Things Black Holes are Not

They are not wormholes (or Einstein-Rosen bridges), providing shortcuts between different points in space. Once you're in a black hole, you can't leave.

Contrary to popular belief, black holes are not cosmic vacuum cleaners. They don't suck in all other matter. From far enough away, their gravitational effects are just like those of other objects of the same mass.

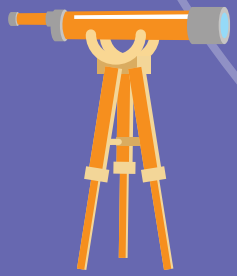
They are not portals to other dimensions or universes. Even if you could escape a black hole, it wouldn't be a very nice form of transportation due to the side effects.

Interesting Facts About Black Holes

Stellar-mass black holes can be created when two neutron stars merge. And two black holes can merge to make a larger one! We're not sure how the universe makes supermassive black holes, though.

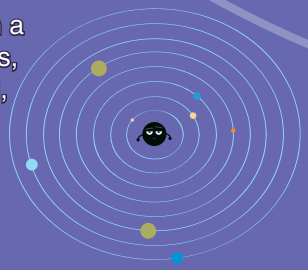
Albert Einstein rejected the idea that black holes might exist.

The closest known black hole, called 1A 0620-00, is 3,000 light-years away. For comparison, our nearest stellar neighbor is 4.2 light-years away.



The first time we saw a real image of a black hole was in 2019. That was when the Event Horizon Telescope shared an image of M87*, a supermassive black hole 55 million light-years away.

If you replaced the Sun with a black hole of the same mass, nothing would happen! Well, it would be a lot colder, but the planets would stay in the same orbits.



FS-2019-9-437-GSFC

National Aeronautics and Space Administration

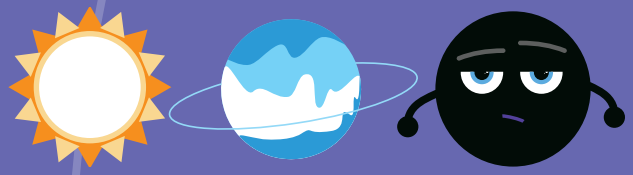
BLACK HOLE

Safety Information Card

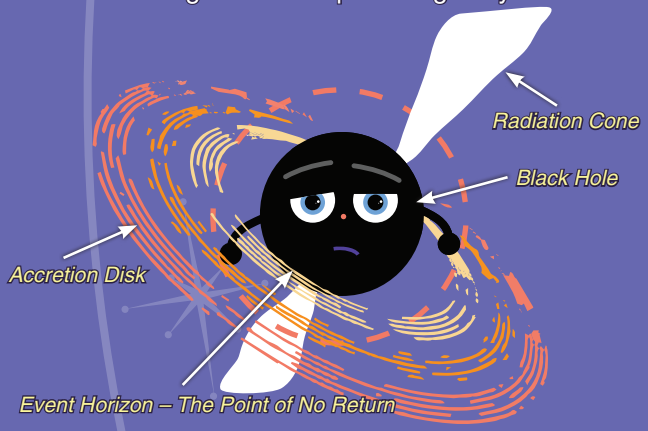
www.nasa.gov

What Should I Know About Black Holes?

Black holes are physical objects in space, just like everything else we see in the night sky.



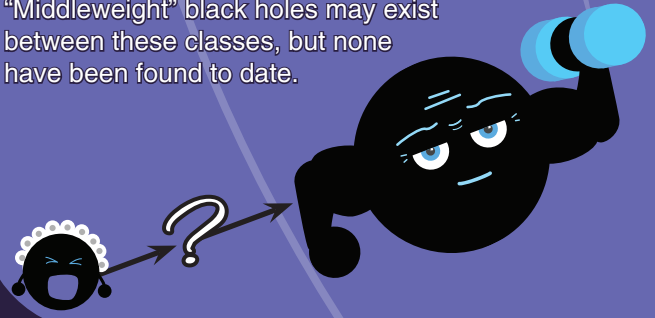
But they pack so much mass into so small a space that not even light can escape their gravity.



Known black holes fall into two classes:

- Stellar mass: 5 to tens of times the Sun's mass
- Supermassive: 100,000 to billions of times the Sun's mass

"Middleweight" black holes may exist between these classes, but none have been found to date.



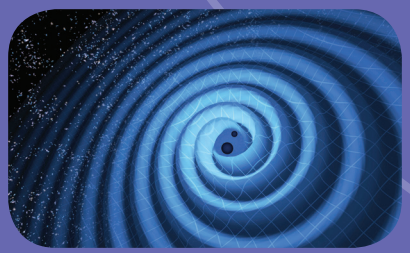
Signs a Black Hole is Near

Black holes can be surrounded by rings of gas and dust called accretion disks. The material in the disk gets hot enough to generate X-rays and other light.

You can also find black holes by tracking stars' orbits over many years. This is how scientists learned there's a supermassive black hole at the center of our galaxy!

Credit: ESO/M. Parsa/L. Calçada

Keep an eye out for ripples in space-time called gravitational waves. They can be created when two black holes rotate around each other or when a star orbits close to a black hole.



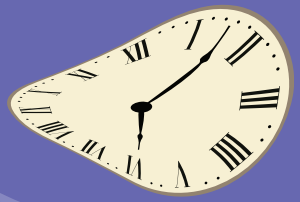
Credit: LIGO/T. Pyle

Please be aware that black holes could be present in any direction in space.

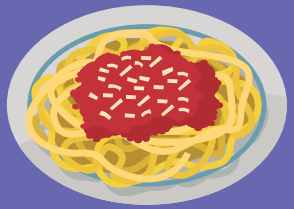
Warning Signs You're Too Close to a Black Hole

Radiation Gravity compresses and heats debris in the accretion disk to millions of degrees, producing lots of lethal radiation.

Time dilation As you get closer to the black hole, time appears to be passing faster for distant objects. Anyone watching you will notice time passing more slowly for you, but you feel like time is speeding up for everyone else.



Spaghettification As objects approach the event horizon, they're horizontally compressed and vertically stretched, like a noodle.



Once you enter the event horizon, escaping the black hole requires traveling faster than light. As this technology is currently unavailable, please maintain a safe distance from black holes at all times.