

Name _____

Cosmic Collisions: Can Black Holes Merge Together?

Short Answer Key

1. The "death spiral" is a slow process during which two black holes in a binary system spiral inward over millions of years as they release gravitational energy in the form of gravitational waves.
2. Gravitational waves provide information about black hole mergers by detecting the ripples in spacetime caused by the acceleration and collision of the black holes. This is significant for astrophysics because it allows scientists to study black holes in ways previously impossible and provides insights into their properties and distribution in the universe.
3. Massive stars play a crucial role in the formation of binary systems of black holes. When these massive stars reach the end of their life cycles and undergo supernova explosions, they can leave behind two black holes in close orbit around each other.
4. The primary difference between the binary system of black holes and the final result of a black hole merger is that in a binary system, two separate black holes are in close proximity, while in a merger, they combine to form a single, larger black hole.
5. One significant insight gained from the detection of gravitational waves from black hole mergers is a better understanding of the population and distribution of black holes in the universe. This information helps scientists refine their models of black hole formation and evolution.

