

A Black Hole Is Not a Hole

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Way out beyond where you are right now, beyond the clouds, beyond the Moon, beyond Pluto, beyond our solar system, space goes on and on. You could travel for trillions of miles and you'd barely get to the closest star. In another few trillion miles you might pass another star. Space is that huge.

Way out there, trillions, quadrillions, and even more *-illions* of miles away, are special places called black holes. These places in space are special because of their powerful pull on other things. A black hole's pull is the strongest pull in the entire universe.

Nothing can out-tug a black hole. No army of tow trucks, no convoy of supersized earth haulers, no fleet of giant rocket engines. Not all of them combined.

A black hole pulls in nearby dust. It pulls in nearby asteroids. It pulls in nearby stars and even nearby starlight. And no light, stars, asteroids, or dust comes out. Not ever.

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Have you ever pulled out a sink stopper and watched water swirl down the drain? Spirals of water flow toward the center. You've made a small whirlpool.

Imagine a bigger whirlpool in a river. Far away, nobody knows it's there. Boats chug and sail along. Schools of fish dart by, following their fishy urges. Closer to the whirlpool, it's a different story.

A fish swimming near the whirlpool's edge feels a gentle tug as the current drags it toward the spinning center. No problem. With a little swish, the fish can speed up, giving itself the oomph to swim away. After putting some distance between itself and the whirlpool, the fish no longer feels the current's inward pull.

But what if the fish drifted farther in?

Closer to the center of the whirlpool, the pull would grow stronger. To escape the whirlpool, the fish would have to swim faster than it had to at the edge. Even closer to the middle, if the fish couldn't go much faster, it would find itself swept all the way in, stuck in the swirl, pulled round and round and round.

A black hole works something like that whirlpool.

Even though a black hole's pull is the strongest in the universe, it's not strong from far away. Galaxies and stardust drifting through space don't get dragged into a distant black hole.

However, near a black hole, gases and dust and stars encounter its tug. Some things may be hurtling by so fast they won't get pulled into the black hole. Other things may not be as swift. They will be drawn in.

Closer and closer, the tugging force gets stronger and stronger. Close enough, the black hole no longer acts like a whirlpool.