

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

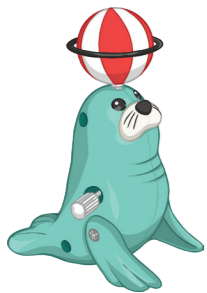
Complete the table below.

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

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

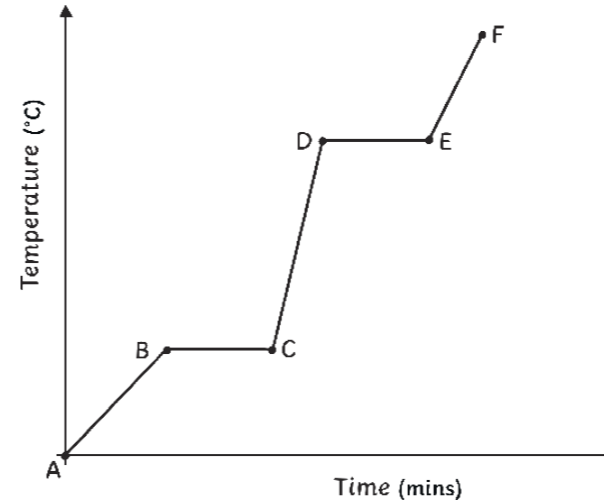


A regular object has a volume of 25cm³ and a density of 7g/cm³. Calculate its mass.

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

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

- B → C _____
- D → E _____
- E → D _____
- C → B _____



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

Define the term 'specific latent heat'. d

What does the term 'specific latent heat of vaporisation' mean?

What is the formula that links energy, mass and specific latent heat?

Calculate the amount of energy required for a saucepan of water to boil when 20g of water changes to steam. The specific latent heat of evaporation of water is 2.26×10^6 J/kg

Delete the wrong answers. e

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.

Specific Heat Capacity f

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: _____

a 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

b Underline the correct answer. 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

c Define the differences in density between solids and liquids.

d What is an internal system?

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

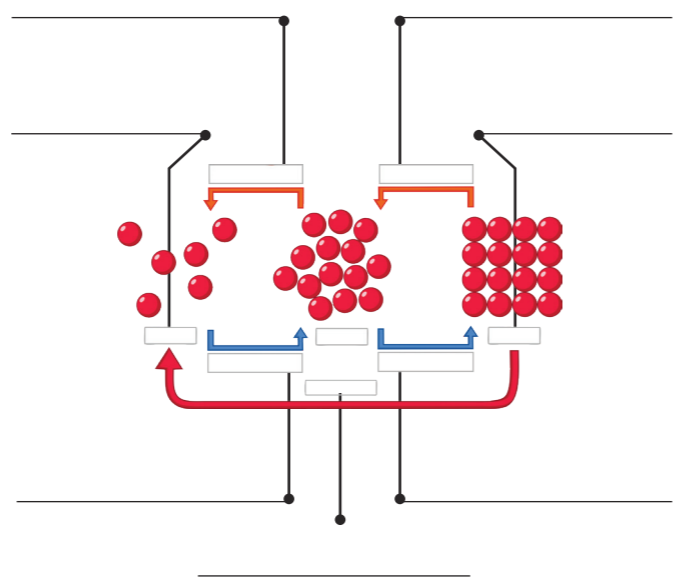
A gas has a mass of 4.4g and a volume of 2.3cm³. Calculate the density of the gas.

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

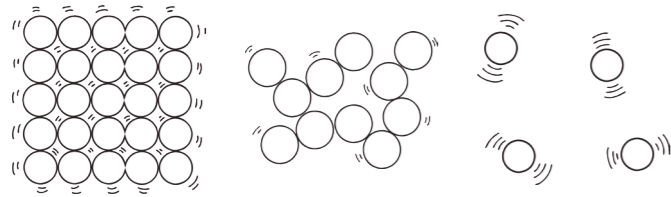


f Explain the term specific latent heat of fusion.

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



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



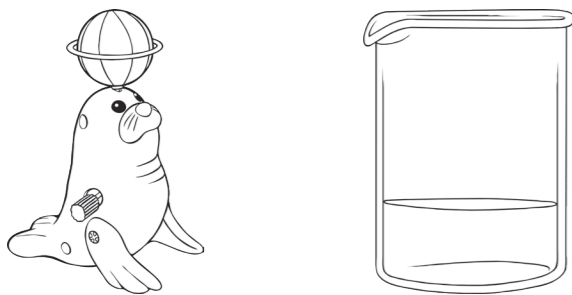
Complete the table below.

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

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



Irregular object:
 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.

Liquid:
 Measure the mass of an empty beaker.
 Using a measuring cylinder, measure 100cm³ of liquid. Pour the liquid into the beaker and record its mass.
 mass of liquid = mass of beaker + mass of liquid - mass of empty beaker

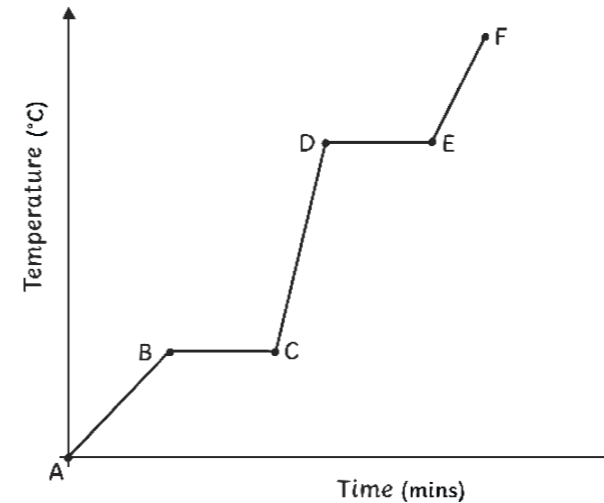
Calculate the density.
 density of liquid = mass of liquid ÷ volume of liquid
A regular object has a volume of 25cm³ and a density of 7g/cm³. Calculate its mass.

density = mass ÷ volume
 Rearrange the formula:
 mass = density × volume
 = 7 × 25 = 175g

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.

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

- 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.

Define the term 'specific latent heat'. d

The amount of energy required to change 1kg of a substance from one state to another, without a change in temperature.

What does the term 'specific latent heat of vaporisation' mean?

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

What is the formula that links energy, mass and specific latent heat?

energy = mass × specific latent heat

Calculate the amount of energy required for a saucepan of water to boil when 20g of water changes to steam.

The specific latent heat of evaporation of water is 2.26 × 10⁶ J/kg

0.02 × 2.26 × 10⁶ = 4.5 × 10⁴J

Delete the wrong answers. e

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.

Specific Heat Capacity f

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.

energy = mass × specific heat capacity × temperature change

Write the units for

energy: joules

mass: kg

specific heat capacity: J/kg°C

a
 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

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

b
 Underline the correct answer.
 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

c
 Define the differences in density between solids and liquids.

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.

d
 What is an internal system?
 An internal system is one in which the energy is stored by the particles within it.

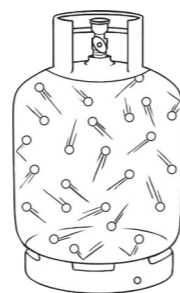
e
 Explain, in terms of particles, why gases are easy to compress.

There are spaces between the particles.

A gas has a mass of 4.4g and a volume of 2.3cm³. Calculate the density of the gas.

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

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.

f
 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.

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

