1
00:00:00,040 --> 00:00:09,050
[Music]

2
00:00:09,070 --> 00:00:13,080
Carolyn Crow: So far we've found more than 400 planets around other stars.

3
00:00:13,100 --> 00:00:17,110
Unfortunately, for many years to come, we won't be able to see them as anything more than dim

4
00:00:17,130 --> 00:00:21,180
points of light. If only the planets that we know best could help us

5
00:00:21,200 --> 00:00:25,250
learn more about the real worlds behind those dim points of light.

6
00:00:25,270 --> 00:00:29,430
Well it turns out they can. Remember the Deep Impact mission?

7
00:00:29,450 --> 00:00:33,460
The NASA spacecraft that slammed a probe into a comet in 2005?

8
00:00:33,480 --> 00:00:37,480
Well now it's headed for another comet. While on its way we used its

9
00:00:37,500 --> 00:00:41,500
instruments to study the amount of red, green, and blue light reflected

10
00:00:41,520 --> 00:00:45,540
by Earth, the Moon, and Mars. Combining this color information

11
00:00:45,560 --> 00:00:49,560
with similar studies of the other planets in our solar system, we found an interesting

12
00:00:49,580 --> 00:00:53,590
pattern. These crosshairs mark the spot where

13
00:00:53,610 --> 00:00:57,620

a planet would perfectly reflect all the light from the Sun. The more

14
00:00:57,640 --> 00:01:01,640
red light a planet reflects, the farther it moves to the right on this chart.

15
00:01:01,660 --> 00:01:05,660
The more blue light it reflects, the higher it goes. And if the

16
00:01:05,680 --> 00:01:09,840
planet reflects relatively little blue and red light, it falls in the dark

17
00:01:09,860 --> 00:01:13,850
section. Viewed in this way, here's

18
00:01:13,870 --> 00:01:17,870
where the planets lie.

19
00:01:21,920 --> 00:01:25,920
Not surprisingly, Mars, the reddest planet, occupies the reddest spot.

20
00:01:25,940 --> 00:01:29,960
Mercury is also nearby on the plot because neither planet has a large

21
00:01:29,980 --> 00:01:33,980
atmosphere that scatters blue light. Venus has a thick cloudy atmosphere

22
00:01:34,000 --> 00:01:38,020
that reflects most of the red light and only a little bit

23
00:01:38,040 --> 00:01:42,050
of the blue light, so it stays near the bottom. Jupiter and Saturn fall in the darkest

24
00:01:42,070 --> 00:01:46,100
region of the plot. Their atmospheres have methane and ammonia in it, which

25
00:01:46,120 --> 00:01:50,110
absorbs red light and other gasses that absorb blue light.

26
00:01:50,130 --> 00:01:54,270
Here's what's really interesting. In this chart, Earth stands apart

27
00:01:54,290 --> 00:01:58,290
from all the other planets. Earth is

28
00:01:58,310 --> 00:02:02,320
really blue. Not because of its oceans, but because it has an atmosphere that reflects

29
00:02:02,340 --> 00:02:06,350
a lot of blue light. It makes sense, that's why the sky is blue.

30
00:02:06,370 --> 00:02:10,380
At the same time, Earth does reflect a little bit of red light.

31
00:02:10,400 --> 00:02:14,420
Long before we have telescopes that will show us what extrasolar

32
00:02:14,440 --> 00:02:18,460
planets really look like, we'll be able to measure their colors and put them on the plot.

33
00:02:18,480 --> 00:02:22,500
This means we'll be able to tell the difference between alien

34
00:02:22,520 --> 00:02:26,550
versions of Mars, Jupiter, and even Earth. And that's