

Name _____

Quantum Computing vs. Classical Computing: A Cosmic Clash of Computation

Open-Ended Response Answer Key

1. Quantum computing could impact cryptography by breaking current encryption methods due to its ability to perform certain calculations much faster than classical computers. This could lead to the need for new encryption techniques that are resistant to quantum attacks. For example, quantum computers could factor large numbers quickly, compromising the security of traditional encryption methods like RSA.
2. When explaining quantum superposition to a friend, you could use the analogy of a magical coin that can be both heads and tails at the same time until observed. You might explain that just as a coin can exist in multiple states, a qubit can exist in multiple states simultaneously. It's as if the qubit is exploring all its options at once until you measure it, and then it "chooses" one state.
3. If pursuing a career in quantum computing, you might be interested in addressing challenges related to error correction in quantum computers. You could contribute by developing or improving quantum error correction codes to mitigate errors caused by environmental factors. This is crucial for the reliability and scalability of quantum computers.
4. In a hypothetical scenario where quantum computing is integrated into everyday life, we might see advancements in various fields. Quantum computers could revolutionize drug discovery, optimize supply chains, improve traffic management, and advance scientific research. Everyday devices and technologies could benefit from faster and more efficient computations, leading to innovations we can't even imagine today. Quantum computing might also play a crucial role in solving complex global challenges, such as climate modeling and energy optimization.

