

Name \_\_\_\_\_

## Exploring the Secrets of the Universe: How Astronomers Detect and Study Black Holes

### Short Answer Key

1. Binary star systems allow astronomers to detect black holes through the gravitational interaction between the black hole and its companion star. For example, irregularities in the motion of the companion star can indicate the presence of a black hole.
2. Gravitational wave detection involves measuring tiny ripples in space-time caused by the interaction of massive objects like black holes. This has allowed astronomers to directly observe black hole mergers and learn more about their properties.
3. An accretion disk is a swirling disk of superheated gas and dust that forms around a black hole. It emits various forms of radiation, such as X-rays, which astronomers can detect and study.
4. The Event Horizon Telescope captured the first image of a black hole by creating a virtual telescope with a network of radio telescopes around the world. The image showed the silhouette of the supermassive black hole at the center of the M87 galaxy, surrounded by a glowing ring of hot gas and dust.

