

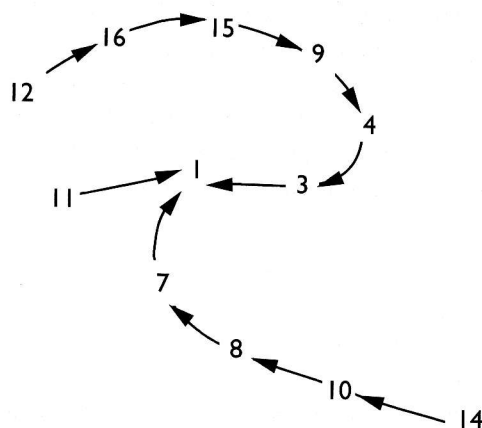
This idea works as follows:

- Start with a number and write down its divisors.
- Add these divisors together apart from the number itself.
- For example, the divisors of 12 are 1, 2, 3, 4, 6 and 12.
- Add these divisors together, apart from number 12, i.e.  $1 + 2 + 3 + 4 + 6 = 16$ .
- 16 now becomes the second number in this divisor 'chain'.
- Adding the divisors of 16 (apart from 16 itself) we have  $1 + 2 + 4 + 8 = 15$ .

The chain continues as follows:

$12 \rightarrow 16 \rightarrow 15 \rightarrow 9 \rightarrow 4 \rightarrow 3 \rightarrow 1$ .

Other starting numbers can subsequently be added to the diagram, for example:



This could make a wall display and be used as a stimulus for discussion, for example:

- What numbers go directly to 1? Why does this happen?
- What happens to powers of two, i.e. 2, 4, 8, 16? Why does this happen?

The first idea is more a case of 'divisors in reverse' as it is about working with Lowest Common Multiples (LCMs).

Choose a number, for example, 10.

Partition it into addition pairs, for example, 9 and 1, 8 and 2, 7 and 3, etc.

Determine the LCM of each pair, for example:

- the LCM of 9 and 1 is 9;
- the LCM of 8 and 2 is 8;
- the LCM of 7 and 3 is 21.

The idea is to find the *largest* LCM that appears in a completed list, so that students can try to predict which number pair for any starting value produces the largest LCM.

Students might similarly explore lowest LCMs.

The final idea is another 'practise and consolidation' type of task where the context is to classify numbers as 'Abundant', 'Deficient' or 'Perfect'. These terms are defined according to whether the sum of the divisors (excluding the number itself) is greater than, less than or equal to the number under consideration.

For example, the number 12 is abundant because its divisors of 1, 2, 3, 4 and 6 total to 16 which is greater than 12.

The number 10 is deficient because its divisors of 1, 2 and 5 total to 8 which is less than 10.

Perfect numbers are very rare, once the first four have been found students will need to start searching in the millions to find the next, so most numbers can be classified as 'abundant' or 'deficient'.