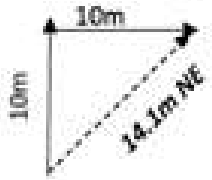
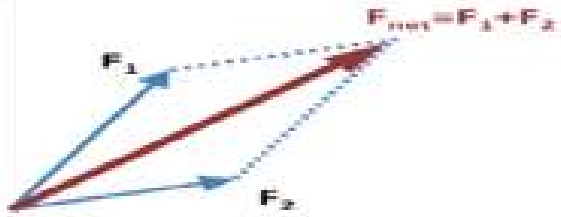
KNOWLEDGE ORGANISER

Forces and Vectors



Measure displacement / resultant force with a ruler or by

$F = \sqrt{a^2 + b^2}$



Scalar Quantity	Vector Quantity
Mass	Force
Speed	Acceleration
Distance	Displacement
Time	Velocity

Contact Forces	Non-Contact Forces
Friction	Gravitational Forces
Air Resistance	Electrostatic Forces
Tension	Magnetic Forces
Reaction Forces	Nuclear Forces

MASS AND WEIGHT

Mass (kg) – amount of matter

Weight (N) – force caused by gravity

Weight (N) = mass (kg) x gravity (N/kg)

WORK DONE

When work is done, energy is transferred.

Work done (J) = force (N) x distance (m)

Spring Constant and Hooke's Law

Hooke's Law describes that the extension of an elastic object is **proportional** to the force applied to the object. However, there is a maximum applied force for which the extension will still increase proportionally. If the **limit of proportionality** is exceeded, then the object becomes **permanently deformed** and can no longer return to its original shape. This can be identified on a graph of extension against force when the gradient stops being linear (a straight line) and begins to plateau. The limit is shown on the graph above and this is the specific object's **elastic limit**.