

In previous classes you will have learned about scalars and vectors, so this is just a handy reminder about what they are.

SCALAR

It only has size, or in physics language, magnitude. It is just a real number that describes something totally, without the need for any extra information.

For example:
Mass, Age, Density, Volume and Time

VECTOR

A vector is a "scalar + direction". Speed is a scalar e.g., 20 mph. Velocity is a vector, it takes the speed and adds a direction e.g., 20 mph to the north-east.

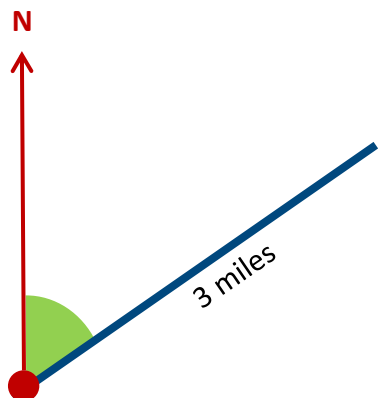
For example:
Displacement, Velocity and Acceleration

Let's look at an examples. Distance versus displacement. Distance is a scalar; it is just a real number value with an appropriate unit. It doesn't tell you anything about the direction of the distance. If you were told that the hospital was 3 miles away, you are being advised of the distance to the hospital and that may not be very useful.

3 miles



Now you are advised of the displacement of the hospital. The hospital is 3 miles away on a bearing of 050°. This is much more helpful. In an emergency you are more likely to receive treatment when you are advised of a vector quantity, displacement.



To be a vector it must also abide by the rules of vectors. They must be able to add together (commutative law and associative law). They must subtract (or add negatively!).

They can be multiplied, the dot product to produce a scalar.

$$A \cdot B = |A| |B| \cos \theta$$

They can be multiplied via the cross product to create a new vector.

$$C \times D = |C| |D| \sin \theta$$