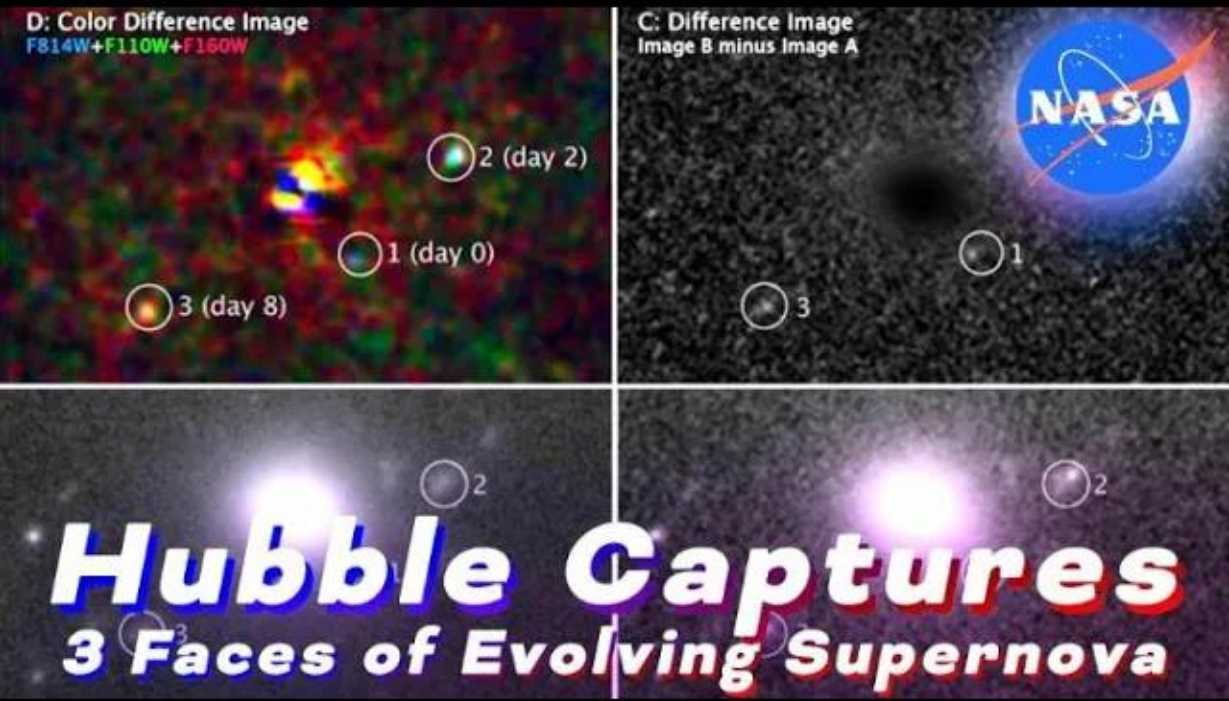
D: Color Difference Image
F814W+F110W+F160W
2 (day 2)
1 (day 0)
3 (day 8)
C: Difference Image
Image B minus Image A
NASA
1
3
2
2
Hubble Captures
3 Faces of Evolving Supernova

1
00:00:05,630 --> 00:00:03,590
NASA's Hubble Space Telescope captured

2
00:00:09,290 --> 00:00:05,640
three separate moments in a far-off

3
00:00:11,930 --> 00:00:09,300
supernova explosion in a single snapshot

4
00:00:14,930 --> 00:00:11,940
these moments provide a unique glimpse

5
00:00:17,689 --> 00:00:14,940
into the supernova's early life

6
00:00:20,450 --> 00:00:17,699
it is quite rare to detect a supernova

7
00:00:23,810 --> 00:00:20,460
explosion at a very early stage because

8
00:00:26,689 --> 00:00:23,820
that stage is so short it only lasts for

9
00:00:28,009 --> 00:00:26,699
hours to a few days and it can be easily

10
00:00:30,769 --> 00:00:28,019
missed

11
00:00:32,930 --> 00:00:30,779
the star exploded more than 11 billion

12
00:00:35,569 --> 00:00:32,940
years ago when the universe was less

13
00:00:39,350 --> 00:00:35,579

than one-fifth of its current age of

14
00:00:41,630 --> 00:00:39,360
13.8 billion years in a single exposure

15
00:00:43,670 --> 00:00:41,640
Hubble captured the supernova's rapid

16
00:00:46,549 --> 00:00:43,680
change of color which indicates

17
00:00:49,310 --> 00:00:46,559
temperature change the early hotter

18
00:00:52,250 --> 00:00:49,320
phase appears blue as the Supernova

19
00:00:54,049 --> 00:00:52,260
cooled its light turned redder this

20
00:00:56,389 --> 00:00:54,059
detection was possible through a

21
00:00:58,970 --> 00:00:56,399
phenomenon called gravitational lensing

22
00:01:00,950 --> 00:00:58,980
as first predicted by Einstein's theory

23
00:01:03,529 --> 00:01:00,960
of general relativity

24
00:01:07,130 --> 00:01:03,539
in this case the immense gravity of the

25
00:01:08,929 --> 00:01:07,140
Galaxy cluster Abel 370 both bent and

26
00:01:10,969 --> 00:01:08,939
magnified the light from the more

27
00:01:14,450 --> 00:01:10,979
distant Supernova located behind the

28
00:01:17,149 --> 00:01:14,460
cluster like a giant Cosmic lens

29
00:01:19,010 --> 00:01:17,159
this lensing effect split and warped the

30
00:01:22,249 --> 00:01:19,020
supernova's light bending it along

31
00:01:24,530 --> 00:01:22,259
separate Pathways of varying lengths

32
00:01:27,109 --> 00:01:24,540
the different travel times between each

33
00:01:29,270 --> 00:01:27,119
path created a time delay that produced

34
00:01:31,670 --> 00:01:29,280
three distinct images of the explosion

35
00:01:35,030 --> 00:01:31,680
at different times that arrived at Earth

36
00:01:39,950 --> 00:01:37,910
this is the first detailed look at a

37
00:01:41,569 --> 00:01:39,960
supernova at such an early time of the

38
00:01:43,969 --> 00:01:41,579

universe's evolution

39
00:01:46,069 --> 00:01:43,979
the research could help scientists learn