For Creative Minds

Number Patterns

A number pattern is a list of numbers that follows a particular sequence.

When a number pattern is made by skip counting, it is an **arithmetic sequence**. For example, "5, 10, 15, 20," is an arithmetic sequence. This sequence is made by skip counting with fives. The number you skip count by—in this case, 5—is called the common difference.

Some number patterns use multiplication to find the next number. This is called a **geometric sequence**. For example, "1, 3, 9, 27" is a geometric sequence. Each number is the product of 3 and the previous number.

There are other kinds of number patterns that are not arithmetic or geometric patterns. One example is the pattern Eli discovers in the zoo: the Fibonacci sequence. A mathematician named Leonardo Pisano (whose nickname was Fibonacci) first discovered this number pattern in the year 1202. The Fibonacci sequence begins with the number 1. Each number in the pattern is the sum of the previous two numbers.

Look at the number patterns below. Match each number pattern to its description. Then fill in the missing number.

A. 1, 2, 4, __, 16, 32, 64 . . .

B. 0, 7, 14, 21, 28, 35, __ . . .

C. __, 2, 3, 4, 5, 6, 7, 8 . . .

D. 2, 4, 6, 8, __, 12, 14 . . .

E. 1, 3, 5, __, 9, 11, 13 . . .

1. This is a number pattern of even numbers, made by skip counting with 2s.
2. This is a number pattern of odd numbers, starting with 1 and skip counting by 2s.
3. In this geometric pattern, each number is double (two times) the previous number.
4. In this arithmetic sequence, the common difference is 1.
5. In this arithmetic sequence, the common difference is 7.

Fibonacci Numbers in Nature

The numbers of the Fibonacci sequence often appear in nature. Count the number of petals on a flower, the number of leaves on a twig, or the number of seeds in an apple. You might find a Fibonacci number! Many plants—but not all—have a general tendency to grow leaves or petals that match a Fibonacci number. Even in plants that usually have a Fibonacci number, there can be individual plants that grow differently. For example, most clovers have 3 leaves. But sometimes a clover grows an extra leaf and is a lucky four-leaf clover! Sometimes a flower might have one petal that is stunted or torn off.

Count the petals or leaves of the plants below and see how many are Fibonacci numbers.
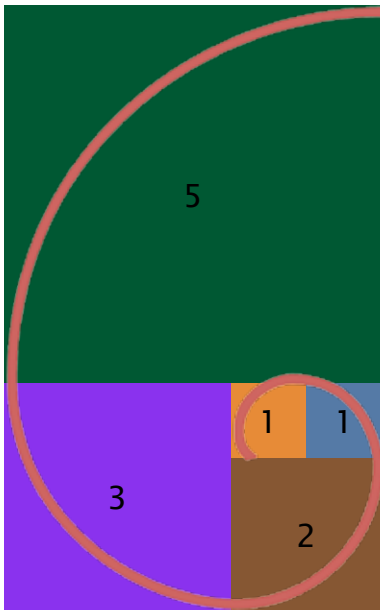
Answer: All of them!

Fibonacci and You

The Fibonacci numbers appear in the human body! Humans have 5 appendages off the trunk of the body: 1 head, 2 arms, and 2 legs. We have 2 arms. Each arm has 3 parts: upper arm, forearm, and hand. Each hand has 5 fingers. Where else can you find Fibonacci numbers?
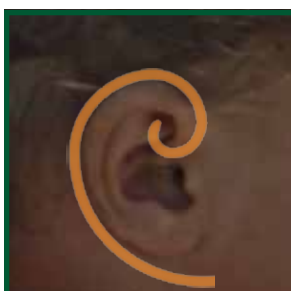
Golden Spiral

The Fibonacci sequence can be used to create a spiral. Begin with the 1 square inside. If you trace from corner to corner on each square, you will see a spiral pattern. This pattern can continue forever, adding bigger and bigger squares.


galaxy

hurricane

This spiral often appears in nature and is called the **golden spiral**. This is the shape of spiral galaxies in space. This is the spiral of hurricanes moving across the ocean.

Look at the images below to see other examples of the golden spiral in nature.

Fibonacci and You

The golden spiral can be found in the human body too! It is in the curve of our ears and the swirl in our closed hands.
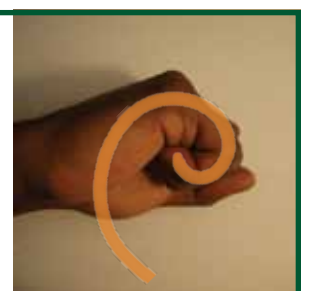
Animal Matching

Match the description of each animal to the name and picture on the left. Answers are below.

A. This large reptile is covered in small, bony scales. When it rests in the water, this animal looks like a log or part of a tree. This animal is native to North America and Asia.

camel

B. This mammal is the largest land animal in North America. It weighs up to 2,800 pounds (1270 kg). This animal is often confused with its African relative, the buffalo, but they are different species.

gorilla

C. This mammal is known for the humps on its back. Some have only one hump and are found in Africa and the Middle East. Others have two humps and are native to central Asia.

alligator

D. This mammal uses tools to find food, cross rivers, and build nests. It can use sign language to talk with humans. This animal is native to Africa.

flamingo

E. This bird likes to stand on one leg. Most of these animals live in South America or Africa. They can also be found in North America, Asia, and Europe.

bison