**Solids Liquids and Gases**

[**https://www.youtube.com/watch?v=mZQgd2sPxpk**](https://www.youtube.com/watch?v=mZQgd2sPxpk)

| **Property** | **Webinar** | **Lecture** |
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| **States listed** | Three states: solid, liquid, gas. | At least four states: solid, liquid, gas, plasma. |
| **Shape** | Solid: fixed shape. | Liquid: no fixed shape (takes container shape). | Gas: no fixed shape (fills space). | Solid: definite shape. | Liquid: no definite shape (assumes container shape). | Gas: no definite shape. |
| **Volume** | Solid: fixed volume. | Liquid: fixed volume (misconception warning). | Gas: no fixed volume (fills space). | Solid: definite volume. | Liquid: definite volume. | Gas: no definite volume. |
| **Filling behaviour** | Gas fills the whole space it is in. | Implied by no definite volume for gases; liquids take container shape but do not fill entire volume. |
| **Rigidity** | Solid: rigid. | Liquid: not rigid. | Gas: not rigid. | Not explicitly stated; implied: solids rigid; liquids/gases are fluids (thus not rigid). |
| **Compressibility** | Solid: cannot be squashed/compressed. | Liquid: cannot be squashed/compressed. | Gas: can be squashed/compressed. | Solid: negligible compressibility (nearly incompressible). | Liquid: slightly compressible. | Gas: highly compressible. |
| **Particle arrangement / order** | Solid: particles closely packed in fixed positions. | Liquid: closely packed but not as in solids. | Gas: particles not closely packed. | Solid: lined-up particles; ordered arrangement. | Liquid: disordered clusters, quite close. | Gas: extremely disordered. |
| **Particle distance** | Solid: closely packed. | Liquid: closely packed (slightly looser than solids). | Gas: far apart. | Solid: distances small and fixed. | Liquid: particles quite close. | Gas: highly empty space (far apart). |
| **Intermolecular forces** | Not stated explicitly. | Solid: high. | Liquid: considerable (weaker than solids). | Gas: very small. |
| **Motion of particles** | Solid: cannot move anywhere. | Liquid: move around each other. | Gas: move randomly (implied). | Solid: vibrational motion only. | Liquid: random motion. | Gas: random motion. |
| **Fluidity / ability to flow** | Solid: cannot flow. | Liquid: can flow. | Gas: can flow (implied by filling space). | Solids: do not exhibit fluidity. | Liquids: are fluids. | Gases: are fluids. |
| **Diffusion** | Not stated. | Solids: do not diffuse. | Liquids: diffuse through other liquids. | Gases: diffuse rapidly. |
| **Density** | Example: helium less dense than air (for gases). | Solids: high density. | Liquids: intermediate density. | Gases: low density. |
| **Viscosity** | Not stated. | Liquids: viscosity present; lower fluidity ↔ higher viscosity. Gases: low viscosity. |
| **Factors affecting viscosity / fluidity** | Not stated. | Liquids: ↑intermolecular forces → ↑viscosity (↓fluidity); ↑temperature → ↑fluidity (↓viscosity) via ↑average KE; larger/compact particles → ↑viscosity. |
| **Surface tension** | Not stated. | Liquids: present due to cohesive forces; surface molecules cohere more strongly. |
| **Examples** | Solid: computer. | Liquid: water. | Gas: helium (less dense than air, unreactive). | Gases: H₂ (lightest), He (highest ionisation potential; noble), Ne, Ar, Kr, Xe, Rn (heaviest gaseous non‑metal), N₂ (most abundant in atmosphere), O₂, Cl₂, F₂ (most reactive gaseous element). |