a

What is the equation linking density, mass and volume?

_____

b

Write the symbols and units for the following:

density: _____

mass: _____

volume: _____

c

Draw the particle models for solids, liquids and gases.

d

Describe the three states of matter in terms of structure, shape and movement of the particles.

solid - _____

_____

_____

liquid - _____

_____

_____

gas - _____

_____

_____

e

Why is a change of state referred to as a physical change and not a chemical change?

_____

_____

f

Describe the displacement technique used to determine the volume of an irregularly shaped object.

_____

_____

_____

g

When substances change state, their mass is conserved. What does this mean?

_____

_____

Describe how to determine the volume of a regularly shaped object.

_____

h

What is an internal system?

_____

_____

i

Define internal energy.

_____

_____

j

List some factors that affect the increase of temperature of a system.

_____

_____

_____

k

Explain the differences in density of solids, liquids and gases.

_____

_____

_____

_____

_____

_____

_____

_____

_____

l

Define specific heat capacity.

_____

_____

m

What is the equation linking change in thermal energy, mass, specific heat capacity and temperature?

_____

_____

n

Write the units and symbols for the following:

energy: _____

mass: _____

specific heat capacity: _____

temperature change: _____

o

After a long journey, the temperature of a car tyre increases. What is the effect on the gas particles within the tyre?

_____

_____

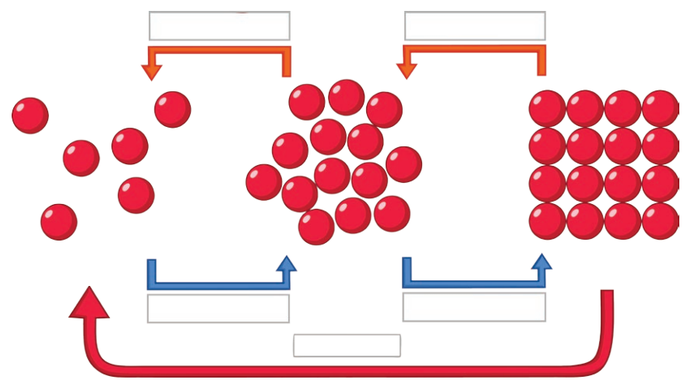
_____

_____

_____

p

Label the diagram with the terms used for changes of state.



a

Define latent heat.

b

What is the equation linking energy for a change of state, mass and specific latent heat?

Write the symbol and unit for the following:

specific latent heat: _____

c

Describe the difference between specific latent heat of fusion and specific latent heat of vaporisation.

d

Distinguish between specific heat capacity and specific latent heat.

e

What is the equation that links pressure and volume?

List the symbols and units for the following:

pressure: _____

volume: _____

f

Explain the effect of an increase in temperature on the pressure of a gas in a container.

g

For the heating and cooling curve (shown in section J), what are the terms used to describe the changes of state for:

B ➔ C _____

D ➔ E _____

E ➔ D _____

C ➔ B _____

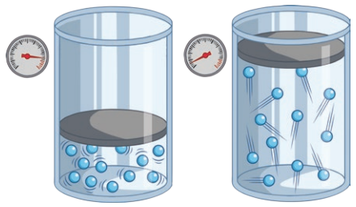
h

What is happening to the particles between A-B, C-D and E-F?

How are kinetic energy of particles and temperature related?

i

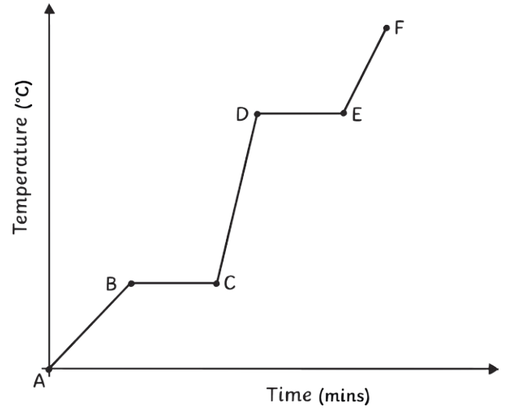
Using the diagram, explain the effect of an increase of volume on pressure.



(a) High pressure (b) Low pressure

j

What are the states of matter for the diagonal sections of the graph? Add labels to the graph below.



k

When work is done on a gas, what effect is there on the internal energy of the gas?

l

When work is done on a gas what effect can there be on the temperature of the gas?

m

Using the image above, explain what happens to:

a) The internal energy of the gas within the tyre:

b) The energy of the particles:

c) The temperature of the gas:

n

My main areas for improvement in this topic are:

a

What is the equation linking density, mass and volume?

density = mass ÷ volume

b

Write the symbols and units for the following:

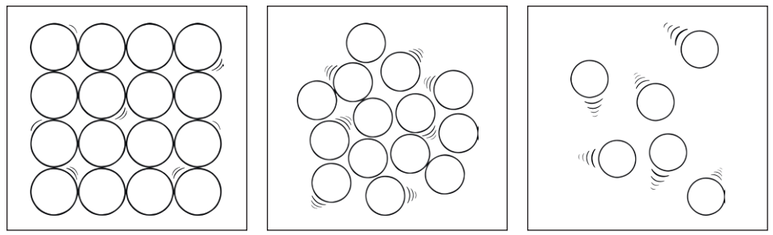
density: **(ρ) kilograms per metre cubed, kg/m^3**

mass: **(m), kilograms, kg**

volume: **(V), metres cubed, m^3**

c

Draw the particle models for solids, liquids and gases.



d

Describe the three states of matter in terms of structure, shape and movement of the particles.

solid – **They have a regular structure and the particles are packed closely together so they have a definite shape. The particles are in a fixed position but do vibrate.**

liquid – **They have an irregular structure and the particles are close together. They take the shape of the container but do not have a definite shape. The particles vibrate and move over one another.**

gas – **The particles are widely dispersed and do not have a definite shape. The particles move around rapidly.**

e

Why is a change of state referred to as a physical change and not a chemical change?

If the changes are reversed then the material will recover its original properties.

f

Describe the displacement technique used to determine the volume of an irregularly shaped object.

Fill a displacement vessel/eureka can with water. Put the spout of the can over a measuring cylinder. Put the irregularly shaped object into the can and measure the volume of water displaced.

g

When substances change state, their mass is conserved. What does this mean?

The mass of the substance does not change once it has changed state.

Describe how to determine the volume of a regularly shaped object.

width × length × height

h

What is an internal system?

An internal system is one in which the energy is stored by the particles within it.

i

Define internal energy.

This is the total kinetic and potential energy of the particles that make up that system.

j

List some factors that affect the increase of temperature of a system.

Mass of the substance.

Type of material being heated.

Energy input.

k

Explain the differences in density of solids, liquids and gases.

Solids are very dense because the particles are so closely packed together and there are strong forces of attraction between them. Liquids are less dense than solids, but more dense than gases because the particles are very close together and attract one another. Gases are the least dense and have very weak forces of attraction only when they collide.

l

Define specific heat capacity.

The amount of energy needed to cause a 1°C rise in 1kg of a substance.

m

What is the equation linking change in thermal energy, mass, specific heat capacity and temperature?

change in thermal energy = mass x specific heat capacity x temperature change

n

Write the units and symbols for the following:

energy: **(E), Joules, J**

mass: **(m), kilograms, kg**

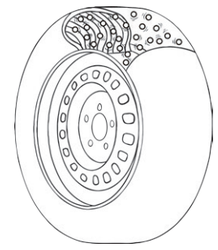
specific heat capacity: **(c), Joules per kg per degree Celsius, J/kg oC**

temperature change: **(Δ), degrees Celsius, oC**

o

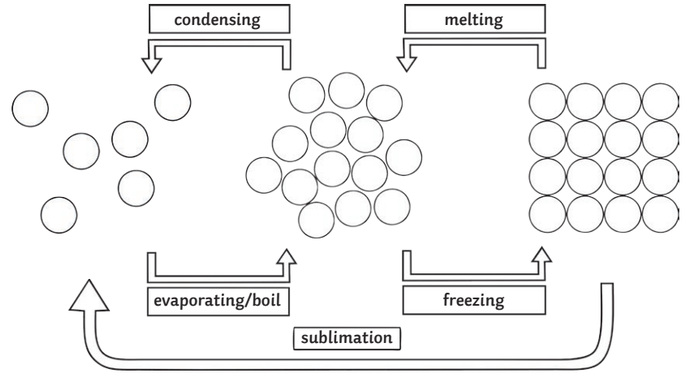
After a long journey, the temperature of a car tyre increases. What is the effect on the gas particles within the tyre?

The gas particles will gain more kinetic energy, therefore they will move around more.



p

Label the diagram with the terms used for changes of state.



a

Define latent heat.

Latent heat is the energy required for the change of state of a substance.

b

What is the equation linking energy for a change of state, mass and specific latent heat?

Energy for a change of state = mass x specific latent heat

Write the symbol and unit for the following:

specific latent heat: **(L), joules per kilogram, J/kg**

c

Describe the difference between specific latent heat of fusion and specific latent heat of vaporisation.

Specific latent heat of fusion is the amount of energy needed to change 1kg of a substance from a solid to a liquid with no change of temperature. Specific latent heat of vaporisation is the amount of energy needed to change 1kg of a substance from liquid to gas with no change of temperature.

d

Distinguish between specific heat capacity and specific latent heat.

Specific heat capacity is the amount of energy required to increase the temperature of a substance, whereas specific latent heat is the energy needed to change the state of a substance with no temperature change.

e

What is the equation that links pressure and volume?

Pressure x volume = constant

List the symbols and units for the following:

pressure: **(p), pascals, Pa**

volume: **(V), metres cubed, m^3**

f

Explain the effect of an increase in temperature on the pressure of a gas in a container.

An increase in temperature causes more collisions of the gas particles with the walls of the container. This causes an increase in the force on the walls of the container over a particular area and so increases the pressure.

g

For the heating and cooling curve (shown in section J), what are the terms used to describe the changes of state for:

B ➔ C **Melting**

D ➔ E **Evaporating/Boiling**

E ➔ D **Condensing**

C ➔ B **Freezing**

h

What is happening to the particles between A-B, C-D and E-F?

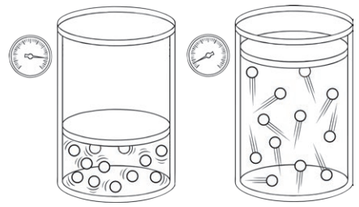
They are gaining kinetic energy and spreading out more.

How are kinetic energy of particles and temperature related?

As the temperature increases the kinetic energy of the particles increases.

i

Using the diagram, explain the effect of an increase of volume on pressure.

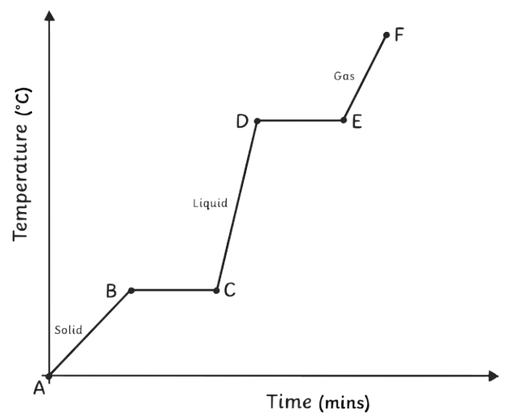


(a) High pressure **(b) Low pressure**

An increase in volume causes the particles to spread out more and so the number of collisions on the walls of the container decreases. So, there is less force exerted on the container over a certain area and therefore a lower pressure.

j

What are the states of matter for the diagonal sections of the graph? Add labels to the graph below.



k

When work is done on a gas, what effect is there on the internal energy of the gas?

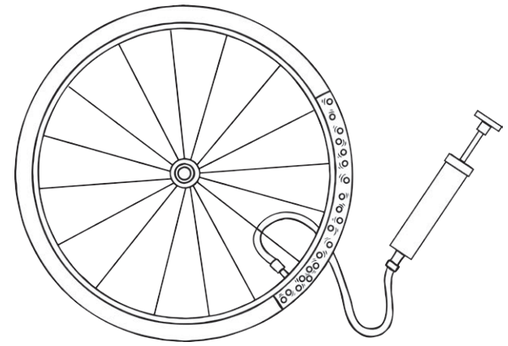
The internal energy of the gas increases.

l

When work is done on a gas what effect can there be on the temperature of the gas?

The temperature can increase.

m



Using the image above, explain what happens to:

a) The internal energy of the gas within the tyre:

The internal energy of the gas increases.

b) The energy of the particles:

The particles gain kinetic energy.

c) The temperature of the gas:

The temperature of the gas increases.

n

My main areas for improvement in this topic are: