

Teacher's Overview

In this UKS2, 60 minute lesson, children are introduced to the Fibonacci sequence and its importance in nature. Children recreate the Golden Spiral and produce a clay plate containing its image. Finally children solve a puzzle based upon the Fibonacci sequence.

National Curriculum 2014 Links

Generate and describe linear number sequences.

UKS2 Learning Objective:-

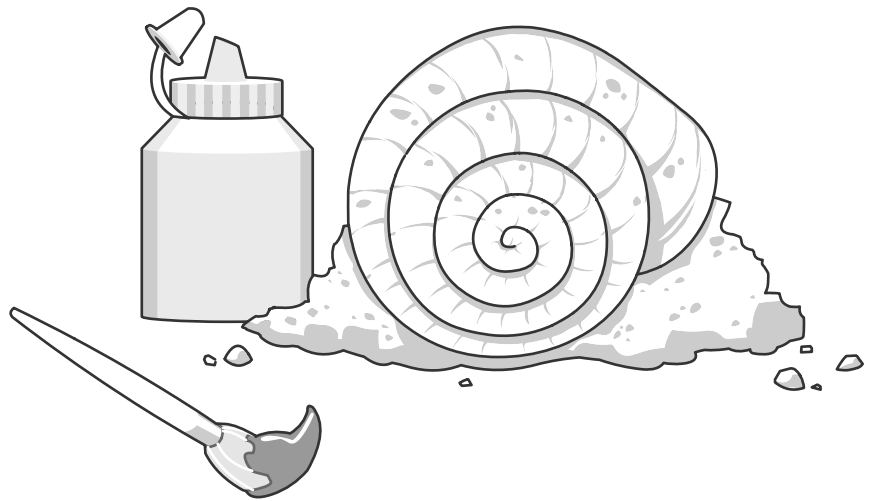
To recreate the Golden Spiral and to apply the Fibonacci sequence to real life problems.

Keywords

Fibonacci
sequence
spiral

Resources

- quick drying clay
- paint and glaze
- clay utensils
- Reference Sheet 1
- cm square paper
- rulers
- compasses (optional)



Starter 0-15 minutes:

1,1,2,3,5,8,13,__,__,__

Display this sequence of numbers.

Do any of the children recognise this sequence?

Can they continue the sequence?

Can they identify a rule for this sequence?

Main 15-45 minutes:

Explain to the children that this sequence is called the Fibonacci sequence. Explain the history of its discovery and how it can be seen throughout nature. (See Teacher's Notes). The terms of the sequence are produced by adding together the previous two terms. The next 3 terms of the sequence are 21, 34 and 55.

Explain to the children that today they will be creating a Fibonacci clay plate, based on the Golden Spiral.

Issue the children with the Reference Sheet and squared paper. Children should recreate the Golden Spiral on the paper, drawing the curve using a pair of compasses (optional).

Children should then cut around the outside square of the spiral, to create a template.

Distribute a portion of clay to each child and direct them to roll it out until it is at least 26cm x 16cm x 1cm. This size of clay plate should be able to accommodate 4 Golden Spirals.

Place the Golden Spiral template on the clay and gently trace around the spiral and the squares. Repeat this 4 times until the plate has four images of the Golden Spiral.

Each section of the spiral can be decorated with an individual pattern and once dry the plate can be painted and glazed.

Extension:

Research other repeating patterns in nature, such as tessellating patterns and use these as inspiration when decorating the plate.

Plenary:- 45-60 minutes

Klara, Sten, Stig, Manu, Chip and Meg are having a tea party and Meg and Chip don't want to sit next to each other. How many ways could the EducationCity characters sit? If we have 1 chair, 2 chairs, 3 chairs, 4 chairs. Hint: use a different colour or symbol to distinguish Meg and Chip from the other EducationCity characters.

Klara, **S**ten, **S**tig, **M**anu, **M**eg and **C**hip

- 1 chair** striped or solid **2 ways**
- 2 chairs** striped solid or solid striped or solid solid **3 ways**
- 3 chairs** striped solid striped, solid solid striped, solid striped solid, solid striped striped, solid solid solid **5 ways**
- 4 chairs** striped solid striped solid, solid solid solid striped, striped solid solid solid, solid striped solid striped, solid solid striped solid, solid striped solid solid, solid solid solid solid, striped solid solid striped **8 ways**

Teacher's Notes:

Fibonacci (otherwise known as Leonardo of Pisa) was born in the Italian town of Pisa around 1175AD. He was a great mathematician who spent much of his formative years travelling around the Mediterranean coast, mixing with merchants and learning about arithmetic. He was considered by many to be the most talented mathematician in the middle ages. In 1202 Fibonacci published a book called "Liber abaci". The book was based around the algebra and arithmetic that he had come across during his travels and contained a selection of mathematical problems aimed at merchants. One of the problems in the book was about a

pair of rabbits it asked the question:-

When a pair of rabbits is two months old, it produces another pair and from then on produces one pair every month. Starting with the one pair at the beginning of a year, how many pairs of rabbits will there be at the end of the year?

The answer can be seen in the following table. The totals form the Fibonacci sequence.

Month	Pairs of Infant Rabbits	Pairs of Mature Rabbits	Total
1	1	0	1
2	0	1	1
3	1	1	2
4	1	2	3
5	2	3	5
6	3	5	8
7	5	8	13
8	8	13	21

The sequence that Fibonacci discovered can be seen throughout nature. For example, tree branches rotate around the trunk in a pattern based on the Fibonacci numbers. The Fibonacci sequence also appears in the number of leaves found on plants, the patterns in the petals of flowers, in the scales of a pineapple and in pinecones and fir cones. The Fibonacci numbers apply to the growth of every living thing, even mankind. This spiral affect that the Fibonacci sequence creates, is known as the Golden Spiral.

