

Draw the particle models for solids, liquids and gases. a

Complete the table below.

State	Can You Squash it?	Does It Flow?	Shape
Solid	_____	_____	_____
Liquid	_____	_____	_____
Gas	_____	_____	_____

Underline the physical changes and circle the chemical changes from the following:

iron rusting, digesting food, dissolving sugar in water, burning wood, ice melting, breaking a bottle

What is the equation linking density, volume and mass? b

\_\_\_\_\_

Write the symbols and units for:

density: \_\_\_\_\_

volume: \_\_\_\_\_

mass: \_\_\_\_\_

Describe how you would find out the density of an irregular object and a liquid. c



Keywords: balance, Eureka can, measuring cylinder

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

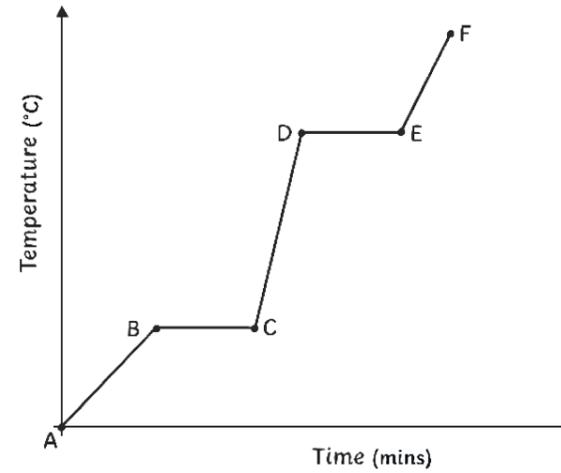
Underline the correct answer: d

The internal energy of a system is the total energy that its particles have in its:

- kinetic energy stores
- potential energy stores
- kinetic and potential energy stores

For the heating and cooling curve shown below, what are the terms used to describe the changes of state between: e

- B → C M \_\_\_\_\_
- D → E E \_\_\_\_\_
- E → D C \_\_\_\_\_
- C → B F \_\_\_\_\_

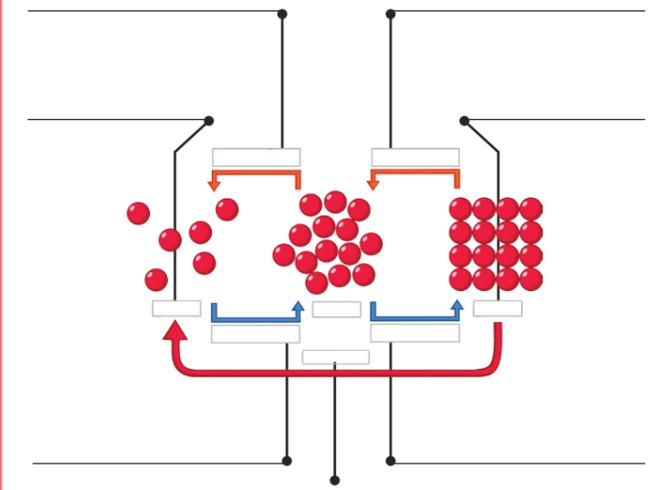


In terms of energy, what do the horizontal sections on the graph show?

\_\_\_\_\_

\_\_\_\_\_

Label the diagram, using the following keywords: melting, freezing, evaporating, condensing, sublimating, liquid, gas, solid f



Delete the wrong answers. g

The specific heat capacity of a substance is the energy required to change the temperature of 500g / 1kg of the substance by 1°C / 10°C.

When a substance changes state – for example, from a solid to a liquid – explain why the mass of the substance remains the same.

\_\_\_\_\_

\_\_\_\_\_

**Specific Heat Capacity**

Complete the sentences below about temperature and heat.

Temperature is the measure of how \_\_\_\_\_ an object is. It is measured in \_\_\_\_\_.

Heat is the measure of the \_\_\_\_\_ contained in an object. It is measured in \_\_\_\_\_.

When heat energy is transferred to an object, there is a temperature increase. The temperature rise is dependent on three things:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

State the equation that links energy, mass, specific heat capacity and temperature change.

\_\_\_\_\_

Write the units for energy: \_\_\_\_\_

mass: \_\_\_\_\_

specific heat capacity: \_\_\_\_\_

Calculate the amount of energy transferred to increase the temperature of 24g of lead from 10°C to 30°C.

The specific heat capacity of lead is 128J/kg°C

\_\_\_\_\_

\_\_\_\_\_

	Force between Particles	Energy Levels
Solid	s _____	l _____
Liquid	w _____	s _____
Gas	almost n _____	l _____

Define the differences in density between solids and liquids.

less, particles, dense, fewer, strong, closely

Solids are very \_\_\_\_\_ because the particles are so \_\_\_\_\_ packed together and there are \_\_\_\_\_ forces of attraction between them.

Liquids are \_\_\_\_\_ dense than solids because the \_\_\_\_\_ are further apart and have \_\_\_\_\_ forces of attraction.

Explain, in terms of particles, why gases are easy to compress.

A gas has a mass of 4.4g and a volume of 2.3cm<sup>3</sup>. Calculate the density of the gas.

A student heats a sealed cylinder containing a gas. What will happen to the pressure within the cylinder?



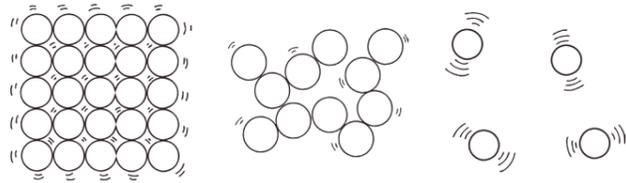
Explain the term specific latent heat of fusion.

What is an internal system?

Describe how you would find out the density of a liquid.



Draw the particle models for solids, liquids and gases. a



Complete the table below.

State	Can You Squash it?	Does It Flow?	Shape
Solid	no	no	fixed
Liquid	no	yes	Takes shape of container from bottom.
Gas	yes	yes	Takes shape of whole container.

Underline the physical changes and circle the chemical changes from the following:

iron rusting, digesting food, dissolving sugar in water, burning wood, ice melting, breaking a bottle

What is the equation linking density, volume and mass? b

density = mass ÷ volume

Write the symbols and units for:

**density:** (ρ) kilograms per metre cubed, kg/m<sup>3</sup>

**volume:** (V) metres cubed, m<sup>3</sup>

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

Describe how you would find out the density of an irregular object and a liquid. c



**Keywords:** balance, Eureka can, measuring cylinder

Measure the mass of the object.  
Place a beaker under the spout of a eureka can and fill with water until water comes out of the spout.  
Once the water has stopped dripping, remove the beaker and replace it with a measuring cylinder.  
Submerge the object in the eureka can and collect the displaced water. The volume of water collected equals the volume of the object.

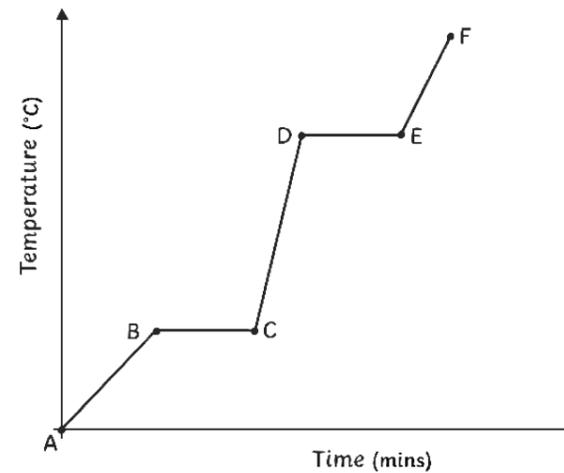
Underline the correct answer: d

The internal energy of a system is the total energy that its particles have in its:

- kinetic energy stores
- potential energy stores
- kinetic and potential energy stores

For the heating and cooling curve shown below, what are the terms used to describe the changes of state between: e

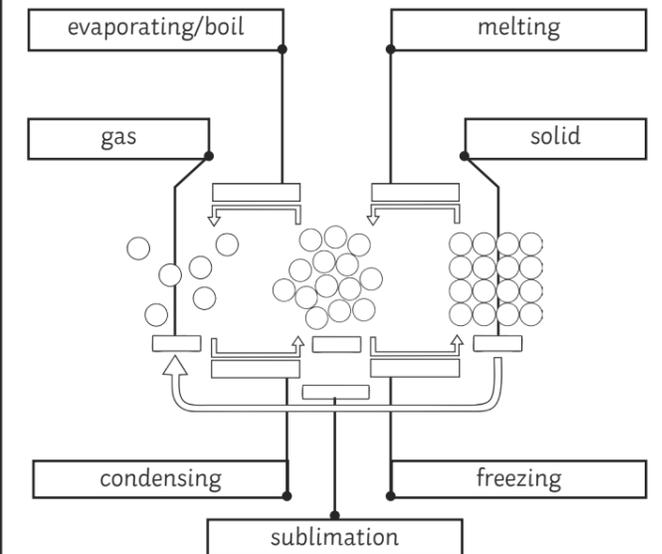
- B → C Melting
- D → E Evaporating
- E → D Condensing
- C → B Freezing



In terms of energy, what do the horizontal sections on the graph show?

Energy is transferred by heating and not used to change temperature.

Label the diagram, using the following keywords: melting, freezing, evaporating, condensing, sublimating, liquid, gas, solid f



Delete the wrong answers. g

The specific heat capacity of a substance is the energy required to change the temperature of ~~500g~~ / 1kg of the substance by 1°C / ~~10°C~~.

When a substance changes state – for example, from a solid to a liquid – explain why the mass of the substance remains the same.

The number of particles in the substance remains the same.

**Specific Heat Capacity**

Complete the sentences below about temperature and heat.

Temperature is the measure of how hot an object is. It is measured in °C.

Heat is the measure of the thermal energy contained in an object. It is measured in joules.

When heat energy is transferred to an object, there is a temperature increase. The temperature rise is dependent on three things:

1. The mass of the object;
2. The substance the object is made from;
3. The amount of energy transferred.

State the equation that links energy, mass, specific heat capacity and temperature change.

$$\text{energy} = \text{mass} \times \text{specific heat capacity} \times \text{temperature change}$$

Write the units for

energy: joules

mass: kg

specific heat capacity: J/kg°C

Calculate the amount of energy transferred to increase the temperature of 24g of lead from 10°C to 30°C.

The specific heat capacity of lead is 128J/kg°C

$$0.024 \times 128 \times 20 = 61.44\text{J}$$

	Force between Particles	Energy Levels
Solid	strong	little
Liquid	weaker	some
Gas	almost none	lots

Define the differences in density between solids and liquids.

less, particles, dense, fewer, strong, closely

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 because the particles are further apart and have fewer forces of attraction.

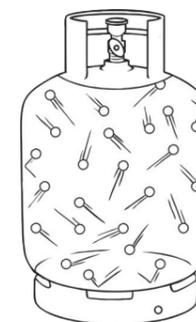
Explain, in terms of particles, why gases are easy to compress.

There are spaces between the particles.

A gas has a mass of 4.4g and a volume of 2.3cm<sup>3</sup>. Calculate the density of the gas.

$$\begin{aligned} \text{density} &= \text{mass} \div \text{volume} \\ &= 4.4 \div 2.3 \\ &= 1.9\text{g/cm}^3 \end{aligned}$$

A student heats a sealed cylinder containing a gas. What will happen to the pressure within the cylinder?



If the gas is heated up, the pressure will increase. This is because the particles will move around more quickly and hit the walls of the cylinder harder and more frequently.

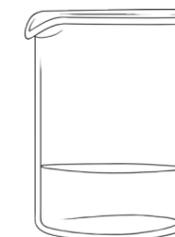
Explain the term specific latent heat of fusion.

The amount of energy required to change 1kg of a solid into 1kg of liquid without a change in temperature.

What is an internal system?

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

Describe how you would find out the density of a liquid.



Measure the mass of an empty beaker.

Using a measuring cylinder, measure 100cm<sup>3</sup> of liquid.

Pour the liquid into the beaker and record its mass.

$$\text{mass of liquid} = \text{mass of beaker} - \text{mass of empty beaker} + \text{mass of liquid}$$

$$\text{density of liquid} = \text{mass of liquid} \div \text{volume of liquid}$$

