

snack you very nice good and still

174

00:08:27,850 --> 00:08:24,900

healthy excellent okay and in your box I

175

00:08:30,290 --> 00:08:27,860

see you had tomatoes and Pop Tarts and

176

00:08:32,660 --> 00:08:30,300

bacon and eggs so what did you guys come

177

00:08:36,140 --> 00:08:32,670

up with for your healthy meal oh you

178

00:08:38,450 --> 00:08:36,150

came up with egg and bacon tomato

179

00:08:40,040 --> 00:08:38,460

burrito is it sort of like a breakfast

180

00:08:45,020 --> 00:08:40,050

burrito yep would you eat this for

181

00:08:47,390 --> 00:08:45,030

breakfast yep okay okay so I had over

182

00:08:50,300 --> 00:08:47,400

here this team I gave you guys some mini

183

00:08:53,180 --> 00:08:50,310

donuts I gave you some gummy bears some

184

00:08:54,860 --> 00:08:53,190

garbanzo beans sliced peppers and a

185

00:08:56,570 --> 00:08:54,870

granola bar right a couple pieces of

186

00:09:01,700 --> 00:08:56,580

bread would you come up with we came up

187

00:09:03,500 --> 00:09:01,710

with the Peavy pepper and apple oh honey

188

00:09:05,150 --> 00:09:03,510

sounds excellent that's a good

189

00:09:06,770 --> 00:09:05,160

combination with a little garbanzo bean

190

00:09:08,510 --> 00:09:06,780

garnish around there so you can eat on

191

00:09:09,980 --> 00:09:08,520

that good you stuck with the healthy you

192

00:09:13,340 --> 00:09:09,990

left out the gummy bears and the donuts

193

00:09:14,720 --> 00:09:13,350

excellent way to go okay so on this

194

00:09:18,560 --> 00:09:14,730

table it looks like you had cinnamon

195

00:09:21,260 --> 00:09:18,570

toast crunch cookies and do you want to

196

00:09:25,880 --> 00:09:21,270

tell me what's in in this one gauge how

197

00:09:27,410 --> 00:09:25,890

much carrot and rice and what's on the

198

00:09:29,360 --> 00:09:27,420

cup is cinnamon toast crunch

199

00:09:30,950 --> 00:09:29,370

okay and then you actually create a

200

00:09:32,990 --> 00:09:30,960

dessert too didn't you you want to tell

201
00:09:35,630 --> 00:09:33,000
us about this concoction here is a

202
00:09:37,900 --> 00:09:35,640
cookie oh do you mr. Kish

203
00:09:40,310 --> 00:09:37,910
and a gentleman toast concept Bonnie

204
00:09:42,980 --> 00:09:40,320
okay so you have to eat the good stuff

205
00:09:45,200 --> 00:09:42,990
before you eat the dessert right yes

206
00:09:46,910 --> 00:09:45,210
very nice who I met today I'm very nice

207
00:09:48,650 --> 00:09:46,920
I like the combination there excellent

208
00:09:50,510 --> 00:09:48,660
so I got a full milk okay on this box

209
00:09:52,610 --> 00:09:50,520
what we have over here we had a candy

210
00:09:55,460 --> 00:09:52,620
bar we had some Cheetos and a little bit

211
00:09:58,640 --> 00:09:55,470
of tuna and we had some crackers right

212
00:10:03,440 --> 00:09:58,650
so what did you come up with uh I came

213
00:10:04,910 --> 00:10:03,450

up with I can't look tuna crackers and

214

00:10:08,750 --> 00:10:04,920

tomato and some Hot Cheetos and I've

215

00:10:10,370 --> 00:10:08,760

mixed it into like a bread bread you can

216

00:10:12,620 --> 00:10:10,380

either like breakfast and then lunch

217

00:10:14,660 --> 00:10:12,630

breakfast or lunch okay excellent

218

00:10:17,000 --> 00:10:14,670

and you left out the candy bar you know

219

00:10:19,880 --> 00:10:17,010

you did good nutrition I think we've got

220

00:10:21,110 --> 00:10:19,890

some very nutritious meals here and now

221

00:10:23,750 --> 00:10:21,120

what we're gonna do is we're going to

222

00:10:25,010 --> 00:10:23,760

take we have actually in our collection

223

00:10:26,930 --> 00:10:25,020

space food

224

00:10:29,780 --> 00:10:26,940

we're going to take a look at some of

225

00:10:34,430 --> 00:10:29,790

the more unusual artifacts that we have

226

00:10:37,190 --> 00:10:34,440

here in our museum collection I'm here

227

00:10:39,860 --> 00:10:37,200

today with a curator Valerie Neal and

228

00:10:43,040 --> 00:10:39,870

we're taking a look at some space food

229

00:10:45,230 --> 00:10:43,050

and Valerie I'm curious how did we get

230

00:10:46,580 --> 00:10:45,240

these very strange-looking soft drink

231

00:10:50,000 --> 00:10:46,590

cans in our collection

232

00:10:53,510 --> 00:10:50,010

well coca-cola and Pepsi approached NASA

233

00:10:56,720 --> 00:10:53,520

about flying soft drinks in space in an

234

00:10:59,660 --> 00:10:56,730

early shuttle mission in the early 1980s

235

00:11:02,660 --> 00:10:59,670

this was a time known as the cola wars

236

00:11:04,790 --> 00:11:02,670

when Coke and Pepsi were very

237

00:11:07,160 --> 00:11:04,800

competitive with each other each wanting

238

00:11:09,020 --> 00:11:07,170

to be the number one soft drink provider

239

00:11:12,140 --> 00:11:09,030

in the world and what could be cooler

240

00:11:15,920 --> 00:11:12,150

than to be the first soft drink in space

241

00:11:18,350 --> 00:11:15,930

so why soft drinks well they thought

242

00:11:20,420 --> 00:11:18,360

that maybe the crews would like to have

243

00:11:23,630 --> 00:11:20,430

a greater variety in their beverage

244

00:11:26,210 --> 00:11:23,640

selection the astronauts had always been

245

00:11:27,950 --> 00:11:26,220

accustomed to powdered drinks and they

246

00:11:30,770 --> 00:11:27,960

thought that maybe they'd like to have a

247

00:11:32,810 --> 00:11:30,780

good all-american soft drink while they

248

00:11:34,850 --> 00:11:32,820

were in space but there are problems

249

00:11:37,910 --> 00:11:34,860

with that yeah I can see they've got

250

00:11:40,340 --> 00:11:37,920

these bizarre tops on them exactly if

251
00:11:43,730 --> 00:11:40,350
you were to pop the top of a soft drink

252
00:11:46,280 --> 00:11:43,740
can in space it would spew everywhere

253
00:11:48,830 --> 00:11:46,290
and make a big mess or even if you

254
00:11:51,650 --> 00:11:48,840
twisted the cap it would float out of

255
00:11:54,470 --> 00:11:51,660
the bottle so the companies put some

256
00:11:56,780 --> 00:11:54,480
time and effort into devising a special

257
00:12:01,160 --> 00:11:56,790
soft drink can for use in weightlessness

258
00:12:03,050 --> 00:12:01,170
and Coke developed a device on top that

259
00:12:05,840 --> 00:12:03,060
you would actually put in your mouth and

260
00:12:08,330 --> 00:12:05,850
push the button and it would squirt the

261
00:12:10,970 --> 00:12:08,340
soft drink into your mouth and then

262
00:12:14,180 --> 00:12:10,980
Pepsi did an adaptation of a standard

263
00:12:16,100 --> 00:12:14,190

shaving cream can or a whipped cream can

264

00:12:18,440 --> 00:12:16,110

where again you would put the little

265

00:12:22,640 --> 00:12:18,450

spigot on top right into your mouth and

266

00:12:24,770 --> 00:12:22,650

drink that way and just a shaving cream

267

00:12:28,610 --> 00:12:24,780

and whipped cream come out pretty foamy

268

00:12:30,800 --> 00:12:28,620

so did Pepsi and so did Coke for that

269

00:12:33,590 --> 00:12:30,810

matter the crews were not really

270

00:12:35,220 --> 00:12:33,600

impressed with the taste or the mix of

271

00:12:37,620 --> 00:12:35,230

carbonation and

272

00:12:40,860 --> 00:12:37,630

syrup and is it in there just the way an

273

00:12:42,540 --> 00:12:40,870

ordinary coke can or Pepsi can is no

274

00:12:44,460 --> 00:12:42,550

there's actually structure inside the

275

00:12:47,880 --> 00:12:44,470

can to keep the carbonation and the

276
00:12:50,610 --> 00:12:47,890
syrup separate so that they would mix at

277
00:12:52,320 --> 00:12:50,620
the point of drinking and they tried

278
00:12:54,480 --> 00:12:52,330
different combinations and they never

279
00:12:57,200 --> 00:12:54,490
got the taste quite right or the

280
00:13:01,950 --> 00:12:57,210
consistency quite right well how do you

281
00:13:03,990 --> 00:13:01,960
keep an ice cold soft drink in space

282
00:13:05,910 --> 00:13:04,000
well that was also part of the problem

283
00:13:08,040 --> 00:13:05,920
there's no refrigerator on the Space

284
00:13:10,140 --> 00:13:08,050
Shuttle and so they had to drink at room

285
00:13:12,180 --> 00:13:10,150
temperature and who likes to drink a

286
00:13:15,780 --> 00:13:12,190
warm soft drink no not me not the

287
00:13:18,660 --> 00:13:15,790
astronauts well thank you very much it's

288
00:13:25,080 --> 00:13:18,670

very interesting history on cola wars in

289

00:13:27,150 --> 00:13:25,090

space ok so now from NASA's Johnson

290

00:13:30,630 --> 00:13:27,160

Space Center in Houston Texas

291

00:13:35,940 --> 00:13:30,640

we have food scientists dr. Grace

292

00:13:39,780 --> 00:13:35,950

Douglas joining us hi grace hello grace

293

00:13:45,270 --> 00:13:39,790

can you tell us how important is food to

294

00:13:47,700 --> 00:13:45,280

astronauts food is incredibly important

295

00:13:49,770 --> 00:13:47,710

to our crew members they're on the

296

00:13:52,500 --> 00:13:49,780

International Space Station for around 6

297

00:13:54,780 --> 00:13:52,510

months and it is a very unfamiliar

298

00:13:56,820 --> 00:13:54,790

environment it's not very home-like so

299

00:13:58,140 --> 00:13:56,830

the familiarity of the food and the

300

00:14:00,240 --> 00:13:58,150

comfort they can get from the food the

301
00:14:01,800 --> 00:14:00,250
variety the choices they have the health

302
00:14:03,330 --> 00:14:01,810
aspects they can get out of the food are

303
00:14:05,220 --> 00:14:03,340
all very important meal times are

304
00:14:07,170 --> 00:14:05,230
incredibly important to the crew members

305
00:14:08,490 --> 00:14:07,180
just similar to mealtimes here it's fun

306
00:14:10,620 --> 00:14:08,500
to eat with your friends it's great to

307
00:14:12,060 --> 00:14:10,630
eat with your family holiday occasions

308
00:14:14,220 --> 00:14:12,070
where everyone gets together are still

309
00:14:16,200 --> 00:14:14,230
very important to crew in flight so we

310
00:14:18,600 --> 00:14:16,210
want to provide them with the variety

311
00:14:21,690 --> 00:14:18,610
and with the familiarity of food that

312
00:14:24,270 --> 00:14:21,700
they would have here on earth ok so now

313
00:15:30,780 --> 00:14:24,280

we're going to take a look at some

314

00:15:36,040 --> 00:15:33,970

hey grace this is chef K I just wanted

315

00:15:37,600 --> 00:15:36,050

to ask you so we saw that fun that

316

00:15:42,660 --> 00:15:37,610

they're eating how do they actually

317

00:15:47,199 --> 00:15:45,220

we have several different kinds of food

318

00:15:50,259 --> 00:15:47,209

we have many of our foods are

319

00:15:52,139 --> 00:15:50,269

freeze-dried and so we prepare them so

320

00:15:55,179 --> 00:15:52,149

something like macaroni and cheese or

321

00:15:57,009 --> 00:15:55,189

potatoes au gratin and then we remove

322

00:15:58,780 --> 00:15:57,019

the moisture here on earth and they can

323

00:16:00,489 --> 00:15:58,790

add that moisture back once they get

324

00:16:01,869 --> 00:16:00,499

into flight and eat it when they get

325

00:16:03,519 --> 00:16:01,879

there and this preserves the food

326

00:16:06,040 --> 00:16:03,529

without the moisture microorganisms

327

00:16:08,379 --> 00:16:06,050

can't grow and so they can keep the food

328

00:16:10,090 --> 00:16:08,389

for a long amount of time without

329

00:16:11,559 --> 00:16:10,100

refrigerators and without freezers which

330

00:16:13,900 --> 00:16:11,569

they do not have on the International

331

00:16:15,970 --> 00:16:13,910

Space Station additionally we have

332

00:16:17,530 --> 00:16:15,980

several thermos stabilized products

333

00:16:20,319 --> 00:16:17,540

their retort thermos stabilized so it's

334

00:16:21,999 --> 00:16:20,329

canned food in a flexible pouch and all

335

00:16:23,590 --> 00:16:22,009

of our packaging is flexible and

336

00:16:27,730 --> 00:16:23,600

lightweight so it's easy to stow and

337

00:16:30,790 --> 00:16:27,740

launch into flight we have several items

338

00:16:33,790 --> 00:16:30,800

that come from the commercial grocery

339

00:16:35,319 --> 00:16:33,800

store such as candies and crackers and

340

00:16:37,239 --> 00:16:35,329

we repackage them for flight because

341

00:16:38,799 --> 00:16:37,249

they can't have crumbs and flights so

342

00:16:40,210 --> 00:16:38,809

you can't just open a bag of cookies

343

00:16:42,489 --> 00:16:40,220

there would be crumbs that would float

344

00:16:44,290 --> 00:16:42,499

out so this way it's a single serving

345

00:16:48,040 --> 00:16:44,300

and they won't have to deal with crumbs

346

00:16:49,689 --> 00:16:48,050

and additionally we repackage them

347

00:16:51,519 --> 00:16:49,699

because it extends their shelf life

348

00:16:52,900 --> 00:16:51,529

things that get launched onto the

349

00:16:55,269 --> 00:16:52,910

International Space Station end up being

350

00:16:57,699 --> 00:16:55,279

there for a year to three years so they

351
00:17:01,769 --> 00:16:57,709
have to have a long quality and safety

352
00:17:04,329 --> 00:17:01,779
shelf-life our drinks are packaged with

353
00:17:07,679 --> 00:17:04,339
so we have powdered drinks and they're

354
00:17:10,539 --> 00:17:07,689
packaged with a septum similarly to the

355
00:17:12,880 --> 00:17:10,549
freeze-dried foods and the septum is a

356
00:17:15,639 --> 00:17:12,890
one-way valve and in flight they can

357
00:17:17,590 --> 00:17:15,649
inject a needle that injects water into

358
00:17:19,990 --> 00:17:17,600
these packages and once they pull the

359
00:17:22,090 --> 00:17:20,000
needle out the one-way valve keeps the

360
00:17:24,250 --> 00:17:22,100
liquid from coming back out and after a

361
00:17:27,880 --> 00:17:24,260
few minutes of massaging the foods they

362
00:17:29,500 --> 00:17:27,890
can cut it open and just eat it with a

363
00:17:32,049 --> 00:17:29,510

spoon or with a fork and there's a

364

00:17:33,730 --> 00:17:32,059

surface tension created by the moisture

365

00:17:35,289 --> 00:17:33,740

in the food that keeps it in the package

366

00:17:38,019 --> 00:17:35,299

or on the spoon or fork while they're

367

00:17:40,659 --> 00:17:38,029

eating and for the drinks they have a

368

00:17:41,470 --> 00:17:40,669

straw that inserts through the one-way

369

00:17:43,270 --> 00:17:41,480

valve and

370

00:17:44,710 --> 00:17:43,280

as a clamp so they can just drink one

371

00:17:46,750 --> 00:17:44,720

sip at a time and clamp it in between

372

00:17:50,080 --> 00:17:46,760

and and the drink doesn't just keep

373

00:17:52,120 --> 00:17:50,090

coming out of the straw okay

374

00:17:53,860 --> 00:17:52,130

well I'm sure it varies from cruda

375

00:17:55,150 --> 00:17:53,870

member to crew member but what would be

376

00:17:56,980 --> 00:17:55,160

like some of the favorite things that

377

00:17:58,480 --> 00:17:56,990

they that they enjoy up there that they

378

00:18:04,020 --> 00:17:58,490

really want you and what challenges you

379

00:18:06,580 --> 00:18:04,030

guys to make them several crew members

380

00:18:08,590 --> 00:18:06,590

say that they like spicy foods they like

381

00:18:10,450 --> 00:18:08,600

things with a little bit more flavor so

382

00:18:14,310 --> 00:18:10,460

we send things like sriracha sauce and

383

00:18:17,049 --> 00:18:14,320

hot sauce but we also have things like

384

00:18:20,919 --> 00:18:17,059

shrimp cocktail which has a spicy sauce

385

00:18:22,750 --> 00:18:20,929

and it and the reason for this could be

386

00:18:24,130 --> 00:18:22,760

due to potentially a few different

387

00:18:26,950 --> 00:18:24,140

factors one of them is there's a fluid

388

00:18:29,470 --> 00:18:26,960

shift to the head in spaceflight and so

389

00:18:30,970 --> 00:18:29,480

it can give them a sensation similar to

390

00:18:32,620 --> 00:18:30,980

having a cold where they don't taste

391

00:18:34,960 --> 00:18:32,630

things as well additionally there's

392

00:18:37,980 --> 00:18:34,970

competing aromas in space wait they're

393

00:18:40,630 --> 00:18:37,990

in an enclosed environment and finally

394

00:18:42,100 --> 00:18:40,640

the aromas don't dissipate the same way

395

00:18:44,350 --> 00:18:42,110

they do on earth they don't rise and

396

00:18:46,000 --> 00:18:44,360

dissipate similarly in microgravity so

397

00:18:48,460 --> 00:18:46,010

they're losing that aroma that they're

398

00:18:50,980 --> 00:18:48,470

getting from the food good interesting

399

00:18:53,080 --> 00:18:50,990

for them I'm sure because a lot of times

400

00:18:55,090 --> 00:18:53,090

what I say down here on earth is that we

401
00:18:56,560 --> 00:18:55,100
eat with our eyes our nose and they're

402
00:18:58,120 --> 00:18:56,570
Roma's and all that that's the first

403
00:18:59,860 --> 00:18:58,130
thing that we get that makes us be ready

404
00:19:01,060 --> 00:18:59,870
to be like oh and that sends it all to

405
00:19:02,860 --> 00:19:01,070
the brain saying I'm ready to eat this

406
00:19:06,130 --> 00:19:02,870
so it's probably effective for them I

407
00:19:08,169 --> 00:19:06,140
understand okay and I think that we have

408
00:19:11,890 --> 00:19:08,179
some questions from the audience

409
00:19:14,740 --> 00:19:11,900
do you have a question mm-hmm why is the

410
00:19:16,659 --> 00:19:14,750
big beans mushy like the baby is

411
00:19:22,509 --> 00:19:16,669
supposed to be like a bean instead of

412
00:19:30,249 --> 00:19:25,159
I'm not sure we want to know why this

413
00:19:34,999 --> 00:19:30,259

you're referring to so we have packaged

414

00:19:38,840 --> 00:19:35,009

being product so like uh in a pouch yes

415

00:19:40,399 --> 00:19:38,850

it's a package and so I think we have

416

00:19:42,710 --> 00:19:40,409

their thermostat they would be thermos

417

00:19:45,799 --> 00:19:42,720

stabilized and in a pouch similar to a

418

00:19:48,710 --> 00:19:45,809

canned food so it would be it would

419

00:19:55,180 --> 00:19:48,720

probably feel squishy er okay and we

420

00:20:02,899 --> 00:20:01,220

is it like always inflated like is I'm

421

00:20:07,730 --> 00:20:02,909

sorry what did you want to repeat that

422

00:20:12,580 --> 00:20:07,740

is the midday Mia why are the macadamia

423

00:20:18,379 --> 00:20:15,649

we pull a vacuum on our packages to

424

00:20:20,149 --> 00:20:18,389

remove the oxygen and it gives our items

425

00:20:22,220 --> 00:20:20,159

a longer shelf life they don't have the

426
00:20:25,340 --> 00:20:22,230
oxygen in them that causes some of the

427
00:20:27,470 --> 00:20:25,350
reactions like rancidity and that can

428
00:20:28,940 --> 00:20:27,480
actually make them feel stiffer so if

429
00:20:30,200 --> 00:20:28,950
you cut that package open and they have

430
00:20:32,570 --> 00:20:30,210
the ability to just to move around

431
00:20:33,619 --> 00:20:32,580
they'll be like normal macadamia nuts

432
00:20:35,840 --> 00:20:33,629
that you would buy at the grocery store

433
00:20:37,730 --> 00:20:35,850
here it's the fact that the vacuum is

434
00:20:41,749 --> 00:20:37,740
pooled that makes it feel stiff and

435
00:20:44,180 --> 00:20:41,759
let's go to an online question can you

436
00:20:50,480 --> 00:20:44,190
AJ would like to know if you can have

437
00:20:52,460 --> 00:20:50,490
dairy in space we don't have

438
00:20:53,989 --> 00:20:52,470

refrigerators or freezers so you can't

439

00:20:56,180 --> 00:20:53,999

have dairy like you would normally think

440

00:20:58,100 --> 00:20:56,190

of it at the grocery store but we do

441

00:21:01,430 --> 00:20:58,110

have nonfat dry milk that they can drink

442

00:21:03,109 --> 00:21:01,440

in a pouch once they rehydrate it in

443

00:21:04,609 --> 00:21:03,119

flight and we also have nonfat dry milk

444

00:21:07,669 --> 00:21:04,619

in the cereals that they can rehydrate

445

00:21:10,399 --> 00:21:07,679

in a freeze-dried type of package and

446

00:21:12,680 --> 00:21:10,409

eat as a cereal and we also have a

447

00:21:16,369 --> 00:21:12,690

yogurt product that's thermo stabilized

448

00:21:17,539 --> 00:21:16,379

in a pouch and so it's not a like a

449

00:21:19,369 --> 00:21:17,549

yogurt that you would find in the

450

00:21:21,619 --> 00:21:19,379

grocery store it but it's a dairy

451

00:21:26,659 --> 00:21:21,629

product and it doesn't need to be

452

00:21:28,909 --> 00:21:26,669

refrigerated hey grace I have a quick

453

00:21:30,230 --> 00:21:28,919

question for you here on earth I have to

454

00:21:32,119 --> 00:21:30,240

chat a lot of challenges that we have

455

00:21:33,499 --> 00:21:32,129

some very special dietary needs that we

456

00:21:33,830 --> 00:21:33,509

have to follow with a lot of things as a

457

00:21:35,210 --> 00:21:33,840

gluten

458

00:21:36,500 --> 00:21:35,220

three different things like that what's

459

00:21:38,000 --> 00:21:36,510

been a challenge for you guys are you

460

00:21:44,029 --> 00:21:38,010

able to accommodate a lot of different

461

00:21:47,120 --> 00:21:44,039

things up there we have not had to

462

00:21:49,159 --> 00:21:47,130

accommodate factors such as that

463

00:21:51,409 --> 00:21:49,169

previously there's a potential that we

464

00:21:54,320 --> 00:21:51,419

will have to in the future currently we

465

00:21:56,149 --> 00:21:54,330

have a standard menu and so the crew has

466

00:21:58,820 --> 00:21:56,159

the same choice every crew member has

467

00:22:00,289 --> 00:21:58,830

the same choice from that standard menu

468

00:22:02,990 --> 00:22:00,299

and then they have some specialty items

469

00:22:05,630 --> 00:22:03,000

that they get in what we call bonus

470

00:22:08,210 --> 00:22:05,640

containers that they can choose but I

471

00:22:11,210 --> 00:22:08,220

would say it would be difficult to

472

00:22:13,909 --> 00:22:11,220

accommodate some of those specialty

473

00:22:16,190 --> 00:22:13,919

conditions without more of a preference

474

00:22:17,659 --> 00:22:16,200

menu which is difficult to do on the

475

00:22:20,630 --> 00:22:17,669

International Space Station as a

476

00:22:22,880 --> 00:22:20,640

complete menu but we could potentially

477

00:22:24,320 --> 00:22:22,890

do that with more of a preference menu

478

00:22:26,450 --> 00:22:24,330

and sending up more food that they

479

00:22:28,730 --> 00:22:26,460

choose it just is difficult it's a

480

00:22:30,440 --> 00:22:28,740

challenge with the way that the resupply

481

00:22:30,860 --> 00:22:30,450

vehicles are launched and when they get

482

00:22:35,269 --> 00:22:30,870

there

483

00:22:37,970 --> 00:22:35,279

and we have another online question what

484

00:22:44,149 --> 00:22:37,980

is the most exotic food you've ever made

485

00:22:47,149 --> 00:22:44,159

for space so most of the foods that we

486

00:22:51,080 --> 00:22:47,159

make in our lab are very familiar

487

00:22:56,480 --> 00:22:51,090

American fare we do have some items that

488

00:22:59,870 --> 00:22:56,490

use curry sauces and we also have some

489

00:23:01,639 --> 00:22:59,880

some items that come from the European

490

00:23:04,340 --> 00:23:01,649

Space Agency and the Canadian Space

491

00:23:06,680 --> 00:23:04,350

Agency and the Japanese space agency and

492

00:23:09,710 --> 00:23:06,690

additionally the Russian space agency

493

00:23:11,240 --> 00:23:09,720

provides some items that for their crew

494

00:23:12,440 --> 00:23:11,250

members that they might share with our

495

00:23:17,260 --> 00:23:12,450

crew member system of those

496

00:23:25,070 --> 00:23:21,350

take a look at some of the packaging

497

00:23:27,830 --> 00:23:25,080

that the students did here earlier today

498

00:23:31,070 --> 00:23:27,840

so I'm gonna send it over to chef K and

499

00:23:32,570 --> 00:23:31,080

okay well we have team blueberry over

500

00:23:34,190 --> 00:23:32,580

here this looks pretty interesting what

501
00:23:40,090 --> 00:23:34,200
did you guys have for your concept that

502
00:23:47,380 --> 00:23:44,430
been in for you and for the ham rice

503
00:23:50,919 --> 00:23:47,390
cursed food was gonna put the top on and

504
00:23:53,380 --> 00:23:50,929
close it more with my tape and with the

505
00:23:56,260 --> 00:23:53,390
cereal we was gonna put bubble wrap on

506
00:23:58,740 --> 00:23:56,270
it with a pipe pipe cleaner okay

507
00:24:01,750 --> 00:23:58,750
excellent okay and let's take a look at

508
00:24:04,150 --> 00:24:01,760
you all had something pretty creative

509
00:24:04,990 --> 00:24:04,160
you were gonna cover it and then what

510
00:24:08,740 --> 00:24:05,000
were you gonna do

511
00:24:11,650 --> 00:24:08,750
Oh boobs gonna put a plate over sides of

512
00:24:14,440 --> 00:24:11,660
that name put the monoi oil and then put

513
00:24:16,480 --> 00:24:14,450

this as the handle and tape it down so

514

00:24:21,850 --> 00:24:16,490

if you like carrying it like this okay

515

00:24:23,590 --> 00:24:21,860

so we had some really great ideas and

516

00:24:25,120 --> 00:24:23,600

chef Katie you've got one more over

517

00:24:26,049 --> 00:24:25,130

there absolutely this team right here

518

00:24:29,230 --> 00:24:26,059

what did you guys have that you're

519

00:24:30,940 --> 00:24:29,240

setting up with the garbanzo the peanut

520

00:24:34,240 --> 00:24:30,950

butter and pepper sandwich you needed to

521

00:24:39,520 --> 00:24:34,250

get that there what do you yeah peanut

522

00:24:40,750 --> 00:24:39,530

butter well how are you packaging two

523

00:24:43,590 --> 00:24:40,760

plates in the foil

524

00:24:47,590 --> 00:24:43,600

two plates in there wrap it for okay

525

00:24:49,480 --> 00:24:47,600

okay I think we have time for one more

526
00:24:52,090 --> 00:24:49,490
do you guys want to tell us how you were

527
00:24:54,880 --> 00:24:52,100
planning on packaging this up we just

528
00:24:57,130 --> 00:24:54,890
planning to wrap it in foil and then

529
00:24:59,590 --> 00:24:57,140
wrap it up and tape to make sure that

530
00:25:05,560 --> 00:24:59,600
nothing falls out the burrito and

531
00:25:08,590 --> 00:25:05,570
damaged astronauts okay so we had a lot

532
00:25:12,070 --> 00:25:08,600
of great ideas I have another question

533
00:25:15,039 --> 00:25:12,080
for grace grace I understand that NASA

534
00:25:18,279 --> 00:25:15,049
is getting ready to do a longer mission

535
00:25:24,159 --> 00:25:18,289
very possibly to Mars how are you going

536
00:25:25,990 --> 00:25:24,169
to prepare food for that long time we

537
00:25:28,720 --> 00:25:26,000
have quite a bit of research going on in

538
00:25:31,149 --> 00:25:28,730

that area right now so our food system

539

00:25:32,740 --> 00:25:31,159

right now the nutrition does degrade in

540

00:25:34,539 --> 00:25:32,750

these prepackaged foods and so does the

541

00:25:36,010 --> 00:25:34,549

quality over time and when you're

542

00:25:37,500 --> 00:25:36,020

looking at a Mars mission you're looking

543

00:25:39,850 --> 00:25:37,510

at a two-and-a-half year mission and

544

00:25:42,430 --> 00:25:39,860

possibly the food would get sent ahead

545

00:25:44,440 --> 00:25:42,440

of the crewmembers because it's a lot of

546

00:25:45,909 --> 00:25:44,450

mass and a lot of volume and so you're

547

00:25:47,560 --> 00:25:45,919

looking at an entire food system that

548

00:25:49,270 --> 00:25:47,570

might be five years old by the time that

549

00:25:50,740 --> 00:25:49,280

they're finishing their mission so we

550

00:25:52,600 --> 00:25:50,750

need to stabilize the nutrition

551

00:25:53,860 --> 00:25:52,610

stabilize the quality of the foods that

552

00:25:55,180 --> 00:25:53,870

they have good nutrition and

553

00:25:57,010 --> 00:25:55,190

high-quality food that they really enjoy

554

00:25:59,440 --> 00:25:57,020

eating throughout that entire length of

555

00:26:01,960 --> 00:25:59,450

time so we are investigating some new

556

00:26:04,060 --> 00:26:01,970

processing technologies new packaging

557

00:26:05,260 --> 00:26:04,070

that can lengthen that shelf-life and

558

00:26:08,049 --> 00:26:05,270

additionally we're looking at options

559

00:26:09,820 --> 00:26:08,059

such as having a pick and eat salad crop

560

00:26:11,740 --> 00:26:09,830

element that would add some fresh

561

00:26:14,530 --> 00:26:11,750

produce to their menu that they could

562

00:26:17,020 --> 00:26:14,540

easily grow in flight and and and have

563

00:26:19,270 --> 00:26:17,030

as a supplement to the prepackaged food

564

00:26:22,150 --> 00:26:19,280

system so there are several options that

565

00:26:23,980 --> 00:26:22,160

we are investigating in order to be to

566

00:26:27,130 --> 00:26:23,990

have a successful food system for a Mars

567

00:26:30,490 --> 00:26:27,140

mission ok and we have an online

568

00:26:33,340 --> 00:26:30,500

question currently can astronauts grow

569

00:26:41,830 --> 00:26:33,350

food in space or is this still in the

570

00:26:44,830 --> 00:26:41,840

research phase we have a unit a veggie

571

00:26:46,840 --> 00:26:44,840

unit that just went up from the Kennedy

572

00:26:49,419 --> 00:26:46,850

Space Center from their space biology

573

00:26:51,310 --> 00:26:49,429

program there and they did grow some

574

00:26:52,810 --> 00:26:51,320

lettuce recently in flight they did not

575

00:26:55,510 --> 00:26:52,820

eat that lettuce at this point it came

576

00:26:58,510 --> 00:26:55,520

back to earth to be tested for

577

00:27:00,730 --> 00:26:58,520

microbiological safety and for its

578

00:27:02,350 --> 00:27:00,740

vitamin content and so in future though

579

00:27:04,510 --> 00:27:02,360

potentially they could use a unit like

580

00:27:08,190 --> 00:27:04,520

that to grow some of these picnic crops

581

00:27:10,990 --> 00:27:08,200

and eat them as part of their meals

582

00:27:17,110 --> 00:27:11,000

Makayla wanted to know what the messiest

583

00:27:21,520 --> 00:27:19,600

we try not to have messy foods for

584

00:27:23,200 --> 00:27:21,530

spaceflight because in microgravity it

585

00:27:25,140 --> 00:27:23,210

would go everywhere crumbs would go

586

00:27:27,760 --> 00:27:25,150

everywhere so we try to keep our foods

587

00:27:29,320 --> 00:27:27,770

contains where the surface tension keeps

588

00:27:31,720 --> 00:27:29,330

them in the package and that there's not

589

00:27:35,140 --> 00:27:31,730

a lot of crumbs so it would be difficult

590

00:27:37,510 --> 00:27:35,150

to pick a messy food it could possibly

591

00:27:39,640 --> 00:27:37,520

be a drink so if it comes out of the

592

00:27:43,600 --> 00:27:39,650

straw and they're trying to chase a

593

00:27:45,910 --> 00:27:43,610

drink that could be considered messy and

594

00:27:48,460 --> 00:27:45,920

chef K believe you have an audience

595

00:27:49,990 --> 00:27:48,470

question I do what you guys I'll say

596

00:27:55,870 --> 00:27:50,000

they're like would you go out to space

597

00:27:57,550 --> 00:27:55,880

where do you keep all the food when they

598

00:27:58,930 --> 00:27:57,560

go into flight right now the food gets

599

00:28:01,030 --> 00:27:58,940

shipped to them periodically and

600

00:28:03,010 --> 00:28:01,040

resupply missions and then they store it

601
00:28:05,020 --> 00:28:03,020
on the International Space Station in

602
00:28:06,760 --> 00:28:05,030
various locations and they actually have

603
00:28:09,040 --> 00:28:06,770
a pantry style food system so they have

604
00:28:10,930 --> 00:28:09,050
different containers of food that they

605
00:28:13,630 --> 00:28:10,940
open so one will be meats and one will

606
00:28:15,840 --> 00:28:13,640
be vegetables and one will be snacks and

607
00:28:19,120 --> 00:28:15,850
so they have a couple of each of those

608
00:28:21,160 --> 00:28:19,130
containers open that they can pick from

609
00:28:25,600 --> 00:28:21,170
pantry style and and and make their

610
00:28:28,510 --> 00:28:25,610
meals well grace thank you so much chef

611
00:28:31,290 --> 00:28:28,520
okay thank you so much Whittier thank