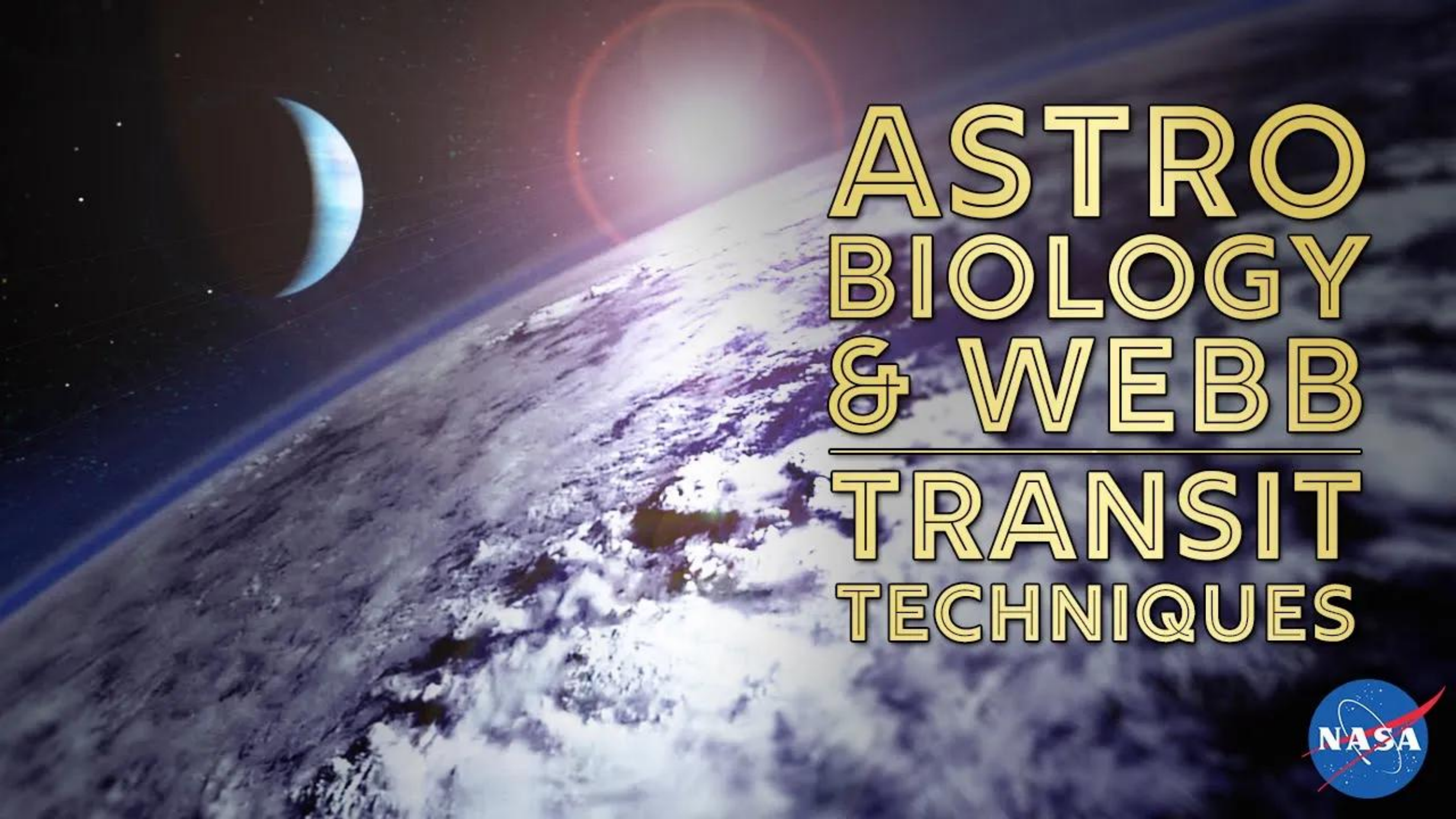
ASTRO
BIOLOGY
& WEBB
TRANSIT
TECHNIQUES
NASA

1
00:00:10,150 --> 00:00:08,390
james webb is going to characterize the

2
00:00:13,190 --> 00:00:10,160
atmospheres of exoplanets using a

3
00:00:15,190 --> 00:00:13,200
technique called transit spectroscopy if

4
00:00:17,349 --> 00:00:15,200
it's watching a planet transit across

5
00:00:19,029 --> 00:00:17,359
its star so the planet passes directly

6
00:00:21,349 --> 00:00:19,039
in front of its star from our point of

7
00:00:23,990 --> 00:00:21,359
view a really sensitive telescope can

8
00:00:26,790 --> 00:00:24,000
actually pick up those tiny tiny dips in

9
00:00:28,870 --> 00:00:26,800
the starlight and measure that a planet

10
00:00:31,189 --> 00:00:28,880
is there that's how we discovered a lot

11
00:00:33,670 --> 00:00:31,199
of the planets that we found planets

12
00:00:36,229 --> 00:00:33,680
have atmospheres and atmospheres can

13
00:00:37,990 --> 00:00:36,239

actually let some of the light pass

14
00:00:39,350 --> 00:00:38,000
through them on the way to our

15
00:00:40,869 --> 00:00:39,360
telescopes

16
00:00:42,709 --> 00:00:40,879
there are different gases in these

17
00:00:45,830 --> 00:00:42,719
atmospheres that can absorb different

18
00:00:47,750 --> 00:00:45,840
colors of light and so by using a really

19
00:00:50,150 --> 00:00:47,760
sensitive telescope that can measure

20
00:00:52,470 --> 00:00:50,160
what colors of light get absorbed when

21
00:00:53,590 --> 00:00:52,480
the planet is being backlit by its star

22
00:00:55,590 --> 00:00:53,600
and some of that light is passing

23
00:00:57,830 --> 00:00:55,600
through the atmospheres then we can

24
00:00:59,590 --> 00:00:57,840
learn what's in those atmospheres what

25
00:01:01,349 --> 00:00:59,600
gases are there that's absorbing those

26
00:01:02,389 --> 00:01:01,359
various colors of light what are they

27
00:01:04,070 --> 00:01:02,399
made of

28
00:01:06,310 --> 00:01:04,080
there's another technique called the

29
00:01:08,469 --> 00:01:06,320
phase curve technique the phase curve

30
00:01:10,789 --> 00:01:08,479
technique looks at the planet and the

31
00:01:12,870 --> 00:01:10,799
star when the planet is not in front of

32
00:01:14,149 --> 00:01:12,880
the star you got the signal from both

33
00:01:16,710 --> 00:01:14,159
and it also looks at them when the

34
00:01:18,310 --> 00:01:16,720
planet passes directly behind the star

35
00:01:20,469 --> 00:01:18,320
so in that case you can only see the

36
00:01:22,310 --> 00:01:20,479
signal from the star and by taking the

37
00:01:23,510 --> 00:01:22,320
difference of those two signals you can

38
00:01:25,910 --> 00:01:23,520

figure out what the signal from the

39
00:01:28,070 --> 00:01:25,920
planet was if you have a sufficiently

40
00:01:29,670 --> 00:01:28,080
sensitive instrument and from that

41
00:01:32,149 --> 00:01:29,680
technique we can also learn things about

42
00:01:33,510 --> 00:01:32,159
what the planet is made out of and also

43
00:01:35,590 --> 00:01:33,520
some interesting things about the

44
00:01:38,390 --> 00:01:35,600
planet's temperature and all this

45
00:01:40,469 --> 00:01:38,400
together tells us a lot of information

46
00:01:43,650 --> 00:01:40,479
about what these planets are like and