Vector and scalars (cover work)

Distance and displacement

When you travel to school in a car, you travel across a road, you do not take a direct route to the school. Distance without change of direction is called **displacement**. The direct route to the school would be the displacement

A close up of a map

Description automatically generated

Vectors and scalars

As well as velocity and displacement, many other physical quantities have both as size and a direction. Physical quantities that have direction are called **vector**.

Other examples of vectors include:

* Acceleration
* Momentum
* Weight
* Gravitational field strength

Physical quantities that have size, but no specific direction are called scalars. Examples include.

Examples of scalars include:

* Speed
* Distance
* Time
* Mass
* Energy
* Power

The size of a quantity is its magnitude. A vector has magnitude (i.e. size) as well as direction.

A scalar has magnitude only.

* A vector quantity has a magnitude and a direction
* A scalar quantity has magnitude only

A picture containing clock

Description automatically generatedRepresenting a vector quantity

Any vector quantity can be represented by an arrow, like the displacement arrow in the image above.

* The direction of the arrow shows the direction of the vector quantity
* The length of the arrow represents the magnitude of the vector quantity

Scale diagrams

When more than one force acts on an object, those forces on the object sometimes need to be shown on a scale diagram.

For example, 2 forces of 3.0N and 4.0N act at right angles to each other on a small object. We can draw this on a graph by choosing a scale (10mm = 10N) so on this scale, the 2 arrows will have to be 30mm and 40mm

A picture containing clock

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1. A) A magnitude of a vector quantity is the size or amount of the physical quantity

b) The difference between a scalar quantity and a vector quantity is that vector quantities have a direction as well as a magnitude, whereas scalar quantities just have a magnitude.

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