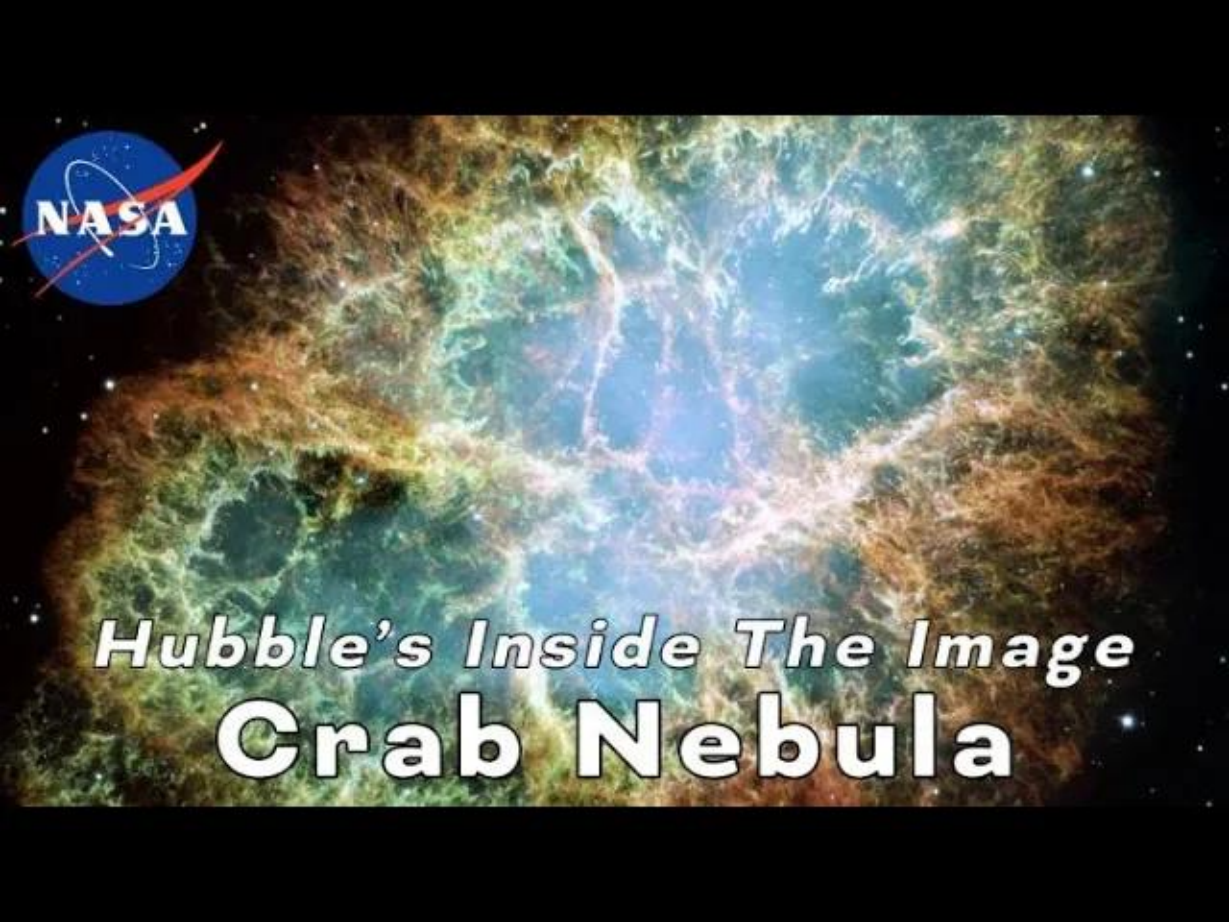
NASA
Hubble's Inside The Image
Crab Nebula

1
00:00:08,690 --> 00:00:03,230
foreign

2
00:00:10,790 --> 00:00:08,700
[Music]

3
00:00:13,730 --> 00:00:10,800
this is an image of the Crab Nebula

4
00:00:16,430 --> 00:00:13,740
which is one of the most famous and most

5
00:00:18,109 --> 00:00:16,440
well-studied astronomical objects ever

6
00:00:21,230 --> 00:00:18,119
and it's one of the Touchstone images

7
00:00:23,170 --> 00:00:21,240
from the Hubble Space Telescope

8
00:00:26,150 --> 00:00:23,180
it's just the most beautiful

9
00:00:27,710 --> 00:00:26,160
awe-inspiring image you can imagine

10
00:00:30,710 --> 00:00:27,720
technically it's actually called a

11
00:00:33,110 --> 00:00:30,720
pulsar wind nebula and we can connect it

12
00:00:36,530 --> 00:00:33,120
to events in history going back to the

13
00:00:38,389 --> 00:00:36,540

year 1054 where Chinese astronomers

14
00:00:40,670 --> 00:00:38,399
recorded the appearance of one new star

15
00:00:42,229 --> 00:00:40,680
which they called a guest star that got

16
00:00:44,389 --> 00:00:42,239
incredibly bright that you could see it

17
00:00:47,150 --> 00:00:44,399
during the daytime which we now know was

18
00:00:49,250 --> 00:00:47,160
a supernova explosion that was visible

19
00:00:53,630 --> 00:00:49,260
to the naked eye during the day for

20
00:00:58,970 --> 00:00:56,029
what we're seeing here this filamentary

21
00:01:02,330 --> 00:00:58,980
structure is actually density variations

22
00:01:04,189 --> 00:01:02,340
in that material so as that material was

23
00:01:06,770 --> 00:01:04,199
spewed from the star in the Supernova

24
00:01:08,929 --> 00:01:06,780
explosion it's still got the

25
00:01:12,350 --> 00:01:08,939
Fingerprints of that explosion it's

26
00:01:14,990 --> 00:01:12,360
still expanding out into the surrounding

27
00:01:17,510 --> 00:01:15,000
medium so what we're able to see are

28
00:01:20,450 --> 00:01:17,520
knots of material made up of things like

29
00:01:22,429 --> 00:01:20,460
oxygen sulfur and in this full color

30
00:01:25,130 --> 00:01:22,439
image the oxygen is coming out

31
00:01:27,289 --> 00:01:25,140
separately from The sulfur where the the

32
00:01:30,050 --> 00:01:27,299
greenish yellowish tinge is really

33
00:01:32,350 --> 00:01:30,060
oxygen heavy

34
00:01:39,410 --> 00:01:36,710
is the Pulsar at the center and it's

35
00:01:42,710 --> 00:01:39,420
very energetic so it's it's spewing out

36
00:01:45,109 --> 00:01:42,720
energy at all wavelengths actually and

37
00:01:48,410 --> 00:01:45,119
some of that energy is being captured by

38
00:01:50,450 --> 00:01:48,420

the material surrounding the pulsar and

39
00:01:53,210 --> 00:01:50,460
then that material glows and it glows in

40
00:01:55,249 --> 00:01:53,220
a certain wavelength or color depending

41
00:01:57,889 --> 00:01:55,259
on what it's made of so all the material

42
00:02:00,410 --> 00:01:57,899
that we're seeing here is actually from

43
00:02:02,749 --> 00:02:00,420
the Star itself it's it's been blown out

44
00:02:06,230 --> 00:02:02,759
in that Supernova explosion

45
00:02:08,330 --> 00:02:06,240
but it's being illuminated by the Pulsar

46
00:02:11,029 --> 00:02:08,340
in the center

47
00:02:13,430 --> 00:02:11,039
oxygen is such an important element of

48
00:02:15,949 --> 00:02:13,440
life on the planet Earth we are

49
00:02:18,410 --> 00:02:15,959
breathing in oxygen as we speak where

50
00:02:21,650 --> 00:02:18,420
did that oxygen come from

51
00:02:24,170 --> 00:02:21,660
came from the hearts of stars they made

52
00:02:25,970 --> 00:02:24,180
the oxygen infusion and they expelled it

53
00:02:28,309 --> 00:02:25,980
back into the interstellar medium we're

54
00:02:29,750 --> 00:02:28,319
actually watching that happen here maybe

55
00:02:31,670 --> 00:02:29,760
someday there will be a planet there

56
00:02:33,650 --> 00:02:31,680
with an atmosphere that includes oxygen