

Chapter 8 – Quick Revision Sheet

Force and Laws of Motion

FORCE — *The Game Changer*

Force is simply a push or pull, but in physics it's the reason anything starts moving, stops, speeds up, slows down, or changes direction — basically, force = “motion controller” of the universe.

TYPES OF FORCES — Who's Acting?

Contact forces need touch (like friction & muscular force), while non-contact forces act from a distance (like gravity & magnetism) — even without touching, they can control motion.

BALANCED vs UNBALANCED — *The Decision Maker*

Balanced forces cancel each other → no change in motion;
unbalanced forces win the battle → motion changes (start, stop, speed up, slow down, turn).



NEWTON'S FIRST LAW — *Law of Inertia*

An object loves its current state — it will stay at rest or keep moving straight unless an external force disturbs it (inertia = resistance to change).



INERTIA — *Lazy Nature of Objects*

More mass = more inertia → harder to change motion; that's why a truck is harder to push than a bicycle.



NEWTON'S SECOND LAW

Force = mass × acceleration ($F = ma$) → more force = more acceleration, but more mass = harder to accelerate → motion depends on both. Acceleration always happens in the direction of force, which means force doesn't just move objects, it controls *how* they move.



MOMENTUM — *Motion Power*

Momentum = mass × velocity → heavier & faster objects have more “motion impact” and are harder to stop.



NEWTON'S THIRD LAW

Every action has an equal and opposite reaction — forces always come in pairs (you push ground → ground pushes you forward).



CONSERVATION OF MOMENTUM

In a closed system, total momentum before = total momentum after → momentum never disappears, it just transfers.



REAL LIFE CONNECTION — *Why It Matters*

Seatbelts, rockets, walking, collisions — everything around you follows these laws, making physics not just theory but daily life reality.