Problem Solving in L2 Physics

There are only three techniques.

Technique	Physical results and ideas used	Data needed	Limitations
Using forces and torques	Newton's laws and force laws	Forces acting on the system Masses *Diagram:* force diagram.	Need to know how the forces change at all the points in time you are interested in, so only really useful if forces are not changing (i.e. no acceleration).
Using energy	Conservation of energy	Types of energy changes occuring The amount of energy in each form before and after event takes place *Diagram:* energy flowchart	Some kinds of energy are difficult to calculate with (e.g. heat and sound). However, if you can make approximations like neglecting friction, this is often easier than using forces because you only need to know how the system is behaving at the beginning and the end of some period of time.
Using momentum	Conservation of momentum	Momentum of particles before and after event takes place *Diagram:* picture of the event before and after.	Only useful if there are a small number of things interacting (usually two), and only if you know velocities and masses, and only over small periods of time – in particular, in collisions.

Always:

- Draw at least one diagram. Pick out the important parts of the question and write them down on some scrap paper.
- Take a guess which kind of technique you should start with. (Heuristic: for collisions, momentum conservation; if the acceleration is constant, force laws; otherwise energy conservation).
- Calculate and work out as much as you can using your chosen technique.
- If you can't see how to get the answer yet, pick another technique.