

The Particle Model

Q1.(2019)

B

Q2.a(2019)

FIRST CHECK THE ANSWER ON ANSWER LINE If answer = 2 (g / cm³) award 3 marks	3		ALLOW higher level answers involving $\rho_1 V_1 = \rho_2 V_2$
Mass of (each) cube is $16 \times 1 = 16$ (g) ✓		2×2.1	IGNORE $16 \div 1 = 16$ (g)
Volume of B is $2^3 = 8$ (cm ³) ✓			ALLOW $2 \times 2 \times 2 = 8$ (cm ³)
= 2 (g / cm ³) ✓		1×1.2	
OR		OR	
Volume of B is $8 \times$ volume of A ✓		2×2.1	
Density of B is $1/8 \times$ density of A = $16 / (2^3)$ ✓			
= 2 (g / cm ³) ✓		1×1.2	

Q2.b(2019)

Density of cube/metal/ A > density of water ✓	1	1×1.1	ALLOW density of cube/metal/ A is greater (than 1) / more dense / higher density IGNORE it has a greater density than cube B
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Q2.c(2019)

 <p>Force up: pull of support on spring / surface force from support / AW ✓</p> <p>Force down: pull of cube A / AW ✓</p>	2	2×1.2	ALLOW higher level answers involving weight of the spring in addition to weight of cube IGNORE weight / gravity Pull or force must be present in the answer for the mark to be awarded
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Q2.d(2019)

Forces are equal (and opposite) / force up = force down / force of cube = force of support / AW ✓	1	1.1	ALLOW forces are balanced / in equilibrium / forces cancel out IGNORE references to Newton's Third Law
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Q2.e(2019)

The spring accelerates ✓	1	1.1	ALLOW spring moves (in the direction of the force) / falls / position changes IGNORE references to the spring changing shape / spring deforms / stretching or not stretching / unbalanced force / constant velocity
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Q2.f(2019)

FIRST CHECK THE ANSWER ON ANSWER LINE If answer = 1.2 (N) award 3 marks	3		
(F =) kx ✓		1.2	ALLOW correct equation in words or symbols
$F = 30 \times 0.04$ ✓		2.1	
= 1.2 (N) ✓		2.1	

Q3.(2020)

B

Q4.(2020)

Any three from: As temperature increases, speed of particles increases / AW ✓ As temperature increases, (kinetic) energy of particles increases ✓ Particles collide more frequently (with wall of canister) ✓ Particles collide with more force (with wall of canister) ✓ Increased pressure can cause canister to explode ✓	3	3 × 2.1	ALLOW a higher level response: at high temperature, greater rate of change of momentum increasing force ✓✓
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Q5.(2021)

D ✓

Q6.a(2021)

[1 before 5]
5 before 4 ✓
4 before 3 ✓
[3 before 2]

Q6.b(2021)

<p>Peer Review</p> <p>Any one from:</p> <p>to confirm the experiment is reproducible ✓</p> <p>to check the method ✓</p> <p>to check for mistakes ✓</p> <p>to ensure quality of research / uphold standards / prevent unethical behaviour ✓</p> <p>to offer advice by experts ✓</p> <p>Communication</p> <p>Any one from:</p> <p>other scientists can check / test / verify / validate results (against own results) ✓</p> <p>other scientists can develop or use ideas or theories ✓</p> <p>others can use or compare the data ✓</p> <p>improve knowledge or education ✓</p> <p>more data available / allow further development or research ✓</p> <p>to gain credit or acknowledgement for their work ✓</p>	2	2 × 3.2a	<p>ALLOW to check it is carried out correctly</p> <p>IGNORE to see if others think the same</p> <p>ALLOW to ensure the experiments are performed correctly / to know of any downfalls / checking the findings / check the validity / to cross check</p> <p>ALLOW to detect false claims</p> <p>ALLOW to add more ideas/points / to give another opinion</p> <p>ALLOW to make corrections</p> <p>ALLOW other investigations or experiments could be done afterwards / for more opinions and theories</p> <p>ALLOW to see similarities and differences</p> <p>ALLOW help with new technologies</p>
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Q7.a(2021)

Any two from:

Density of solids is the greatest / AW ✓

Density of gases is the least / AW ✓

Density of solids > density of liquids / ORA ✓

Density of solids > density of gases / ORA ✓

Density of liquids > density of gases / ORA ✓

Q7.b(2021)

Atoms more tightly packed in a solid than liquid / ORA ✓	2	2 × 1.1	ALLOW answers on a labelled diagram
So greater mass in the same volume / ORA ✓			

Q8.(2022)

D ✓

Q9.(2022)

C ✓

Q10.(2022)

Accurate ✓

1

3.2b

more than one word is 0 marks

if answer line blank allow answer indicated in the
list but answer line takes precedence

Q11.(2023)

A

Q12.(2023)

B

Q13.(2023)

C

Q14.(2024)

D

Q15.(2024)

C