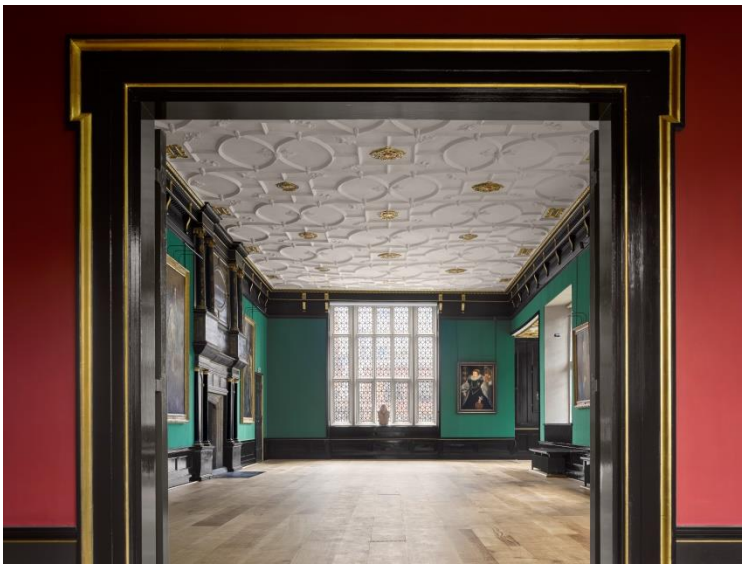
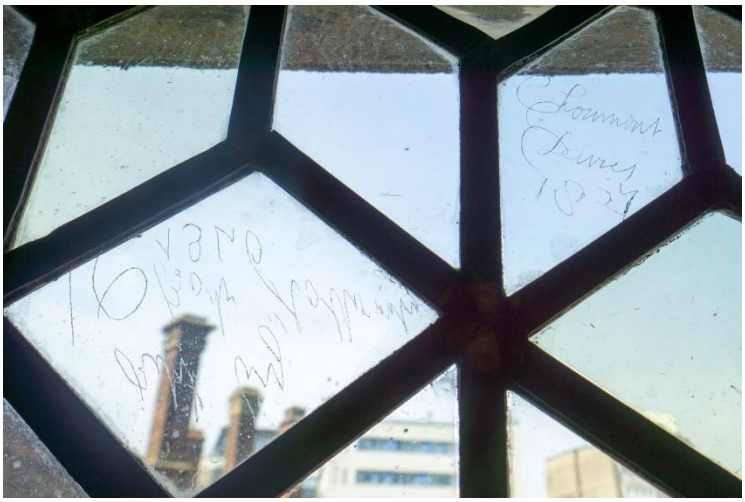
Maths KS2





The Tudor Windows

The magnificent windows in the Great Chamber are typical of Tudor style. Glass was extremely expensive and most houses in the 1500s had shutters instead of glass, or sometimes used very thin-shaved animal horn to let in some (minimal) light, but keep out the wind and weather. In the 1500s, it became possible to make slightly larger sheets of flat glass which could be held together in a lead lattice frame. Lattices themselves became geometric works of art as windows in wealthy people's homes became larger and larger. Thomas Howard installed most of the windows in this room in 1570 and was displaying his huge wealth. The window at the far end of the room was installed in 1870 to add further light re-using old panes of glass. Many have names scratched on them by resident Brothers, schoolboys or glaziers.

Friday Afternoon Maths

If Friday afternoons are good for gazing out of the window, here are a few ideas for fun Friday maths starting with the fabulous Tudor windows of the Great Chamber.

The pattern in the lattice is fascinating and can do strange things to the eyes. Hexagons? Stars? Tumbling blocks? Concertina-folds? Strings of diamonds?

Years 3-4

Shape and tessellation

The lattice is actually made up of **pairs of inflected parallelograms and one rhombus**.

Use the printable diagram below and play with the measurement data to explore

- basic geometry of parallelograms and rhombuses
- area, angles and tessellation
- Calculate the number of parallelograms or rhombuses needed for the alcove window
- Determine area of the alcove window
- Calculate the volume of the room
- Explore the Golden Ratio of architecture or art.

Facts in Parallelograms

Measurements of lattice panes

- Rhombus 8cm x 8cm
- Parallelogram 10cm x 8cm

Measurements of room

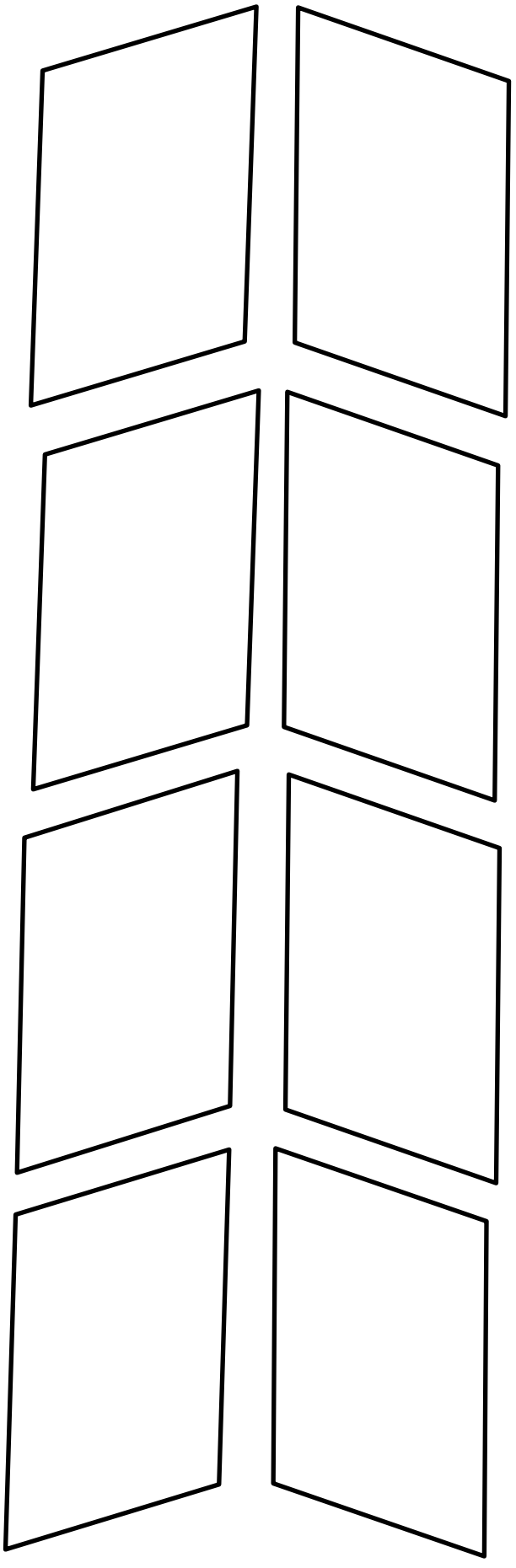
- Height 5.5m
- Length 19.8 m
- Width 6.8 m

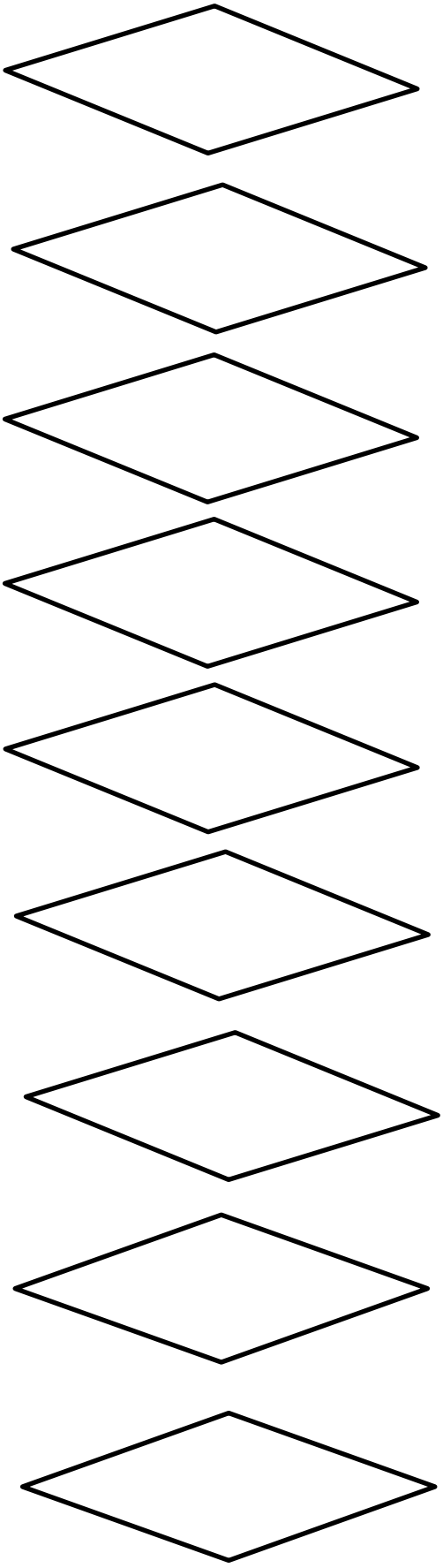
Alcove window: 4.75m x 3.5m

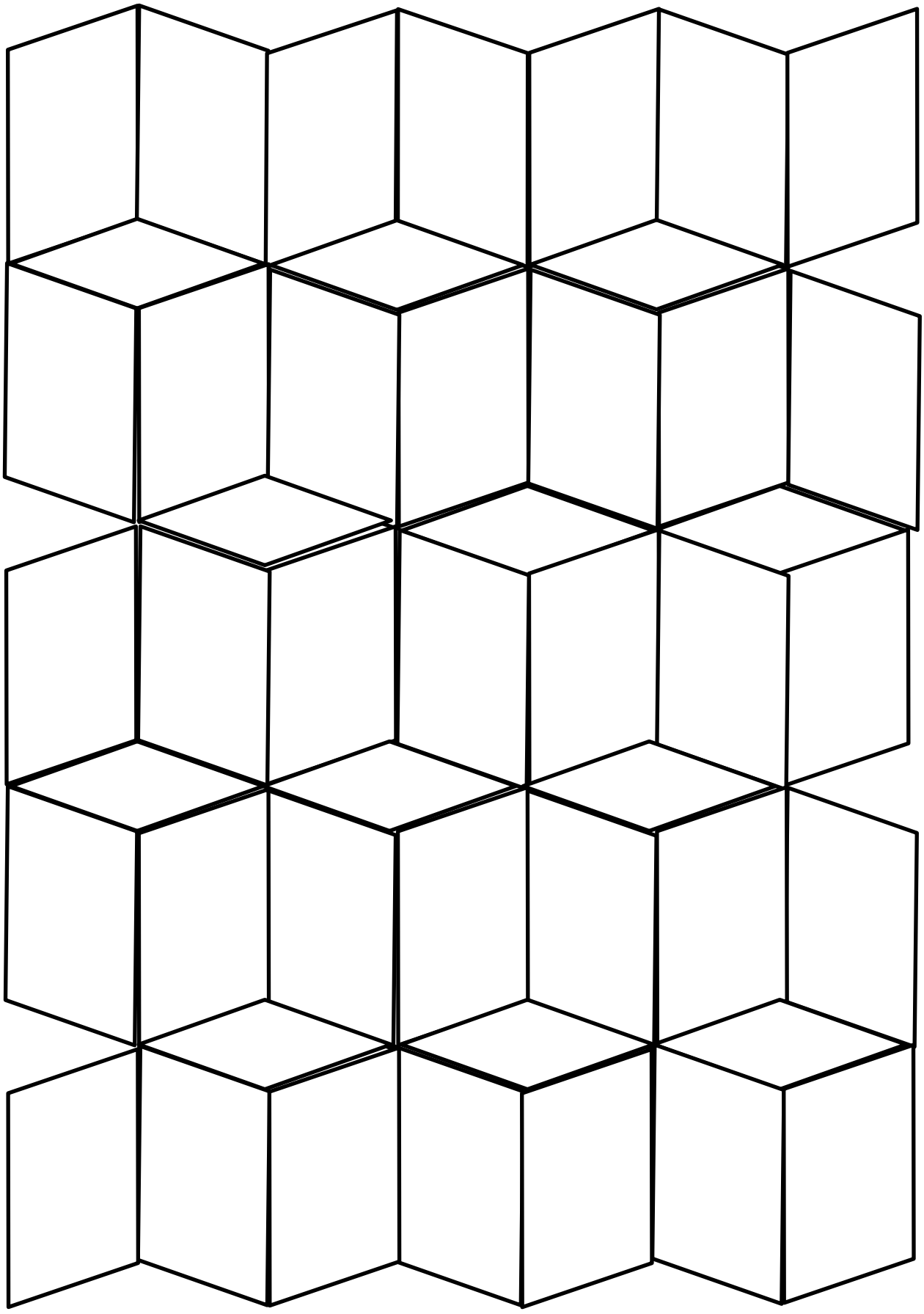
Ideas for fun mathematical art

To explore basic tessellation, copy the diagram of parallelograms and rhombuses onto sheets of different, dark and light coloured papers. Cut out and create amazing patterns using shade and light.

As introduction to topography, copy the lattice onto sheets of photocopy-able acetate. Use highlighter pens to colour in the sections. Try to ensure that no two adjoining shapes are the same colour. Mount in a frame of black craft paper to create stunning stained glass windows.



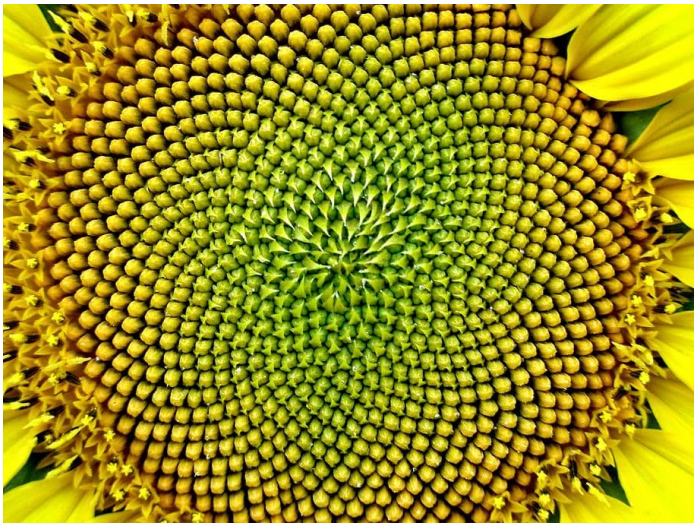


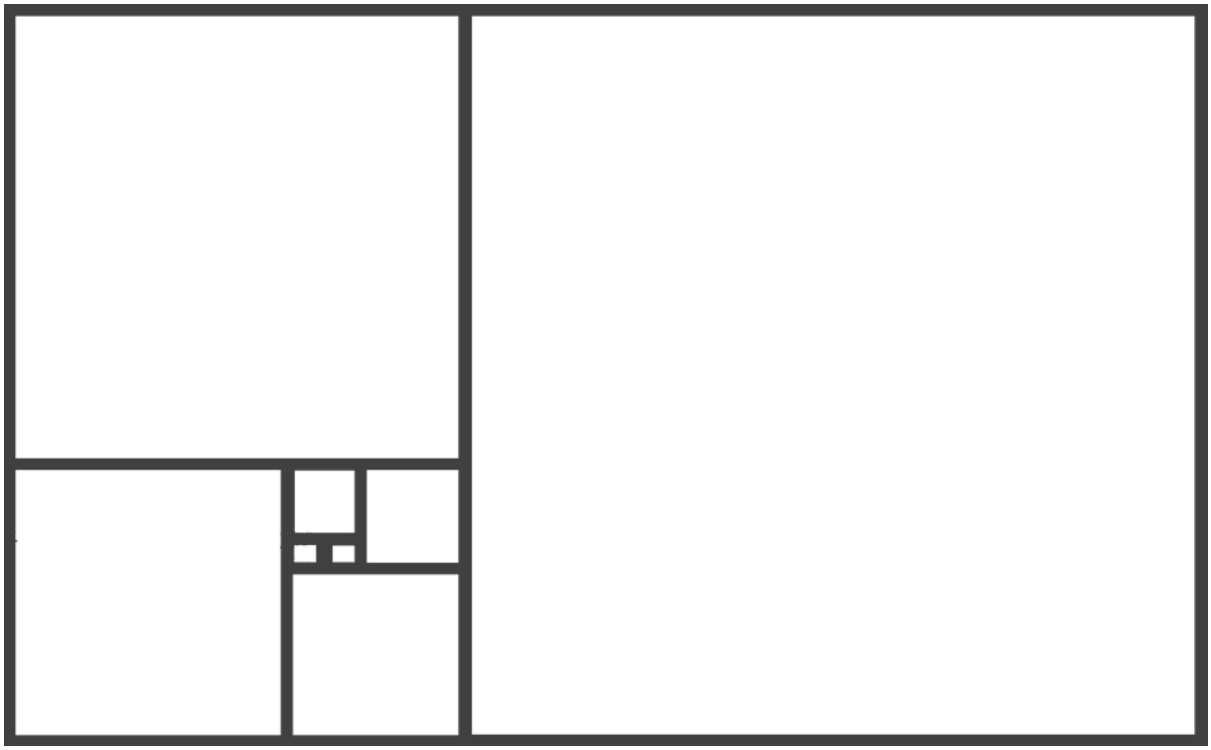


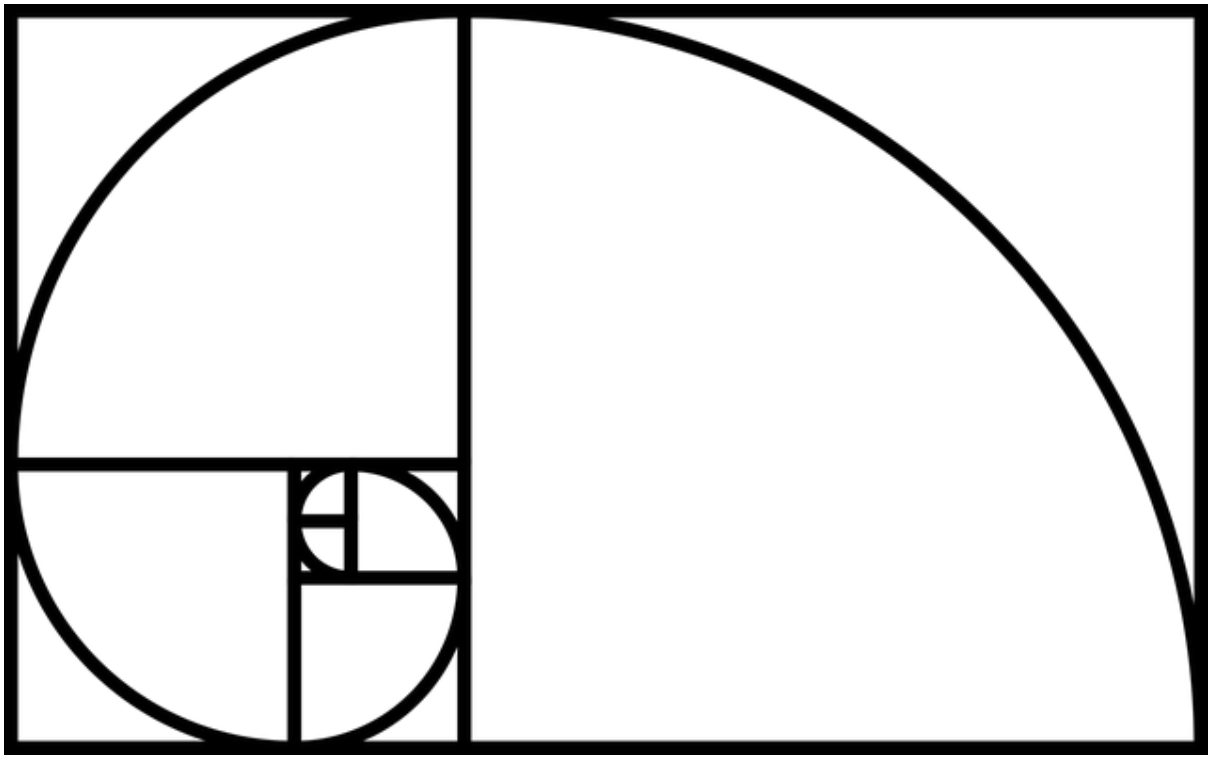
Years 5-6

Perfect Proportions

The room itself is closely proportioned to the ***Golden Ratio*** – a proportion of measurements frequently found in nature as a spiral constructed to the ratio. See diagrams and examples from nature below.





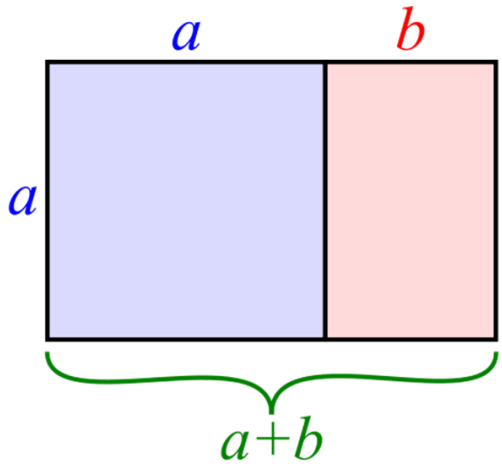


The ratio has been used in art, music, and classical architecture since its discovery by the ancient Greek sculptor of the Parthenon statues Phidias and mathematician, Euclid. Artists from Leonardo da Vinci to Mondrian, the proportions of a violin to the intervals in a musical scale, from the Parthenon building to St Pauls Cathedral, the Golden Ratio is everywhere as rectangles and spirals! It's an instinctively, perfect shape, governing our intuitive sense of classical balance and beauty.

The Golden Ratio is demonstrated in the Fibbonaci Sequence of numbers. This sequence is made by starting with 0 and 1 and adding the previous two digits to create the third. A rectangle drawn to the Golden Ratio proportions would follow these numbers.

0, 1, 1,2, 3, 5, 8, 13, 21, 34, 55, etc

If a = 8, then b would = 5 Or if a=21, then b would = 13



a+b is to a, as a is to b or 1.618:1

The Great Chamber is close to 2 of these Golden Rectangles placed end to end.

To draw a 'Perfect' rectangle to the Golden Ratio

- Draw a square with sides of any length
- Find the exact centre of the bottom edge and place the point of a pair of compasses on it
- Place the pencil on an upper corner of the square
- Draw an arc down to an extended lower line of the square. This marks the lower corner of the rectangle

For a simple explanation of the relationship between these numbers, rectangles and spiral, how to draw a Golden Rectangle and where maths meets art, the following blog explains concisely

Golden ratio in art