

For most of the problems we will be facing in the next few weeks, we will only need to work in two dimensions.

We use a 2D coordinate system so we can formally put vectors on a grid and more easily do these vector operations.

Once we have our axes, the next thing we need are unit vectors.

Unit vectors have a magnitude of 1 and are in a defined direction.

For a normal x, y coordinate system, we have \hat{i} in the positive x direction and \hat{j} in the positive y direction.

In Cartesian coordinates, the unit vectors are the same no matter what point in space we're at.

We can also define a unit vector in the direction of an arbitrary vector.

The key here is to make sure it has a magnitude of 1.