Name_____   Date_____

Prime Numbers

Reading and Discussion

What is the difference between a **prime** number and a **composite** number?

- A **prime number** is a number with only two factors - itself and 1.
- A **composite number** has more than two factors.

What is a **factor**?

A **factor** is a number which divides evenly into another number. For example:

- 30 ÷ 6 = 5 and 30 ÷ 5 = 6; therefore 6 and 5 are **factors** of 30.

Let's see how this works. The number 9 can be divided evenly by 1, 3 and 9, so 9 is a **composite number**. The number 2 can be divided only by itself and 1, so 2 is a **prime number**.
The number 1 can be divided only by itself; it is neither composite nor prime.

To work out if a number is prime or composite we need to work out how many factors it has. We can do this by trial and error. For example, we can try to divide 67 by 2, by 3, by 5, by 7, and so on. We will find that only 1 and 67 divide evenly, so we can be sure that 67 is a **prime number**.

There is an easier way to work out all the prime numbers from 1 to 100. It is called the **sieve** method. In the same way that we use a sieve to separate unwanted objects from the objects we want, this method removes the composite numbers and leaves the prime numbers behind. Here is how it works:

1. Take a grid divided into 100 squares and write in numbers from 1 to 100.
2. First cross out number 1, because we know that 1 is not a prime number.
3. Leave number 2, because we know that 2 is a prime number. Cross out all the other numbers that can be divided by 2. Remember that all even numbers can be divided by 2.
4. Do the same with 3.
5. Leave 5 and cross out all the numbers divisible by 5.
6. Now look at the numbers which are left. Can you find and cross out all the numbers which can be divided by 7 except for 7 itself? Not quite as easy, but there are only a couple left which haven't already been crossed out.
7. The last one to leave is 11. All the multiples of 11 will have been already crossed out.
8. Once you have sieved away all the composite number the numbers left on the grid are **prime numbers**.

Activities

Activity A: Sieve out the composite numbers

Number the squares in the table from 1 to 100. The first row as been done for you. Then, using the sieve method, cross out all of the **composite numbers**.

1	2	3	4	5	6	7	8	9	10

Now write down all the prime numbers from 1 to 100.

Activity B: Identify the composite numbers

Here are some random numbers between 1 and 100. Draw a circle around all the composite numbers you can find.

2 6 10 13 15 17 22 25 29 32 34 37 41 45 47

52 56 59 61 66 70 73 74 78 85 91 94 96 97

Answer Sheet

Activity A

1	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

Activity B

2 6 10 13 15 17 22 25 29 32 34 37 41 45 47

52 56 59 61 66 70 73 74 78 85 91 94 96 97