1
00:00:12,150 --> 00:00:04,030
Music

2
00:00:12,170 --> 00:00:16,190
Narrator: Just to the east of M27, the "Apple Core" nebula,

3
00:00:16,210 --> 00:00:20,360
there's a star that can be seen in binoculars. And this star hosts

4
00:00:20,380 --> 00:00:24,460
a giant planet. The star is slightly smaller and

5
00:00:24,480 --> 00:00:28,510
cooler than our sun. In 2005, astronomers found it's Jupiter-

6
00:00:28,530 --> 00:00:32,600
size planet, named HD 189733b.

7
00:00:32,620 --> 00:00:36,610
Incredibly, the planet orbits just 3 million miles

8
00:00:36,630 --> 00:00:40,630
from the star, twelve times closer than Mercury orbits our sun.

9
00:00:40,650 --> 00:00:44,660
It's so close that the planet whips around its star in a little

10
00:00:44,680 --> 00:00:48,750
over two days. But this planet pays a steep price for skirting

11
00:00:48,770 --> 00:00:52,780
its sun. Sometimes, the star erupts with powerful flares,

12
00:00:52,800 --> 00:00:56,830
flares that heat the planet's upper atmosphere so much that the gasses

13
00:00:56,850 --> 00:01:00,840

simply escape. Since the planet passes in front if its

14
00:01:00,860 --> 00:01:04,890
star as we see it from Earth, astronomers were able to use the Hubble

15
00:01:04,910 --> 00:01:08,940
Space Telescope to establish that the atmosphere was evaporating.

16
00:01:08,960 --> 00:01:13,030
But when they looked again in 2010, there was not trace of an escaping

17
00:01:13,050 --> 00:01:17,070
atmosphere. Yet when astronomers looked once more in 2011,

18
00:01:17,090 --> 00:01:21,100
they saw dramatic evidence that the atmosphere was eroding.

19
00:01:21,120 --> 00:01:25,140
Hydrogen gas was rushing away from the planet at speeds over 300,000 miles

20
00:01:25,160 --> 00:01:29,160
an hour. What had changed? The same astronomers

21
00:01:29,180 --> 00:01:33,230
were also watching the star with NASA's Swift satellite. Just 8 hours before

22
00:01:33,250 --> 00:01:37,280
Hubble was scheduled to look for the planet's atmosphere, Swift saw the star

23
00:01:37,300 --> 00:01:41,330
erupt in a powerful X-ray flare. Similar

24
00:01:41,350 --> 00:01:45,370
flares happen frequently on the sun. But because the planet is so

25
00:01:45,390 --> 00:01:49,400
big and so close to its star, this X-ray blast had an outsized

26
00:01:49,420 --> 00:01:53,470
effect, heating the planet's atmosphere and sweeping away 1,000

27
00:01:53,490 --> 00:01:57,490
tons of gas each second. The escaping gas gave the planet a

28
00:01:57,510 --> 00:02:01,520
comet-like tail. While HD 189733b

29
00:02:01,540 --> 00:02:05,570
has plenty of gas to spare, atmospheric erosion is an

30
00:02:05,590 --> 00:02:09,580
important process, one able to whittle down any gas giant planet that

31
00:02:09,600 --> 00:02:13,630
hugs its star too close.