
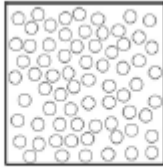
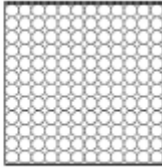


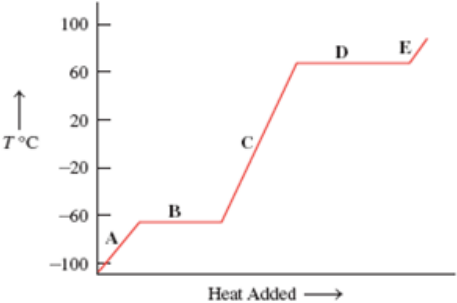
Core questions – Physics – Unit 3 – Particle model

	Question	Answer
1	What is the particle model useful for?	To explain the states of matter and the differences in their density: solids are denser than gases as there are more particles in a given volume than gases have.
2	What are the limitations of using the particle model?	No movement shown, atoms not solid spheres, no forces shown, only in 2D
3	Draw a particle diagram for solid, liquid and gas.	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Gas</p> </div> <div style="text-align: center;">  <p>Liquid</p> </div> <div style="text-align: center;">  <p>Solid</p> </div> </div>
4	How are particles arranged in solids?	Close together, held in a fixed, regular arrangement
5	What are the forces of attraction like in solids?	Strong
6	How do particles move in solids?	Vibrate about a fixed position
7	How are particles arranged in liquids?	Close together, <u>irregular</u> arrangement
8	What are the forces of attraction like in liquids?	Weaker than solids, allowing particles to move
9	How do particles move in liquids?	Slow moving, random directions
10	How are particles arranged in gases?	Far apart, not touching
11	What are the forces of attraction like in gases?	No forces
12	How do particles move in gases?	High speed, random directions
13	What is the definition of density?	The amount of matter in a given volume. (mass per unit volume)
14	What is the word equation for density?	density = $\frac{\text{mass}}{\text{volume}}$
15	What is the symbol equation for density?	$\rho = \frac{m}{V}$
16	What are the common units of density?	kg/m ³
17	Describe how to find the volume of a regular solid.	<ul style="list-style-type: none"> • Use a ruler to measure the length, width and height of the object in metres • Find the volume by multiplying the $l \times w \times h$ • Place the object on a balance to find the mass in kilograms • Find the density by dividing the mass by the volume
18	Describe how to find the volume of an irregular solid.	<ul style="list-style-type: none"> • Place the object on a balance to find its mass. • Place the object into a measuring cylinder filled with water. • Measure how much the volume in the measuring cylinder increases; this is the volume of the object • Find the density by dividing the mass by the volume.

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19	Describe how to find the volume of a liquid.	<ul style="list-style-type: none"> • Place a measuring cylinder on a balance and make sure the balance reads zero • Pour a set volume of the liquid into the measuring cylinder (10ml) • Calculate the density of the liquid by dividing the mass by the volume
20	What other equipment could be used to measure length, if required to a more precise value?	A micrometre or a set of Vernier callipers.
21	What is a physical change?	One in which the material recovers its original properties if the change is reversed
22	When is mass conserved?	During changes of state which are examples of physical changes
23	What is a change of state?	If a substance is heated enough, the particles will have enough energy in the kinetic energy stores to break the bonds holding them together, changing the properties of the substance
24	What change of state is melting?	Solid → liquid
25	What change of state is freezing?	Liquid → solid
26	What change of state is boiling/evaporating?	Liquid → Gas
27	What change of state is condensing?	Gas → Liquid
28	What change of state is sublimating?	Solid → Gas / Gas → Solid
29	What is internal energy?	The total kinetic energy and potential energy stored inside a system by the particles that make up the system.
30	How does heating an object change the internal energy?	It increases the energy of the particles that make up the system to either increase the temperature or cause a change of state.
31	What does the increase in temperature of a system depend on?	The mass of the substance, the type of material and the energy input.
32	What is the word equation that relates the change in energy of a system, mass, specific heat capacity & temperature change?	Change in thermal energy = mass x specific heat capacity x temperature change
33	What is the symbol equation that relates the change in thermal energy of a system to the factors that it depends upon?	$\Delta E = m c \Delta\theta$
34	What are the units and unit symbols of specific heat capacity?	Joules per kilogram per degree Celsius, J/kg °C
35	What is the specific heat capacity of a substance?	The amount of energy required to raise the temperature of 1 kg of the substance by 1 °C
36	What is latent heat?	The amount of energy needed for a substance to change state
37	What happens to the energy supplied to a substance when it changes state?	It increases the potential energy stored but not the kinetic energy store of the particles
38	What is the specific latent heat of a substance?	The amount of energy required to change the state of 1 kg of the substance with no change in temperature

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39	What is the word equation for the energy needed for a change of state of a substance?	Energy needed for a change of state = mass × specific latent heat
40	What is the symbol equation for the energy for a change of state?	$E = m L$
41	What is the unit and unit symbol of specific latent heat?	Joules per kilogram, J/kg
42	What is the specific latent heat of fusion?	The change of state from solid to liquid
43	What is the specific latent heat of vaporisation?	The change of state from liquid to vapour (gas)
45	Label this heating graph: 	A – solid B – melting (solid to liquid) C – liquid D – boiling (liquid to gas) E – gas
46	What is the temperature of a gas related to?	The average kinetic energy of the particles in the gas. Higher the temperature, the higher the average kinetic energy
47	How can we increase the speed and frequency of collision in a container?	Increase temperature and/or decrease volume
48	What happens to the pressure of a gas, held at constant volume, when the temperature is increased?	Increases
49	What happens to the pressure of a gas, held at constant temperature, when the volume is increased?	Decreases
50T	What happens when gas particles collide with something? (Triple only)	They exert a force
51T	What is gas pressure? (Triple only)	The total force exerted by all of the particles in the gas on a unit area of the container walls
52T	What two factors will increase the gas pressure in a container? (Triple only)	Faster particles & more frequent collisions
53T	What equation relates the pressure and volume of a gas held at constant temperature? (Triple only)	pressure × volume = constant $p V = \text{constant}$ $P_1 V_1 = P_2 V_2$
54T	What is the unit and unit symbol of pressure? (Triple only)	Pascals, Pa
55T	What is the unit and unit symbol of volume? (Triple only)	Metres cubed, m ³
56T	What is work? (Triple only)	The transfer of energy by a force.

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57T	When work is done on a gas, what happens to the gas? (Triple only)	The internal energy increases and it can also cause an increase in temperature
58T	State one example of when work is done on a gas (Triple only)	A bicycle pump, doing work on the gas leads to an increase in its temperature