Finding Prime Numbers
The Sieve of Eratosthenes

	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

1. How many of the numbers above are prime? _____

2. What is the smallest prime number? _____

3. What are the prime factors of 30? _____

4. Circle the numbers that are divisible by 3: **16, 27, 43, 51,   87**

Name _____ Date _____

<u>Directions for Use</u>

The Sieve of Eratosthenes (air-uh-toss-the-knees) is used to illustrate the difference between prime numbers and composite numbers. If this activity is completed correctly, students will have a visual reference that tells them which numbers are prime, and the factors of the composite numbers. Here is one way to make it work:

1. Students begin by circling 2. This is the smallest prime number.

2. Students then cross out every number that is a <u>multiple </u>of 2, (4, 6, 8...), using a diagonal slash from upper left to lower right:

3. Students then circle 3, then next smallest prime number.

4. Cross out all multiples of 3, (6, 9, 12...) using a diagonal slash from upper right to lower left:
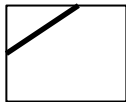
5. Next, circle 5. Cross out all multiples of 5 (10, 15, 20...) with a verticle slash:

6. Circle 7. Cross out all multiples of 7 (14, 21, 28...) with a horizontal slash:

7. Finally, circle 11. Cross out all multiples of 11 with a small slash in the upper left corner:

8. That's as far as you have to go. Now, circle every number that is left uncrossed, and those are the prime numbers between 2 and 100. Also, students can identify the prime factors of each composite number by looking at the slash marks on each number. This helps students to understand divisibility.

Answers:

1. How many of the numbers above are prime?   25

2. What is the smallest prime number?   2

3. What are the prime factors of 30? 2, 3, 5

4. Circle the numbers that are divisible by 3: **16, 27, 43, 51, 87**

Notes:

*For a number to be considered "prime", it must have <u>exactly</u> two <u>different</u> factors: 1 and itself. Therefore, the number 1 is not considered a prime number because it does not have two <u>different</u> factors.

*Remind students that although the Sieve indicates the prime factors of composite numbers, it doesn't indicate when there are multiples of the same prime factor. For instance, we can see that 36 has 2 and 3 as factors, but there is no indication that $36 = 2 \cdot 2 \cdot 3 \cdot 3$.