

### Why use this resource?

Students have to sort sequences based on properties that they have decided on. The set of sequences given contains properties such as [arithmetic](#), [geometric](#), [convergent](#), [divergent](#), [increasing](#), [decreasing](#) and [periodic](#) so students should be encouraged to sort them more than once to give a greater opportunity for different properties to be recognised. There are several sequences included in the set that may help to test the definitions of properties that students have provided.

This resource can also be used to build language and definitions if students have not met these words before.

### Preparation

Print out the [cards](#) and have poster paper available for students to note their groupings.

### Possible approach

Students could work in small groups to sort the sequences and to try to define the properties they have used. It is worth observing that there are several ways of grouping the sequences, therefore students should be encouraged to group them in more than one way. If students are struggling to group in different ways then other students could be asked to share their headings and definitions, but not their grouping. This might bring out some interesting discussions such as whether  $1, 1, 1, 1, \dots$  is convergent. There are also some prompting questions in the [Suggestion](#).

As a class, discuss the different properties that students have used for their groupings. You may wish to share some [possible groupings](#) as a starting point for discussion. Alternatively, students could be given copies of these same [three suggested groupings](#) without any headings. Do these use any of the properties the students identified for themselves?

To finish, students could be asked to write down their definitions of the properties that have been discussed including their own examples of sequences (and perhaps non-examples as well).

## Key questions

- How have you defined periodic/arithmetic/convergent... sequences?
- Are there any sequences that you aren't sure fit your definitions?
- Are there any sequences that have more than one of the properties you've identified?

## Possible support

These questions could be used to help students to start either their first or second way of grouping the cards.

- What sequences have you met before? What properties do they have?
- How do you generate the next term in each sequence? What will the  $n^{\text{th}}$  term be?
- What would it look like if you plotted the sequences on a graph?

Students could also be given a copy of one or more of the [grouping diagrams](#) and be asked how they think these groupings were constructed.

## Possible extension

- Can you make up some of your own sequences which fit your groupings?
- Can you make up a sequence that does *not* fit in with any of these groupings?