

## 1. Consecutive sums

*What you have to do*

Consecutive numbers are numbers that come next to each other when you count:

5 and 6 are consecutive numbers;

12, 13 and 14 are consecutive numbers;

98, 99, 100, 101 and 102 are consecutive numbers.

But 5 and 7 aren't consecutive, 12 and 14 aren't and 99 and 102 aren't.

Some numbers can be made by adding together two or more consecutive numbers:

9 can be made by adding together 4 and 5.

This can be written as the addition  $4 + 5 = 9$ ;

It can also be made by adding together 2 and 3 and 4.

This can be written as  $2 + 3 + 4 = 9$ ;

10 can be made by adding together 1 and 2 and 3 and 4.

This can be written as  $1 + 2 + 3 + 4 = 10$ .

Find out which numbers from 1 to 10 can be made in this way. Keep a note of how you made each number, and which numbers can be made in more than one way (like 9 in the example above).

Now try the numbers from 10 to 20. Are there any of these you cannot make?

What about the numbers from 20 to 30, 30 to 40 and so on? You can carry on as far as you like! You should try all the numbers to at least 50 so that you can spot any patterns you might see and explain them to your teacher.

Try to answer these questions:

Which numbers can you not make? (Check first to be quite sure.)

Which numbers can you make in only one way?

Which numbers can you make in two different ways?

Are there any numbers you can make in three different ways?

Are there any you can make in four different ways?

## 1. Consecutive sums

Numbers 1, 2, 4, 8, 16, 32, 64, ..... Cannot be made by adding together two or more consecutive numbers (these numbers are the powers of 2:  $2^0, 2^1, 2^2, 2^3, 2^4$  etc.)

There are many patterns to be found, some of which are:

The sum of two consecutive numbers is always odd;

The sum of three consecutive numbers, two of which are even, is always odd;

The sum of three consecutive numbers, two of which are odd, is always even;

The sum of four consecutive numbers will always be even and so on;

The numbers 6, 9, 12, 15 etc. can be expressed as the sum of 3 consecutive numbers. (The odd numbers amongst them can also be expressed as the sum of two consecutive numbers.)

By constructing a table as illustrated on the following page other patterns become obvious. How far children go with this investigation is a matter of their ability and interest. However, children capable of attempting this investigation should at least be able to deduce that:

Some numbers can be expressed in more than one way;

Only odd numbers can be expressed as the sum of two consecutive numbers;

The numbers made by adding three consecutive numbers go up in steps of 3 (6, 9, 12 etc).

Number	Two consecutive	Three consecutive	Four consecutive	Five consecutive
1				
2				
3	1 + 2			
4				
5	2 + 3			
6		1 + 2 + 3		
7	3 + 4			
8				
9	4 + 5	2 + 3 + 4		
10			1 + 2 + 3 + 4	
11	5 + 6			
12		3 + 4 + 5		
13	6 + 7			
14			2 + 3 + 4 + 5	
15	7 + 8	4 + 5 + 6		1 + 2 + 3 + 4 + 5
16				
17	8 + 9			
18		5 + 6 + 7	3 + 4 + 5 + 6	
19	9 + 10			
20				2 + 3 + 4 + 5 + 6
21	10 + 11	6 + 7 + 8		
22			4 + 5 + 6 + 7	

## 1. Flags of the world

*What you have to do*

Find pictures of as many different flags as you can. These can be national flags from anywhere in the world, flags used at sporting events such as the chequered flag, or any other flags you might find.

Some good places to look are:

The library where you might find flags in an encyclopaedia, an atlas or a book about flags;

The Internet;

Books in your classroom or around the school;

Books at home.

When you have a good collection of flags (and this may take some time) you can begin to look at them carefully. It will be useful if you can cut the flags out but be sure to check first that this is allowed. You might like to try some or all of these activities:

1. Sort them in different ways, for example:

By colour - those that have some red on them perhaps;

By shape - those that have stripes, squares, stars etc.;

Any that have animals on them might go together.

These are just a few ideas. Think of some interesting ways to sort them.

2. Choose some flags with stripes, or with squares or crosses. Work out what fraction of the flag is coloured red, blue, green etc.

Try to do some of the more difficult ones. You might need to do some measuring, and you might need to ask for some help.

If you can't work out the fractions exactly, make a good estimate.

## 1. Flags of the world (*continued*)

3. Find some flags that have symmetry. Find some with:
- One line of symmetry;
  - Two lines of symmetry;
  - More than two lines of symmetry;
  - Rotational symmetry.

If you can cut them out or copy them, draw the lines of symmetry on the flags.

4. Design your own flag. Set yourself some rules.  
Perhaps you decide it must be certain colours and a quarter of it must be blue.  
Or it must have stripes, or squares, or a cross.  
Perhaps your rules say it must have one line of symmetry.  
Make up your own rules.  
When you have made your flag write down what its purpose is.
5. Choose 3 or 4 flags that you especially like and find out everything you can about the flag and the country (or whatever else) it represents.

Talk to your teacher about how you might keep a record of all your work.

## 1. Flags of the world

Children may need help in gathering a collection of flags. Some of the tasks will be much easier if the flags can be cut out, so you may like to consider making copies of ones that the children find in books, on charts etc.

The following are very useful sites providing a wealth of information and opportunities to download pictures of flags. They are not child-friendly, however, as they contain so much complex information, but offer plenty of background guidance and ideas.

[www.flags.net](http://www.flags.net)

[www.crwflags.com/fotw/flags](http://www.crwflags.com/fotw/flags)

Depending on ability some children may need help with measuring/estimating areas and fractions.

You may want to confine the children's work to, say, national flags, or sporting flags, flags representing organisations, charities, religions etc. if this will fit in better with other work in the classroom at the time. (It will also make the task more limited and manageable.)

You will need to discuss with the children how they will keep a record of their work - perhaps provide them with a large format book (scrapbook?) in which they can keep copies of flags, drawings, any written work they might do etc.

Or perhaps they could have a dedicated display area on which to build up an interactive display as they progress. This could then be a whole class, interactive resource.