

Name _____

Cell Division Chronicles: The Tale of Mitosis, Meiosis, and Living Beings

Open-Ended Response Answer Key

1. Genetic diversity, fostered by meiosis and mitosis, is essential for the adaptability and resilience of species. It allows populations to respond to environmental changes, pathogens, and other challenges. In ecosystems, genetic diversity contributes to biodiversity, enhancing overall ecosystem health and stability.
2. Meiosis is specialized for the creation of gametes, ensuring genetic diversity in sexually reproducing organisms. During meiosis, homologous chromosomes exchange genetic material through crossing-over, resulting in unique genetic combinations in each gamete. When these gametes fuse during fertilization, offspring inherit a diverse set of traits from both parents, enhancing genetic diversity.
3. In a world where all living things went through meiosis instead of mitosis, genetic diversity would be significantly higher. This would lead to a greater potential for adaptation to changing environments and an increased variety of traits within populations. However, it might also result in more complex genetic interactions and potentially slower growth and development due to the complexity of meiotic processes.
4. Exceptions like asexual reproduction play essential roles in evolution and biodiversity. While sexual reproduction generates genetic diversity, asexual reproduction allows for rapid reproduction in stable environments. Asexual reproduction can also lead to the accumulation of advantageous traits within a population. These exceptions contribute to the rich tapestry of life's diversity by providing different strategies for survival and adaptation.

