**Y13 A level Mathematics**

**24 Sequences and Series 2 weeks**

## Teaching objectives

**a** To generate sequences from given nth terms

**b** To generate sequences from a given recurrence relations

**c** To understand and use the sigma notation for the sum of series

**d** To be able to find the nth term for an arithmetic sequence

**e** To be able to find the sum to n terms of an arithmetic series

**f** To understand the difference between arithmetic and geometric sequence and series

**g** To be able to find the nth term of a geometric series

**h** To be able to find the sum to n terms of a geometric series

**i** To be able to find the sum to infinity of a convergent series including the use of 

**j** be able to use sequences and series in modelling

**Resources for advance preparation:**

[SW: Introduction to sequences and Series](https://www.stem.org.uk/resources/elibrary/resource/32369/sequences-and-series) (last page maybe)

[UM: Sort it out](https://undergroundmathematics.org/sequences/sort-it-out) (print cards students can cut out)

[KM: Introductory Problems](http://www.kangaroomaths.com/free_resources/ks5/resources/session4/introducingsequencesandseries/) (print out the problems 1 per group)

[KM: Trio](http://www.kangaroomaths.com/free_resources/ks5/resources/session4/as/trio/) (1 set per group)

[Sequence sorting from SRWhitehouse on TES](https://www.tes.com/teaching-resource/geometric-series-6146796) (1 sheet per student)

[SW: Sorting Sequences](https://www.stem.org.uk/system/files/elibrary-resources/legacy_files_migrated/25262-Sorting%20Sequences.pdf) (print blank venn diagrams per group)

[SW: Matching the sequence](https://www.stem.org.uk/system/files/elibrary-resources/legacy_files_migrated/25259-Matching%20the%20Sequences.pdf) (1 card set per group)

[AS Loop](http://www.kangaroomaths.com/free_resources/ks5/resources/session4/as/matchup.xls) (1 set per group)

[KM: TRIO](http://www.kangaroomaths.com/free_resources/ks5/resources/session4/gs/trio) (1 set per group)

[SW: Which belongs to which](https://www.stem.org.uk/system/files/elibrary-resources/legacy_files_migrated/25261-Which%20belongs%20to%20which.pdf) (1 card set per group although could project)

[SW: Find the Sequence](https://www.stem.org.uk/system/files/elibrary-resources/legacy_files_migrated/25679-APs%20and%20GPs_Find%20the%20Sequence.pdf) (1 card set per group)

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|  | **Starter** | **Main teaching**  Including key questions, key teaching points, models and resources | **Notes**  Including Support and Extension | **Consolidation/Plenary**  Including key questions and homework |
| **1-2** | [SW: Introduction to sequences and Series](https://www.stem.org.uk/resources/elibrary/resource/32369/sequences-and-series)  [UM: Sort it out](https://undergroundmathematics.org/sequences/sort-it-out)  Gets students talking about increasing, decreasing and periodic sequences again  [KM: Introductory Problems](http://www.kangaroomaths.com/free_resources/ks5/resources/session4/introducingsequencesandseries/) (could do in groups as a carousel or class feedback) | Within these tasks introduce all terminology and deal with understanding and using sigma notation.  [**RISP 20**](http://www.s253053503.websitehome.co.uk/risps/risp20.html)to get the idea of computers involved – this can then be returned to later in the unit to look at algebraically  Having gone through a range of recurrence relations use MWB for example get students to define; arithmetic, geometric, divergent, convergent, oscillating, periodic could then use [SW: Sorting Sequences](https://www.stem.org.uk/system/files/elibrary-resources/legacy_files_migrated/25262-Sorting%20Sequences.pdf) more able might be able to discuss sum of series being finite for some series but probably leave discussion for later once sum of series introduced.  **Chinese Whispers** – first student writes a sequence (define some rules for this) the next student writes a recurrence relation/nth term for this sequence fold the top part over so only the relationship is seen and passes on, next student writes sequence generated, repeat over and over. Has the sequence remained the same throughout? Where were the mistakes? This can be used at any point during the module as more sequence types become known. | Use calculator’s functionality or spread sheets to speed up the analysis of recurrence relations. Setting up of the correct formulae by the students is an important skill  Can use idea within [MEI: SoW](http://www.mei.org.uk/files/sow/23-sequences-and-series.pdf)  Could be useful for introducing Sigma notation  Get students to attempt [**RISP 14**](http://www.s253053503.websitehome.co.uk/risps/risp14.html)with computers/calculators  [UM: Sum Estimating](https://undergroundmathematics.org/sequences/sum-estimating) | Use old exam questions  [BOTM: Recurrence Plenary](http://www.kangaroomaths.com/samples/activities/c1ss_recurrence.htm) (project this)  **Homework**: Routine Practice or Integral Exercises |
| **3-4** | [UM: Change one thing](https://undergroundmathematics.org/sequences/change-one-thing)  Integral Skills checks  Maths box 3 QN starters | Lesson material aiming to cover arithmetic sequences and series  [SW: Matching the sequence](https://www.stem.org.uk/system/files/elibrary-resources/legacy_files_migrated/25259-Matching%20the%20Sequences.pdf)  N13: Standards Unit  Integral: Actiivity 2: student technology task  [KM: Trio](http://www.kangaroomaths.com/free_resources/ks5/resources/session4/as/trio/)  [AS Loop](http://www.kangaroomaths.com/free_resources/ks5/resources/session4/as/matchup.xls)  [KM: PROBING QUESTIONS](http://www.kangaroomaths.com/free_resources/ks5/app/c1seqandserapp.doc) | [KM: Things to make you go hmmmmmm…….](http://www.kangaroomaths.com/free_resources/ks5/resources/session4/truesometimesnever.ppt) (includes GP as well) | [Modelling example](http://www.thechalkface.net/resources/money_matters.pdf)  [UM: R9468](https://undergroundmathematics.org/sequences/r9468)  [UM: R8249](https://undergroundmathematics.org/sequences/r8249)  [KM: On Target\*](http://www.kangaroomaths.com/free_resources/ks5/ontarget2006/c1/seriesandsequences.doc)  **Homework:** Routine practice or Integral Exercises |
| **5-7** | Integral Skills Check  Maths box 3 QN starters  MWB recaps of previous lessons | Lesson materials aiming to cover geometric sequences and series  [Sequence sorting from SRWhitehouse on TES](https://www.tes.com/teaching-resource/geometric-series-6146796)  [Project Maths resources on Geometric Sequences](http://www.projectmaths.ie/documents/T&L/GeometricSequences.pdf)  [Project Maths resources on Geometric Series](http://www.projectmaths.ie/documents/T&L/GeometricSeries.pdf)  [KM: TRIO](http://www.kangaroomaths.com/free_resources/ks5/resources/session4/gs/trio) | [**RISP 20**](http://www.s253053503.websitehome.co.uk/risps/risp20.html)  Modelling  [UM: Achilles and the Tortoise](https://undergroundmathematics.org/sequences/achilles-and-the-tortoise)  [Don Steward](http://donsteward.blogspot.co.uk/2017/04/geometric-sequences.html) | [UM: R9177](https://undergroundmathematics.org/sequences/r9177)  [UM: R7487](https://undergroundmathematics.org/sequences/r7487)  [Money Modelling](http://www.thechalkface.net/resources/currency.pdf)  [KM: On Target](http://www.kangaroomaths.com/free_resources/ks5/ontarget2006/c2/seriesandsequences.doc)  **Homework:** Routine practice or Integral Exercises used across lessons as appropriate |
| **8-10** | [RISP 2](http://www.s253053503.websitehome.co.uk/risps/risp2.html)  Integral Skills Check  Maths box 3 QN starters | A series of activities that can be used once students have a sound understand of the material in this unit as they are somewhat synoptic  MEI: Thinking about sequences  [UM: Common Terms](https://undergroundmathematics.org/sequences/common-terms)  [SW: Find the Sequence](https://www.stem.org.uk/system/files/elibrary-resources/legacy_files_migrated/25679-APs%20and%20GPs_Find%20the%20Sequence.pdf)  [SW: Which belongs to which](https://www.stem.org.uk/system/files/elibrary-resources/legacy_files_migrated/25261-Which%20belongs%20to%20which.pdf) |  | [UM: R6405](https://undergroundmathematics.org/sequences/r6405)  **Homework:** Topic Assessment |