Factors & Multiples

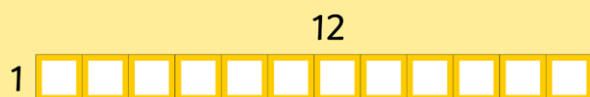## Factors

Find the different factors of a number by working out which numbers divide into it evenly.

What are all the factors of 12?

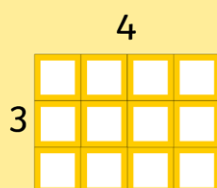$$12 \div 1 = \mathbf{12}$$

$$12 \div 2 = \mathbf{6}$$

$$12 \div 3 = \mathbf{4}$$

The factors of 12 are:

1, 2, 3, 4, 6, 12

Remember:

A factor is a number that when multiplied with another, produces a given number.

Multiples

Multiples appear in the number's multiplication table. You can calculate them by counting on by that number.
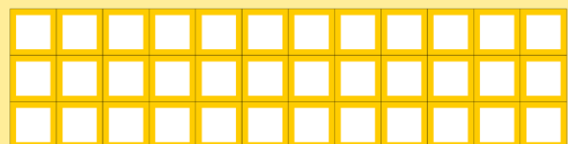
What are all the multiples of 12?
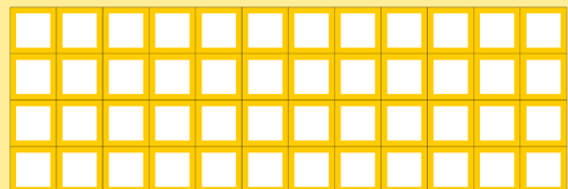
$$12 \times 1 = \mathbf{12}$$

$$12 \times 2 = \mathbf{24}$$

$$12 \times 3 = \mathbf{36}$$

$$12 \times 4 = \mathbf{48}$$

The multiples of 12 include:

12, 24, 36, 48...

Remember:

A multiple is a number that may be divided by another, a certain number of times, without a remainder.

Factor pairs are a great way to use your times tables and find 'pairs' of numbers that multiply to get your target number. If this happens then you have a factor 'pair' with each individual number being factors.

We used factor rainbows in class to show this. There are also factor 'bugs' and 'trees'.

Factor Pairs

What are all the numbers you can multiply together to get your target number?

Target Number = 36

1, 2, 3, 4, 6, 9, 12, 18, 36
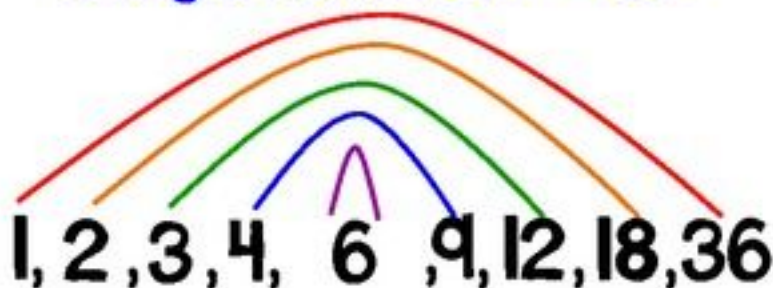
Never forget 1 and the number itself!

Example - Factors of 21
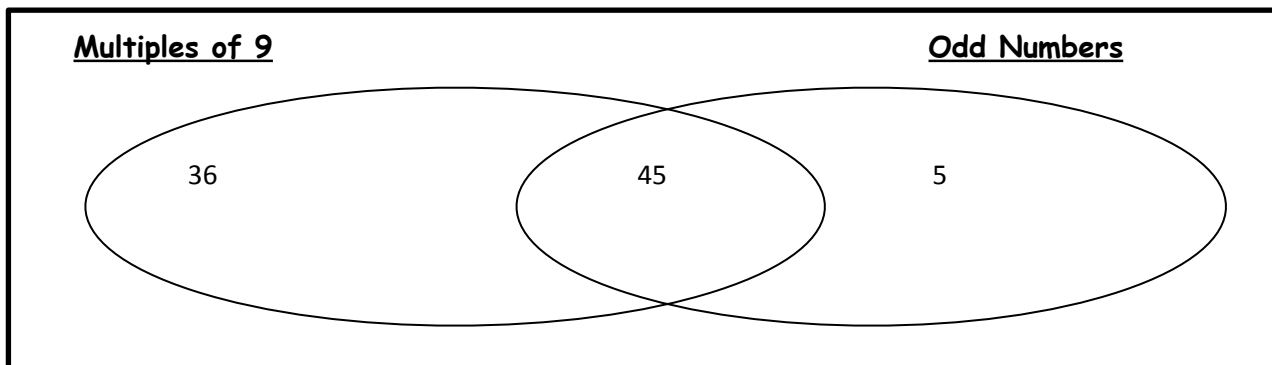
1 x 21   3 x 7

So the factors are 1,3,7 and 21

Bronze

Sorting numbers using Venn diagrams

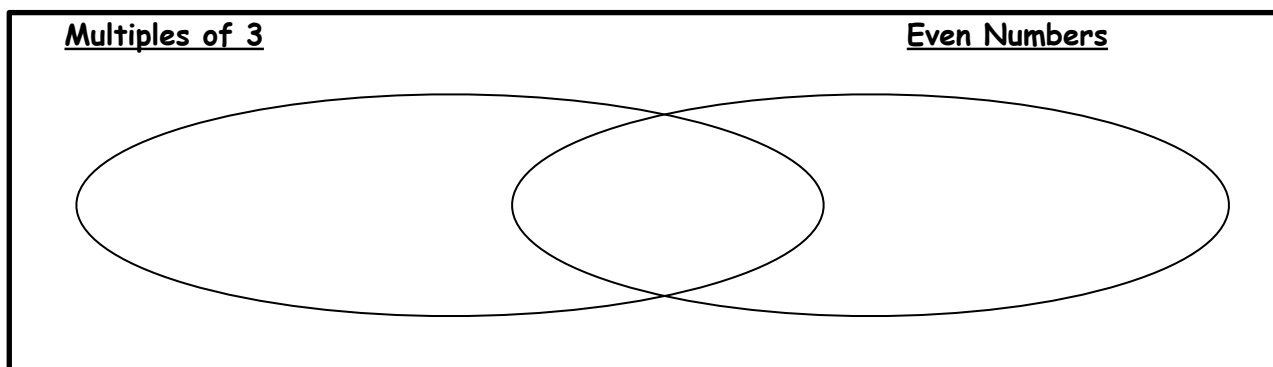1. Sort the numbers below into the correct section. Some have been done to help you start.
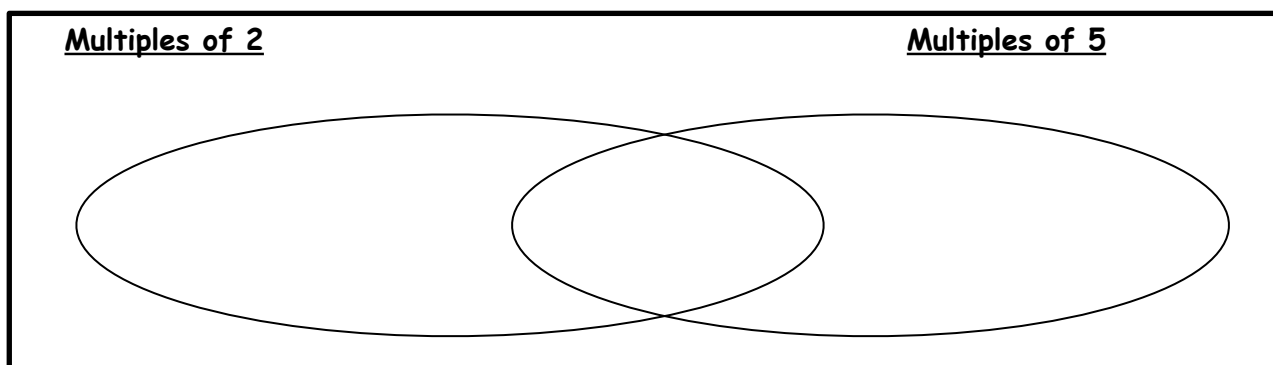
24, 7, 5, 2, 45, 63, 36

Multiples of 9   Odd Numbers

36   45   5

2. Sort the numbers below into the correct section.

3, 6, 12, 17, 21, 27, 39, 30, 24, 29

Multiples of 3   Even Numbers

3. Sort the numbers below into the correct section.

2, 5, 10, 3, 20, 15, 17, 25, 8, 6

Multiples of 2   Multiples of 5
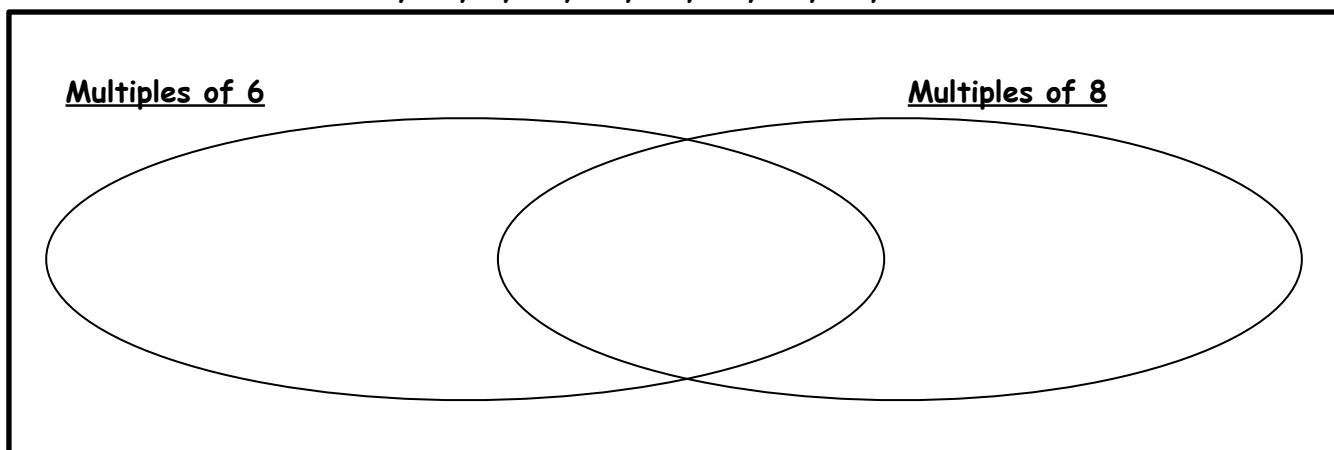
You just need to use your times tables here and odd/even number knowledge.

In the middle just means that the number is both!

4. Sort the numbers below into the correct section.

8, 24, 9, 12, 48, 16, 30, 26, 42, 6

Multiples of 6   Multiples of 8

Growth Mindset Challenge

This is two way table.

See if you can sort the numbers using the headings provided.

3, 2, 6, 11, 18, 8, 22, 33, 27, 4

	Multiple of 3	Not a multiple of 3
Multiple of 2		
Not a multiple of 2	3	11

Use each number once! Two have been done for you.

3 is a multiple of 3 but not a multiple of 2.

11 is not a multiple of 2. It is also not a multiple of 3.

Silver

Complete the factor pairs for 12

●●●●●●●●●●●● $1 \times \boxed{} = 12$

$\boxed{} \times \boxed{} = 12$
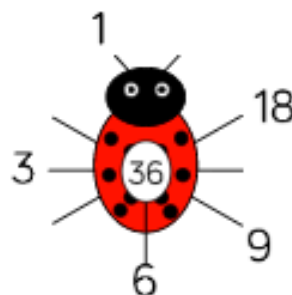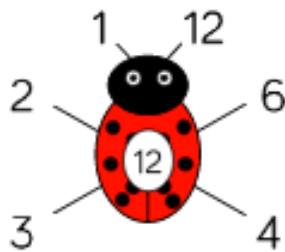
$\boxed{} \times 6 = 12$

12 has ____ factor pairs. 12 has ____ factors altogether.
Use counters to create arrays for 24
How many factor pairs can you find?

Here is an example of a factor bug for 12
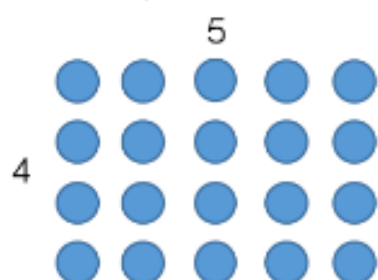Complete the factor bug for 36

1 12
2   6
  12
3   4

1
        18
3 36
        9
    6

Are all the factors in pairs?
Draw your own factor bugs for 16, 48, 56 and 35

Gold

If you have twenty counters, how many different ways of arranging them can you find?

5

4

How many factors of twenty have you found by arranging your counters in different arrays?

Circle the factors of 60

9,   6,   8,   4,   12,   5,   60,   15,   45

Which factors of 60 are not shown?

Fill in the missing factors of 24

$1 \times$ ____   ____ $\times 12$

$3 \times$ ____   ____ $\times$ ____

What do you notice about the order of the factors?

Use this method to find the factors of 42

Gold Investigation

Try and test lots of different examples!

Some numbers are equal to the sum of all their factors (not including the number itself).

e.g. 6

6 has 4 factors, 1, 2, 3 and 6

Add up all the factors not including 6 itself.

$1 + 2 + 3 = 6$

6 is equal to the sum of its factors (not including the number itself)

How many other numbers can you find that are equal to the sum of their factors?
Which numbers are less than the sum of their factors?
Which numbers are greater than the sum of their factors?

Silver

1 x 12   2 x 6   3 x 4
12 has 3 factor pairs and 6 factors.
1 and 36   2 and 18   3 and 12   4 and 9   6

Gold

1 x 20   2 x 10   4 x 5
4, 6, 60,12, 5 and 15 - Try to find/think of the rest!
1 x 24   3 x 8   2 x 2   4 x 6