

Name \_\_\_\_\_

## How are Black Holes Formed?

### Short Answer Key

1. After a supernova explosion, a massive star's core can become either a neutron star or a black hole. If the core's mass is below approximately 2.5 times the mass of the Sun, it becomes a neutron star, an incredibly dense object packed with neutrons. If the core's mass exceeds that limit, it collapses further, forming a black hole, a region of infinite density surrounded by an event horizon.
2. The event horizon is the invisible boundary surrounding a black hole beyond which nothing, not even light, can escape. It is significant because it marks the point of no return, and any object or information that crosses it is lost to the black hole's gravitational pull.
3. A neutron star is the result of a massive star's core collapsing under gravity but not exceeding the mass limit (about 2.5 times the mass of the Sun) to become a black hole. Neutron stars are incredibly dense, consisting mainly of neutrons. In contrast, a black hole is formed when the core's mass exceeds the limit, and it collapses into a singularity, a point of infinite density surrounded by an event horizon.
4. The mass of a collapsing star's core determines whether it becomes a black hole or a neutron star. If the core's mass is less than about 2.5 times the mass of the Sun, it becomes a neutron star. If the core's mass exceeds this limit, it collapses further under its own gravity, forming a black hole.
5. Supermassive black holes are typically found at the centers of galaxies because they have had billions of years to accrete mass through interactions with surrounding stars, gas, and other black holes. Their immense gravitational pull influences the motion of stars and gas within galaxies, helping to shape the galaxy's structure and behavior.

