



#trainlikemike

1
00:00:00,506 --> 00:00:19,976
[Music]

2
00:00:20,476 --> 00:00:22,726
>> What we eat in space is
very similar to what we have

3
00:00:22,796 --> 00:00:25,936
down here on earth; in fact,
we have a nutrition lab

4
00:00:25,936 --> 00:00:28,526
that does a great job of
putting together a very healthy,

5
00:00:28,896 --> 00:00:31,376
nutritious menu for us
with a lot of variety

6
00:00:31,826 --> 00:00:34,336
and so sometimes I think I may
actually eat better while I'm

7
00:00:34,336 --> 00:00:36,896
up on space than when
I'm down here on earth.

8
00:00:36,896 --> 00:00:39,626
>> My name is Monica Leong;
I'm a research scientist here

9
00:00:39,736 --> 00:00:41,846
at NASA Space Food
Systems Laboratory.

10
00:00:42,406 --> 00:00:44,606
I conduct research and
development projects

11

00:00:44,766 --> 00:00:48,426
on future food systems
for long duration missions

12
00:00:48,816 --> 00:00:51,226
and I also support the
Aero National Space Station

13
00:00:51,486 --> 00:00:52,166
food provisioning.

14
00:00:52,456 --> 00:00:53,856
The American Food System has

15
00:00:53,856 --> 00:00:56,016
about 203 food items
on the menu.

16
00:00:57,026 --> 00:00:59,266
We try to give them
foods that are familiar

17
00:00:59,266 --> 00:01:02,796
to what they have here on earth
so we make them mac and cheese,

18
00:01:02,986 --> 00:01:05,416
we make them beef brisket.

19
00:01:05,416 --> 00:01:08,186
They get all sorts of stuff
to make them comfortable

20
00:01:08,186 --> 00:01:10,876
because when you're in space
and you're in a confined area

21
00:01:10,876 --> 00:01:13,166
with only five other people,
you might miss home a little bit

22

00:01:13,316 --> 00:01:15,356

so we try to make
it as comfortable

23

00:01:15,396 --> 00:01:16,616

as possible with food.

24

00:01:17,516 --> 00:01:21,066

[Music]

25

00:01:21,566 --> 00:01:23,196

>> So how much water
do I drink in space?

26

00:01:23,246 --> 00:01:24,086

Well, I don't know yet.

27

00:01:24,086 --> 00:01:27,586

I do know that down here on
earth, I drink a lot of water.

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00:01:27,586 --> 00:01:30,746

In fact, I always have
my water bottle with me

29

00:01:30,746 --> 00:01:34,256

and so I'm constantly drinking
water and I'm anticipating

30

00:01:34,256 --> 00:01:36,416

that that will be
the same up on orbit

31

00:01:36,576 --> 00:01:38,926

but obviously it can be
a little bit different

32

00:01:39,446 --> 00:01:41,116

and I won't have
my water bottle,

33

00:01:41,116 --> 00:01:44,586

I'll have my little water bag
with me when I'm floating around

34

00:01:44,586 --> 00:01:46,166

but I do anticipate
drinking lots

35

00:01:46,166 --> 00:01:47,446

of water while I'm
on orbit as well.

36

00:01:47,666 --> 00:01:49,726

>> They're allowed
about 2 liters

37

00:01:49,726 --> 00:01:50,996

of water a day for drinking.

38

00:01:51,716 --> 00:01:56,046

They are also allowed about
500 milliliters of water

39

00:01:56,156 --> 00:01:59,236

for rehydration of their
freeze dried food products.

40

00:01:59,806 --> 00:02:01,466

We also expect that
they get some water

41

00:02:01,546 --> 00:02:04,336

from the thermo stabilize
products just

42

00:02:04,366 --> 00:02:07,796

to make sure they have good

healthy nutrition up there.

43

00:02:08,296 --> 00:02:11,896

[Music]

44

00:02:12,396 --> 00:02:15,546

>> So our diet while we're up
in space is actually managed

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00:02:15,546 --> 00:02:18,696

by the nutrition lab and
there are actually experts

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00:02:18,696 --> 00:02:22,016

in that field that monitor
everything that we eat

47

00:02:22,216 --> 00:02:25,456

that understand all of
the nutrition that goes

48

00:02:25,456 --> 00:02:28,586

into every meal that we
have and so without them,

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00:02:28,956 --> 00:02:32,506

our diet wouldn't be as good
as it is and wouldn't be

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00:02:32,506 --> 00:02:33,686

as nutritious as it is.

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00:02:33,686 --> 00:02:37,626

>> So when we're designing
the menus for the astronauts

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00:02:37,686 --> 00:02:40,506

in space, we have a dietician
on staff who makes sure

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00:02:40,506 --> 00:02:42,436
that it's well balanced
with all the vitamins

54

00:02:42,436 --> 00:02:44,246
and nutrients that they need.

55

00:02:44,246 --> 00:02:48,416
They also eat about 3,000
calories a day more or less,

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00:02:48,656 --> 00:02:51,786
it depends on each astronaut
but they're given a menu,

57

00:02:51,786 --> 00:02:53,146
a standard menu to guide them.

58

00:02:53,146 --> 00:02:55,116
They don't have to stick with it

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00:02:55,116 --> 00:02:57,266
but we [inaudible] food
pantry style so they go in

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00:02:57,266 --> 00:02:58,526
and just take what
they want for the day.

61

00:02:59,116 --> 00:03:02,916
Here's some examples of the
food, so we have beverages here.

62

00:03:03,486 --> 00:03:04,786
This is a mango peach smoothie.

63

00:03:04,946 --> 00:03:06,126
This is a cinnamon scone.

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00:03:06,336 --> 00:03:09,126

Here are some black beans in
a thermo stabilized pouch.

65

00:03:09,356 --> 00:03:12,936

They also get tortillas which
is actually a very hot commodity

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00:03:12,936 --> 00:03:13,246

up there.

67

00:03:13,566 --> 00:03:15,586

Granola bars, cream of spinach

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00:03:15,676 --> 00:03:17,596

for example, [inaudible]
crackers.

69

00:03:17,956 --> 00:03:21,616

We also have condiment packages
for them so we send them

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00:03:21,616 --> 00:03:24,926

up things like ketchup,
mayo, Tobasco, mustard.

71

00:03:25,446 --> 00:03:28,626

They just -- they often
come back to us and said

72

00:03:28,626 --> 00:03:30,076

that the food doesn't
taste the same

73

00:03:30,076 --> 00:03:31,336

in space as it does on earth.

74

00:03:31,826 --> 00:03:34,316

They also can't have

regular salt

75

00:03:34,506 --> 00:03:37,516

so we give them salt
in a bottle.

76

00:03:38,516 --> 00:03:42,416

[Music]

77

00:03:42,916 --> 00:03:45,076

Some of the research
that I do here at NASA is

78

00:03:45,076 --> 00:03:47,106

for the advanced food
technology portfolio.

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00:03:47,106 --> 00:03:50,616

I'm doing research to
characterize food systems

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00:03:50,616 --> 00:03:51,606

for long duration missions,

81

00:03:51,606 --> 00:03:53,246

including the ones
going to Mars.

82

00:03:53,876 --> 00:03:55,606

One of the problems
that we have is

83

00:03:55,606 --> 00:03:58,836

that the food can be really
heavy and they also can take

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00:03:58,836 --> 00:04:01,936

up a lot of space so one of
the countermeasures to that is

85

00:04:01,936 --> 00:04:05,116

to develop a nutrition
bar that can encompass all

86

00:04:05,116 --> 00:04:07,236

of the nutrients from a
breakfast and lunch meal --

87

00:04:07,546 --> 00:04:10,976

or lunch meal and put
them into a food bar.

88

00:04:11,866 --> 00:04:13,966

There's nothing like that
in the market right now

89

00:04:14,366 --> 00:04:17,136

but we developed 700
calorie food bars

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00:04:17,396 --> 00:04:19,516

that can just be
packaged into one pouch

91

00:04:20,016 --> 00:04:23,166

so it will minimize waste
and it will be lightweight

92

00:04:23,356 --> 00:04:26,296

and it will be easy to eat and
it takes no time to prepare.

93

00:04:26,966 --> 00:04:28,196

We're looking at
other technologies

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00:04:28,196 --> 00:04:30,136

such as instant beverages
to encompass all

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00:04:30,136 --> 00:04:31,266
of the nutrients as well.

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00:04:31,826 --> 00:04:34,706
There are a lot of applications
for this in the real world;

97

00:04:34,986 --> 00:04:37,976
for instance, it could
help with disaster relief,

98

00:04:38,176 --> 00:04:39,806
some temporary hunger relief,

99

00:04:40,206 --> 00:04:42,376
as well as for camping
and survival foods.

100

00:04:43,516 --> 00:04:47,346
[Music]

101

00:04:47,846 --> 00:04:51,066
So this is an example of what a
Thanksgiving dinner might look

102

00:04:51,066 --> 00:04:52,816
like on the International
Space Station

103

00:04:53,196 --> 00:04:55,906
so here we have smoked
turkey and it's actually

104

00:04:55,906 --> 00:05:00,146
in a radiated product that is
produced for us by the military.

105

00:05:00,846 --> 00:05:03,886
We have cornbread dressing

which is a freeze dried item

106

00:05:03,886 --> 00:05:07,116

and it looks like this at first but once it's rehydrated,

107

00:05:07,116 --> 00:05:09,916

it looks just like normal cornbread dressing.

108

00:05:09,916 --> 00:05:13,776

Likewise, we have the green beans with mushrooms which looks

109

00:05:13,776 --> 00:05:16,366

like this in its pouch and then when you add water to it,

110

00:05:16,366 --> 00:05:18,196

it looks a lot like that.

111

00:05:19,346 --> 00:05:23,586

Here we have candied yams, which is a thermal stabilized product

112

00:05:23,886 --> 00:05:26,696

so it comes in a pouch like this and they just heat it up

113

00:05:26,696 --> 00:05:27,656

and put it right on the plate.

114

00:05:28,806 --> 00:05:31,366

Here we have mashed potatoes, which is very similar

115

00:05:31,486 --> 00:05:33,076

to the green beans and cornbread dressing,

116

00:05:33,076 --> 00:05:35,466

where it's freeze dried
and you just add water,

117

00:05:35,466 --> 00:05:36,816

head it up and it's ready.

118

00:05:36,816 --> 00:05:39,716

We also have apple cider here,

119

00:05:39,716 --> 00:05:41,776

so this is what their
beverages look like in space.

120

00:05:42,146 --> 00:05:45,526

For dessert, we have
apples with spice,

121

00:05:45,646 --> 00:05:47,986

also a thermal stabilized
product, comes in a pouch,

122

00:05:48,226 --> 00:05:49,126

just heat it up and serve.

123

00:05:49,586 --> 00:05:51,626

Another option for dessert
would be the cranapple

124

00:05:51,626 --> 00:05:52,376

dessert product.

125

00:05:53,516 --> 00:05:57,086

[Music]