
5 THINGS
BLACK HOLES

1
00:00:12,770 --> 00:00:09,549
[Music]

2
00:00:16,790 --> 00:00:12,780
a black hole is a single point in space

3
00:00:19,970 --> 00:00:16,800
that has a lot of mass one of the ways

4
00:00:22,490 --> 00:00:19,980
that we look for black holes is to

5
00:00:25,550 --> 00:00:22,500
develop new instruments and new

6
00:00:28,250 --> 00:00:25,560
technologies that can try to search for

7
00:00:33,410 --> 00:00:30,230
thank you

8
00:00:36,590 --> 00:00:33,420
as we've observed black holes including

9
00:00:38,770 --> 00:00:36,600
the the supermassive black hole in the

10
00:00:41,330 --> 00:00:38,780
center of our galaxy

11
00:00:44,690 --> 00:00:41,340
because it has such a strong gravity

12
00:00:49,130 --> 00:00:44,700
because it has lots of mass stars will

13
00:00:51,650 --> 00:00:49,140

orbit black holes and as stars get

14
00:00:55,310 --> 00:00:51,660
closer and closer to the center of the

15
00:00:58,610 --> 00:00:55,320
black hole as it crosses over the Event

16
00:01:01,010 --> 00:00:58,620
Horizon what will happen is that the

17
00:01:03,470 --> 00:01:01,020
material of these Stars will get

18
00:01:06,950 --> 00:01:03,480
shredded apart because the gravitational

19
00:01:09,649 --> 00:01:06,960
pull of a black hole is so strong that

20
00:01:11,630 --> 00:01:09,659
the material of the Stars gets pulled

21
00:01:14,510 --> 00:01:11,640
apart

22
00:01:16,429 --> 00:01:14,520
but there is an event horizon which is

23
00:01:19,310 --> 00:01:16,439
the point at which the black hole's

24
00:01:21,890 --> 00:01:19,320
gravity starts to to pull you so much

25
00:01:24,410 --> 00:01:21,900
that you can't escape so as you approach

26
00:01:26,030 --> 00:01:24,420
the black hole you'll feel its pull but

27
00:01:28,490 --> 00:01:26,040
then as you get closer and closer and

28
00:01:29,870 --> 00:01:28,500
closer towards the Event Horizon that's

29
00:01:32,210 --> 00:01:29,880
the point of no return so you couldn't

30
00:01:34,789 --> 00:01:32,220
escape past that

31
00:01:37,609 --> 00:01:34,799
the easiest way to think of a black hole

32
00:01:41,030 --> 00:01:37,619
is just like anything that has mass so

33
00:01:43,249 --> 00:01:41,040
the Earth has mass and one of the

34
00:01:45,170 --> 00:01:43,259
reasons that the moon orbits around the

35
00:01:48,770 --> 00:01:45,180
earth is because the gravitational

36
00:01:51,789 --> 00:01:48,780
attraction of these two massive bodies

37
00:01:54,830 --> 00:01:51,799
um and so Earth is distorting the space

38
00:01:57,830 --> 00:01:54,840

around the moon and so that's what keeps

39
00:02:00,410 --> 00:01:57,840
the moon in orbit and so now take that

40
00:02:03,950 --> 00:02:00,420
to an extreme so take something that's

41
00:02:06,590 --> 00:02:03,960
as massive as the sun or as massive as a

42
00:02:09,770 --> 00:02:06,600
Million Suns and put it at a single

43
00:02:13,729 --> 00:02:09,780
point and that Distortion that you get

44
00:02:17,110 --> 00:02:13,739
is coming from that amount of mass in a

45
00:02:22,670 --> 00:02:18,949
foreign

46
00:02:25,190 --> 00:02:22,680
black holes vary in size a lot we know

47
00:02:27,890 --> 00:02:25,200
that black holes can be formed by

48
00:02:30,770 --> 00:02:27,900
massive stars exploding and then

49
00:02:33,350 --> 00:02:30,780
collapsing into the singular point and

50
00:02:35,330 --> 00:02:33,360
those give us black holes that are about

51
00:02:38,630 --> 00:02:35,340
the mass of the Sun so those are solar

52
00:02:41,030 --> 00:02:38,640
mass black holes however we also know at

53
00:02:43,850 --> 00:02:41,040
the center of galaxies like the Milky

54
00:02:46,190 --> 00:02:43,860
Way There are super massive black holes

55
00:02:49,369 --> 00:02:46,200
and these are millions or even billions

56
00:02:53,030 --> 00:02:49,379
of times the mass of the Sun and how

57
00:02:57,050 --> 00:02:53,040
these form is actually a mystery

58
00:02:59,630 --> 00:02:57,060
studying black holes really gives us a

59
00:03:03,410 --> 00:02:59,640
fundamental insight into how gravity

60
00:03:06,770 --> 00:03:03,420
works because it's such a small physical

61
00:03:10,550 --> 00:03:06,780
scale but it's a super massive object

62
00:03:13,610 --> 00:03:10,560
and so understanding how black holes

63
00:03:15,890 --> 00:03:13,620

work and the interactions of black holes

64
00:03:18,110 --> 00:03:15,900
in in other parts of the universe really

65
00:03:20,030 --> 00:03:18,120
give us a fundamental Insight that we

66
00:03:22,850 --> 00:03:20,040
could then use to think about how our

67
00:03:25,670 --> 00:03:22,860
own solar system works

68
00:03:28,190 --> 00:03:25,680
and so if we can understand how black

69
00:03:31,800 --> 00:03:28,200
holes work it'll give us a key to really