

Name _____

Birth of Cosmic Snowballs: How Comets Are Formed

Open-Ended Response Answer Key

1. Comets are indeed "cosmic time capsules" that contain materials from the early solar system. Studying comets can help scientists understand the composition and conditions of the early solar system, including the presence of ices and organic molecules. This knowledge is crucial for unraveling the origins of planets, including Earth, and gaining insights into the potential for life's emergence in our solar system.
2. Comets that come close to Earth's orbit can pose both risks and benefits. While the impact of a large comet could have catastrophic consequences, studying comets provides valuable data to assess and mitigate potential impact threats. Scientists use telescopes and space missions to track and monitor comets, enabling early warnings and potential deflection strategies. These efforts help protect our planet from potential impacts.
3. Comets, as celestial messengers carrying primordial materials, offer clues about the ingredients necessary for life. Studying comets can inform our understanding of the prebiotic chemistry that might have occurred on Earth and other celestial bodies. It sheds light on the role of comets in delivering water and organic molecules, potentially influencing the emergence of life.
4. A future space mission to rendezvous with a comet might have objectives such as collecting samples, analyzing the comet's composition, and studying its structure and behavior. Challenges may include spacecraft navigation, dealing with the harsh conditions near the Sun, and managing data transmission over vast distances. Scientific discoveries from such a mission could include insights into the building blocks of the early solar system, organic molecules, and the processes that shaped comets' evolution.

