CP7/8 Energy and Forces and their Effects

1. Work and Power

Energy	The capacity to do work, or the capacity to apply a force.
Joules (J)	The units of energy
Kilojoule (kJ)	1000 joules. 1000 J = 1 kJ.
Work Done	The energy transferred by a force.

work done = force × distance moved in direction of force

$$E = F \times d$$

E is Work done, in joules (J)
F is Force, in newtons (N)
D is Distance, in metres (m)

Power	The rate of energy transfer. Unit Watt (W).

power = work done ÷ time taken

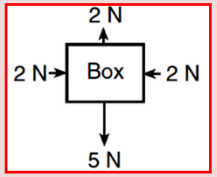
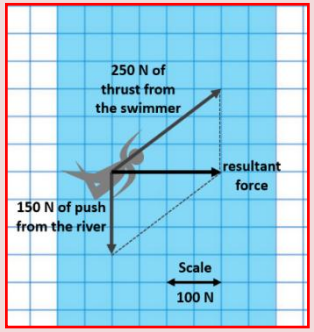
$$P = \frac{E}{t}$$

P is power, in watts (W)
E is work done, in joules (J)
T is time, in seconds (s)

2. Contact & Non-Contact Forces

Contact Force	A force that acts when two objects touch: Friction, air resistance, upthrust, normal contact force
Normal Contact Force	Force that acts at right angles to a surface as a reaction to a force on that surface.
Non-contact Force	A force that acts at a distance: Gravitational, magnetic, electrostatic forces
Action-Reaction Forces	If, A applies an action force to B, B applies a reaction force of same size and opposite direction to A. (Newton's 3rd Law)
Force Field	The area around an object where its force can affect other objects.
Magnetic Field	The area of magnetic force around a magnet.
Magnet	Attracts magnetic materials (iron, nickel, cobalt) and attracts or repels other magnets.
Electric Field	The area of electrostatic force around an object charged with static electricity.

3. Vector Diagrams (HIGHER ONLY)

Free Body Diagram	A diagram showing all the forces on an object. 
Vector Diagram Arrows	Arrows showing the size and direction of a force – must be drawn to scale.
Scale Diagram	Diagram drawn on graph paper to find the size of forces.
Resultant Force	The force left over when forces acting in opposite directions are cancelled out.
Resultant Force Diagram	Draw correct arrows for two forces, add lines to make a parallelogram. Resultant force = the diagonal of the parallelogram.
Resultant Force Diagram	
Resolving Forces	Breaking a force up into its horizontal and vertical components.
Component Forces	The vertical and horizontal forces that a diagonal force is made from.

Resolving Forces Diagram	Draw a correct force arrow, add arrows for vertical and horizontal component forces.
Resolving Forces Diagram