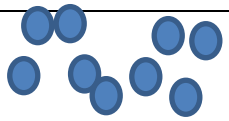
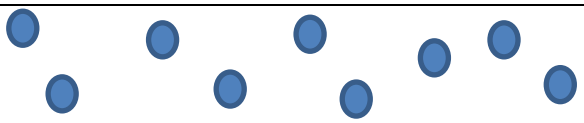
P1 Topic 1 Particle Model

States of matter	
1. Name the 3 states of matter	**Solid, liquid, gas**
2. Draw 9 particles in solid	
3. Draw 9 particles in a liquid	
4. Draw 9 particles in gas	
5. Which state of matter is usually the most dense? Why?	**Solid, because particles are closer together**
6. Which state of matter is usually the least dense? Why?	Gas, because particles are further apart
7. Changing from a solid to a liquid is called…	**melting**
8. Changing from a liquid to a gas is called….	**evaporation**
9. Changing from a gas to a liquid is called…	**condensation**
10. Changing from a liquid to a solid is called….	**freezing**
11. Changing from a solid to a gas is called…	sublimation
12. Are changes of state physical or chemical changes? Why?	Physical, because the change can be reversed (and no bonds are broken/ made)
13. The mass of a substance before a change of state is ….. as the mass of the substance after the change (e.g. when a solid melts, the mass of the solid is ….. as the mass of the liquid)	the same as
Density	
14. How do you calculate density?	***Density = mass/ volume***
15. State the units for mass	kg
16. State the units for volume	m^3
17. State the units for density	**kg/m^3**
Conductivity	
18. Which state of matter can conduction occur in?	Solids
19. If a material has a high thermal conductivity, this means heat will pass along it……	**quickly/ fast**
20. If a material has a low thermal conductivity, this means heat will pass along it…..	slowly
21. For a house to be insulated, the walls should have a …. thermal conductivity	low
22. For a house to be insulated, the walls should be thick/ thin	thin

Internal energy	
23. Define internal energy	Energy stored by particles in a system
24. When do particles have kinetic energy?	**When they are moving**
25. Define potential energy	Stored energy (see energy topics)
26. Internal energy = _____ + _____	Kinetic energy + potential energy of particles
27. What does heating do to particles?	**Increases their energy**
28. State 2 ways a material/ system can change when it is heated	• **Increase in temperature** • **Change state**
Specific heat capacity	
29. Define specific heat capacity	• Amount of energy required • To raise the temperature of 1kg • By 1°C
30. State the units for specific heat capacity	J/ kg °C
31. What does ΔE stand for?	Change in thermal energy
32. What does Δθ stand for?	Change in temperature
33. What does c stand for?	Specific heat capacity
34. If a material has a high specific heat capacity, **a lot/ not much**, energy is needed to increase its temperature by 1°C	A lot
Specific latent heat	
35. Define specific latent heat	• Amount of energy required • To change the state of 1 kg • With no change in temperature
36. When a change of state occurs, what happens to the internal energy?	Increases
37. When a change of state occurs, what happens to the temperature of the substance?	**Stays the same**
38. State the units for latent heat	J/kg
39. Define specific latent heat of fusion	Change from solid to liquid
40. Define specific latent heat of vaporisation	Change from liquid to gas (vapour)
41. On a heating/ cooling graph, what is happening when there is a flat, horizontal line?	**A change of state**
42. On a heating/ cooling graph, what is happening when the line goes up?	Temperature is increasing, but material is NOT changing state
Gas pressure	
43. Describe the movement of gas particles	• **Constant (they don't stop)** • **random (go in any direction)**
44. If the volume of gas stays the same: as the temperature increases, the movement of the gas particles…..	increases
45. If the volume of gas stays the same: as the temperature increases, the pressure….	**increases**
46. If the volume of gas stays the same: increasing the movement of the gas particles will …. the pressure of the gas	increase

Skills section

You will be given these formulae:

- **$\Delta E = m \times c \times \Delta\theta$ (ΔE = energy, m = mass, c = specific heat capacity, $\Delta\theta$= temperature change)**
- **$E = m L$ (E = energy, m = mass, L = specific latent heat)**

4marks per question:

- **Equation written down**
- **Substitution of numbers into the equation**
- **Number answer**
- **Units on the answer**

47. An object has a mass of 12 kg and a volume of $4m^3$. Calculate the density of the object	**p= m/V** **12 /4** **3 kg/m^3**
48. An object with a mass of 5kg is made of a material with a specific heat capacity of 10J/ kg °C. It increases in temperature by 10°. Calculate the energy transferred	$\Delta E = m \times c \times \Delta\theta$ 5 x 10 x 10 500 J
49. An object with a mass of 3kg is made of a material with a specific heat capacity of 2000J/ kg °C. It increases in temperature by 40°. Calculate the energy transferred	$\Delta E = m \times c \times \Delta\theta$ 3 x 2000 x 40 240,000 J
50. An object with a mass of 9kg is made of a material with a specific heat capacity of 250J/ kg °C. It is heated from 20°C to 40°C. Calculate the energy transferred	$\Delta E = m \times c \times \Delta\theta$ Temperature change = 40-20 = 20°C E = 9 x 250 x 20 = 45000J
51. 4kg of a liquid is heated and it turns into a gas. The specific latent heat of the substance is 600J. Calculate the energy	E = m L 4 x 600 2,400J
52. 8kg of a solid is heated and it turns into a liquid. The specific latent heat of the substance is 1000J. Calculate the energy	E = m L 8 x 1000 8,000J

TRIPLE ONLY	
Gas pressure	
1. Define pressure	Net force of particles at right angles to the wall of the gas container/ surface
2. If temperature is kept constant: increasing the volume of a gas will ….. the pressure	decrease
3. Explain why increasing the volume of a gas will decrease the pressure (if temperature is kept constant)	Particles are more spread out Net force of particles will be reduced
4. State the units for pressure	Pascals (Pa)
5. Define work	Transfer of energy by a force
6. What does doing work on a gas do to the internal energy of the gas?	Increases it
7. What does doing work on a gas do to the temperature of the gas?	Increases it
8. Explain how a bicycle pump increase the temperature of the gas	• It decreases the volume • Which increases the pressure • Which increases the temperature
<u>Skills section</u> **You will be given this formula:** • **pV = constant (p= pressure, V = volume)**	