

Black holes

Introduction to black holes

The black hole is the most bizarre known object in the universe.
A black hole contains an extremely powerful gravitational field where not even light can escape.
Black holes are capable of destroying planets and stars millions times its size.
Black holes existence distorts the space-time continuum.

How black holes are formed

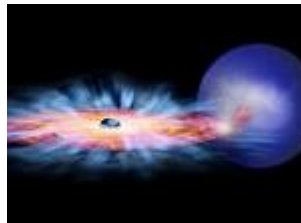
The black holes are formed when a massive star explodes-a supernova explosion.
The core of the star will usually collapse to become a neutron star but not always.
If the collapsing core is heavier than three solar masses then even densely packed neutrons cannot hold up against gravity, the star collapses and forms into a black hole. The core is supercompressed after the explosion and the amount of gravity is extremely powerful.

Searching and detecting black holes

Detecting a black hole is difficult due to the fact that they emit no visible light.
The black holes are invisible in space unless a star orbits near it and it starts pulling the star in.
When the star layers of gas and atmosphere is being pulled apart, an accretion disk is formed and makes the black hole visible to the naked eye. A recent new way of detecting black holes is by use of detecting radio waves, x-rays and the heat a black holes gives off.

The impact of black holes on stars and planets

If a star was to orbit near a black hole then the strong gravity of the black hole would pull the planet/star toward the black hole. The layers of gas and atmosphere of the object would be slowly ripped off the planet. Exactly what happens to the matter being sucked in is unknown to scientists. A black hole can consume planets and stars millions times its size. It can take years to consume the whole star.



Weighing a black hole

The black hole can be weighed by determining if a star has an invisible companion.
If it is a neutron star then it can't weigh more than three solar masses, if the invisible object weighs more than three solar masses then it must be a black hole.

Supermassive black holes

Some black holes weigh in at millions or even billions times the mass of the sun. These black holes are not produced by supernova explosions but by the collapse of huge gas clouds in the galaxies past. The immense gravity of the supermassive black holes attract dust and gas from large area's of space, it forms a massive accretion disk.

Miniature black holes

It is believed that tiny black holes were formed by the immense forces of the big bang.

These black holes are the sizes of atoms but have the mass of billions of tonnes.

The black holes intense gravity causes it to slowly release 'Hawking radiation' (named after Stephen Hawking after his discovery of mini black holes) which drains its energy and mass. The mini black holes are destroyed in a blast of gamma rays.

The anatomy of black holes

The singularity is at the centre of the black hole and is surrounded by an invisible boundary.

This invisible boundary is called the event horizon, nothing is able to escape from inside it.

At the bottom of a black hole is the gravitational well which traps all matter and light in the black hole.

