Sacred Images - Mathematics and Fibonacci Numbers

Summary

Many of the geometric shapes that we use in mathematics can be found in the photographs of rock art, as well as in nature. Leonardo Fibonacci was interested in spirals and numbers, and discovered that there are patterns in nature that can be explained with numbers.

Time Frame

3 class periods of 45 minutes each

Group Size

Individual

Life Skills

Thinking & Reasoning

Materials

53 or more counters or markers- kernels of popcorn, small rocks, beans, seeds, jellybeans, etc., all about the same size.
Paper for writing numerical patterns

Background for Teachers

Spirals and circular shapes are commonly found in nature. Native Americans know of the power and sacredness of the circle as it represents the many forms in nature. Their world is one of primarily rounded shapes while the world of the White Man is one of mostly squares and angles. In 1202, Leonardo Fibonacci, of Pisa, used a sequence of numbers that he discovered were found in pine cone spirals. These pine cone spirals are beautiful, natural models of a mathematical idea called exponential growth.

Instructional Procedures

Activity: Spot the pattern

See if your students can spot the pattern in his number sequence:

0	3+5=8
1	5+8=13
1+1=2	8+13=21
1+2=3	13+21=34
1+3=5	21+34=55

Just add the last two numbers of the sequence together to get the next number. This is called the pattern of consecutive sums.

Here is a list of the first 20 Fibonacci numbers: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610, 987, 1,597, 2,584, 4,181, 6,765

Activity: Nature Walk

Go on a Nature walk and look for spiral and circular shapes in nature.

Do you see many shapes in Nature with angles (squares, rectangles, triangles)?

Find a few pine cones and count the number of spirals and watch for the Fibonacci sequence. Counterclockwise, there are 13 spirals, and when you count clockwise, you'll find 8. This same sequence is found in several mathematical formulas and in natural forms such as plants and flowers.

Why do you think this is? No one knows why and this remains a mystery.

Activity: "Build a Spiral with Fibonacci Numbers"

To start the spiral, place one counter on the table or floor. This represents "1", the first number of the sequence.

Place another counter below it. This counter represents the "1" which is the second number of the sequence.

Now place one counter next to the last one to make a line of two counters. This represents the "2", the third number of the sequence.

Directly above the "2" line, place two more counters to make a row of three for the "3" line. Just to the left of the "3" line, make a row of five counters for the "5" line.

Just below the "5" line, make a row of eight counters. To the right of the eight line, make a row of 13. Directly above the "13" line, make a row of 21. If you have the markers, the time, and the space. You can keep going! This shape is a common shape used for centuries by many great civilizations, including the Egyptians, the Greeks, and the Native Americans.

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