



NC.4.OA.3 Find all factor pairs for whole numbers up to and including 50 to:

- *Recognize that a whole number is a multiple of each of its factors.*
- *Determine whether a given whole number is a multiple of a given one-digit number.*
- *Determine if the number is prime or composite.*

- *I can find all factor pairs for a whole number between 1 and 100.*
- *I can show how a whole number is a multiple of each of its factors.*
- *I can determine if a whole number between 1 and 100 is a multiple of a particular one digit number.*
- *I can determine the numbers between 1-100 that are prime.*
- *I can determine the numbers between 1-100 that are composite.*
-

~ Factors vs Multiples ~

- Factors: the number you skip count by.
- Multiples: the number you land on when you skip count

$$\frac{5}{\text{factor}} \times \frac{2}{\text{factor}} = \frac{10}{\text{multiple}}$$

~ PRIME vs Composite ~

- Prime numbers: numbers that only have two factors - one and itself
example: 11, 13, 23, 61, etc
- Composite numbers: numbers that have more than two factors
example: 24, 32, 12, 9, 27, etc

OA.4

Factors & Multiples

Prime & Composite Numbers

Factors: a number that can be multiplied to make a certain product

3, 2, 1 {18} 18, 9, 6

6 factors
3 factor pairs

$$\begin{array}{r|l} 18 & \\ 1 & 18 \\ 2 & 9 \\ 3 & 6 \end{array}$$

Multiples: the result of multiplying a number by another number

Find the multiples of 7:
7, 14, 21, 28, 35, 42, 49,

Prime Number:

a number with ONLY two factors - itself & 1

Composite Number:

a number with MORE than 2 factors

PRIME AND COMPOSITE NUMBERS

Color all the prime numbers RED
Color all the composite numbers BLUE

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

$$5 \quad \begin{array}{r} 5 \\ 1 \end{array} \overline{) 5}$$

$$7 \quad \begin{array}{r} 7 \\ 1 \end{array} \overline{) 7}$$

$$23 \quad \begin{array}{r} 23 \\ 1 \end{array} \overline{) 23}$$



all these #'s only have 2

$$10 \quad \begin{array}{r} 10 \\ 2 \end{array} \overline{) 10}$$

$$27 \quad \begin{array}{r} 27 \\ 3 \end{array} \overline{) 27}$$

$$33 \quad \begin{array}{r} 33 \\ 3 \end{array} \overline{) 33}$$

$$100 \quad \begin{array}{r} 100 \\ 2 \\ 4 \end{array} \overline{) 100}$$

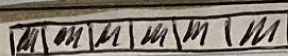
all these #'s have more than 2 factors

NC. 4. OA. 4 Factors / Factor Pairs

Definitions

array: A way of displaying objects in a row or column.

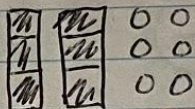
Examples



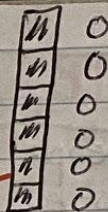
$$1 \times 6$$

000000

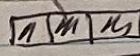
Arrays



$$3 \times 2$$



$$6 \times 1$$



$$2 \times 3$$

000
000

factor: The numbers that are multiplied together to give a product.

$$2 \times 3 = 6$$

Factors

Product

factor pairs: Numbers that when multiplied together give a certain product.

The factor pairs of 6 are 1 and 6 and 2 and 3.

Generalize: To make a general statement.

* You generally start dividing the whole number by 1, then divide the whole number by 2, and so on.

$$1 \times 6 = 6 \text{ and } 6 \times 1 = 6$$

$$2 \times 3 = 6 \text{ and } 3 \times 2 = 6$$

$$3 \times 2 = 6 \text{ and } 2 \times 3 = 6$$

4 is not a factor

5 is not a factor

$$6 \times 1 = 6 \text{ and } 1 \times 6 = 6$$

Things to Remember for finding factors:

- ① Rows go across and columns go down
- ② When factor pairs start repeating, you can generalize, that all the factors of a number are found.
- ③ The number of rows and the number of counters in each row are factors of the total number of counters.
- ④ Remember the factors of a number always include 1 and the number

Definitions

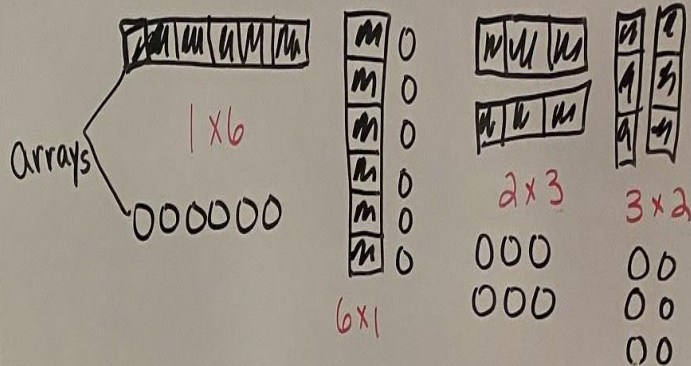
Array: A way of displaying objects in a row or column

Factor: The numbers that are multiplied together to give a product.

Factor pairs: Numbers that when multiplied together give a certain product.

Generalize: to make a general statement

Examples



$$2 \times 3 = 6$$

Factors Product

The factor pairs for 6 are
1 and 6 and 2 and 3.

$1 \times 6 = 6$ and $6 \times 1 = 6$
 $2 \times 3 = 6$ and $3 \times 2 = 6$
 $3 \times 2 = 6$ and $2 \times 3 = 6$
 4 is not a factor
 5 is not a factor
 $6 \times 1 = 6$ and $1 \times 6 = 6$

Factors

The numbers that are multiplied together to give a product. (Factors listed on top of the flap)

Factor pairs: Numbers that when multiplied together give a certain product. (Factor pairs under the flaps)

12	45	7	16
1, 3, 4, 6, 12	1, 3, 5, 9, 15 and 45	1, 7	1, 2, 4, 8 and 16

19	25	8	1
1, 19	1, 5, 25	1, 2, 4 and 8	1

*Remember: Factors begin with 1 and end with that given number
See examples on top of flap.

Factors

The numbers that are multiplied together to give a product. (Factors listed on top of the flap)

Factor pairs: Numbers that when multiplied together give a certain product (or pairs under the flaps)

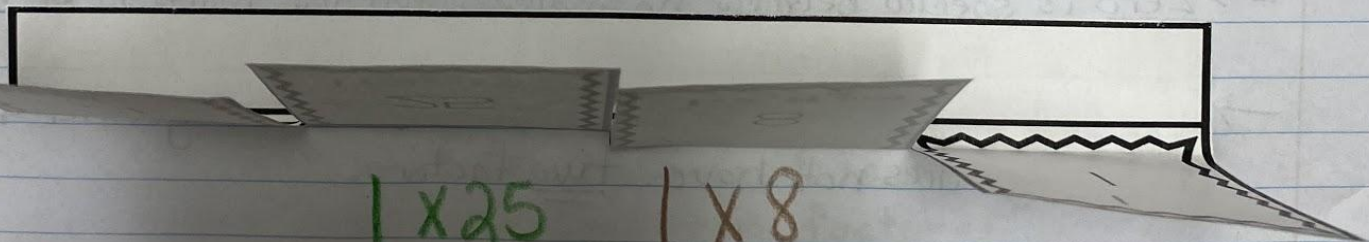


1×15
 3×5

1×12
 2×6
 3×4

1×7

1×10
 2×5
 4×2.5



1×19

1×25
 5×5

1×8
 2×4

1×1

*Remember: Factors begin with 1 and end with that given number.
See examples on top of flap.



23 Factors
1, 23

000000000000000000000000
1 x 23

Prime or Composite

10 0000000000
1 x 10 Composite
3, 4, 6, 7, 8, 9
00000 00 5 x 2
00000 00
2 x 5 00

1, 2, 5, and 10.

Definitions

Prime number: A whole number greater than 1 that has exactly two factors, itself and 1.

Composite number: A whole number greater than 1 with more than two factors.

The number (1) cannot be a prime number.

- It is not greater than 1.
- It does not have 2 factors.

Examples

7 is a prime number
0000000
1 x 7 = 7
7 x 1 = 7

7 only has two factors, itself and 1.

8 is a composite number.

00000000 0000 00
1 x 8 0000 00
2 x 4 00
4 x 2

The factors of 8 are 1, 2, 4 and 8.

PRIME

Prime numbers: A whole number greater than 1 that has exactly two factors, itself and 1.

Example: 7 (prime) 1 and 7 are factors

0000000

$$1 \times 7 = 7$$

0
0
0
0
0
0

$$7 \times 1 = 7$$

7 has only two factors, itself and 1.

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

Special Notes about prime numbers:

- Zero is special because no matter what you multiply ~~it~~ by zero the product is always zero, so it is not prime.
- One can't be prime because it is not greater than 1 and it does not have two factors.

* Computers use prime #'s like a secret code. It makes information hard to unscramble.

You can use arrays or multiplication to see if a number is prime or composite.

COMPOSITE

Composite Number: A whole number greater than 1 with more than two factors.

Example: 8 (composite)

1, 2, 4 and 8 are factors

$$\begin{array}{r}
 00000000 \\
 1 \times 8 \\
 0000 \quad 00 \\
 2 \times 4 \quad 00 \\
 \quad 00 \\
 \quad 00 \\
 4 \times 2
 \end{array}
 \begin{array}{r}
 0 \\
 0 \\
 0 \\
 0 \times 1 \\
 0 \\
 0 \\
 0 \\
 0
 \end{array}$$

The factors of 8 are
1, 2, 4, and 8

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

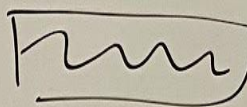
Special Notes about ~~prime~~ composite numbers:

- Zero is special because no matter what you multiply by zero the product is always zero, so it is not composite.
- One can't be ~~prime~~ composite because it is not greater than 1 and it does not have two factors.

Multiple: The product of a given whole number and any non-zero whole number.


Factor: Numbers that when multiplied together give a product.

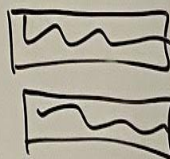
The factors of 24 are 1, 2, 3, 4, 6, 8, 12, and 24.


 $1 \times 24 = 24$

24 is a multiple of

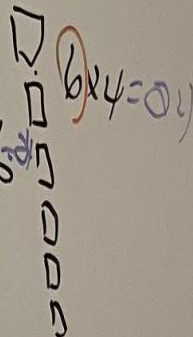
1, 2, 3, 4, 6, 8, 12 and 24.


 $24 \times 1 = 24$

 $2 \times 12 = 24$

 $12 \times 2 = 24$

 $4 \times 6 = 24$

 $6 \times 4 = 24$

 $3 \times 8 = 24$

 $8 \times 3 = 24$

$8 \times 3 = 24$

Multiples

Multiples: The product of a given whole number and only non-zero whole number. (factor)

Example: 24 ← The factors of 24 are 1, 2, 3, 4, 6, 8, 12, and 24.
24 is a multiple of 1, 2, 3, 4, 6, 8, 12 and 24.

x1 x2 x3 x4 x5 x6
2: 2, 4, 6, 8, 10, 12...

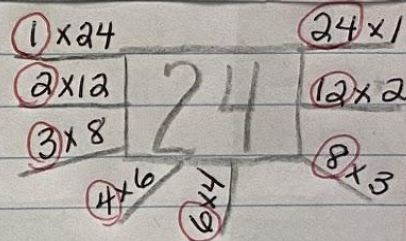
x1 x2 x3 x4 x5
5: 5, 10, 15, 20, 25...

x1 x2 x3 x4 x5
10: 10, 20, 30, 40, 50...

x1 x2 x3 x4 x5
12: 12, 24, 36, 48, 60...

x1 x2 x3 x4
25: 25, 50, 75, 100...

x1 x2 x3 x4
50: 50, 100, 150, 200...



*The factors and a whole number gives the product of a given whole number.

In the example above, all multiplication equations equal the given number 24. So 24 is a multiple of those numbers.

*To find multiples, read the problem to determine how many multiples the question asks for. See example below.

6 Find 5 multiples of 6. Use multiplication. **6, 12, 18, 24, 30**

$$6 \times 1 = 6$$

$$6 \times 2 = 12$$

$$6 \times 3 = 18$$

$$6 \times 4 = 24$$

$$6 \times 5 = 30$$

*You can skip count to find multiples of a number.

A circular border composed of the digits 0 through 9, repeated twice. Each digit is a different color and has a small, cute cartoon face with eyes and a mouth. The digits are arranged in a circle, with the sequence 0-9 on the top half and 9-0 on the bottom half.

*Independent Practice is located
on separate worksheet.*