

Name \_\_\_\_\_

## Unveiling Secrets: The Sieve of Eratosthenes and Prime Number Discovery

### Open-Ended Response Answer Key

1. The Sieve of Eratosthenes could be adapted for use in modern computing environments by implementing it as an algorithm or program that can efficiently find prime numbers within very large ranges, leveraging the power of computers to handle extensive calculations.
2. The Sieve of Eratosthenes holds historical significance as one of the earliest known methods for finding prime numbers, dating back to ancient Greece. In mathematical contexts, it demonstrates the power of systematic approaches to problem-solving and lays the foundation for more advanced number theory.
3. Limitations of the Sieve of Eratosthenes may include its memory and computational requirements, especially for very large ranges of numbers. Additionally, its efficiency may decrease as the size of the range increases due to the need to strike out multiples of each prime number.
4. Real-world applications where knowing prime numbers would be useful include cryptography, where prime numbers are used to generate secure encryption keys, and computer algorithms, where prime numbers are utilized in various mathematical operations and optimizations.

