

Rubric: Particle Model of Matter

Task

Students present a labelled model or report on the particle model of matter.

Curriculum alignment

Students investigate the particle model of matter in relation to the physical properties of solids, liquids, and gases ([Outcome](#)). They represent solids, liquids, and gases using the particle model of matter and relate the movement and arrangement of particles to the state of matter ([Skills](#)). Students understand that the particle model of matter explains the behaviour of particles in matter ([Understanding](#)) and that the movement and arrangement of particles affect physical properties ([Understanding](#)).

Rubric

Criterion	Beginning	Developing	Proficient	Exemplary
Representation of particles and states	Particles shown but not clearly distinguished between solids, liquids, and gases.	Particles shown in two states with some differences in arrangement or spacing.	Particles correctly shown in all three states with clear differences in arrangement and spacing.	Particles shown with accurate spacing, arrangement, and movement patterns for all three states.
Labels and identification	Few or unclear labels. Identifies fewer than two states of matter.	Labels present but incomplete or partially unclear. Identifies all three states but with some missing details.	Clear, accurate labels for particles, spacing, and states. All three states identified with correct terminology.	Comprehensive labels including particle movement direction, spacing descriptions, and state names with precise scientific language.
Connection to particle behaviour	Little or no explanation of how particles move or are arranged.	Attempts to explain particle movement or arrangement in one or two states.	Explains particle movement and arrangement in all three states. Connects spacing to state differences.	Explains particle movement, spacing, and attractive forces. Links particle behaviour to observable physical properties.
Accuracy and completeness	Contains significant errors or omissions. Model or report is incomplete.	Contains minor errors. Most key ideas from the particle model are present.	Accurate representation of the particle model. Includes all main ideas: particles move, have spaces, and behave differently in each state.	Accurate and detailed. Includes all particle model ideas plus connections to density, compressibility, or other physical properties.

Scoring

Count the number of cells at each level across all four criteria. The overall result reflects the level where most cells fall. If cells are split evenly between two levels, the lower level is the result. A student with all four criteria at Proficient or higher meets the learning outcome.

Notes for the teacher

- Watch for models or reports that show particles as solid shapes touching each other in gases. This is a common misconception. Redirect students to show large spaces between gas particles and movement in all directions.
- Accept both visual models (drawings, diagrams, physical arrangements) and written reports. Both formats can demonstrate understanding of particle arrangement and movement.
- When assessing labels, accept informal language (like "particles are spread out" for gases) alongside formal terms, as long as the meaning is clear and accurate.
- Students who struggle to represent all three states at once may benefit from focusing on one state at a time before combining them. Extend advanced students by asking them to explain how the particle model accounts for melting, freezing, or evaporation.