1
00:00:00,100 --> 00:00:01,100
Music

2
00:00:04,480 --> 00:00:08,613
Life on other planets -- the idea has fascinated man for ages.

3
00:00:10,520 --> 00:00:10,523
The discovery of Earth-like planets with life-sustaining water and air may come one step closer

4
00:00:16,850 --> 00:00:18,850
through NASA's Kepler mission.

5
00:00:18,970 --> 00:00:20,270
When the Kepler spacecraft launches from Cape Canaveral Air Force Station in Florida

6
00:00:23,270 --> 00:00:28,603
aboard a Delta II rocket, it begins a quest in our part of the Milky Way galaxy.

7
00:00:28,860 --> 00:00:34,460
The spacecraft will orbit our sun as it focuses on 100,000 stars that may be orbited

8
00:00:35,000 --> 00:00:37,200
by their own inhabitable planets.

9
00:00:37,930 --> 00:00:44,130
From NASA's Kennedy Space Center in Florida, join us now as we focus on this exciting mission

10
00:00:44,180 --> 00:00:45,780
and prepare for liftoff!

11
00:00:48,780 --> 00:00:56,446
Hi! Thanks for joining us. I'm your host Tiffany Nail. I'm here at Kennedy Space Center Visitor Complex in Flori

12
00:00:56,680 --> 00:00:57,770
This area is known as the Rocket Garden. It's dedicated to the massive giants that have soared into space

13
00:01:02,590 --> 00:01:08,256

over the years. Here the public can get an up-close look at these incredible rockets.

14
00:01:08,560 --> 00:01:13,960
This place can be especially inspiring to students. But even if they can't visit,

15
00:01:14,210 --> 00:01:14,820
students from across the country can learn more about NASA through our Digital Learning Network.

16
00:01:20,000 --> 00:01:21,363
So we decided to give a group of those students a chance to ask the questions for today's program.

17
00:01:25,170 --> 00:01:25,360
Here's Damon Talley from the Digital Learning Network to introduce you to the class.

18
00:01:30,580 --> 00:01:31,156
Thanks Tiffany. Hello, and welcome to the Digital Learning Network.

19
00:01:34,470 --> 00:01:36,630
We're able to connect with classrooms all across the country, and today we have a special link up with

20
00:01:39,110 --> 00:01:40,256
Sharon Bains' seventh-grade classroom at Pine Ridge Middle School in Naples, Florida.

21
00:01:43,630 --> 00:01:44,630
Hello everyone!

22
00:01:45,280 --> 00:01:51,480
Morning! Good morning Mr. Talley and NASA. We're certainly happy to be with you this morning.

23
00:01:52,050 --> 00:01:52,446
We have some great questions for you.

24
00:01:54,120 --> 00:01:54,806
Great! Well, we'll get to those questions in just a few minutes. First, let's learn more about Kepler from

25
00:02:00,500 --> 00:02:00,546
Kepler Mission Scientist Dr. David Koch, who stopped by the NASA Direct Studio recently.

26
00:02:06,320 --> 00:02:06,650
The Kepler mission is specifically designed to look for Earth-like planets going around other stars

27
00:02:12,590 --> 00:02:16,923
stars like our sun. Kepler is designed to find things like Earth.

28
00:02:18,450 --> 00:02:22,450
That you can't do from the ground you have to go into space.

29
00:02:22,530 --> 00:02:29,263
The Kepler mission consists of just one instrument. This is not a facility for the general community.

30
00:02:31,010 --> 00:02:37,343
This is designed to do just one thing and that is to look for planets going around other stars.

31
00:02:37,640 --> 00:02:45,173
And the way that we do that is with an instrument we call a photometer. It's a general purpose kind of telescope

32
00:02:45,230 --> 00:02:51,630
but a special kind of telescope it's called a Schmidt design. It has a very large field of view.

33
00:02:52,240 --> 00:02:52,480
We need to look at a lot of stars. We're going to look at over a 100,000 stars at once with this mission.

34
00:02:59,000 --> 00:02:59,793
Our telescope field of view is about equal to taking your hand at arm's length, hold it up to the sky

35
00:03:04,940 --> 00:03:10,873
also equal to about two dips from the big dipper. With that, we can now see lots of stars

36
00:03:11,180 --> 00:03:14,646
and then we can look for planets around those stars.

37
00:03:17,070 --> 00:03:25,536
The way Kepler works is it looks for transits that is a planet passing in front of the star and blocking a little bit of

38
00:03:26,940 --> 00:03:33,273

As we look at that star, we don't see the planet, we just see the starlight dim for a few hours

39
00:03:34,530 --> 00:03:41,930
as the planet goes in front. One transit, though, isn't enough. What you need is to see a sequence of transits.

40
00:03:42,260 --> 00:03:49,793
The first one and the second one give you a period, but only if you see that third one at exactly the right time,

41
00:03:50,440 --> 00:03:58,440
do you know you have a planet orbiting that star. From the period crossing the starlight, crossing the face of the

42
00:04:01,980 --> 00:04:08,780
you can get the distance the planet is from the star using Kepler's third law we named it after Kepler

43
00:04:09,360 --> 00:04:13,760
the man who invented, who discovered the laws of planetary motion.

44
00:04:14,400 --> 00:04:21,200
We are going to operate this mission initially for three and a half years that's a baseline mission.

45
00:04:23,000 --> 00:04:24,473
It's been designed to operate for at least six years. The reason we have to look for three and a half years

46
00:04:28,660 --> 00:04:31,593
is we're looking for a sequence of transits.

47
00:04:33,560 --> 00:04:40,493
To get the data down, we have an antenna on the side of the spacecraft that has to get pointed to Earth.

48
00:04:41,340 --> 00:04:48,873
So once a month, we have to point away from looking at our star field and point that antenna so it beams the d

49
00:04:50,380 --> 00:04:53,846
down to Earth. So once a month, we'll get that data.

50
00:04:55,320 --> 00:05:01,586
Boy, what we get out of this mission is going to open our eyes, maybe change the way we think.

51
00:05:01,620 --> 00:05:08,020
We're going to look at 100,000 stars. We expect to find hundreds of planets. What if we get one?

52
00:05:08,570 --> 00:05:15,303
What if we get zero? That'll be an eye opener, too. We'd have to think, are we alone? Is life unique?

53
00:05:17,140 --> 00:05:17,613
Are there no other beings? We won't know that until we get an answer from this, to ask the next question abou

54
00:05:24,400 --> 00:05:30,066
but at least we'll have the answer, are there planets like Earth somewhere out there?

55
00:05:30,410 --> 00:05:30,786
Thanks Dr. Koch. Before the Kepler spacecraft can start its mission, it has to get into space.

56
00:05:36,300 --> 00:05:38,153
Let's take some questions now for our NASA Rocket Scientist Armando Piloto, who will also answer them from

57
00:05:41,780 --> 00:05:44,380
NASA Direct Studio. Who has a question?

58
00:05:46,180 --> 00:05:50,713
Hi. My name is Shelia. Did you always want to be a rocket scientist?

59
00:05:54,130 --> 00:06:00,596
Hi Shelia! Actually as a kid growing up, I dreamed of launching home runs in a baseball field and

60
00:06:00,720 --> 00:06:05,720
not necessarily launching rockets. Playing baseball is what I wanted to do.

61
00:06:06,340 --> 00:06:11,740
But obviously, I have a great job here at NASA. I am very dedicated to what I do.

62
00:06:12,530 --> 00:06:18,730
And you know, to be able to be part of the Kepler mission and to be able to work with rockets

63
00:06:19,000 --> 00:06:26,066

is a very rewarding and phenomenal experience. And I'm definitely looking forward to the successful launch

64
00:06:26,590 --> 00:06:31,856
of Kepler. So to answer your question, no, but I definitely love what I do now.

65
00:06:32,050 --> 00:06:35,983
Hi. My name is Otto. Where do you sit during the countdown?

66
00:06:36,170 --> 00:06:43,703
Hey Otto! During launch day, during terminal count, I sit in the Mission Director's Center together with the rest

67
00:06:44,710 --> 00:06:45,656
of the NASA management and ULA management team. The Mission Director's Center is actually located

68
00:06:50,230 --> 00:06:56,230
at approximately two to three miles away from the launch site. And the MDC, as we call it,

69
00:06:57,360 --> 00:07:03,960
is equipped with all kinds of data displays, video screens and communication networks to enable the

70
00:07:05,940 --> 00:07:13,340
management team to determine the health of the spacecraft, the health of the launch vehicle and ensure that a

71
00:07:13,970 --> 00:07:14,043
systems are ready to proceed with launch.

72
00:07:16,630 --> 00:07:22,096
Hi. My name is Lawton. I was just wondering, what kind of fuel does a rocket burn?

73
00:07:22,360 --> 00:07:29,026
That's a great question. The fuel that we use on the rocket is dependent on what rocket we're using.

74
00:07:29,040 --> 00:07:36,906
For Kepler, we’ll be launching aboard a Delta II vehicle, and the first stage of the Delta II burns a combination c

75
00:07:39,150 --> 00:07:43,683
liquid oxygen and RP1. RP1 is essentially a highly refined kerosene.

76
00:07:47,950 --> 00:07:48,480
Hi. My name is Andres. How do you know what kind of rocket to use?

77
00:07:51,820 --> 00:07:59,220
OK. Determining what kind of rocket to use is based on a number of different factors, including cost, schedule,

78
00:08:01,090 --> 00:08:08,890
technical requirements and risk. But primarily there are two main factors that we consider the size of the space

79
00:08:13,420 --> 00:08:17,753
and also the orbit where the spacecraft needs to be delivered to.

80
00:08:18,350 --> 00:08:18,403
Hi. I'm Kelly. What should I study if I want to become a rocket scientist?

81
00:08:23,230 --> 00:08:30,696
Hi Kelly! I'll tell you what I study. I have a bachelor's degree in mechanical engineering and a master's degree

82
00:08:33,920 --> 00:08:34,060
in engineering management. But my advice to you and to the rest of the kids, that if you want to work with rock

83
00:08:41,380 --> 00:08:47,846
is to first of all, do good at math and science so that you can develop strong analytical skills.

84
00:08:48,310 --> 00:08:54,910
I would also encourage you to take classes in speech and debate so that you can also develop strong

85
00:08:57,970 --> 00:09:05,370
communication skills. I think it's also very important that you get involved with team projects and team sports

86
00:09:06,690 --> 00:09:14,823
so that you can learn to interact in a team environment. And then once in college, I think it's important to earn a

87
00:09:15,880 --> 00:09:23,813
in either physics, science, engineering or math. I think the combination of strong analytical and communication

88
00:09:27,220 --> 00:09:34,753

combined with one of those degrees will open a lot of opportunities for you, including opportunities to work here

89
00:09:36,170 --> 00:09:39,436
at the Kennedy Space Center working with rockets.

90
00:09:40,290 --> 00:09:40,486
Well that's all we have time for. Thanks Ms. Bains and your students for all of your help today.

91
00:09:46,560 --> 00:09:47,560
Goodbye.

92
00:09:50,470 --> 00:09:52,870
Now back to your host, Tiffany Nail.

93
00:09:53,230 --> 00:09:54,473
Thanks Damon, and thanks to all our guests for helping us learn more about this exciting mission of Kepler.

94
00:09:59,120 --> 00:10:04,920
You can follow the countdown on NASA TV and on our live launch blog at nasa.gov/kepler.