Vectors and Scalars

Vectors and scalars are quantities that are used throughout physics, and it is important to understand the differences between the two and how they are used.

Scalar Quantities

A scalar is a quantity described by a single value (with appropriate units), and is completely described by that value.

These will often be written as single (usually lowercase) letter such as *a* or *k*

Examples of Scalars: Height, time, speed, volume, mass, temperature, distance (doesn't require direction), any physical quantity that can be completely described by a single magnitude value.

Vector Quantities

A vector is a quantity described by a value (with appropriate units) AND a corresponding direction of that value. Mathematically, it is a directed line segment with the magnitude being its length.

These are written as: $\vec{A}$, usually an uppercase letter, with an arrow above it directed toward the right.

Vector Examples: Velocity of an object, the force involved in pulling/pushing something, displacement of an object, weight (direction of force is toward earth's center), any physical quantity with a magnitude value and direction.

Key distinction between vectors and scalars is vectors require both a value and direction in order to be a vector, whereas a Scalar is strictly only a single value.