

Name \_\_\_\_\_

## The Enigmatic Boundary: Understanding the Event Horizon of a Black Hole

### Short Answer Key

1. The event horizon defines the boundary beyond which nothing, not even light, can escape the gravitational pull of the black hole. It separates the observable universe from the unobservable interior of the black hole.
2. The size of the event horizon increases with the mass of the black hole. For example, a stellar-mass black hole may have an event horizon a few kilometers in radius, while a supermassive black hole can have an event horizon spanning millions of kilometers.
3. The Schwarzschild radius is the distance from the center of a non-rotating, spherically symmetric black hole at which the event horizon forms. It represents the critical boundary beyond which escape is impossible due to the black hole's gravity.
4. The event horizon renders the interior of a black hole invisible, making direct observation of black holes challenging.

Astronomers rely on indirect methods, such as studying the effects of a black hole's gravity on nearby objects or observing emissions from matter falling into the black hole's vicinity.

5. If an astronaut were to cross the event horizon of a black hole, they would be trapped by the black hole's gravity. They would become part of the unobservable interior of the black hole, and their existence would be hidden from the outside universe.

