

Particles**What's the science story?**

An introduction to particles, particle diagrams and how materials behave in different states of matter.

Previous knowledge:

Reactions

Next steps...

Links to pressure and reactions in year 8 and 9.

**Keywords**

Particle, diffusion, energy, states of matter,
rates of diffusion.

Working scientifically skills:

WS2 draw diagrams
WS13 constructing tables
WS17 Making conclusions

Assessments:

Exit ticket – condensation and evaporation

KS3 – Year 7

Lesson No. and Title	Learning objectives	National Curriculum	Practical equipment
1. Particle model	<p>ARE – Explain properties of materials based on particle arrangement.</p> <p>AGD – Apply knowledge to an object.</p>	<ul style="list-style-type: none"> • changes of state in terms of the particle model • atoms and molecules as particles 	<ul style="list-style-type: none"> • tripod • gauze • Bunsen burner • heatproof mat • beaker • syringe filled with a gas • syringe filled with a liquid • syringe filled with a solid • ice cube • hair dryer • jug with solid blocks • jug with water • balloon • balance
2. States of matter	<p>ARE – Use observations to decide whether something is a solid, liquid or gas.</p> <p>AGD – Argue how to classify substances which behave unusually as solids, liquids or gases.</p>	<ul style="list-style-type: none"> • the differences in arrangements, in motion and in closeness of particles explaining changes of state, shape and density • changes of state in terms of the particle model 	<p>Beakers</p> <p>Balloon</p> <p>Wooden Block</p> <p>Plasticine</p>

KS3 – Year 7

3. Melting and solidifying	<p>ARE – Explain melting and solidifying in terms of changes to the energy of particles.</p> <p>AGD – Suggest reasons for different melting points of different substances.</p>	<p>conservation of material and of mass, and reversibility, in melting, changes with temperature in motion and spacing of particles</p> <p>the difference between chemical and physical changes</p>	<p>Salol</p> <p>Beaker</p> <p>Stopwatches</p>
4. Melting and solidifying part two	<p>ARE – display results on a graph, noting melting and solidifying temperatures.</p> <p>AGD – Suggest reasons for different melting points of different substances.</p>	<ul style="list-style-type: none"> • conservation of material and of mass, and reversibility, in melting, • changes with temperature in motion and spacing of particles <ul style="list-style-type: none"> • internal energy stored in materials 	
5. More changes of state	<p>ARE – Explain differences in evaporation and condensation in terms of energy and mass.</p> <p>AGD – Apply and link knowledge.</p>	<ul style="list-style-type: none"> • conservation of material and of mass, and reversibility, in melting, freezing, evaporation, condensation, 	<p>Beakers</p> <p>Perspex screen</p>

KS3 – Year 7

6. More changes of state part 2	<p>ARE – Explain sublimation and dissolving based on arrangement and movement of particles.</p> <p>AGD – Apply knowledge to a real life example.</p>	<ul style="list-style-type: none"> conservation of material and of mass, and reversibility, in melting, freezing, evaporation, sublimation, condensation, dissolving 	<p>Beakers Salt</p>
7.Freezing	<p>ARE – Draw annotated diagrams of particles before and after freezing.</p> <p>AGD – Evaluate the results in a freezing investigation.</p>	<ul style="list-style-type: none"> the differences in arrangements, in motion and in closeness of particles explaining changes of state, shape and density; the anomaly of ice-water transition 	<p>Beakers Ice</p>
8. Diffusion	<p>ARE – Draw annotated diagrams of particles before and after diffusion.</p> <p>AGD – Apply diffusion to living things.</p>	<ul style="list-style-type: none"> Brownian motion in gases diffusion in liquids and gases driven by differences in concentration 	<p>U bend Potassium permanganate</p>