Some Basic Field Concepts

Mathematically, a field is a function that can take on various values at various points in space and time. A field can be a scalar field or a vector field.

Examples:

Scalar field: temperature field in a classroom. We associate a *number* (the temperature) with each point in the room at any time.

Vector field: electric field in some region of space. We associate a *vector* (the electric field) with each point in the region of space at any time.

At an introductory level we may consider a 'force field', such as a gravitational or electric field, as a means of expressing what the force due to some charge (or mass) distribution would be ***if*** another charge (or mass) was placed somewhere in space.

Thus, a field extends through space and makes a general statement about the charge (or mass) distribution that is the ***source*** of the field, without reference to any particular charge (or mass) that the field ***could*** act on.

Convention: the electric field points in the direction of the force on a *positive* charge.