# 5. Mind Map: Gravitational PE & Mechanical Energy



**Gravitational PE + Mech. energy**

- 1️⃣ Gravitational Potential Energy Tie-In
  - Work done by gravity = $-\Delta U_{grav} = -(U_{final} - U_{initial})$
  - If an object falls, $W_{gravity} = +mgh$ (gravity does positive work)
  - If an object rises, $W_{gravity} = -mgh$ (gravity does negative work)
  - Work done by gravity equals the change in kinetic energy ($\Delta K$).
  - As an object falls, its potential energy decreases and kinetic energy increases.
  - As an object rises, its potential energy increases and kinetic energy decreases.
- 2️⃣ Mechanical Energy Conservation (No Applied Force)
  - When only gravity does work (no applied or resistive forces)
    - Total mechanical energy = KE + PE = constant
    - On rise: KE ↓, PE ↑, Total Energy stays constant
    - On fall: KE ↑, PE ↓, Total Energy stays constant

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