1
00:00:00,120 --> 00:00:18,950
[Music]

2
00:00:24,070 --> 00:00:21,830
the trojan asteroids are small bodies in

3
00:00:27,189 --> 00:00:24,080
our solar system they share it in orbit

4
00:00:29,830 --> 00:00:27,199
with jupiter there's two swarms of them

5
00:00:31,910 --> 00:00:29,840
one located 60 degrees ahead of jupiter

6
00:00:34,630 --> 00:00:31,920
in its orbit and the other swarm is

7
00:00:37,590 --> 00:00:34,640
located 60 degrees behind jupiter in its

8
00:00:39,910 --> 00:00:37,600
orbit and these trojan asteroids are

9
00:00:42,069 --> 00:00:39,920
remnants from planetary formation so

10
00:00:44,630 --> 00:00:42,079
sometimes we'll call them the fossils of

11
00:00:46,790 --> 00:00:44,640
solar system formation their near

12
00:00:49,670 --> 00:00:46,800
neighbors might have gone into forming

13
00:00:52,389 --> 00:00:49,680

the giant planets and so these objects

14
00:00:55,029 --> 00:00:52,399
then became captured in their locations

15
00:00:58,229 --> 00:00:55,039
today and so in that way we can look and

16
00:01:00,229 --> 00:00:58,239
see what went into forming the planets

17
00:01:02,790 --> 00:01:00,239
in our solar system the main goal of the

18
00:01:05,590 --> 00:01:02,800
lucy mission is to explore the trojan

19
00:01:08,710 --> 00:01:05,600
asteroids we want to understand where

20
00:01:10,789 --> 00:01:08,720
these asteroids came from and why

21
00:01:13,510 --> 00:01:10,799
they're so diverse this is going to be

22
00:01:15,830 --> 00:01:13,520
our first ever exploration of these

23
00:01:18,230 --> 00:01:15,840
objects from the earth

24
00:01:20,390 --> 00:01:18,240
we can see certain features on the

25
00:01:23,190 --> 00:01:20,400
trojan asteroids we can see where

26
00:01:25,429 --> 00:01:23,200
they're located we can see their colors

27
00:01:27,830 --> 00:01:25,439
and we can get spectra

28
00:01:31,270 --> 00:01:27,840
spectra can tell you about the surface

29
00:01:33,270 --> 00:01:31,280
composition a spectrum is when you take

30
00:01:34,950 --> 00:01:33,280
light and spread it out into all its

31
00:01:36,710 --> 00:01:34,960
different wavelengths and so you have

32
00:01:39,109 --> 00:01:36,720
the brightness of the light as a

33
00:01:41,109 --> 00:01:39,119
function of wavelength so think of it

34
00:01:44,310 --> 00:01:41,119
like a rainbow but you're going to

35
00:01:47,590 --> 00:01:44,320
divide up the colors even more finely

36
00:01:49,429 --> 00:01:47,600
than just roy g biv from earth the

37
00:01:51,270 --> 00:01:49,439
trojan asteroids are just a point of

38
00:01:53,429 --> 00:01:51,280

light and you can't

39
00:01:56,789 --> 00:01:53,439
tell one part of the trojan asteroid

40
00:01:58,950 --> 00:01:56,799
composition versus another part and lucy

41
00:02:01,429 --> 00:01:58,960
is going to be able to get that detail

42
00:02:03,749 --> 00:02:01,439
close up but we'll be able to do that by

43
00:02:05,670 --> 00:02:03,759
taking this spacecraft and these

44
00:02:07,749 --> 00:02:05,680
instruments to the trojan asteroids and

45
00:02:10,070 --> 00:02:07,759
we'll be able to see how the surface

46
00:02:11,190 --> 00:02:10,080
composition varies across the trojan

47
00:02:14,470 --> 00:02:11,200
asteroids

48
00:02:17,350 --> 00:02:14,480
additionally we have really large solar

49
00:02:19,670 --> 00:02:17,360
arrays because we are solar-powered

50
00:02:21,750 --> 00:02:19,680
spacecraft the spacecraft gets its power

51
00:02:23,830 --> 00:02:21,760
from the sun at the trojan asteroids

52
00:02:26,470 --> 00:02:23,840
we're more than five times further from

53
00:02:29,030 --> 00:02:26,480
the sun than earth is so there's much

54
00:02:31,589 --> 00:02:29,040
less light we need large solar arrays to

55
00:02:32,309 --> 00:02:31,599
power our spacecraft and in fact we will

56
00:02:35,589 --> 00:02:32,319
be

57
00:02:37,670 --> 00:02:35,599
the furthest operating spacecraft