

Name _____

The Fiery Heart: How the Sun Produces Energy and Heat

Open-Ended Response Answer Key

1. Nuclear fusion is a vital process in the Sun's energy production as it generates the tremendous heat and light that powers the Sun. It maintains the Sun's brightness by continuously producing energy through the fusion of hydrogen atoms into helium. Without nuclear fusion, the Sun would not emit the essential light and heat that sustains our solar system.
2. The radiative zone and convective zone both transport energy within the Sun, but through different mechanisms. In the radiative zone, energy travels as electromagnetic radiation, bouncing between atoms. In the convective zone, energy moves through the rising and sinking of hot gas, creating convection currents. While both zones play a role in transporting energy, they have distinct methods and characteristics.
3. The Sun's energy is harnessed naturally on Earth through processes like photosynthesis, where plants convert sunlight into energy. Additionally, solar technology, such as solar panels, captures the Sun's energy and converts it into electricity for various purposes, including powering homes and providing clean, renewable energy.
4. The Sun's future involves a transformation into a red giant, during which it will expand in size and potentially engulf some inner planets like Mercury and Venus. This phase will have significant consequences for our solar system, potentially altering the orbits and conditions of remaining planets. Eventually, the Sun will shed its outer layers and become a white dwarf, marking the end of its active life as a star.

