



Priscilla Strain

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1
00:00:06,150 --> 00:00:16,840
>>> Hey, what are you doing here?
I'm here to add a little perspective, first,

2
00:00:16,840 --> 00:00:23,650
let's get you closer in scale to me.
>> Whoa, whoa, whoa!

3
00:00:23,650 --> 00:00:28,779
Come on!
>> Next\h■■ well, get away from me.

4
00:00:28,779 --> 00:00:32,890
>> What exactly are you doing?
Well, there seems to be a little confusion

5
00:00:32,890 --> 00:00:36,330
about today's astronauts and those whoa went
to the moon.

6
00:00:36,330 --> 00:00:41,440
I thought I'd offer a little perspective.
So today astronauts travel to the International

7
00:00:41,440 --> 00:00:46,630
Space Station.
It's just in low earth orbit, right about

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00:00:46,630 --> 00:00:51,510
here.
Today astronauts have to travel about 215\h miles

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00:00:51,510 --> 00:00:54,690
from the earth to get to the International
Space Station.

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00:00:54,690 --> 00:00:58,480
>> Fascinating.
Can we get to the moon part please?

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00:00:58,480 --> 00:01:02,280

>> I'm getting there.

Hold your green cheeks.

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00:01:02,280 --> 00:01:10,010

To get to the moon, however, astronauts have to travel about 240,000 miles away from the

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00:01:10,010 --> 00:01:14,460

earth.

And they took a very specific path from the

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00:01:14,460 --> 00:01:19,010

earth to the moon where they landed.

>> Ow, that's my eye!

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00:01:19,010 --> 00:01:25,000

>> Once there, they set up experiments, took lots of photo and video and picked up some

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00:01:25,000 --> 00:01:29,710

rocks to bring back.

While two astronauts were on the move, a third

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00:01:29,710 --> 00:01:33,270

one within a command module orbiting around moon.

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00:01:33,270 --> 00:01:38,430

>> Like a little fly.

Can we get these astronauts off of me?

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00:01:38,430 --> 00:01:44,220

They're walking all over my face!

>> When the other two finished on the surface

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00:01:44,220 --> 00:01:49,800

they launched into orbit and got back to earth.

>> Nice.

21
00:01:49,800 --> 00:01:57,530
Can we make the normal head size now.
Other than the moon being a really long way

22
00:01:57,530 --> 00:02:00,820
away, what have we learned since the Apollo
moon program?

23
00:02:00,820 --> 00:02:12,870
>> At least 30 minutes worth of stuff.
This is stem in 30.

24
00:02:12,870 --> 00:02:54,390
>> This is stem in 30.
>> Hi, I'm Beth.

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00:02:54,390 --> 00:02:58,120
>> Check this out.
This is a Saturn 5\F1 engine, the type

26
00:02:58,120 --> 00:03:02,411
engine that took humans to the moon.
>> We coming to you live today from the the

27
00:03:02,411 --> 00:03:07,762
national air and space museum.
We are going to be in the news exhibit, a

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00:03:07,762 --> 00:03:16,019
new moon rises and these are images from the
lunar reconnaissance orbital camera, or LROC

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00:03:16,019 --> 00:03:24,180
for short.
We have a moon expert who will be answering

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00:03:24,180 --> 00:03:26,879
questions that you submit and we might take
them live on the show.

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00:03:26,879 --> 00:03:33,409
>> And we've got the campus joining us today,
great questions ready to ask our experts.

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00:03:33,409 --> 00:03:41,040
40 years ago we went to the moon and those
sights are still there because the wind and

33
00:03:41,040 --> 00:03:44,839
rain don't exist on the moon.
So those sites are still pristine.

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00:03:44,839 --> 00:03:52,680
>> LROC has taken a lot of great images that
we can see that shows us craters and valleys

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00:03:52,680 --> 00:03:56,669
and as Murray said, even the Apollo landing
site.

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00:03:56,669 --> 00:04:01,150
We haven't been to the moon for 40 years,
so why are we still interested in it?

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00:04:01,150 --> 00:04:06,340
We'll be taking a look at that today during
the program, but first let's take a closer

38
00:04:06,340 --> 00:04:12,609
look at our closest natural satellite.
>> The regular daily and monthly rhythms of

39
00:04:12,609 --> 00:04:17,170
earth's only natural satellite, the moon,
have guided time keepers for thousands of

40
00:04:17,170 --> 00:04:22,699
years.
The ocean tides have been chartered by many

41
00:04:22,699 --> 00:04:27,330
cultures in many agents.
The light areas of the moon are known as the

42
00:04:27,330 --> 00:04:30,770
highlands.
The dark features called MARIA are the impact

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00:04:30,770 --> 00:04:35,940
basin once filled with lava.
These light and dark areas represent rocks

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00:04:35,940 --> 00:04:40,759
of different compositions and ages.
The craters themselves, which have been preserved

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00:04:40,759 --> 00:04:44,840
for billions of years, provide an impact history
for the moon.

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00:04:44,840 --> 00:04:49,070
Over these billions of years, the surface
of the moon has been ground to fragments,

47
00:04:49,070 --> 00:04:54,330
ranging from huge boulders to powder.
Today the entire moon is covered by great

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00:04:54,330 --> 00:05:00,220
outery dust and rocky debris.
Upon foreseeing the landscape, astronaut buzz

49
00:05:00,220 --> 00:05:02,750
Aldridge proclaimed...
>> Beautiful.

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00:05:02,750 --> 00:05:05,430
Beautiful.
Magnificent.

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00:05:05,430 --> 00:05:10,290
>> Reporter: It was once thought that the arid lifeless moon had not changed very much

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00:05:10,290 --> 00:05:15,659
geologically for a billion years.
Recent studies using the lunar reconnaissance

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00:05:15,659 --> 00:05:20,889
orb the bitter have shown that the moon is much more dynamic than we thought.

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00:05:20,889 --> 00:05:25,810
>> And now I'm joined by Dr.\hTom waters who is a senior scientist here at museum at the

55
00:05:25,810 --> 00:05:29,300
center for earth and planetary study.
Tom, thanks so much for being here.

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00:05:29,300 --> 00:05:36,800
>> Had my pleasure.
>> You are on the lunar orbiter\h■■■ the

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00:05:36,800 --> 00:05:43,389
LROC mission and you also cure the rated this exhibit.

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00:05:43,389 --> 00:05:49,080
Do you want to tell us a little bit about why this program and exhibit are important.

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00:05:49,080 --> 00:05:57,630
>> The latest orbiter actually had two very important goals.

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00:05:57,630 --> 00:06:03,470
Many of you probably don't know that's in orbit right now and it has been since 2009.

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00:06:03,470 --> 00:06:09,930
One of the goals was to prepare us to put humans back on the moon.

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00:06:09,930 --> 00:06:17,080
When we talk about humans haven't been to the moon in 40 years.

63
00:06:17,080 --> 00:06:24,919
So one of the jobs that we had is to study a whole bunch of areas on the moon, 50 areas

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00:06:24,919 --> 00:06:32,689
on the the moon, in great, great detail, to prepare us with that community to go back

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00:06:32,689 --> 00:06:36,340
to the the moon.
We're doing that using the very special instruments

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00:06:36,340 --> 00:06:42,219
on board the lunar reconnaissance orbiter which includes the can cameras, and the cameras

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00:06:42,219 --> 00:06:47,539
are really special because two of those cameras are actually telescopes and they're take really

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00:06:47,539 --> 00:06:54,009
high resolution images of the lunar surface and the second part of it that I want to finish

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00:06:54,009 --> 00:06:58,210
was to do science.
We wanted to use those very special cameras

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00:06:58,210 --> 00:07:01,720
to study the moon in a way that hadn't been possible before.

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00:07:01,720 --> 00:07:06,219
>> And you've gotten these images back.
Have you seen anything that surprised you

72
00:07:06,219 --> 00:07:07,830
about the moon?
Absolutely.

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00:07:07,830 --> 00:07:14,580
If I can show you some pictures, one of the
things that, really surprised us was features

74
00:07:14,580 --> 00:07:20,740
like this.
They are volcanic lava flows.

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00:07:20,740 --> 00:07:43,979
We thought the moon had been inactive for
a

76
00:07:43,979 --> 00:07:53,189
billion years.
>> Glowing red as the lavas were flowing out

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00:07:53,189 --> 00:07:59,349
on to the surface.
The other thing that we found in some of these

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00:07:59,349 --> 00:08:03,630
images were these scarves.
These fault scarves.

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00:08:03,630 --> 00:08:10,020
They're actually formed when the crust of
the moon is pushed together.

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00:08:10,020 --> 00:08:14,520
And we knew that there were a couple of these.
In fact, the Apollo 17 landing site, the last

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00:08:14,520 --> 00:08:20,120
landing site where Apollo astronauts the visited,
there's one of these fault scarves.

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00:08:20,120 --> 00:08:26,699
But we didn't know how many there were.
Now we've found thousands of these faults

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00:08:26,699 --> 00:08:32,510
all over the moon that are indicating that
the moon is actually shrinking.

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00:08:32,510 --> 00:08:37,320
But don't work it's not going anywhere, it's
shrinking by a little bit.

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00:08:37,320 --> 00:08:44,320
>> Now I'm joined by Dr. Alan Adele.
Thank you so much for being here.

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00:08:44,320 --> 00:08:49,370
>> The moon is actually slowly contracting
as we sit in this room.

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00:08:49,370 --> 00:08:58,070
>> And so this is happening a lot
it's not as long ago as you thought.

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00:08:58,070 --> 00:09:03,390
That's the thing, that's really one of the
big surprises is the moon is not this lifeless

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00:09:03,390 --> 00:09:13,121
body, it's still geologically very active.
One of the things we did at the moon is collect

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00:09:13,121 --> 00:09:17,000
moon rocks.
But you had to have special tools.

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00:09:17,000 --> 00:09:21,290
And I got a chance to talk with Alan nadele,
and he showed me some of the special tools

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00:09:21,290 --> 00:09:25,691
that we use.
>> Now, I'm joined by Dr.\hAlan NADELE, thank

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00:09:25,691 --> 00:09:28,140
you for being here.
>> It's my pleasure.

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00:09:28,140 --> 00:09:30,660
>> Behind us, there's a whole bunch of stuff
in this case.

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00:09:30,660 --> 00:09:33,540
You want to tell us a little bit about what's
in here.

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00:09:33,540 --> 00:09:39,140
>> Sure.
One of the fascinating things about the human

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00:09:39,140 --> 00:09:43,890
exploration plan in the 1960s and '70s was
how much preparation they did and how much

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00:09:43,890 --> 00:09:49,930
planning they did for doing the essential
aspects of the mission, one of which of course

99
00:09:49,930 --> 00:09:53,470
is to collect samples.
Why go there and walk around if you didn't

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00:09:53,470 --> 00:09:59,090
bring anything back.
So the astronaut had a hope chest of tools.

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00:09:59,090 --> 00:10:04,690

First the astronauts only the tools they could carry attached to their belt.

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00:10:04,690 --> 00:10:08,880

By Apollo 14 they had a little wheel barrel with a tool carrier.

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00:10:08,880 --> 00:10:14,930

And of course '15, '16, '17 they have a lunar rover, a car.

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00:10:14,930 --> 00:10:20,420

>> I notice a lot of the tools have longer handles that we're used to here on earth.

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00:10:20,420 --> 00:10:24,810

>> You'll notice first of that is all there are two various lengths.

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00:10:24,810 --> 00:10:28,320

The shorter ones were used, as I said on the the earlier missions, when I had to carry

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00:10:28,320 --> 00:10:33,090

them attached to the belts and later on they got longer.

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00:10:33,090 --> 00:10:35,130

There are a lot of advantages of having them long.

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00:10:35,130 --> 00:10:39,250

One the suits are fairly stiff. And although they actually fell down a few

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00:10:39,250 --> 00:10:44,130

times and able to get up, basically they had to move around like that and there wasn't

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00:10:44,130 --> 00:10:46,040

a whole lot of stooping.

>> Sort of waddle.

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00:10:46,040 --> 00:10:48,130

>> Right.

There wasn't a whole lot of stooping so they

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00:10:48,130 --> 00:10:52,930

needed the extra extension.

One of the things that's a little bit frustrating

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00:10:52,930 --> 00:11:00,510

to us is we have no phone tools.

Why would they bring a tool back?

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00:11:00,510 --> 00:11:05,610

Every ounce is important.

So to bring any of those back would be to

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00:11:05,610 --> 00:11:09,590

sacrifice the ability to bring back another

rock.

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00:11:09,590 --> 00:11:13,690

There's one interesting tool here that's called
a contingency sampler.

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00:11:13,690 --> 00:11:18,310

When Neil Armstrong stepped on to the moon,
one of his first jobs before he did anything

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00:11:18,310 --> 00:11:22,830

else, was to use the contingency sampler to
scoop up some dirt.

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00:11:22,830 --> 00:11:26,960

Because if something went wrong and they said
abort, abort, climb back in, we have to go,

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00:11:26,960 --> 00:11:30,490

they wanted to have at least one sample to bring back.

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00:11:30,490 --> 00:11:36,170

So that's one of my favorite objects.

One of the challenges was to get the samples

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00:11:36,170 --> 00:11:42,270

back to earth not contaminated by particles from hair, skin or any of the other things

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00:11:42,270 --> 00:11:47,270

that would have been naturally contaminating the atmosphere inside the spacecraft.

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00:11:47,270 --> 00:11:53,650

And so union carpet corporation developed these Apollo lunar surface return containers

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00:11:53,650 --> 00:11:56,140

or what we call rock boxes.

>> Rock box is easier.

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00:11:56,140 --> 00:12:04,170

S and their design was to be triple sealed so that as the containers and rocks and soil

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00:12:04,170 --> 00:12:09,300

were put inside, it could be closed very tightly and then to keep from contamination.

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00:12:09,300 --> 00:12:15,140

It didn't work perfectly but enhanced the purity of the samples that the scientists

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00:12:15,140 --> 00:12:19,080

could examine when they got back to earth.

>> Well, thank you for explaining all these

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00:12:19,080 --> 00:12:21,150

interesting things to us.

I appreciate.

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00:12:21,150 --> 00:12:22,870

>> My pleasure.

Thank you.

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00:12:22,870 --> 00:12:25,800

>> So Tom, are we ready for some questions?

>> Yes.

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00:12:25,800 --> 00:12:31,690

>> Let start with an online question.

>> What other instruments besides the camera

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00:12:31,690 --> 00:12:36,070

are on board the LRO?

That's a great question about there's actually

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00:12:36,070 --> 00:12:45,050

seven different instruments on the spacecraft.

I work with, again, the cameras, but one of

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00:12:45,050 --> 00:12:52,400

the other instruments is designed to give

us elevation, so there's a laser that actually

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00:12:52,400 --> 00:12:58,750

fires pulses to the moon and then looks for

them to bounce back and that gives you a measurement

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00:12:58,750 --> 00:13:10,270

of how high and low things are.

All the instruments together allow us to do

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00:13:10,270 --> 00:13:12,730

some really, really great science.

>> Okay.

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00:13:12,730 --> 00:13:16,700

And we have an audience question.

What's your question?

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00:13:16,700 --> 00:13:22,700

Can a moon sustain life?

>> Can the moon sustain life?

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00:13:22,700 --> 00:13:26,860

It's at the great question.

The biggest problem the moon has in sustaining

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00:13:26,860 --> 00:13:31,970

life is it has no atmosphere.

So it's literally h■■ there's nothing

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00:13:31,970 --> 00:13:36,720

there, so there's no air to breathe of any

form or any kind.

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00:13:36,720 --> 00:13:42,510

So if you're gonna live on the moon, you pretty

much have to build a place.

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00:13:42,510 --> 00:13:47,820

You have to build a place that you can bring

the oxygen that you need to breathe and you

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00:13:47,820 --> 00:13:51,740

have to kind of protect it.

You have to put it somewhere where it's not

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00:13:51,740 --> 00:14:01,880

gonna get hit by very small or even larger

meteors because the moon has no protection

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00:14:01,880 --> 00:14:04,970

the way the earth does.

The earth's atmosphere protects us from a

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00:14:04,970 --> 00:14:10,410

lot of small and even some fairly big objects
but the moon doesn't have that.

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00:14:10,410 --> 00:14:14,410

You want to be careful about how you build
it, but, yes, you'd have to build a mace to

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00:14:14,410 --> 00:14:17,840

live on the moon.

>>> Thank you very much.

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00:14:17,840 --> 00:14:24,440

Marty got a chance to go to his former school,
south valley liberty school in Missouri and

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00:14:24,440 --> 00:14:32,440

brought them a special treat.

>> I'm here in south bounty school in the

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00:14:32,440 --> 00:14:36,830

liberty, Missouri.

This is my former school where I used to teach

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00:14:36,830 --> 00:14:41,120

and actually graduated from liberty high school
a long, long time ago.

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00:14:41,120 --> 00:14:47,850

Some of you guys were actually in my class.

Today we're gonna be making impact craters

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00:14:47,850 --> 00:14:51,160

just like on the moon.

You guys are going to have marbles, you're

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00:14:51,160 --> 00:14:55,340

going to hold them up above the simulated
lunar surface that has flour below it and

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00:14:55,340 --> 00:15:00,130

this thin layer of cocoa on top.

We'll drop it in and see what happens when

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00:15:00,130 --> 00:15:06,570

a crater is formed on the afternoon.

You guys ready?

163

00:15:06,570 --> 00:15:11,340

>> Yeah.

>> Let's go.

164

00:15:11,340 --> 00:15:16,660

>> Nice one.

That was cool.

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00:15:16,660 --> 00:15:21,990

Check it out.

Do you think it would happen if we dropped

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00:15:21,990 --> 00:15:28,260

it from higher or lower.

Larger or smaller depending on how much speed

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00:15:28,260 --> 00:15:37,880

it's got.

Good look at something here.

168

00:15:37,880 --> 00:15:43,530

You guys see the white there?

Did you notice that that came out of the crate

169

00:15:43,530 --> 00:15:44,720

center.

>> Yeah.

170

00:15:44,720 --> 00:15:48,680

>> When that hits with enough force, it actually
takes what's underneath and throw it is out

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00:15:48,680 --> 00:15:51,970

on top and we can see that and it's called
ejectA.

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00:15:51,970 --> 00:15:56,480

And what's cool about that, when the astronauts
went to the moon, they were able to find ejectA

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00:15:56,480 --> 00:16:01,780

from craters and pick up that, and the rock
that they picked up that was considered ejectA

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00:16:01,780 --> 00:16:04,890

was actually from inside the moon, not just
the surface.

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00:16:04,890 --> 00:16:09,610

So we can study the surface of the moon just
by picking up any random rock but if it came

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00:16:09,610 --> 00:16:13,240

from inside a crater, we knew we had a rock
from inside the moon.

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00:16:13,240 --> 00:16:17,261

We're going to try something different now.
I want to you drop another one.

178

00:16:17,261 --> 00:16:27,660

This one I want to you drop right here now
we've got two craters.

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00:16:27,660 --> 00:16:34,590

This one kind of got messed up, did it?
Can we tell which one is newer?

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00:16:34,590 --> 00:16:39,870

The one that's less deformed.
Exactly, when we look at the moon now we can

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00:16:39,870 --> 00:16:46,030

see the craters fully forms are probably newer than the ones who maybe have an overlap in

182

00:16:46,030 --> 00:16:48,410

them.

So you can actually tell the ages of the craters

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00:16:48,410 --> 00:16:54,800

of the moon by how they overlap other craters.

You guys did a great job making craters on

184

00:16:54,800 --> 00:16:58,610

the surface of the moon but I thought it might

be kind of cool if we took an opportunity

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00:16:58,610 --> 00:17:04,640

to actually see something from the moon.

What I have with me today from our friends

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00:17:04,640 --> 00:17:13,130

at NASA, I brought actual h■■ well, look.

>> Whoa!

187

00:17:13,130 --> 00:17:17,110

>> You guys are gonna get a chance to look

at these upclose today.

188

00:17:17,110 --> 00:17:25,409

You guys ready?

>> Yeah!

189

00:17:25,409 --> 00:17:33,310

>> Let's do it.

>> You guys got an opportunity to make craters

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00:17:33,310 --> 00:17:37,050

on the surface of the has and see what we

can learn by actually looking at the moon

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00:17:37,050 --> 00:17:40,030

and then you guys got an opportunity to actually hold some.

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00:17:40,030 --> 00:17:42,909

Is that pretty cool.

>> Yeah.

193

00:17:42,909 --> 00:17:45,160

>> You guys did crater than I ever thought you would.

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00:17:45,160 --> 00:17:51,620

Nice work.

>> We're now joined by Chris sprain, the curator

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00:17:51,620 --> 00:17:54,340

for the moon rocks we have on display here in the museum.

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00:17:54,340 --> 00:17:57,040

Thank you so much for talking with us today.

>> Happy to be here.

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00:17:57,040 --> 00:18:01,560

>> We're standing in front of images of the Apollo landing sites where they were actually

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00:18:01,560 --> 00:18:05,270

able to pick up the rocks and bring them back.

Can you tell us about the rocks that we have

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00:18:05,270 --> 00:18:06,930

on display here?

Yes.

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00:18:06,930 --> 00:18:13,890

We have a rock from Apollo 15 that was collected by astronaut Dave Scott.

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00:18:13,890 --> 00:18:21,390

And it's 3.3 billion years old.

Then we also have an ancient rock from the

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00:18:21,390 --> 00:18:27,420

lunar highlands.

And it's 4.36 billion years old.

203

00:18:27,420 --> 00:18:33,210

>> Moon rocks are really old.

We have two samples from Apollo 17 which are

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00:18:33,210 --> 00:18:40,110

collected by the astronaut Jack Schmidt and

gene SERNON, a rock and also we have lunar

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00:18:40,110 --> 00:18:44,000

soil.

>> Outstanding.

206

00:18:44,000 --> 00:18:47,030

>> On the video that we watched, those students
got a chance to actually hold moon rocks,

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00:18:47,030 --> 00:18:53,350

that was cool, wasn't it?

Yeah.

208

00:18:53,350 --> 00:19:02,510

>> Could you come here please?

Thank you weigh brought in are actual moon

209

00:19:02,510 --> 00:19:04,750

rocks that you guys will get a chance to look
at.

210

00:19:04,750 --> 00:19:11,710

What I think is really cool about this disc

is this disc holds samples from four different

211

00:19:11,710 --> 00:19:15,670

manned missions to the moon.

Apollos 14, 15, 16 and 17.

212

00:19:15,670 --> 00:19:20,910

So in this disc it represents now times the

man went to the moon and I'll give you guys

213

00:19:20,910 --> 00:19:29,791

the chance to actually look at these.

You were telling me earlier that this sample

214

00:19:29,791 --> 00:19:33,170

actually tells the story of the moon.

How is that?

215

00:19:33,170 --> 00:19:38,340

Well, the lunar rocks are very, very old so

it's a way of looking back through time and

216

00:19:38,340 --> 00:19:40,940

learning about the earliest history of the

moon.

217

00:19:40,940 --> 00:19:45,590

>> And the first one that we're going to talk

about is the Anthracite.

218

00:19:45,590 --> 00:19:52,340

>> It's a light colored rock made up almost

entirely of just one mineral.

219

00:19:52,340 --> 00:20:03,430

It's a common rock-forming mineral on the

earth and they are found very much in the

220

00:20:03,430 --> 00:20:07,150

ancient lunar highlands.

That tells us about the development of the

221

00:20:07,150 --> 00:20:10,610

early lunar crust.

And it's light colored.

222

00:20:10,610 --> 00:20:15,910

When we look up the moon at night and see the light areas and dark areas, we're actually

223

00:20:15,910 --> 00:20:18,580

seeing one of those just like this guy is holding right now?

224

00:20:18,580 --> 00:20:22,920

That's right.

>> Now there's also other rocks in there that

225

00:20:22,920 --> 00:20:30,230

tell that story.

>> It's A Breccia, a rock made up of irregular

226

00:20:30,230 --> 00:20:36,650

laterally shaped fragments of other rocks.

And on the moon, they're just smashed up,

227

00:20:36,650 --> 00:20:41,970

beat up rocks that were little pieces of other rocks, all smashing to and that tells

228

00:20:41,970 --> 00:20:47,559

us about the violent early history of the moon when it was bombarded by meteors and

229

00:20:47,559 --> 00:20:51,530

astroids and man comets, and you see all the craters on the moon.

230

00:20:51,530 --> 00:20:57,440

You can see that that was a very heavy bombardment of the surface, and we can read it in the

231

00:20:57,440 --> 00:20:58,780

rock.

>> Very violent, it sounds like.

232

00:20:58,780 --> 00:21:03,760

>> And how about the third one.

>> Third someone a BASAL and that's a dark

233

00:21:03,760 --> 00:21:13,420

colored igneous rock and that means it formed from melted material that cools and hardens.

234

00:21:13,420 --> 00:21:19,260

And the BASALTs for the very flat and low plains on the moon.

235

00:21:19,260 --> 00:21:25,610

And they have more titanium.

>> Oh, wow.

236

00:21:25,610 --> 00:21:31,790

If you this I this is cool, you can become lunar rock certified to check out this sample

237

00:21:31,790 --> 00:21:38,180

disc, and it's free to use in your classroom. Visit that's right come to the museum have

238

00:21:38,180 --> 00:21:40,770

an opportunity do something that I think is incredibly cool.

239

00:21:40,770 --> 00:21:43,001

They can actually touch a moon rock. Tell us about that.

240

00:21:43,001 --> 00:21:51,220

>> The touch rock was collected on Apollo 17, and it's a BASALT and when you look at

241

00:21:51,220 --> 00:21:57,870

it, maybe it looks kind of plane to you, but when you think about it, it's a really amazing

242

00:21:57,870 --> 00:22:03,690

rock.

It's 3.8 billion years old and it was exposed

243

00:22:03,690 --> 00:22:10,470

on the pass it of the moon about 100 million to 125 million years ago, probably by a crater

244

00:22:10,470 --> 00:22:15,520

impact.

And it sat there waiting until 1972 when astronaut

245

00:22:15,520 --> 00:22:20,190

Jack Schmidt, who was the only professional geologist who was an astronaut who went to

246

00:22:20,190 --> 00:22:26,160

the moon, he picked it up and brought it back to earth, and then in 1976, it found a home

247

00:22:26,160 --> 00:22:30,159

here in the museum, so you can come and touch a piece of another world.

248

00:22:30,159 --> 00:22:32,690

>> That's incredibly cool.

I know my son loves to come here and actually

249

00:22:32,690 --> 00:22:37,170

go over and find the moon rock and touch it. So cool that the visitors can come touch a

250

00:22:37,170 --> 00:22:42,380

piece of another world.

Now, when Neil Armstrong took the first steps

251

00:22:42,380 --> 00:22:45,770

on the surface of the moon, he was wearing a space suit, and that space suit is currently

252

00:22:45,770 --> 00:22:51,100

in conservation at the Harvey center.

I had a chance to talk to one of the conservators

253

00:22:51,100 --> 00:22:55,000

about how they're dealing with the moon dust still on that suit.

254

00:22:55,000 --> 00:23:04,240

>> I am the conservator here at the national museum and in the conservation lab and in

255

00:23:04,240 --> 00:23:09,540

be front of us is Neil Armstrong's space suit that he wore when he took the first step on

256

00:23:09,540 --> 00:23:13,130

the moon.

Now, this is still covered in moon dust, flight

257

00:23:13,130 --> 00:23:14,130

is.

>> Yep.

258

00:23:14,130 --> 00:23:18,480

>> What can you tell us about that moon dust?

The moon dust is mostly on the bottom half

259

00:23:18,480 --> 00:23:23,940

of the suit, you can see it where it's discolored to a little darker gray, and the moon dust

260

00:23:23,940 --> 00:23:30,400

is made of grains, soil or minerals that are very happy and angler.

261

00:23:30,400 --> 00:23:37,700

There's no atmosphere on the moon, so the grains cut into the suit fab.

262

00:23:37,700 --> 00:23:42,030

>> And it's not just one type of grain of moon dust, right?

263

00:23:42,030 --> 00:23:44,650

>> Right.
There have been identified six different types

264

00:23:44,650 --> 00:23:50,600

of grains, and you can see them under the microscope pretty clearly, and we can see

265

00:23:50,600 --> 00:23:55,330

them here on the surface of the suit.
>> So when you're conserving this suit to

266

00:23:55,330 --> 00:23:59,970

eventually go back on public display and keep it for generations to come, have you to think

267

00:23:59,970 --> 00:24:02,450

about that moon dust in your work.
>> Right.

268

00:24:02,450 --> 00:24:05,000

There's not h■■ we don't really want to clean often moon dust.

269

00:24:05,000 --> 00:24:09,500

It doesn't come off easily but there is other types of dust that have gotten on to the suit.

270

00:24:09,500 --> 00:24:13,040

We need special techniques to make sure that the moon dust will remain on the fabric and

271

00:24:13,040 --> 00:24:17,720

we get off unwanted dust from storage and display.

272

00:24:17,720 --> 00:24:22,700

>> Thank you so much for talking to us today.

>> Sure.

273

00:24:22,700 --> 00:24:27,820

>> Okay, Tom we have looked at rocks, new features on the moon.

274

00:24:27,820 --> 00:24:31,390

We looked at moon rocks.

Aren't we done looking at the moon?

275

00:24:31,390 --> 00:24:39,590

Why are we still looking at the moon?

The moon has a very, very special relationship

276

00:24:39,590 --> 00:24:45,370

to the earth, and it's also very special in the solar system because it is our closest

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00:24:45,370 --> 00:24:51,750

neighbor.

And this connection goes back to the moon's

278

00:24:51,750 --> 00:24:58,720

origin and from there it even tends to be today because the earth and the moon still

279

00:24:58,720 --> 00:25:04,120

affect each other.

I mean, we know about the tides, right, the

280

00:25:04,120 --> 00:25:11,110

moon actually influences the rising and falling of the tides on the earth, the bodies of water,

281

00:25:11,110 --> 00:25:15,920

the ocean.

But the earth also has that same effect on

282

00:25:15,920 --> 00:25:20,081

the moon.

It's raising solid tides on the moon and that

283

00:25:20,081 --> 00:25:27,300

kind of flexing this happening is actually

helping to organize these very young faults

284

00:25:27,300 --> 00:25:31,440

that I was talking about earlier that the

indicate that the moon is shrinking.

285

00:25:31,440 --> 00:25:37,010

So the earth in a real way is still helping

to shape the moon today.

286

00:25:37,010 --> 00:25:40,730

>> And the moon rocks that we have, people

are still studying them.

287

00:25:40,730 --> 00:25:42,559

Is that correct.

>>> Oh, yes.

288

00:25:42,559 --> 00:25:49,660

Every year NASA sends out more samples to

investigators who request them for specific

289

00:25:49,660 --> 00:25:53,300

research projects.

And we're still learning things about the

290

00:25:53,300 --> 00:25:59,039

rocks and new things about the examination

composition that we didn't know before.

291

00:25:59,039 --> 00:26:01,280

>> You guys ready for a couple more questions?

>> Sure.

292

00:26:01,280 --> 00:26:06,570

>> Let's go to a online question.

Have we found any new materials that are present

293

00:26:06,570 --> 00:26:13,230

on the moon?

>>> We did find some new minerals on the moon

294

00:26:13,230 --> 00:26:18,130

and we found that they were minerals that were formed at high pressure.

295

00:26:18,130 --> 00:26:22,740

And this comes from all the cratering on the moon and all the bombardment on the moon that

296

00:26:22,740 --> 00:26:27,679

creates high pressures in the rocks and can help form new minerals.

297

00:26:27,679 --> 00:26:36,990

They found a new mineral, it was called Armalcolite, named after neil Armstrong, the Apollo 11

298

00:26:36,990 --> 00:26:42,530

astronauts which we didn't know before but later found an impact crater on the earth.

299

00:26:42,530 --> 00:26:51,730

There was another one and one with a really strange name, Pyroxenite.

300

00:26:51,730 --> 00:26:58,299

>> Okay.

We have an audience question.

301

00:26:58,299 --> 00:27:03,260

>> How are craters formed in the moon?

>> Well, as you can see, there are lots of

302

00:27:03,260 --> 00:27:09,760

craters on the moon and therefore when meteors
or asteroids or even maybe a comet hits the

303

00:27:09,760 --> 00:27:16,200

moon and really hits the surface hard and
then material from underneath the surface

304

00:27:16,200 --> 00:27:23,580

gets thrown out so we can learn about the
subsurface of the moon by studying craters.

305

00:27:23,580 --> 00:27:26,250

>> I want to thank you 2 folks for being here
today.

306

00:27:26,250 --> 00:27:29,940

That's all the time we have.

I also want to thank the international titanium

307

00:27:29,940 --> 00:27:34,300

association.

This is our last show of the school season.

308

00:27:34,300 --> 00:27:38,020

We'll pick up again in September.

We've got some exciting topics.