Name _____

Respiration: The Breath of Life and the Carbon Cycle

Open-Ended Response Answer Key

1. Aerobic respiration takes place in the mitochondria of cells and involves the breakdown of glucose into energy, carbon dioxide, and water. Anaerobic respiration can occur in the absence of oxygen, producing less energy and either lactic acid or ethanol. These processes provide the energy needed for various cellular activities, allowing organisms to function and grow.
2. The carbon cycle is vital for regulating Earth's climate by controlling the concentration of carbon dioxide in the atmosphere. The balance between respiration, which releases carbon dioxide, and photosynthesis, which absorbs it, helps prevent excessive global warming. When this balance is disrupted, such as through increased fossil fuel combustion, it contributes to climate change and environmental challenges.
3. Human activities, particularly the burning of fossil fuels for energy, release vast amounts of carbon dioxide into the atmosphere. This disrupts the natural balance of the carbon cycle, leading to an increase in atmospheric carbon dioxide levels. This excess carbon dioxide acts as a greenhouse gas, trapping heat in the atmosphere and causing global temperatures to rise, resulting in climate change.
4. As a scientist studying the relationship between respiration and climate change, I would investigate how changes in respiration rates of different organisms impact the carbon cycle and carbon dioxide levels in the atmosphere. I would also explore strategies to reduce carbon emissions from human activities and their effects on the environment. Understanding these connections is crucial for developing solutions to mitigate climate change and its consequences.