In two or three dimensions, vectors can be visualized as arrows in space, but they can also exist in any number of sizes.

One of the critical operations that can be performed on vectors is vector addition, which combines two vectors by adding their corresponding components.

For **example**, if we have two vectors:

u = [2, 3, 4]
v = [1, 1, 1]

Then we can add them together to get a new vector:

u + v = [3, 4, 5]

Another essential operation is scalar multiplication, which multiplies a vector by a scalar value. For example, if we multiply the vector u by 2:

2u = [4, 6, 8]

Another important concept in linear algebra is the matrix.

Matrices are rectangular arrays of numbers, usually enclosed in brackets or brackets, and they can be used to represent systems of linear equations.

Matrix operations like addition, subtraction, and scalar multiplication are similar to vectors.

However, matrix multiplication, which is not to be confused with scalar multiplication, is much more involved and is not commutative.

It requires the rows of one matrix to be the same size as the columns of the other.

A linear transformation is a function that takes vectors as inputs and outputs new vectors related to the information in a specific way.

It can be represented by a matrix, which is called a transformation matrix.

When a linear transformation is applied to a vector, it changes its direction and magnitude but not the vector's " type. "